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BRAD LITTLE, GOVERNOR

CELIA GOULD, DIRECTOR

ISDA 2021 Negotiated Rulemaking

April 2021 Update

Dear Stakeholders,

As the rulemaking season approaches, we wanted to provide a roadmap as to what rulemaking will look like this year. We will have some new processes and rulemakings as a result of executive orders or legislative changes. The one constant is the importance of having your participation and involvement. We know our agency benefits from a close relationship with our programs and the needs or expectations of stakeholders.

ISDA's 2021 negotiated rulemaking will fall into two categories:

- Rules reviewed as part of the Governor's Zero-Based Regulation Executive Order, and/or
- Rules reviewed as a result of new legislation.

All notices for these negotiated rulemakings will publish in the Administrative Bulletin on April 2, 2021. The Administrative Bulletin can be found at https://adminrules.idaho.gov/bulletin/.

Zero-Based Rulemaking

Governor Little's Executive Order No. 2020-01 – Zero Based Regulation – directs agencies to facilitate an ongoing review process for existing rules, requiring agencies to put each rule on a five-year review schedule. This process aims to reduce the overall regulatory burden, or remain neutral, as compared to the original rule. Attached you will find the entire five-year review schedule for the agency. Specifically, for 2021, the following rules are scheduled for Zero Based Rulemaking. Notices will be published in the April Administrative Bulletin and meeting dates also are listed below. We strongly encourage all interested stakeholders to participate in these rulemaking meetings.

IDAPA	Name	Meeting Dates
IDAPA 02.04.05	Rules Governing Grade A Milk and Manufacture Grade Milk	Tuesday, April 20, May 18, and June 15 all from 8:30 a.m. to noon
IDAPA 02.04.13	Rules Governing Raw Milk	Tuesday, April 20, May 18, and June 15 all from 1:30 to 5 p.m.
IDAPA 02.04.19	Rules Governing Domestic Cervidae *needs to be updated per legislative action, will include ZBR*	Wednesday, April 21, May 19, and June 16 all from 8:30 a.m. to noon
IDAPA 02.06.33	Organic Food Products Rules	Wednesday, April 21, Monday, May 17, and Wednesday, June 16 all from 1:30 to 5 p.m.
IDAPA 02.04.21	Rules Governing Importation of Animals	Thursday, April 22, May 20, June 17 from 8:30 a.m. to noon
IDAPA 02.04.27	Rules Governing Deleterious Exotic Animals	Thursday, April 22,

		May 20, June 17 from 1:30 to 5 p.m.
IDAPA 02.06.06	Rules Governing the Planting of Beans	Friday, April 23, May 21, June 18 from 8:30 a.m. to noon
IDAPA 02.06.09	Rules Governing Invasive Species and Noxious Weeds	Friday, April 23, May 21, June 18 from 1:30 to 5 p.m.
IDAPA 02.04.14	Rules Governing Dairy Byproduct *needs to be updated per legislative action, will include ZBR*	Monday, April 19, Wednesday, May 19, Monday, June 14 from 1:30 to 5 p.m.

The format of each rulemaking meeting will be similar:

- Facilitated by the Rules Review Coordinator with ISDA staff on hand to answer technical questions and present draft language from previous discussions or as provided by law.
- Initial discussion drafts will be developed by agency staff simply as a starting point for the first meeting and drafts will reference those sections required by statute and those sections that may be out of date with the statute or other incorporated reference documents.
- If stakeholders have proposed changes or drafts they would like to submit for discussion during the meetings, they can email them to rulesinfo@isda.idaho.gov prior to the next meeting so they can be shared on screen.
- Meetings will be held via WebEx.
- As always, all rulemaking information will be posted on the ISDA website under “Laws and Rules.” Information for joining all upcoming meetings will be posted on the website.
- Agency staff will compile minutes, presented materials, and stakeholders’ recommended draft changes. This information also will be posted to the ISDA website.
- ISDA needs to have proposed rules and other supporting materials submitted to DFM in mid-July to ensure adequate time for review prior to publication in the September Bulletin, the subsequent comment period, and a final rule to be prepared for presentation for review by the 2022 Legislature.

If you have any questions or to RSVP for a meeting, please contact Lloyd Knight, ISDA’s Rules Review Coordinator at rulesinfo@isda.idaho.gov.

IDAPA 02 – DEPARTMENT OF AGRICULTURE

02.04.05 - RULES GOVERNING GRADE A MILK AND MANUFACTURE GRADE MILK
02.04.13 - RULES GOVERNING RAW MILK
02.04.19 - RULES GOVERNING DOMESTIC CERVIDAE
02.06.33 – ORGANIC FOOD PRODUCTS RULES
02.04.21 - RULES GOVERNING IMPORTATION OF ANIMALS
02.04.27 - RULES GOVERNING DELETERIOUS EXOTIC ANIMALS
02.06.06- RULES GOVERNING THE PLANTING OF BEANS
02.06.09- RULES GOVERNING INVASIVE SPECIES AND NOXIOUS WEEDS

DOCKET NO. 02-XXXX-XXXX *(OARC will assign)*

NOTICE OF INTENT TO PROMULGATE RULES - NEGOTIATED RULEMAKING

AUTHORITY: In compliance with Sections 67-5220(1) and 67-5220(2), Idaho Code, notice is hereby given that this agency intends to promulgate rules and desires public comment prior to initiating formal rulemaking procedures. This negotiated rulemaking action is authorized pursuant to Sections 22-1103, 22-1907, 22-2004, 22-2006, 25-203, 25-303, 25-305, 25-401, 25-601, 25-3704, 25-3903, 37-303, 37-402, 37-405, 37-516, 37-1101(5), Idaho Code.

MEETING SCHEDULE: Public meetings on the negotiated rulemaking meetings will be held as follows. Additional meetings may be scheduled and will be posted on the ISDA website.

MEETINGS SET FOR PUBLIC PARTICIPATION
VIA TELEPHONE AND WEB CONFERENCING

IDAPA 02.04.05 Rules Governing Grade A Milk and Manufacture Grade Milk **Tuesday, April 20, May 18, and June 15 from 8:30 am to noon**
IDAPA 02.04.13 Rules Governing Raw Milk **Tuesday, April 20, May 18, and June 15 from 1:30 to 5:00 pm**
IDAPA 02.04.19 Rules Governing Domestic Cervidae **Wednesday, April 21, May 19, and June 16 from 8:30 am to noon**
IDAPA 02.06.33 Organic Food Products Rules **Wednesday, April 21, Monday, May 17, and Wednesday, June 16 from 1:30 to 5:00 pm**
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IDAPA 02.06.09 Rules Governing Invasive Species and Noxious Weeds **Friday, April 23, May 21, June 18 from 1:30 to 5:00 pm**

Contact rulesinfo@isda.idaho.gov to make arrangements for participation by telephone and web conferencing.

On March 25, 2020, Governor Little issued a Proclamation declaring an emergency and taking steps to reduce and slow the coronavirus spread. In compliance with the Proclamation and Stages of Reopening, ISDA will hold this meeting via telephone and web conferencing.

METHOD OF PARTICIPATION: Those interested in participating in the negotiated rulemaking process are encouraged to attend the scheduled meeting via telephone and web conferencing. Individuals interested in participating by telephone and web conferencing should contact rulesinfo@isda.idaho.gov. For those who cannot participate by attending the meeting, information for submitting written comments is provided below.

Upon conclusion of the negotiated rulemaking, any unresolved issues, all key issues considered, and conclusions reached during the negotiated rulemaking will be addressed in a written summary and made available on the agency website.

DESCRIPTIVE SUMMARY AND STATEMENT OF PURPOSE: The following is a statement in nontechnical language of the substance and purpose of the intended negotiated rulemaking and the principal issues involved:

These rules are being presented for authorization as part of the ISDA's plan to review each rule every 5 years. There are no specific rulemaking changes planned by the ISDA at this time except for evaluation and amendment consistent with the Governor's Zero-Based Regulation Executive Order. It is anticipated that rulemaking stakeholders will propose and advocate for rulemaking changes as part of the negotiated rulemaking process. The ISDA intends to carefully consider all changes presented by the public and may propose certain changes so long as they are consistent with the rules' statutory authority and the Governor's Executive Order. The ISDA will review the documents that are currently incorporated by reference in this rule and update that list as applicable.

Incorporated by reference documents presented for review will be part of informal negotiated rulemaking and stakeholders will provide input on that process.

ASSISTANCE ON TECHNICAL QUESTIONS, OBTAINING DRAFT COPIES: For assistance on technical questions concerning this negotiated rulemaking, contact Lloyd Knight, Rules Review Officer at (208) 332-8664. Materials pertaining to the negotiated rulemaking, including any available preliminary rule drafts, can be found on the ISDA web site at the following web address: (www.agri.idaho.gov/rulemaking.)

SUBMISSION OF WRITTEN COMMENTS: Anyone may submit written comments regarding this negotiated rulemaking. All written comments must be directed to the undersigned and must be delivered on or before June 20, 2021.

DATED this 3rd day of March, 2021.

Lloyd B. Knight
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From: Hebdon,Tricia
To: Dr. Scott Leibsle; _Rulesinfo
Cc: Boudreau,Toby; Trever,Kathleen; Fredericks,Jim
Subject: {External}IDFG Comments on IDAPA 02.04.19 Domestic Cervidae Strawman 06.16.21 post-meeting
Date: Friday, June 18, 2021 2:17:05 PM

Dr. Leibsle and Mr. Knight,

Chronic Wasting Disease (CWD) poses a significant risk to wild and captive populations. The Idaho Department of Fish & Game recognizes that once present, controlling CWD is not currently possible in wild cervid populations and is highly problematic in domestic populations. Current CWD prevention strategies include regulation of the movement of live cervids and cervid carcasses, the two highest-risk activities for introduction of CWD into new areas. (https://www.fishwildlife.org/application/files/5215/3729/1805/AFWA_CWD_BMPS_12_September_2018_FINAL.pdf)

The nature of CWD prions makes the disease highly spreadable and persistent. Not only are they are extremely resistant in the environment, they are found in body tissues and shed in saliva, feces, and urine. In elk, the experimental incubation ranges from 12-34 months (Williams and Miller, 2002), and shedding can begin prior to development of clinical signs. Transmission may occur indirectly from environmental contaminants and directly from one animal to another.

The long-term (20+ years) persistence of CWD prions in the environment represents a significant obstacle to eradication of CWD from captive and free-ranging cervid populations. Long incubation periods, limited signs of early clinical disease, absence of a reliable and practical ante-mortem testing, and environmental contamination of extremely resistant infectious prions limit the ability to control or eradicate CWD, and emphasize the importance of prevention.

Concentrating animals, whether man-made or natural, can intensify the prevalence of chronic wasting disease. Domestic cervid farming concentrates animals into contained areas, making them prone to infection. Surveillance programs have demonstrated high prevalence in many infected captive elk herds, ranging as high as 59% (CWD Overview – CWD-INFO.ORG). Wild and domestic animals are at increased risk in areas, where CWD is not only on the landscape but in high prevalence. Post-CWD detection, management options for domestic cervid facilities are limited to depopulation or quarantine. Repeated attempts to eradicate CWD from cervid research facilities have failed. Whether contaminated environments can ever be completely disinfected remains questionable, thus leaving prevention as the goal.

IDFG is supportive of measures that would mitigate the risk of introduction of CWD into Idaho and subsequent detrimental effects on both wild and captive elk populations. While the measures described in the IDAPA 02.04.19 Domestic Cervidae Strawman 06.16.21 post-meeting (https://agri.idaho.gov/main/wp-content/uploads/2021/06/020419_Cervidae-strawman-proposed-final-1.pdf), do not prevent potential introduction of CWD, they do provide an ability to detect and take actions to prevent spread to wild populations and other captive facilities.

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Seeded Amplification of Chronic Wasting Disease Prions in Nasal Brushings and Recto-anal Mucosa-Associated Lymphoid Tissues from Elk by Real-Time Quaking-Induced Conversion

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Chronic wasting disease (CWD), a transmissible spongiform encephalopathy of cervids, was first documented nearly 50 years ago in Colorado and Wyoming and has since been detected across North America and the Republic of Korea. The expansion of this disease makes the development of sensitive diagnostic assays and antemortem sampling techniques crucial for the mitigation of its spread; this is especially true in cases of relocation/reintroduction or prevalence studies of large or protected herds, where depopulation may be contraindicated. This study evaluated the sensitivity of the real-time quaking-induced conversion (RT-QuIC) assay of recto-anal mucosa-associated lymphoid tissue (RAMALT) biopsy specimens and nasal brushings collected antemortem. These findings were compared to results of immunohistochemistry (IHC) analysis of ante- and postmortem samples. RAMALT samples were collected from populations of farmed and free-ranging Rocky Mountain elk (*Cervus elaphus nelsoni*; $n = 323$), and nasal brush samples were collected from a subpopulation of these animals ($n = 205$). We hypothesized that the sensitivity of RT-QuIC would be comparable to that of IHC analysis of RAMALT and would correspond to that of IHC analysis of postmortem tissues. We found RAMALT sensitivity (77.3%) to be highly correlative between RT-QuIC and IHC analysis. Sensitivity was lower when testing nasal brushings (34%), though both RAMALT and nasal brush test sensitivities were dependent on both the *PRNP* genotype and disease progression determined by the obex score. These data suggest that RT-QuIC, like IHC analysis, is a relatively sensitive assay for detection of CWD prions in RAMALT biopsy specimens and, with further investigation, has potential for large-scale and rapid automated testing of antemortem samples for CWD.

Transmissible spongiform encephalopathies are a group of progressively fatal neurodegenerative diseases caused by infectious proteins known as prions (1). The pathogenesis of prion diseases involves conversion of the endogenous cellular prion protein (PrP^C) present within specific tissues to the abnormal, protease-resistant form (PrP^{res}) following exposure to an infectious dose of PrP^{res} (1). Chronic wasting disease (CWD), a naturally occurring prion disease of white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), Rocky Mountain elk (*Cervus elaphus nelsoni*), and moose (*Alces alces*), is the only known prion disease affecting free-ranging, nondomestic animals (2, 3). CWD was first described nearly 50 years ago as a fatal, wasting, spongiform encephalopathy of cervids in Colorado and Wyoming (4). The disease has since been documented in 23 U.S. states, 2 Canadian provinces, and, via exportation of farmed cervids, the Republic of Korea (5–8). Four of the 23 states (Texas, Iowa, Pennsylvania, and Ohio) were considered CWD free prior to 2012, with primary cases in three of these states reportedly arising in farmed cervids (9–11). With the movement of cervids across state and national borders, these new epidemic foci illustrate the increased need for highly sensitive surveillance methods and appropriate antemortem tissue collection in order to potentially mitigate both natural and anthropogenic spread and more accurately estimate prevalence.

Presently, there is significant variation in the prevalence of CWD throughout North America, with levels ranging from 0 to 30% in wild populations and approaching 80% in specific captive populations (12, 13). Current prevalence rates are dependent on the use of conventional diagnostic assays, including enzyme-linked immunosorbent assay (ELISA) and immunohistochemistry (IHC) analysis—two assays similar in sensitivity and specificity that utilize a proteolytic pretreatment step to abolish PrP^C cross-reactivity (14). Despite specificities nearing 100% with these assays (14, 15), it is generally acknowledged that these pretreatments may lead to underestimation of the level of PrP^{res} in a given sample

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TABLE 1 Summary of study populations, including sex, samples collected, and postmortem CWD status as determined by obex and retropharyngeal lymph node IHC analysis[a]

Group	No. of males	No. of females	No. of RAMALT samples	No. of nasal brush samples	No. CWD positive (postmortem)	No. CWD negative (postmortem)
Canada	59	61	120	120	44	76
RMNP	0	136 (39)[b]	136 (39)	66 (3)	5	170
TRNP	0	28	28	16	0	28

[a] The number of RAMALT samples collected from females at RMNP included 136 initial and 39 follow-up biopsy specimens; nasal brush samples included 66 initial collections and 3 follow-up collections.

[b] Values in parentheses represent the number of repeat samples collected in subsequent years.

(16–19). This shortcoming has led to the development of assays that utilize amplification of PrP^{res} (e.g., serial protein misfolding cyclic amplification [18, 20]), fluorometric quantitation of seeding activity (e.g., real-time quaking-induced conversion [RT-QuIC] assay [21–23]), or other methods devoid of harsh proteolytic treatments (e.g., the conformation-dependent immunoassay [24]). While the specificities of these assays also approach 100%, studies to specifically identify sensitivity are difficult without costly bioassay studies. As a result, the true sensitivities of conventional IHC analysis and ELISA, as well as experimental detection assays, are difficult to estimate. To date, experimental detection assays have not been reported in conventional surveillance for CWD, such assays have the potential for increased sensitivity and earlier detection of CWD-positive animals (17, 18), an important component of surveillance and detection protocols.

Aside from the selection of a sensitive diagnostic assay for disease detection, definitive diagnosis also requires appropriate tissue collection (25–27). In most species, the obex, a region of the caudal brainstem containing the dorsal motor nucleus of the vagus nerve, is generally considered the most sensitive region of the central nervous system for detection of PrP^{res}, 100% given the above caveats (28–30). However, several studies utilizing IHC analysis of the medial retropharyngeal lymph nodes (RLN) have demonstrated a species-dependent improvement in sensitivity over the brainstem/obex for detection of the infectious prion protein of CWD (PrP^{CWD}) in cervids (25, 27). In white-tailed deer, RLN tissues appear to offer nearly 100% sensitivity for the detection of CWD infection (12, 26, 31), while in elk, upwards of 12% of positive animals may have PrP^{res} deposition limited to the brainstem at the time of necropsy (25). Unfortunately, the brainstem and RLN, the two tissues of choice for sensitivity, are currently available only as postmortem samples. This limitation makes these tissues problematic for understanding epidemiology through population surveillance and individual screening in areas without hunting or culling practices. For this reason, major efforts have been undertaken to identify peripheral lymphoid tissues for antemortem collection and diagnosis which may exhibit sensitivities comparable to those of the brainstem/RLN, including third-eyelid, tonsil, and recto-anal mucosa-associated lymphoid tissue (RAMALT) samples (27, 32–37). Previous studies have additionally demonstrated high levels of PrP^{res} in olfactory epithelium and nasal secretions in several prion diseases (38–48), though this prospect has not been assessed with CWD. Both RAMALT biopsy specimens and nasal brush samples collected from the olfactory epithelium are easily and efficiently collected and processed, making these tissues promising additions in the area of antemortem detection of prion diseases and the samples of choice for our study.

In the present study, we applied a standardized RT-QuIC assay to blindly examine RAMALT biopsy specimens collected from 316 Rocky Mountain elk (*Cervus elaphus nelsoni*) and nasal brush samples from a subpopulation of 205 of these elk. RT-QuIC has previously been shown to efficiently amplify and detect PrP$^{res/CWD}$ in a number of tissues and bodily fluids, including cerebrospinal fluid (CSF), urine, saliva, blood, brain tissue, lymph node tissue, and nasal lavage fluid/swabs (21, 38, 39, 47, 49–54), but to our knowledge, this is the first study to utilize RAMALT biopsy specimen tissue homogenates and nasal brush preparations for amplification and detection of PrP^{CWD} by RT-QuIC. RT-QuIC results were subsequently correlated with ante- and postmortem IHC analysis results obtained with RAMALT, RLN, and brainstem samples at the level of the obex (including obex scoring) and the *PRNP* genotype (27, 55). We hypothesized that the sensitivity of RT-QuIC in antemortem samples would correlate with postmortem IHC analysis of these animals, with our findings demonstrating a relatively rapid and sensitive detection of PrP^{CWD} in both RAMALT and nasal epithelial brush samples collected.

MATERIALS AND METHODS

Study populations. The first group of animals consisted of a population of farmed elk with a recent history of CWD that was identified in Saskatchewan ($n = 120$), in an area with a history of endemic CWD. This population included 40 calves, 38 adult bulls, and 42 adult cows. The second group of animals consisted of a population of elk from a study area described previously (27) and consisted of adult female free-ranging elk in Rocky Mountain National Park (RMNP) that were initially captured and sampled ($n = 136$) or recaptured in later study years for supplemental sample collection ($n = 39$) and released with radio collars during the winters of 2012 to 2014. Two additional females from RMNP showing clinical signs suggestive of CWD were sampled perimortem. A third and separate free-ranging study population in an area of North Dakota (Theodore Roosevelt National Park [TRNP]) where CWD is not known to occur provided for negative control RAMALT biopsy specimens ($n = 28$) and nasal brushings ($n = 16$) collected perimortem (Table 1). All samples from each group were collected with single-use instruments and included RAMALT ($n = 323$) and nasal brush samples ($n = 205$), in accordance with IACUC protocols and state/federal permits (IACUC protocols KSU3503 and IMR_ROMO_Monello_Elk_11/21/2011, National Park Service permits ROMO-2012-SCI-0064 and THRO-2012-SCI-0008, and Colorado Parks and Wildlife permit 13TR2088). Blood collected by cephalic or jugular venipuncture was used to determine the elk *PRNP* genotype (specifically, PRNP position 132 methionine [M] or leucine [L]) as described by O'Rourke et al. (56, 57). Elk were ultimately assessed for CWD via IHC analysis of RAMALT tissue (antemortem) or RLN and brainstem samples at the level of the obex (postmortem). Free-ranging animals determined to be CWD positive were monitored until death or humane euthanasia when exhibiting end-stage clinical signs of CWD. Brainstem and RLN samples were collected from these animals for confirmatory IHC analysis. Farmed animals were humanely euthanized immediately following sample collection.

Tissue collection and processing. Elk in both Canada and RMNP were immobilized with a combination of carfentanil and xylazine as previously described (27). Samples from TRNP elk were collected perimortem in the course of a herd management initiative. RAMALT biopsy specimens were collected by removing a 1.5-by-0.75-cm strip of mucosal tissue from the wall of the rectum approximately 1.0 cm anterior to the mucocutaneous junction of the anus and perpendicular to the cranial/caudal axis of the rectum (27). The sample was divided into two pieces, an approximately 0.5-by-0.5-cm section was frozen and maintained at −80°C, and the remainder was placed in 10% neutral buffered formalin prior to IHC analysis. Frozen RAMALT biopsy specimens were later prepared as an ∼2% homogenate in RT-QuIC dilution buffer (phosphate-buffered saline [PBS] with 0.05% SDS) with a TissueLyser II (Qiagen) with a single 5-mm stainless steel bead and 2-ml conical snap cap tubes with two 2-min cycles of homogenization at a power setting of 20. Homogenates were then maintained at −80°C until analysis by RT-QuIC.

Nasal brush samples were cleanly collected from the right nasal cavity contemporaneously with RAMALT biopsy specimens as follows. A sterile uterine single-sheathed cytology brush (Jorgenson Laboratories no. J0273C) was gently inserted into the right nasal vestibule, directed dorsocaudally through the dorsal nasal meatus, and fed in approximately 6 to 7 in. until located directly rostral to the ethmoid turbinate (Fig. 1A and B). At that time, the sampling brush was fed into the sheath and advanced until obstructed by the ethmoid turbinates. The brush was spun gently to collect turbinate epithelial tissue and retracted into the sheath, and the entire unit was removed from the nasal cavity. The brush tip was then placed in PBS and refrigerated at 4°C between collection and processing. The sample was processed by vortexing vigorously in PBS to remove and suspend cellular matter present on the brush. The cellular suspension was then centrifuged at 3,000 × *g* for 10 min at 4°C. The supernatant from the cellular suspensions was poured off, and the cellular pellet was resuspended in 0.5 ml of PBS and homogenized as described above. Homogenates were then maintained at −80°C until analysis by RT-QuIC.

RAMALT biopsy specimen, RLN tissue, and brainstem/obex tissue IHC analysis. Reference tissues were assayed for PrP^{CWD} by IHC analysis as previously described (37, 58). Briefly, tissue was preserved in 10% neutral buffered formalin and then embedded in paraffin blocks. Cross sections 5 μm thick were mounted on glass slides and deparaffinized before treatment with 99% formic acid for chemical denaturation of PrP^{C}. IHC staining for PrP^{CWD} was performed with the primary antibody Anti-prion 99 (Ventana Medical Systems, Tucson, AZ) and then counterstained with hematoxylin. Biopsy specimens were considered positive if at least one follicle exhibited PrP^{CWD}-specific staining (58). The numbers of staining and nonstaining follicles in each RAMALT biopsy specimen were documented. Samples not demonstrating IHC staining were considered CWD "not detected." The same protocol was used for postmortem brainstem/obex and RLN analysis, with obex sections scored on a PrP^{CWD} deposition scale of 0 (no PrP^{CWD} staining) to 4 (heavy accumulation of PrP^{CWD}) as previously described (59).

RT-QuIC preparation and procedure. RT-QuIC assays were performed with a truncated form of recombinant Syrian hamster PrP (SHrPrP; residues 90 to 231) in pET41b and expressed and purified as previously described (47). In brief, 1-liter cultures of lysogeny broth (LB) containing autoinduction supplements (EMD Biosciences) were inoculated with SHrPrP-expressing Rosetta strain *Escherichia coli*, which was grown overnight and harvested when an optical density at 600 nm of ∼3 was reached. Cells were lysed with BugBuster reagent with supplemented Lysonase (EMD Biosciences), and inclusion bodies (IB) were harvested by centrifugation of the lysate at 15,000 × *g*. IB pellets were washed twice and solubilized overnight in 8 M guanidine hydrochloride (GuHCl) in 100 mM $NaPO_4$ and 10 mM Tris (pH 8.0), clarified by centrifugation at 15,000 × *g* for 15 min, and added to Superflow nickel-nitrilotriacetic acid (Ni-NTA) resin (Qiagen) preequilibrated with denaturing buffer (6.0 M

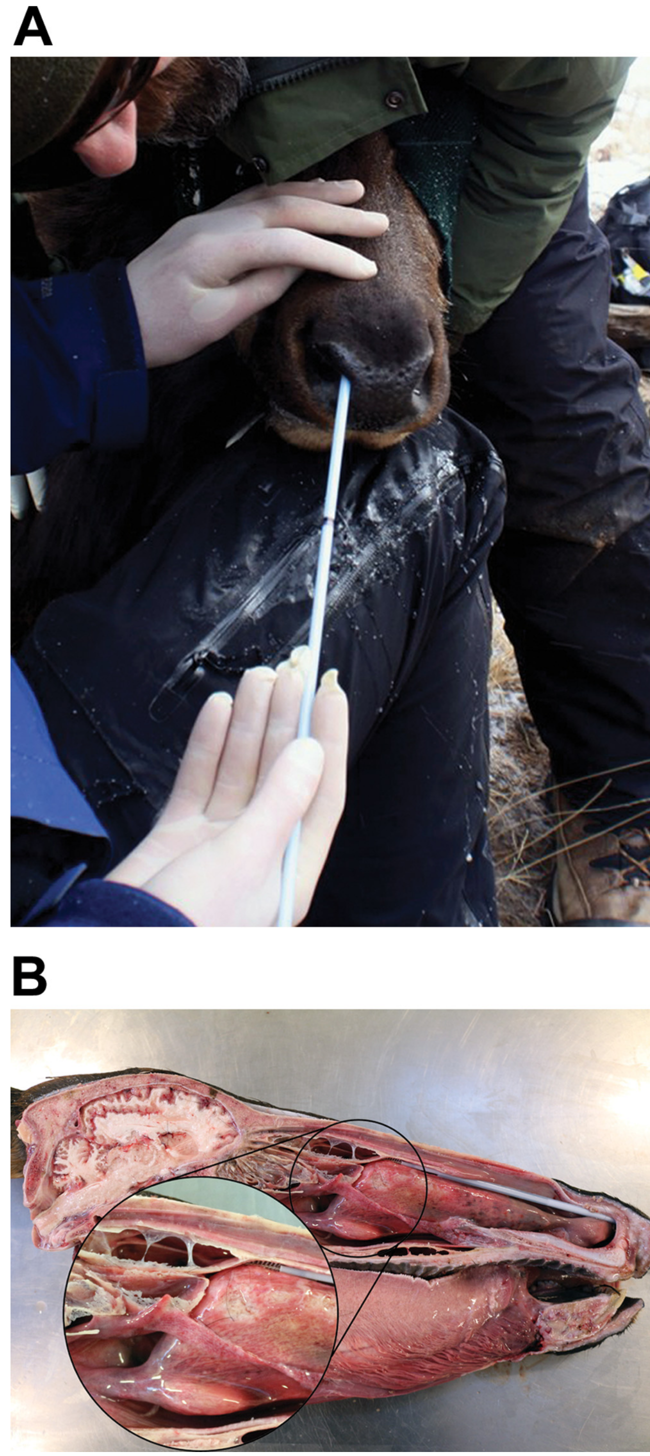

FIG 1 *In vivo* (A) and *ex vivo* (B) demonstrations of nasal brush collection on Rocky Mountain elk.

GuHCl, 100 mM $NaPO_4$, 10 mM Tris, pH 8.0). Denatured SHrPrP and Ni-NTA resin were incubated by rotation at room temperature for 1 h and then added to an XK fast protein liquid chromatography column (GE Healthcare). Refolding was achieved on column with a linear refolding gradient of denaturing buffer (6 M GuHCl, 100 mM $NaPO_4$, 10 mM Tris, pH 8.0) to refolding buffer (100 mM $NaPO_4$, 10 mM Tris, pH 8.0) over 3 h at 1.5 ml/min. SHrPrP was eluted with a linear gradient of refold buffer to elution buffer (100 mM NaPO4, 10 mM Tris [pH 8.0], 500 mM imidazole [pH 5.8]) over 40 min at 2.0 ml/min. Peak UV 280-nm fractions were pooled and dialyzed overnight against two changes of 4.0 liters of dialysis buffer (20 mM $NaPO_4$, pH 5.8). Recovered SHrPrP was adjusted to a final concentration of ~0.5 mg/ml and stored at 4°C for up to 45 days. Purity was evaluated through analyses of fast protein liquid chromatography spectroscopy and Western blotting profiles but most importantly through functionality in the RT-QuIC assay. Seeded amplification with a positive control consisting of pooled CWD-positive brain tissue from six experimentally infected white-tailed deer (cervid brain pool 6 [CBP6]) was evaluated in each experimental run to confirm the consistency and repeatability of the amplification rate, reproducibly amplifying in triplicate between cycles 20 and 24 (data not shown).

Nasal brush preparations were diluted 1:10 in RT-QuIC dilution buffer, while RAMALT homogenates were diluted 1:100 in RT-QuIC dilution buffer. Five microliters of this 10^{-1} or 10^{-2} dilution was added to 95 μl of RT-QuIC reaction buffer consisting of 50 mM $NaPO_4$, 350 mM NaCl, 1.0 mM EDTA tetrasodium salt, 10 μM thioflavin T (ThT), and 0.1 mg/ml truncated SHrPrP^C to yield a final volume of 100 μl. Each sample was tested in triplicate on a single plate in two separate experiments. Nasal brushings were repeated at two different institutions (Kansas State University [KSU], Rocky Mountain Laboratories [RML]). Positive controls consisting of 5 μl of a 10^{-3} dilution of CBP6 spiked into 95 μl of RT-QuIC reaction buffer were included in triplicate in each experiment. Negative controls, also prepared in triplicate, consisted of RAMALT biopsy specimens or nasal brush samples collected from elk known to be negative (confirmed by IHC analysis of brainstem or RLN tissue) from an area where CWD has not been reported (TRNP), as well as untreated RT-QuIC reaction buffer spiked with 5 μl of RT-QuIC dilution buffer. Reactions were prepared in a black 96-well optical-bottom plate that was then sealed and incubated in a BMG Labtech Polarstar fluorimeter at 42°C for 24 h (96 15-min cycles) with intermittent shaking cycles; specifically, 1-min shaking periods (700 rpm, double orbital pattern) alternating with 1-min rest periods. ThT fluorescence measurements (450-nm excitation and 480-nm emission wavelengths) were taken every 15 min with the gain set at 1,200. The relative fluorescence (in relative fluorescence units) of each triplicate sample was progressively monitored against time with orbital averaging and 20 flashes/well at the 4-mm setting.

A replicate well was considered positive when the relative fluorescence crossed a predefined positive threshold, calculated as 10 standard deviations above the mean fluorescence of all of the sample wells from cycles 2 to 8. Positive samples were considered those crossing the threshold in ≥2/6 replicates for both RAMALT and nasal brush analyses.

Correlation of RT-QuIC results with PrP^{CWD} IHC analysis, obex scoring, and the *PRNP* genotype. Considering only our findings from farmed elk, we sought to examine if RT-QuIC results from RAMALT and collected nasal brush samples could be associated with a number of predictor variables, including RAMALT, RLN, and brainstem/obex IHC analysis results; the obex score; and the *PRNP* genotype. We used Spearman correlations to assess the relationship and direction of relationship between RT-QuIC results obtained with RAMALT and nasal brush samples to conventional postmortem methods of detecting CWD infection and to compare results of assays performed at different institutions.

RESULTS

CWD-positive population data and IHC analyses. In the herd of 120 farmed elk, 25 (41%) of the 61 elk cows examined were positive by RLN or brainstem/obex IHC analysis or both, while 19 (32.2%) of 59 bulls were considered positive. Forty (43.5%) of 92 animals that had a PrP 132MM genotype were CWD positive in the obex or RLN by IHC analysis, and 33/40 (82.5%) were RAMALT positive by IHC analysis. Four (14.2%) of 28 132ML elk were CWD positive by postmortem obex/RLN analysis, and just 1/4 was identified by positive follicular staining of RAMALT in IHC analysis. Elk identified as positive postmortem had obex scores ranging from 0 to 4 (Tables 1 and 2).

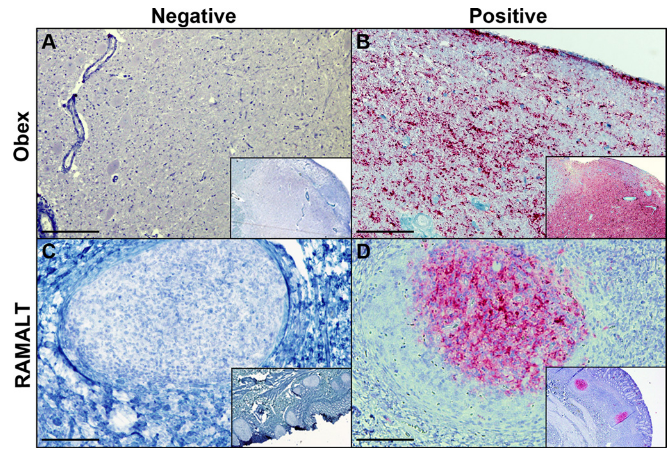

FIG 2 IHC detection of PrP^{CWD} in brainstem (obex) and RAMALT samples by previously described protocols. Panels: A, CWD-negative obex section of an elk from RMNP; B, obex section of an elk from RMNP showing heavy accumulation of material staining positive for PrP^{CWD}; C, RAMALT biopsy specimen from an elk from RMNP showing negative staining for PrP^{CWD}; D, CWD-positive RAMALT biopsy specimen from an elk from RMNP showing heavy accumulation of material staining positive for PrP^{CWD}. IHC analysis was performed with anti-prion 99 antibody (Ventana Medical Systems, Tucson, AZ). Bars = 250 μm.

Of the animals sampled at RMNP, five were identified as CWD positive by RAMALT IHC analysis and eventually confirmed through postmortem IHC analysis of the brainstem and RLN. All brainstem/obex samples of CWD-positive free-ranging cow elk were considered highly positive, indicating disseminated infection and central nervous system accumulation of PrP^{CWD} at the time of euthanasia or death (Fig. 2A and B). Four of these CWD-positive animals were homozygous for methionine at *PRNP* codon 132 (132MM), while a fifth was heterozygous at this position (132ML).

RT-QuIC analysis of RAMALT biopsy specimens. Biopsy specimens from 34/120 farmed elk were positive by RT-QuIC in 3/3 replicates in two separate experiments. Of these RT-QuIC-positive biopsy specimens, 33 were also positive by IHC analysis, though there was an additional specimen positive by IHC analysis that was RT-QuIC negative; RAMALT RT-QuIC correlated 96% with RAMALT IHC analysis (Tables 2 and 3) in this group.

Initial biopsy specimens from 5/136 elk from RMNP (each positive by IHC analysis) showed evidence of prion amplification in 3/3 replicates in two separate experiments (Table 2). None of the 39 animals sampled on recapture or of the 28 sampled from TRNP were considered positive by RT-QuIC or IHC analysis.

RT-QuIC analysis of nasal brush samples. Nasal brush samples collected from 120 farmed elk in Canada, 69 elk in RMNP, and 16 in TRNP were analyzed by a modified RT-QuIC assay as described above. Brush samples collected from farmed elk were positive in 15/120 (12.5%, KSU) or 14/120 (11.7%, RML) cases. Spearman correlation of the results from the two institutions was significant, with a coefficient of 0.883 ($P < 0.001$). Initial brush samples collected from 2/66 elk from RMNP—animals whose RAMALT samples were positive by IHC analysis and whose brainstems were positive by RT-QuIC and IHC analysis—produced amplification in 3/3 replicates, in two separate experiments. In

TABLE 2 Summary of testing data for farmed and free-ranging elk[a]

	No. negative		No. positive		No. with IHC analysis of:					No. with obex score of:					No. tested byRT-QuIC		
																NB	
Group	M	F	M	F	RAMALT	RLN	Obex	RLN^+ $Obex^-$	RLN^- $Obex^+$	0	1	2	3	4	RAMALT	KSU	RML
Canada																	
132MM	26	26	18	22	33	37	35	5	3	5	3	2	10	20	33	15	14
132ML	14	10	1	3	1	4	1	3	0	3	1	0	0	0	1	0	0
RMNP																	
132MM	NA[c]		NA	4	4	4	4	0	0	NA					4	2[b]	2[b]
132ML	NA		NA	1	1	1	1	0	0	NA					1	0	0

[a] Ante- and postmortem RT-QuIC and IHC test results were highly correlative. Testing of RAMALT and nasal brushing (NB) samples also correlated highly with both the obex score and the *PRNP* genotype at position 132. All animals positive by RAMALT testing were also positive by RLN IHC analysis, while some obex-positive animals were RLN negative and vice versa. Neg, chronic wasting disease negative; Pos, chronic wasting disease positive; M, male; F, female.

[b] These positive samples were from a subpopulation of the overall sample population of free-ranging elk, and represented the only two positive elk for which nasal brushings were acquired.

[c] NA, not available.

this subgroup of the larger group of RMNP elk, no other CWD-positive animals were identified through analyses of ante- or postmortem tissues (i.e., these two positive nasal brushings represented the only CWD-positive animals in this subgroup). Likewise, no positive elk that represented RMNP recaptures (0/3) or those sampled from TRNP (0/16) were identified (Fig. 3; Table 2).

Correlation of RT-QuIC results with RAMALT, RLN, and obex IHC analysis results; obex scores; and *PRNP* genotypes. There was a positive correlation (96%) between RAMALT RT-QuIC and IHC analysis results for farmed elk in Canada, an RT-QuIC result obtained with RAMALT from a single animal that failed to detect PrP^{CWD} that was identified by RAMALT IHC analysis and vice versa. RT-QuIC results obtained with RAMALT were negatively correlated with an obex score of 0 (−92%) but positively correlated with obex scores of 3 (48%) and 4 (71%). RT-QuIC results obtained with RAMALT were positively correlated with the 132MM genotype (30%) but negatively correlated with the 132ML genotype (−30%). RT-QuIC results obtained with nasal brush samples were not as reliable in detecting PrP^{CWD} as RT-QuIC results obtained with RAMALT in comparison with RLN and brainstem/obex IHC analyses at 52 and 58%, respectively. However, RT-QuIC results obtained with nasal brush samples were negatively correlated (−58%) with an obex score of 0 but positively correlated (64%) with an obex score of 4 (Fig. 4 and 5 Table 3).

DISCUSSION

The geographic distribution and/or detection of CWD has been progressively expanding in captive and free-ranging populations since its initial documentation in Colorado and Wyoming nearly 50 years ago (4, 60). Increased surveillance efforts during the past several years have led to the detection of new cases in U.S. states previously thought to be outside the area where CWD is endemic (e.g., Texas, Iowa, and Pennsylvania in 2012 and Ohio in 2014) (9–11). As this devastatingly fatal disease spreads across the United States and beyond, the importance of highly sensitive antemortem detection becomes increasingly evident. This study sought to evaluate the use of RT-QuIC as a fast, efficient, and highly sensitive PrP^{CWD} detection assay, with the incorporation of RAMALT and nasal brush samples as useful antemortem target samples.

The results of this study support the hypothesis that RAMALT RT-QuIC exhibits a sensitivity comparable to that of RAMALT IHC analysis for the antemortem detection of CWD infection in elk. Of the 49 animals identified postmortem as CWD positive in the present study, RT-QuIC found seeded amplification in 39 RAMALT biopsy specimens collected antemortem—revealing a sensitivity of 79.6% compared to postmortem testing. No animal considered negative through postmortem testing was positive by antemortem RT-QuIC, indicating a high specificity for CWD infection. With further development, it seems possible that RT-QuIC could have the potential for continued improvement in sensitivity over conventional methods, and while it is seemingly approaching the limits of sensitivity with RAMALT samples, it may prove useful for the identification of CWD prions in other antemortem samples. This is highlighted by the significant progress made in the field of RT-QuIC analysis within the last several years, demonstrating its utility for the identification of prion seeding activity in a multitude of tissues, including CSF, urine, saliva, blood, brain, lymph node tissue, and nasal lavage fluid/swabs (21, 38, 39, 47, 49–54). Additionally, intraassay variability has proven to be low (23, 61), and with the ability to run a large number of samples simultaneously, generating rapid (<24 h), quantitative results, RT-QuIC is a fast, easy, and user-friendly assay with potential for widespread application in CWD research and monitoring.

While confirming its limitations, this study offers additional support for the use of RAMALT as diagnostic tissue. There have been a number of previous studies of elk demonstrating the sensitivity of RAMALT compared to postmortem evaluation (27, 37, 58), making this a potentially useful antemortem sample for understanding the epizootiology of the disease and for management of captive herds in areas where CWD is endemic. While lymphoid follicle counts in RAMALT biopsy specimens have been shown to decline with age (62) and the sensitivity of RAMALT is decreased in cases of early infection (25, 27, 58) and in animals with specific *PRNP* alleles, these limitations should not preclude the continued evaluation of RAMALT as an antemortem testing tissue. Ultimately, shortcomings in sen-

TABLE 3 Spearman correlation between CWD-positive animals and clinical variables[a]

Correlation	Obex	RLN	RAMALT		NB RT-QuIC		132MM	132ML	Obex score of:				
			IHC analysis	RT-QuIC	KSU	RML			0	1	2	3	4
Positive[b]	0.86 (<0.001)[c]	0.95 (<0.001)	0.83 (<0.001)	0.83 (<0.001)	0.50 (<0.001)	0.48 (<0.001)	0.26 (0.19)	−0.26 (0.19)	−0.86 (<0.001)	0.24 (0.25)	0.17 (1.00)	0.40 (<0.001)	0.59 (<0.001)
RAMALT IHC analysis	0.92 (<0.001)	0.87 (<0.001)	1.0 (<0.001)	0.96 (<0.001)	0.60 (<0.001)	0.58 (<0.001)	0.30 (0.04)	−0.30 (0.04)	−0.92 (<0.001)	−0.01 (1.0)	0.21 (0.69)	0.48 (<0.001)	0.71 (<0.001)
132MM	0.32 (<0.001)	0.23 (0.01)	0.30 (<0.001)	0.30 (<0.001)	0.21 (0.02)	0.20 (0.03)	1.0 (<0.001)	−1.0 (<0.001)	−0.32 (0.02)	−0.01 (1.0)	0.07 (1.0)	0.17 (1.0)	0.25 (0.24)
132ML	−0.32 (<0.001)	−0.23 (0.01)	−0.30 (<0.001)	−0.30 (<0.001)	−0.21 (0.02)	−0.20 (0.03)	−1.0 (<0.001)	1.0 (<0.001)	0.32 (0.02)	0.01 (1.0)	−0.07 (1.0)	−0.17 (1.0)	−0.25 (0.24)

[a] Including postmortem IHC results, antemortem IHC and RT-QuIC analyses of RAMALT and nasal brushings (NB), the *PRNP* 132 genotype, and the stage of clinical disease as assessed by obex score.
[b] Correlation applies to tissue correlated with either an obex or an RLN sample that was positive for CWD by IHC analysis.
[c] Shown are correlations (*P* values).

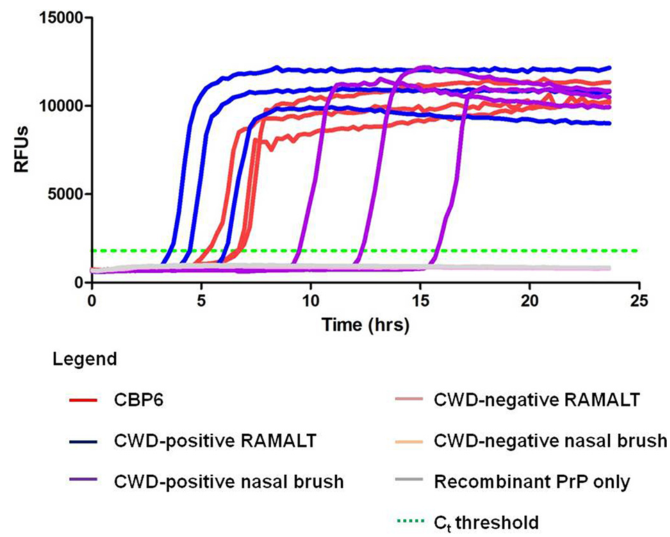

FIG 3 Prion-seeded RT-QuIC amplification of RAMALT and nasal brush samples. CBP6 acted as the positive control. The data are from elk 819 from RMNP, which was ante- and postmortem IHC analysis positive for CWD. Recombinant PrP, SHrPrP. C_t threshold, threshold cycle calculated as 10 standard deviations above the mean fluorescence of all of the samples through cycles 2 to 8.

sitivity may be overcome through continued development of the RT-QuIC or similar assays—specifically, as progress is made on amplification substrates that may enhance diagnostic sensitivity. However, it should be acknowledged that current and past studies indicate that detectable prions may not accumulate in currently employed peripheral tissues from some proportion of animals or until very late in the course of clinical disease, and as a result, either IHC analysis or RT-QuIC may perpetually fall short of a perfect sensitivity critical for use in a screening assay prior to animal movement.

In the present study, the sensitivity of nasal brush sample analysis was quite low compared to that of other antemortem and postmortem sample analyses and to the apparently high sensitivity reported with human Creutzfeldt-Jakob disease (CJD) cases (48), which indicates that it is unsuitable for use in CWD surveillance. Although the anatomic target of nasal brush sampling—the rostral ethmoid turbinates—is a reported site of olfactory epithelium in ruminants (63, 64), it is possible that our sampling technique failed to appropriately collect from this area without rhinoscopic assistance. Alternatively, there may be a delay in the appearance of amplifiable PrP^{res} in olfactory epithelium, as has been suggested for RAMALT. Ongoing studies may help further assess the quality of the olfactory epithelium of cervids and define the kinetics of prion accumulation in nasal tissues. Despite the low sensitivity, the correlation to the obex score (and thus the clinical stage of disease) (31) should not be overlooked. We found the highest sensitivity, 60%, in advanced cases of CWD in elk, with a steady decline toward earlier, preclinical stages of disease. This likely translates to the potential utility of nasal brush samples collected for the diagnosis of CJD—in that preclinical screening of individuals with a genetic predisposition for, or a history of iatrogenic exposure to, prion diseases may not be as fruitful as examination of individuals showing overt clinical symptoms.

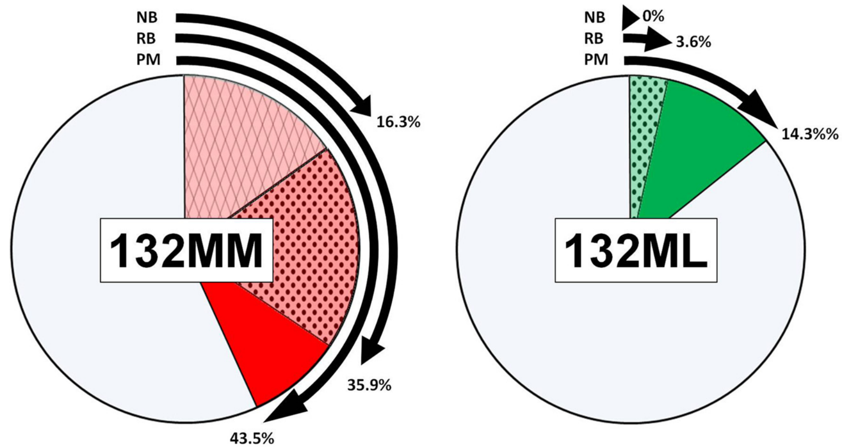

FIG 4 Prevalence of CWD in farmed elk *PRNP* 132 alleles based on RT-QuIC amplification of nasal brush (NB) samples, RAMALT biopsy (RB) specimens, or postmortem (PM) IHC analysis. CWD was more prevalent in 132MM elk; higher sensitivities in RAMALT biopsy specimens and nasal brush analyses were also observed in this genotype.

Recently, additional large- and small-scale depopulation efforts have been undertaken to reduce the impact of CWD in captive and free-ranging cervid herds. In some cases, where the incidence of CWD is likely to have been low, these efforts have proven successful (65, 66). In many cases, however, depopulation efforts were unable to control the spread of CWD in susceptible populations (67, 68). With the demonstrated link between *PRNP* alleles, susceptibility, and antemortem test

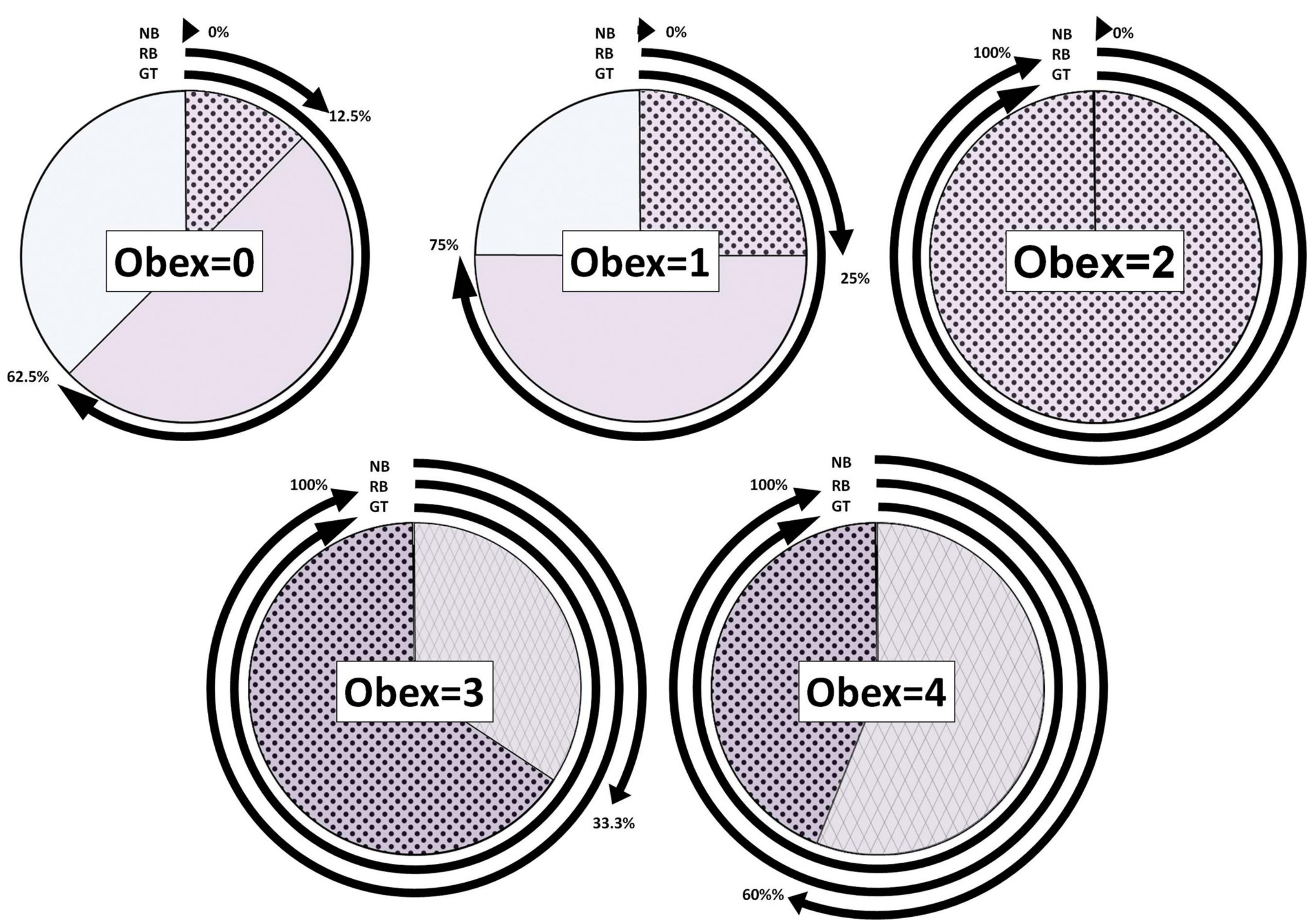

FIG 5 Associations of obex scores with antemortem testing and the genetic background of farmed elk. As obex scores increased, a greater proportion of positive 132MM animals was observed, along with a higher sensitivity observed through both nasal brush and RAMALT biopsy specimen analyses. NB, nasal brush analysis by RT-QuIC; RB, RAMALT biopsy specimen analysis by RT-QuIC; GT, 132MM allele proportion among animals identified as CWD positive.

sensitivity, a combination of antemortem testing, genetic screening, and selective breeding in farmed herds may help reduce the dependence on depopulation regimes. Future antemortem test developments would prove critical in cases of cervid trade, relocation, or reintroduction, in which case euthanasia and postmortem testing are not an option. The unintentional transfer of CWD between Canada and the Republic of Korea, for example, might have been prevented if a perfectly sensitive antemortem test had been available (7). CWD control in free-ranging cervid herds presents a more complex problem because of animal inaccessibility and seasonal migration. The incorporation of antemortem testing strategies could be beneficial, however, when prevalence rates are high or depopulation efforts are contraindicated, as with protected herds. Despite the lower sensitivity of antemortem samples compared to postmortem tissue collection, antemortem tests remain an important tool for monitoring prevalence, mitigating spread of the disease, and developing an expanded understanding of CWD resistance.

In summary, we report the antemortem detection of prion seeding activity by RT-QuIC in RAMALT and nasal brush samples collected from CWD-positive elk. Seeded amplification results from antemortem samples were comparable to those arrived at by IHC analysis with common samples, though both were less sensitive than postmortem testing. As has been reported previously, the stage of clinical disease and the *PRNP* genotype can have a strong influence on antemortem test sensitivity—a finding that could directly translate to efforts to identify preclinical patients at risk of CJD. Although significantly less sensitive than RAMALT biopsy specimen testing, nasal brushing offers the benefits of ease of sample collection, reduced trauma, and simplicity in its use of disposable equipment and sample processing. The employment of antemortem sample collection and testing would be beneficial in better understanding of CWD in cervids across North America, especially as diagnostic techniques—including the RT-QuIC assay—improve.

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REFERENCES

1. **Johnson RT.** 2005. Prion diseases. Lancet Neurol **4:**635–642. http://dx.doi.org/10.1016/S1474-4422(05)70192-7.
2. **Miller MW, Williams ES, McCarty CW, Spraker TR, Kreeger TJ, Larsen CT, Thorne ET.** 2000. Epizootiology of chronic wasting disease in free-ranging cervids in Colorado and Wyoming. J Wildl Dis **36:**676–690. http://dx.doi.org/10.7589/0090-3558-36.4.676.
3. **Spraker TR, Miller MW, Williams ES, Getzy DM, Adrian WJ, Schoonveld GG, Spowart RA, O'Rourke KI, Miller JM, Merz PA.** 1997. Spongiform encephalopathy in free-ranging mule deer (Odocoileus hemionus), white-tailed deer (Odocoileus virginianus) and Rocky Mountain elk (Cervus elaphus nelsoni) in northcentral Colorado. J Wildl Dis **33:**1–6. http://dx.doi.org/10.7589/0090-3558-33.1.1.
4. **Williams ES, Young S.** 1980. Chronic wasting disease of captive mule deer: a spongiform encephalopathy. J Wildl Dis **16:**89–98. http://dx.doi.org/10.7589/0090-3558-16.1.89.
5. **Sigurdson CJ.** 2008. A prion disease of cervids: chronic wasting disease. Vet Res **39:**41. http://dx.doi.org/10.1051/vetres:2008018.
6. **Argue CK, Ribble C, Lees VW, McLane J, Balachandran A.** 2007. Epidemiology of an outbreak of chronic wasting disease on elk farms in Saskatchewan. Can Vet J **48:**1241–1248.
7. **Kim TY, Shon HJ, Joo YS, Mun UK, Kang KS, Lee YS.** 2005. Additional cases of chronic wasting disease in imported deer in Korea. J Vet Med Sci **67:**753–759. http://dx.doi.org/10.1292/jvms.67.753.
8. **Walsh DP, Miller MW.** 2010. A weighted surveillance approach for detecting chronic wasting disease foci. J Wildl Dis **46:**118–135. http://dx.doi.org/10.7589/0090-3558-46.1.118.
9. **Thorne L, Holder T, Ramsay A, Edwards J, Taema MM, Windl O, Maddison BC, Gough KC, Terry LA.** 2012. In vitro amplification of ovine prions from scrapie-infected sheep from Great Britain reveals distinct patterns of propagation. BMC Vet Res **8:**223. http://dx.doi.org/10.1186/1746-6148-8-223.
10. **Smith D.** 20 July 2012. CWD found for 1st time in Iowa. Star Tribune Media Co., Minneapolis, MN.
11. **Romeo T.** 10 October 2012. Pennsylvania officials have announced what they say is the state's 1st confirmed case of a deer found to be suffering from a disorder similar to "mad cow" disease. CBS Local Media, Philadelphia, PA.
12. **Keane DP, Barr DJ, Bochsler PN, Hall SM, Gidlewski T, O'Rourke KI, Spraker TR, Samuel MD.** 2008. Chronic wasting disease in a Wisconsin white-tailed deer farm. J Vet Diagn Invest **20:**698–703. http://dx.doi.org/10.1177/104063870802000534.
13. **Miller MW, Swanson HM, Wolfe LL, Quartarone FG, Huwer SL, Southwick CH, Lukacs PM.** 2008. Lions and prions and deer demise. PLoS One **3:**e4019. http://dx.doi.org/10.1371/journal.pone.0004019.
14. **Hibler CP, Wilson KL, Spraker TR, Miller MW, Zink RR, DeBuse LL, Andersen E, Schweitzer D, Kennedy JA, Baeten LA, Smeltzer JF, Salman MD, Powers BE.** 2003. Field validation and assessment of an enzyme-linked immunosorbent assay for detecting chronic wasting disease in mule deer (Odocoileus hemionus), white-tailed deer (Odocoileus virginianus), and Rocky Mountain elk (Cervus elaphus nelsoni). J Vet Diagn Invest **15:**311–319. http://dx.doi.org/10.1177/104063870301500402.
15. **Spraker TR, O'Rourke KI, Balachandran A, Zink RR, Cummings BA, Miller MW, Powers BE.** 2002. Validation of monoclonal antibody F99/97.6.1 for immunohistochemical staining of brain and tonsil in mule deer (Odocoileus hemionus) with chronic wasting disease. J Vet Diagn Invest **14:**3–7. http://dx.doi.org/10.1177/104063870201400102.
16. **Safar JG, Geschwind MD, Deering C, Didorenko S, Sattavat M, Sanchez H, Serban A, Vey M, Baron H, Giles K, Miller BL, Dearmond SJ, Prusiner SB.** 2005. Diagnosis of human prion disease. Proc Natl Acad Sci U S A **102:**3501–3506. http://dx.doi.org/10.1073/pnas.0409651102.
17. **Haley NJ, Mathiason CK, Zabel MD, Telling GC, Hoover EA.** 2009. Detection of sub-clinical CWD infection in conventional test-negative deer long after oral exposure to urine and feces from CWD$^+$ deer. PLoS One **4:**e7990. http://dx.doi.org/10.1371/journal.pone.0007990.
18. **Haley NJ, Mathiason C, Carver S, Telling GC, Zabel MC, Hoover EA.**

2012. Sensitivity of protein misfolding cyclic amplification versus immunohistochemistry in antemortem detection of CWD infection. J Gen Virol **93**:1141–1150. http://dx.doi.org/10.1099/vir.0.039073-0.
19. **Selariu A, Powers JG, Nalls A, Brandhuber M, Mayfield A, Fullaway S, Wyckoff CA, Goldmann W, Zabel MM, Wild MA, Hoover EA, Mathiason CK.** 2015. In utero transmission and tissue distribution of chronic wasting disease-associated prions in free-ranging Rocky Mountain elk. J Gen Virol **96**:3444–3455. http://dx.doi.org/10.1099/jgv.0.000281.
20. **Saborio GP, Permanne B, Soto C.** 2001. Sensitive detection of pathological prion protein by cyclic amplification of protein misfolding. Nature **411**:810–813. http://dx.doi.org/10.1038/35081095.
21. **Atarashi R, Satoh K, Sano K, Fuse T, Yamaguchi N, Ishibashi D, Matsubara T, Nakagaki T, Yamanaka H, Shirabe S, Yamada M, Mizusawa H, Kitamoto T, Klug G, McGlade A, Collins SJ, Nishida N.** 2011. Ultrasensitive human prion detection in cerebrospinal fluid by real-time quaking-induced conversion. Nat Med **17**:175–178. http://dx.doi.org/10.1038/nm.2294.
22. **Atarashi R, Wilham JM, Christensen L, Hughson AG, Moore RA, Johnson LM, Onwubiko HA, Priola SA, Caughey B.** 2008. Simplified ultrasensitive prion detection by recombinant PrP conversion with shaking. Nat Methods **5**:211–212. http://dx.doi.org/10.1038/nmeth0308-211.
23. **Haley NJ, Carver S, Hoon-Hanks LL, Henderson DM, Davenport KA, Bunting E, Gray S, Trindle B, Galeota J, LeVan I, Dubovos T, Shelton P, Hoover EA.** 2014. Detection of chronic wasting disease in the lymph nodes of free-ranging cervids by real-time quaking-induced conversion. J Clin Microbiol **52**:3237–3243. http://dx.doi.org/10.1128/JCM.01258-14.
24. **Thackray AM, Hopkins L, Bujdoso R.** 2007. Proteinase K-sensitive disease-associated ovine prion protein revealed by conformation-dependent immunoassay. Biochem J **401**:475–483. http://dx.doi.org/10.1042/BJ20061264.
25. **Spraker TR, Balachandran A, Zhuang D, O'Rourke KI.** 2004. Variable patterns of distribution of PrP(CWD) in the obex and cranial lymphoid tissues of Rocky Mountain elk (Cervus elaphus nelsoni) with subclinical chronic wasting disease. Vet Rec **155**:295–302. http://dx.doi.org/10.1136/vr.155.10.295.
26. **Keane DP, Barr DJ, Keller JE, Hall SM, Langenberg JA, Bochsler PN.** 2008. Comparison of retropharyngeal lymph node and obex region of the brainstem in detection of chronic wasting disease in white-tailed deer (Odocoileus virginianus). J Vet Diagn Invest **20**:58–60. http://dx.doi.org/10.1177/104063870802000110.
27. **Monello RJ, Powers JG, Hobbs NT, Spraker TR, O'Rourke KI, Wild MA.** 2013. Efficacy of antemortem rectal biopsies to diagnose and estimate prevalence of chronic wasting disease in free-ranging cow elk (Cervus elaphus nelsoni). J Wildl Dis **49**:270–278. http://dx.doi.org/10.7589/2011-12-362.
28. **Wells GA, Hancock RD, Cooley WA, Richards MS, Higgins RJ, David GP.** 1989. Bovine spongiform encephalopathy: diagnostic significance of vacuolar changes in selected nuclei of the medulla oblongata. Vet Rec **125**:521–524. http://dx.doi.org/10.1136/vr.125.21.521.
29. **Debeer SO, Baron TG, Bencsik AA.** 2001. Immunohistochemistry of PrPsc within bovine spongiform encephalopathy brain samples with graded autolysis. J Histochem Cytochem **49**:1519–1524. http://dx.doi.org/10.1177/002215540104901205.
30. **Chaplin MJ, Barlow N, Ryder S, Simmons MM, Spencer Y, Hughes R, Stack MJ.** 2002. Evaluation of the effects of controlled autolysis on the immunodetection of PrP(Sc) by immunoblotting and immunohistochemistry from natural cases of scrapie and BSE. Res Vet Sci **72**:37–43. http://dx.doi.org/10.1053/rvsc.2001.0518.
31. **Fox KA, Jewell JE, Williams ES, Miller MW.** 2006. Patterns of PrPCWD accumulation during the course of chronic wasting disease infection in orally inoculated mule deer (Odocoileus hemionus). J Gen Virol **87**:3451–3461. http://dx.doi.org/10.1099/vir.0.81999-0.
32. **O'Rourke KI, Baszler TV, Besser TE, Miller JM, Cutlip RC, Wells GA, Ryder SJ, Parish SM, Hamir AN, Cockett NE, Jenny A, Knowles DP.** 2000. Preclinical diagnosis of scrapie by immunohistochemistry of third eyelid lymphoid tissue. J Clin Microbiol **38**:3254–3259.
33. **van Keulen LJ, Schreuder BE, Meloen RH, Mooij-Harkes G, Vromans ME, Langeveld JP.** 1996. Immunohistochemical detection of prion protein in lymphoid tissues of sheep with natural scrapie. J Clin Microbiol **34**:1228–1231.
34. **Hill AF, Zeidler M, Ironside J, Collinge J.** 1997. Diagnosis of new variant Creutzfeldt-Jakob disease by tonsil biopsy. Lancet **349**:99–100. http://dx.doi.org/10.1016/S0140-6736(97)24002-X.
35. **Sigurdson CJ, Williams ES, Miller MW, Spraker TR, O'Rourke KI, Hoover EA.** 1999. Oral transmission and early lymphoid tropism of chronic wasting disease PrPres in mule deer fawns (Odocoileus hemionus). J Gen Virol **80**(Pt 10):2757–2764. http://dx.doi.org/10.1099/0022-1317-80-10-2757.
36. **González L, Dagleish MP, Bellworthy SJ, Siso S, Stack MJ, Chaplin MJ, Davis LA, Hawkins SA, Hughes J, Jeffrey M.** 2006. Postmortem diagnosis of preclinical and clinical scrapie in sheep by the detection of disease-associated PrP in their rectal mucosa. Vet Rec **158**:325–331. http://dx.doi.org/10.1136/vr.158.10.325.
37. **Spraker TR, Gidlewski TL, Balachandran A, VerCauteren KC, Creekmore L, Munger RD.** 2006. Detection of PrP(CWD) in postmortem rectal lymphoid tissues in Rocky Mountain elk (Cervus elaphus nelsoni) infected with chronic wasting disease. J Vet Diagn Invest **18**:553–557. http://dx.doi.org/10.1177/104063870601800605.
38. **Bessen RA, Shearin H, Martinka S, Boharski R, Lowe D, Wilham JM, Caughey B, Wiley JA.** 2010. Prion shedding from olfactory neurons into nasal secretions. PLoS Pathog **6**:e1000837. http://dx.doi.org/10.1371/journal.ppat.1000837.
39. **Bessen RA, Wilham JM, Lowe D, Watschke CP, Shearin H, Martinka S, Caughey B, Wiley JA.** 2012. Accelerated shedding of prions following damage to the olfactory epithelium. J Virol **86**:1777–1788. http://dx.doi.org/10.1128/JVI.06626-11.
40. **Corona C, Porcario C, Martucci F, Iulini B, Manea B, Gallo M, Palmitessa C, Maurella C, Mazza M, Pezzolato M, Acutis P, Casalone C.** 2009. Olfactory system involvement in natural scrapie disease. J Virol **83**:3657–3667. http://dx.doi.org/10.1128/JVI.01966-08.
41. **DeJoia C, Moreaux B, O'Connell K, Bessen RA.** 2006. Prion infection of oral and nasal mucosa. J Virol **80**:4546–4556. http://dx.doi.org/10.1128/JVI.80.9.4546-4556.2006.
42. **Ford MJ, Burton LJ, Morris RJ, Hall SM.** 2002. Selective expression of prion protein in peripheral tissues of the adult mouse. Neuroscience **113**:177–192. http://dx.doi.org/10.1016/S0306-4522(02)00155-0.
43. **Mathiason CK, Powers JG, Dahmes SJ, Osborn DA, Miller KV, Warren RJ, Mason GL, Hays SA, Hayes-Klug J, Seelig DM, Wild MA, Wolfe LL, Spraker TR, Miller MW, Sigurdson CJ, Telling GC, Hoover EA.** 2006. Infectious prions in the saliva and blood of deer with chronic wasting disease. Science **314**:133–136. http://dx.doi.org/10.1126/science.1132661.
44. **Perrott MR, Sigurdson CJ, Mason GL, Hoover EA.** 2013. Mucosal transmission and pathogenesis of chronic wasting disease in ferrets. J Gen Virol **94**:432–442. http://dx.doi.org/10.1099/vir.0.046110-0.
45. **Tabaton M, Monaco S, Cordone MP, Colucci M, Giaccone G, Tagliavini F, Zanusso G.** 2004. Prion deposition in olfactory biopsy of sporadic Creutzfeldt-Jakob disease. Ann Neurol **55**:294–296. http://dx.doi.org/10.1002/ana.20038.
46. **Zanusso G, Ferrari S, Cardone F, Zampieri P, Gelati M, Fiorini M, Farinazzo A, Gardiman M, Cavallaro T, Bentivoglio M, Righetti PG, Pocchiari M, Rizzuto N, Monaco S.** 2003. Detection of pathologic prion protein in the olfactory epithelium in sporadic Creutzfeldt-Jakob disease. N Engl J Med **348**:711–719. http://dx.doi.org/10.1056/NEJMoa022043.
47. **Wilham JM, Orrú CD, Bessen RA, Atarashi R, Sano K, Race B, Meade-White KD, Taubner LM, Timmes A, Caughey B.** 2010. Rapid end-point quantitation of prion seeding activity with sensitivity comparable to bioassays. PLoS Pathog **6**:e1001217. http://dx.doi.org/10.1371/journal.ppat.1001217.
48. **Orrú CD, Bongianni M, Tonoli G, Ferrari S, Hughson AG, Groveman BR, Fiorini M, Pocchiari M, Monaco S, Caughey B, Zanusso G.** 2014. A test for Creutzfeldt-Jakob disease using nasal brushings. N Engl J Med **371**:519–529. http://dx.doi.org/10.1056/NEJMoa1315200.
49. **Atarashi R, Sano K, Satoh K, Nishida N.** 2011. Real-time quaking-induced conversion: a highly sensitive assay for prion detection. Prion **5**:150–153. http://dx.doi.org/10.4161/pri.5.3.16893.
50. **Blanco RA, De Wolf C, Tan B, Agarwal S, Orrú C, Caughey B, Raeber A, Gill A, Manson J, McCutcheon S.** 2012. Analysis of BSE-infected sheep tissues and plasma using the real-time quaking induced conversion (RT-QuIC) assay. Prion **6**:94.
51. **John TR, Schatzl HM, Gilch S.** 2013. Early detection of chronic wasting disease prions in urine of pre-symptomatic deer by real-time quaking-induced conversion assay. Prion **7**:253–258. http://dx.doi.org/10.4161/pri.24430.

52. **Peden AH, McGuire LI, Appleford NEJ, Mallinson G, Wilham JM, Orrú CD, Caughey B, Ironside JW, Knight RS, Will RG, Green AJE, Head MW.** 2012. Sensitive and specific detection of sporadic Creutzfeldt-Jakob disease brain prion protein using real-time quaking-induced conversion. J Gen Virol **93:**438–449. http://dx.doi.org/10.1099/vir.0.033365-0.
53. **Takatsuki H, Atarashi R, Sano K, Satoh K, Nishida N.** 2012. Quantitation of seeding activity of human prion using real-time quaking induced conversion assay. Prion **6:**130–131.
54. **Henderson DM, Manca M, Haley NJ, Denkers ND, Nalls AV, Mathiason CK, Caughey B, Hoover EA.** 2013. Rapid antemortem detection of CWD prions in deer saliva. PLoS One **8:**e74377. http://dx.doi.org/10.1371/journal.pone.0074377.
55. **Thomsen BV, Schneider DA, O'Rourke KI, Gidlewski T, McLane J, Allen RW, McIsaac AA, Mitchell GB, Keane DP, Spraker TR, Balachandran A.** 2012. Diagnostic accuracy of rectal mucosa biopsy testing for chronic wasting disease within white-tailed deer (Odocoileus virginianus) herds in North America: effects of age, sex, polymorphism at PRNP codon 96, and disease progression. J Vet Diagn Invest **24:**878–887. http://dx.doi.org/10.1177/1040638712453582.
56. **O'Rourke KI, Besser TE, Miller MW, Cline TF, Spraker TR, Jenny AL, Wild MA, Zebarth GL, Williams ES.** 1999. PrP genotypes of captive and free-ranging Rocky Mountain elk (Cervus elaphus nelsoni) with chronic wasting disease. J Gen Virol **80**(Pt 10)**:**2765–2769. http://dx.doi.org/10.1099/0022-1317-80-10-2765.
57. **O'Rourke KI, Spraker TR, Zhuang D, Greenlee JJ, Gidlewski TE, Hamir AN.** 2007. Elk with a long incubation prion disease phenotype have a unique PrPd profile. Neuroreport **18:**1935–1938. http://dx.doi.org/10.1097/WNR.0b013e3282f1ca2f.
58. **Spraker TR, VerCauteren KC, Gidlewski T, Schneider DA, Munger R, Balachandran A, O'Rourke KI.** 2009. Antemortem detection of PrPCWD in preclinical, ranch-raised Rocky Mountain elk (Cervus elaphus nelsoni) by biopsy of the rectal mucosa. J Vet Diagn Invest **21:**15–24. http://dx.doi.org/10.1177/104063870902100103.
59. **Spraker TR, O'Rourke KI, Gidlewski T, Powers JG, Greenlee JJ, Wild MA.** 2010. Detection of the abnormal isoform of the prion protein associated with chronic wasting disease in the optic pathways of the brain and retina of Rocky Mountain elk (Cervus elaphus nelsoni). Vet Pathol **47:**536–546. http://dx.doi.org/10.1177/0300985810363702.
60. **Williams ES, Young S.** 1982. Spongiform encephalopathy of Rocky Mountain elk. J Wildl Dis **18:**465–471. http://dx.doi.org/10.7589/0090-3558-18.4.465.
61. **Cramm M, Schmitz M, Karch A, Mitrova E, Kuhn F, Schroeder B, Raeber A, Varges D, Kim YS, Satoh K, Collins S, Zerr I.** 1 April 2015. Stability and reproducibility underscore utility of RT-QuIC for diagnosis of Creutzfeldt-Jakob disease. Mol Neurobiol http://dx.doi.org/10.1007/s12035-015-9133-2.
62. **Spraker TR, VerCauteren KC, Gidlewski TL, Munger RD, Walter WD, Balachandran A.** 2009. Impact of age and sex of Rocky Mountain elk (Cervus elaphus nelsoni) on follicle counts from rectal mucosal biopsies for preclinical detection of chronic wasting disease. J Vet Diagn Invest **21:**868–870. http://dx.doi.org/10.1177/104063870902100618.
63. **Budras KD, Habel RE, Mulling CKW, Greenough PR, Wunsche A, Buda S.** 2011. Bovine anatomy, 2nd ed. Schlütersche Verlagsgesellschaft mbH & Co., KG, Hannover, Germany.
64. **Reece WO, Erickson H, Goff JP (ed).** 2015. Dukes' physiology of domestic animals, 13th ed. Wiley-Blackwell, Hoboken, NJ.
65. **Saunders SE, Bartelt-Hunt SL, Bartz JC.** 2012. Occurrence, transmission, and zoonotic potential of chronic wasting disease. Emerg Infect Dis **18:**369–376. http://dx.doi.org/10.3201/eid1803.110685.
66. **New York State Department of Environmental Conservation.** 2013. Surveillance plan for chronic wasting disease in New York State 2013–2014. New York State Department of Environmental Conservation Cornell University Animal Health Diagnostic Center, Ithaca, NY.
67. **Bartelt G, Pardee J, Thiede K.** 2003. Environmental impact statement on rules to eradicate chronic wasting disease from Wisconsin's free-ranging white-tailed deer herd. Wisconsin Department of Natural Resources, Madison, WI. http://dnr.wi.gov/files/PDF/pubs/ea/EA0063.pdf.
68. **Wasserberg G, Osnas EE, Rolley RE, Samuel MD.** 2009. Host culling as an adaptive management tool for chronic wasting disease in white-tailed deer: a modelling study. J Appl Ecol **46:**457–466. http://dx.doi.org/10.1111/j.1365-2664.2008.01576.x.

From: Dr. Scott Leibsle
To: Lloyd Knight; Chanel Tewalt
Cc: Miranda Juker
Subject: FW: {External}RE: Cervidae Admin Order
Date: Saturday, June 5, 2021 11:03:04 AM
Attachments: image001.png
Haley2016.pdf
REVISED-USDACWD-Program-Standards-final_05_2019.pdf
Spraker et al2016.pdf
image003.png

Please add to the cervidae rulemaking record and post on the comments page.

From: Hebdon,Tricia <tricia.hebdon@idfg.idaho.gov>
Sent: Wednesday, June 2, 2021 4:34 PM
To: Dr. Scott Leibsle <Scott.Leibsle@ISDA.IDAHO.GOV>
Subject: {External}RE: Cervidae Admin Order

Scott,

Thank you for forwarding the Administrative Order.

As for your comments on specific CWD sample types: obex versus medial retropharyngeal lymph nodes (MRPLN); I am attaching several papers and USDA APHIS National CWD Herd Certification Program standards.

According to USDA APHIS CWD Herd Certification Program; Obex and RPLN should be taken for all animals if possible. Lymph nodes are acceptable for both domestic and wild elk to be tested by IHC. Wild Elk can also be tested by ELISA for surveillance; similar to its use for slaughter surveillance for domestic cervids. We usually (not always) have a piece of tissue or paired lymph node for IHC confirmation if we have a positive ELISA.

I have attached a paper by Spraker et al. on obex versus lymph node sampling in elk. The conclusion out of 226 positive elk, 155 had deposits of PrP(cwd) protein in both the obex and the lymph nodes (MRPLN). 43 had only deposits in the lymphoid tissue and 28 had deposits in the obex. Immunostaining of brain alone would have detected only 81 percent of the infected elk and immunostaining lymphoid tissue alone would have detected only 88 percent.

Also, based on the Haley paper (also attached) genetic susceptibility plays a role in obex versus lymph node positivity but post-mortem IHC lymph nodes had a higher correlation with clinical variables than IHC obex. In addition most of the CWD positive states (Wyoming, Colorado, Montana, National Elk Refuge) that manage wild elk use lymph nodes for surveillance and testing because they have a greater positivity rate, can be used on both the ELISA and IHC and do not have issues with poor samples. Lymph nodes can be utilized for both tests even when highly degraded, where obex cannot.

I understand that the domestic cervid industry would like consistency between domestic and wild cervids. I originally made a suggestion during the first negotiated rule meeting that maybe the industry should start taking lymph nodes when they can't get an obex sample (degraded or damaged sample) for submission. This way they always have a sample to test.

IDFG has taken obex from elk since 1998, but switched to taking lymph nodes in 2018 for routine surveillance by ELISA based on the recommendation of other state partners and peer-reviewed research. We could double sample in the future (lymph node and obex), but we will continue to use lymph nodes for ELISA surveillance because obex cannot be used on ELISA. We will always confirm with IHC on either obex or lymph node. In addition, we are going to begin genotyping our wild elk and deer in the next year or two so we will have a better idea of their susceptibility and pattern of prion deposition.

Let me know your thoughts and if you would like you can include this information in the negotiated rule making file.

Tricia

Tricia Hebdon
Wildlife Health Program Coordinator
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From: Dr. Scott Leibsle <Scott.Leibsle@ISDA.IDAHO.GOV>
Sent: Wednesday, June 2, 2021 11:02 AM
To: Hebdon,Tricia <tricia.hebdon@idfg.idaho.gov>
Subject: Cervidae Admin Order

Prior to August 2020, there was no official language in place that restricted domestic imports from areas beyond a CWD endemic area. ISDA felt it was necessary to address that risk, largely due to what we perceived as a reduction in surveillance in Alberta, but also because each state/province uses different criteria to establish their endemic areas, thereby creating different import rules based upon the origin of the animals. The 25 mile "safe zone" was meant to set a minimum standard for those imports.

cid:image001.png@01D757C3.A23C2990

From:	Jim Lowe
To:	Lloyd Knight
Cc:	Dr. Scott Leibsle; Chanel Tewalt
Subject:	{External}Re: Cervidae Rule Stakeholders
Date:	Monday, May 17, 2021 11:33:26 AM

Lloyd,

Would you send me a link for the upcoming Cervidae rulemaking meeting?

For what it is worth, I support the proposed provision for ISDA-sanctioned reindeer exhibits outside of the cervidae facility, replacing the current rule which hands that off to USDA. The USDA exhibitor process is cumbersome and, with the exception of the current ISDA rule, does not apply to or fit our operation.

Also, in response to another comment, I support maintaining the current 6' height requirement for the perimeter fence for reindeer rather than increasing that to 8'. Two years ago we invested in 6' fencing for our reindeer based on the current rule. In our setting, it would be unnecessary to replace or modify the perimeter fence to 8' height, for either domestic containment or for wildlife exclusion.

Thank you,

Jim Lowe
Lowe Family Farmstead
Kuna, ID
208-921-2326

On Sun, May 16, 2021 at 10:51 PM Lloyd Knight <Lloyd.Knight@isda.idaho.gov> wrote:

> Stakeholders:
>
> We have the second round of negotiated rulemaking meetings this week, so a couple of reminders are in order:
>
> - If you RSVP'd for meeting links prior to the April meeting, you should have received three meeting requests – April, May, and June. Please be sure to use the May meeting link this week as it is a different meeting (including Webex link and meeting number for those that call in) than April. If you are going to be joining us for the first time and don't have a link, respond to this email and I will get you added to the list.
> - Be sure to visit our Current Rulemaking page on our website where you can find updated draft rules, notes from the last meeting, and comments and information submitted from stakeholders. You can find that page at: https://agri.idaho.gov/main/i-need-to/see-lawsrules/rulemaking/isda-rulemaking-2021-2022/.
>
> As always, please let us know if you have any questions or concerns. You can send an

email to rulesinfo@isda.idaho.gov.

Thank you.

Lloyd B. Knight

Administrator, Division of Plant Industries

Agency Rules Review Officer

Idaho State Department of Agriculture

Office: (208)332-8664

Mobile: (208)859-4173

Red Deer versus Elk Genetics

Mitochondrial DNA testing has supported that red deer and elk are in fact two distinct species for almost 20 years.

Elk and red deer can have fertile offspring, often a strong indicator that two animals belong to the same species. There are also many differences between the two. Pregnant elk cows carry their calves for 20 days longer than red deer hinds, while bull elk carry their antlers for 35 days longer than red deer stags. An average bull elk weighs 720 pounds, while a red deer stag averages just 400. And of course, the bugle of an elk is a very different experience from the roar of a red deer.

The ability of the two species to produce fertile offspring has helped spawn controversy about red deer game farms. Along with the ethical issues involving the commercialization of wildlife, and concerns over disease, game farms can also compromise the genetic integrity of wild elk herds. If animals egress or ingress into a captive facility, as is sometimes the case, they can mate with wild elk creating a hybrid offspring that can threaten the purity of wild elk herds.

There are two types of DNA testing; mitochondrial speciation and Single Tandem repeat or Single Nucleotide Polymorphisms (STR/SNP).

Mitochondrial DNA speciation would need to have a 96% or higher similarity or sequence homology to Rocky Mtn. Elk (*Cervus Canadensis)* to be considered pure.

STR/SNP speciation would have to have defined alleles that we only see with that species. You would need to have no presence of the Red Deer specific alleles present to call an animal pure or not a hybrid red deer/elk.

Both tests need to be designed based on standard “pure” individuals. The STR/SNP analyses need to encompass a large enough populations to ensure that the loci or alleles being assessed are truly species specific.

Comparative Study

Mol Phylogenet Evol. 2002 Mar;22(3):342-56.
doi: 10.1006/mpev.2001.1065.

A phylogenetic comparison of red deer and wapiti using mitochondrial DNA

Renee O Polziehn[1], Curtis Strobeck
Affiliations expand

- PMID: 11884159
- DOI: 10.1006/mpev.2001.1065

Abstract

A phylogeny was constructed for red deer/wapiti (Cervus elaphus) subspecies using sequence data from the control region of mitochondrial DNA (mtDNA). The tree was rooted using Cervus nippon (sika deer), Cervus albirostris (Thorold's white-lipped deer), and several Odocoileinae species. A division between the mtDNA haplotypes of red deer (European) and wapiti (Asian/North American) corresponds to subspecies found on opposite sides of the Himalayan Mountains and Gobi, which suggests wapiti should be reconsidered for the status of C. canadensis. Using parsimony and distance analysis, red deer and wapiti are derived from a single recent common ancestor, which is consistent with current taxonomy that recognizes the subspecies of Cervus elaphus as monophyletic group. However, maximum-likelihood analysis using weighted transitional substitutions caused red deer to form a sister group to sika deer (Cervus nippon) and wapiti. A phenetic comparison revealed wapiti also share more nucleotide similarities with sika deer, although approximately 5% sequence divergence separates wapiti, sika, and red deer. Phylogenetic evidence from the cytochrome b sequences corroborated observations from the control region. Observations from this study suggest that the species status of wapiti should be reinstated.

From: Dr. Scott Leibsle
To: Lloyd Knight; Chanel Tewalt
Subject: FW: {External}Cervid Negotiated Rule-making information
Date: Wednesday, May 12, 2021 11:48:42 AM
Attachments: image002.png
LankesterAlces2018 (1).pdf
Red Deer versus Elk Genetics.docx
image003.png

Comments for the cervidae portion of the import rule….although, I would probably post these on both the cervidae and import rulemaking pages.

From: Hebdon,Tricia <tricia.hebdon@idfg.idaho.gov>
Sent: Wednesday, April 21, 2021 2:06 PM
To: Dr. Scott Leibsle <Scott.Leibsle@ISDA.IDAHO.GOV>
Subject: {External}Cervid Negotiated Rule-making information

Scott,

There is not a great deal of literature on P. tenuis except in small ruminants (Parelaphostrongylus tenuis - an overview | ScienceDirect Topics), White-tailed deer, and Moose. Below are the cattle withdrawal times for Ivomectin and IDFG uses the longest withdrawal times for all off-label use in wildlife.

I am also attaching some thoughts on Red Deer/Elk Genetic issues for your read. I do know a great deal about the genetics test, I do believe our Director offered for our lab or our Fisheries genetics lab to develop an STR/SNP based assay to support this issue.

Please let me know if you have any other comments or questions.

Tricia Hebdon
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Wildlife Health & Forensic Laboratory
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From:	Dr. Scott Leibsle
To:	Lloyd Knight; Chanel Tewalt
Subject:	FW: {External}North Idaho Reindeer
Date:	Friday, May 28, 2021 8:25:10 AM
Attachments:	image002.png

From: G.Michael Miller <G.MichaelMiller@outlook.com>
Sent: Thursday, May 27, 2021 5:22 PM
To: Dr. Scott Leibsle <Scott.Leibsle@ISDA.IDAHO.GOV>; Miranda Juker <Miranda.Juker@ISDA.IDAHO.GOV>
Cc: Dr. Scott Barnes <Scott.Barnes@ISDA.IDAHO.GOV>
Subject: {External}North Idaho Reindeer

Dr Scott & Miranda,

I appreciate you making time to meet and discuss issues last Monday. I agree that 8-foot game provides a higher level of protection in regards to maintaining positive control by keeping reindeer in and wild Cervid out of the reindeer enclosure. I spoke to Jordon Joanas, Athol, Idaho the other guy that was interested in raising reindeer in north Idaho. 434-382-8387 jorjonas@gmail.com He agreed also to erect 8-foot game fence. We both have similar thoughts of just raising a few reindeer for educational & community events. I plan to fence an acre (200 ft X 200 ft). Since reindeer are resistant and not very susceptible to CWD, I appreciate that the State Veterinarian's office is contacting the USDA Cervid Health Staff to see what their concerns and suggestion are on the CWD requirements to import reindeer into Idaho. Let's continue keeping these lines of communication open so we can all have a good understanding of each other's needs and concerns.

Sincerely,

Mike Miller

11740 W. Pine St

Sandpoint , Id

83864

907-301-7942

IDAHO RANCH OFFERS PLENTY OF REINDEER FOR SEASONAL NEEDS | Northwest | lmtribune.com

From: Siddoway
To: _Rulesinfo
Subject: {External}Negotiated Rule Making, Cervidae
Date: Thursday, April 15, 2021 8:48:09 AM

To: Lloyd Knight

I would like to participate in all of the meetings considering rules on elk. I'm not clear if I should make my points on the issues I want to address or just list those issues and make my arguments during the meetings. So, in this initial email, I will just make a list of topics I would like to discuss. I will not sort the rules governing cervids from rules governing importation.

1. Red deer gene testing 601. 03
2. Two brucellosis tests required 601. 01
3. Meningeal worm 605.
4. Parasiticide—- vet supervision
5. CWD free herd 607.
6. CWD 607. 02
7. TB. 601. 02. Title 9, Part 77, CFR

I also want a discussion on the use and acceptance of a live CWD test as used and accepted in Sheep. We see in rule, 607, the "herd" required surveillance and testing. I would like to explore individual animal testing.

I am sure there will be other concerns that I will want to address by the time these media meetings begin and as soon as I find them, I will forward them to you.

Jeff Siddoway
Juniper Mountain Ranch LLC
siddoway@dcdi.net

Sent from my iPad

From:	William Miller
To:	Lloyd Knight
Subject:	{External}Rule negotiations for domestic cervidae
Date:	Wednesday, April 28, 2021 11:57:50 AM

---------- Forwarded message ---------
From: **William Miller** <elkrancher2@gmail.com>
Date: Wed, Apr 28, 2021, 10:50 AM
Subject: This is the email, I am sending personally to ISDA regarding the rule negotiations, please feel free to resend and or amend and send, so we as an industry, are actively participating in this negotiation.
To: Billy rasmussen <11blrasm@gmail.com>, Jeff Lerwill <jeff@rockymountainelkranch.net>, Cindy Siddoway <cindy@junipermountain.net>, <george.m.kelley@hotmail.com>, <chasejones592@hotmail.com>

In an effort to concer with the governor and ISDA, I would currently support the majority of changes presented by ISDA at the April 21st rile negotiation.

I support the removal of section 020.02, reindeer limited to South of the salmon River.

I would like to see section 022.08, remain as an option for producers to still be allowed to use ranch specific identification.

I support the removal of section 050, Genetics, as there is currently no standard in which tests can be compared to.

I would like to see the removal of section 250.01 subsection a-b-c, as we are in a TB free state, and all of the animals imported are tested, this requirement is unnecessary and places an undue financial burden upon the producer.

I would like to see section 450.01 wording changed to "not required ".

The above listed are in regards to the rules governing domestic cervidae.

In regards to the rules governing import of domestic cervidae, my concerns are as follows:

I would like to see section 600.03, amended to apply this requirement to the animals originating from East of the 100th meridian, as these animals are the subject of the intention of this requirement.

Section 601.02 is an unenforceable requirement, as there is no valid, verifiable test available.

I would not support the amendment to section 606.01, for traceback of source herds as a prerequisite to import. The herd owners have provided their history for 5 years and maintained their credentials to keep their status and eligibility for moving the animals. The source herd verification would only be necessary for an investigation to trace back and track down where the issue originated.

I would like to propose the insertion of a section that will replace the existing executive order, regarding the cwd endemic areas and the safe zone around them. I believe that 20 miles would provide the adequate safe zone, as opposed to the 25 miles in the current order. I realize there is no official study to establish this boundary with any level of certainty. But would like to see our requirement the same as our neighboring state of Utah.

Chronic Wasting Disease

Program Standards

UNITED STATES DEPARTMENT OF AGRICULTURE

United States Department of Agriculture
Animal and Plant Health Inspection Service
Veterinary Services

Chronic Wasting Disease (CWD)
Program Standards

May 2019

Contents

Introduction

The goal of the CWD Herd Certification Program (HCP) is to provide a consistent, national approach to control the incidence of CWD in farmed cervids and prevent the interstate spread of CWD. Achieving this goal will ultimately result in several important long-term outcomes, including:

1) Healthy cervids (both farmed and wild populations) with a reduced risk of CWD.

2) Increased confidence that HCP-certified herds are low risk for CWD infection.

3) Strong trade of cervid animals and products (increased market confidence).

4) Reduced risk of transmission from, and environmental contamination by, CWD-positive herds.

The HCP is a cooperative effort between the Animal and Plant Health Inspection Service (APHIS), regulatory State animal health and wildlife agencies, and farmed cervid owners. APHIS coordinates with these State agencies to encourage cervid owners to certify their herds and comply with the CWD Herd Certification Program Standards.

This goal is accomplished through the establishment of the national CWD herd certification program and interstate movement requirements for CWD-susceptible cervids found in title 9 of the *Code of Federal Regulations* (CFR) parts 55 and 81. These regulations are written as performance-based regulations that describe the legally required outcomes.

The Program Standards provide detailed descriptions of acceptable methods for complying with the legal requirements in 9 CFR parts 55 and 81:

Part A, Herd Certification Program, describes acceptable methods to meet the minimum requirements to certify farmed cervid herds for interstate movement.

Part B, Guidance on Response to CWD, describes acceptable methods to meet the minimum requirements to respond to the finding of CWD in farmed cervid herds.

The methods in these Program Standards have been approved by the APHIS Administrator. Alternatively, States may propose other methods/approaches to meet the regulatory requirements. These alternative proposals should be submitted in writing to APHIS for approval. States may also have additional or stricter requirements that exceed the minimum requirements described in the CWD regulations and do not need to be submitted in writing.

These Program Standards will be reviewed regularly by APHIS and, as appropriate, representatives of the cervid industry and State and Federal agencies. A notice will be published in the *Federal Register* to inform stakeholders of any revisions APHIS plans to the Program Standards.

Definitions

Accredited Veterinarian: A veterinarian approved by the Administrator in accordance with 9 CFR part 161 to perform functions required by cooperative State-Federal disease control programs specified in title 9 CFR.

Administrator: The Administrator of the Animal and Plant Health Inspection Service, or any person authorized to act for the Administrator.

Animal: Any farmed or captive deer, elk, or moose.

Animal Identification Number (AIN): A numbering system for the official identification of individual animals in the United States that provides a nationally unique identification number for each animal. The AIN consists of 15 digits with the first 3 being the country code (840 for the United States or a unique country code for any U.S. territory that has such a code and elects to use it in place of the 840 code).

Animal and Plant Health Inspection Service (APHIS): The Animal and Plant Health Inspection Service of the United States Department of Agriculture.

Annual Removal Rate: All adults (12 months or older) removed or lost from inventory *for any reason* since the previous annual inventory. For example: If 100 animals were on the previous year inventory, and 80 of the same animals are on the current inventory is equal to a 20% annual removal rate. ((100-80)/100)=20%

APHIS Employee: Any individual employed by APHIS who is authorized by the Administrator to do any work or perform any duty in connection with the control and eradication of disease.

Approved State: A State determined by the Administrator to have an Approved State CWD Herd Certification Program per 9 CFR part 55.

Approved State CWD Herd Certification Program: A program operated by a State government for certification of cervid herds with respect to CWD the Administrator has determined meets the requirements of 9 CFR part 55.

Approved Laboratory: A diagnostic laboratory approved by the Administrator to conduct official tests for CWD in accordance with 9 CFR 55.8.

Assistant District Director (AD): The APHIS veterinary official assigned by the Administrator to supervise and perform the official APHIS animal health work in the APHIS District and corresponding State or States.

Certified Herd: A herd that has enrolled in a Herd Certification Program and has attained Certified status as defined in 9 CFR part 55.

Certified CWD Sample Collector: An individual who has completed appropriate training and is certified by his or her State to perform collection, submission, and preservation of samples for CWD testing in farmed cervids.

Cervid: All members of the family Cervidae and hybrids, including deer, elk, moose, caribou, reindeer, and related species. For the purposes of this document, the term “cervid” refers specifically to cervids susceptible to CWD. These are animals in the genera *Odocoileus, Cervus*, *Alces,* and their hybrids, i.e. deer, elk, and moose.

> **NOTE:** APHIS proposes to amend the CFR in the future by removing the list of susceptible species from the definition of “cervid” and instead listing the genera APHIS considers susceptible to CWD. In anticipation of this change, we are adding a definition of “CWD-susceptible cervid species” to this revision of the Program Standards.These changes will give APHIS more flexibility to change the list of species considered susceptible to CWD as evidence becomes available.

Chronic Wasting Disease (CWD): A transmissible spongiform encephalopathy of cervids. Clinical signs in affected animals include, but are not limited to: Loss of body condition, behavioral changes, excessive salivation, increased drinking and urination, depression, and eventual death.

Commingled, Commingling: Animals are commingled if they have direct contact with each other, have less than 10 feet of physical separation, or share equipment, pasture, or water sources/watershed (i.e., indirect contact). Animals are considered to have commingled if they have had such contact with a CWD-positive animal or contaminated premises within the last 5 years.

CWD-Exposed Animal: An animal that is part of a CWD-positive herd, or that has been exposed to a CWD-positive animal or contaminated premises within the previous 5 years.

CWD-Exposed Herd: A herd in which a CWD-positive animal has resided within 5 years prior to that animal’s diagnosis with CWD, as determined by an APHIS employee or State representative.

CWD Herd Certification Program: This program, established in 9 CFR part 55.

CWD-Positive Animal: An animal that has had a diagnosis of CWD established through official confirmatory CWD testing conducted by the National Veterinary Services Laboratories (NVSL).

CWD-Positive Herd: A herd in which a CWD-positive animal resided at the time it was diagnosed which has not been released from quarantine.

CWD-Susceptible Cervid Species: APHIS identifies CWD-susceptible species based on scientific evidence of natural infection or experimental infections through intranasal and/or oral routes. This includes animals in the genera *Odocoileus, Cervus*, and *Alces* and their hybrids, i.e. deer, elk, and moose. Specifically, the following are considered to be susceptible to CWD: White-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), black-tailed deer (*Odocoileus hemionus columbianus*), and any associated subspecies. It also includes North American elk or wapiti (*Cervus canadensis*), red deer (*Cervus elaphus*), and Sika deer (*Cervus nippon*).

> **NOTE:** APHIS proposes to amend the definition of "cervid" in the CFR in the near future by removing the list of susceptible species from the definition. To accommodate this future change, we are adding the definition of "CWD-susceptible cervid species" to this revision of the Program Standards. In the future, APHIS anticipates adding the genera *Rangifer* and *Muntiacus* to the list of CWD-susceptible species when the CFR is amended.

CWD-Suspect Animal: An animal for which an APHIS employee or State representative has determined that unofficial CWD test results, laboratory evidence, or clinical signs suggest a diagnosis of CWD, but for which official laboratory results have been inconclusive or not yet conducted.

CWD-Suspect Herd: A herd for which unofficial CWD test results, laboratory evidence, or clinical signs suggest a diagnosis of CWD, as determined by an APHIS employee or State representative, but for which official confirmatory laboratory results have been inconclusive or not yet conducted.

Deer, Elk, and Moose: All animals in the genera *Odocoileus, Cervus*, *Alces*, and hybrids of these species.

Deputy Administrator: The Veterinary Services (VS) Deputy Administrator or any other official to whom the Administrator has delegated authority to act as the Deputy Administrator.

Designated CWD HCP Coordinator: The epidemiology officer designated by the State to coordinate CWD HCP activities in the State, in accordance with 9 CFR 55.23. The coordinator may be a State representative selected by the State or an APHIS employee identified in consultation with APHIS.

Enrollment Date: The enrollment date for any herd that joins the CWD Herd Certification Program after August 13, 2012 will be the date the herd is approved for participation unless an exception listed in 9 CFR 55.22(a)(1) applies.

Enrolled Herd: A herd that has enrolled in a Herd Certification Program and met the minimum requirements defined in 9 CFR part 55.

Epidemiologically-Linked Herd: Herds are epidemiologically-linked if the investigation determines that the CWD-exposed animal(s) have resided with a CWD-positive animal within 5 years prior to the diagnosis of CWD in the positive herd or from the identified date of entry of CWD into the positive herd and have since moved to or through other herds, Those herds are then considered to be epidemiologically linked. An Epidemiological–linked herd can be a Trace-back Epi-linked, Trace-forward Epi-linked or Pass-through Epi-linked.

Farmed or Captive: Privately or publicly maintained, or held for economic or other purposes, within a perimeter fence or confined area, or captured from a free-ranging population for interstate movement and release.

Herd: One or more animals that are:
1) Under common ownership or supervision and are grouped on one or more parts of any single premises (lot, farm, or ranch) or
2) All animals under common ownership or supervision on two or more premises which are geographically separated but on which animals have been interchanged or had direct or indirect contact with one another (i.e. commingled).

Herd Inventory: A herd owner's written or electronic record of all of the animals belonging to a herd including each animal's species, date of birth, age, sex, date of acquisition and source (for animals not born into the herd), date of disposal and destination (for animals removed from the herd), and all individual identification numbers (from tags, tattoos, electronic implants, etc.). A physical herd inventory refers to the process by which an APHIS employee, State representative, or accredited veterinarian reconciles a herd owner's records with the animals and their identifications physically present in the herd.

Herd Plan: A written herd and/or premises management agreement developed by APHIS in collaboration with the herd owner, State representatives, and other affected parties. The herd plan will not be valid until it has been reviewed and signed by the Administrator, the State representative, and the herd owner. A herd plan sets out the steps to be taken to control spread of CWD from a CWD-positive herd, to control the risk of CWD in a CWD-exposed or CWD-suspect herd, or to prevent introduction of CWD into that herd or any other herd. A herd plan will require specified means of identification for each animal in the herd; regular examination of animals in the herd by a veterinarian for clinical signs of disease; reporting to a State or APHIS representative of any clinical signs of a central nervous system disease or chronic wasting condition in the herd; maintaining records of the acquisition and disposition of all animals entering or leaving the herd, including the date of acquisition or removal, name and address of the person from whom the animal was acquired or to whom it was disposed; and the cause of death, if the animal died while in the herd.

A herd plan may also contain additional requirements to prevent or control the possible spread of CWD, depending on the particular circumstances of the herd and its premises, including but not limited to depopulation of the herd, specifying the time for which a premises must not contain cervids after CWD-positive, -exposed, or –suspect animals are removed from the premises; fencing requirements; selective culling of animals; restrictions on sharing and movement of possibly contaminated livestock equipment; premises cleaning and disinfection requirements; or other requirements. A herd plan may be reviewed and changes to it suggested at any time by any party signatory to it, in response to changes in the situation of the herd or premises or improvements in understanding the nature of CWD epidemiology or techniques to prevent its spread. The revised herd plan will become effective after it is reviewed by the Administrator and signed by the Administrator, the State representative, and the herd owner.

Herd Status: The status of a herd assigned under the CWD Herd Certification Program in accordance with 9 CFR 55.24. Herd status is based on the number of years of monitoring without evidence of the disease and any specific determinations that the herd has contained or has been exposed to a CWD-positive, -exposed, or -suspect animal.

Hunt Facility: A privately owned ranch or other premises selling commercial hunts.

Limited Contact: Any brief, incidental contact between cervids from different herds such as occurs in sale or show rings and alleyways at fairs, livestock auctions, sales, shows, and exhibitions. Limited contact does not include penned animals having less than 10 feet of physical separation or contact through a fence; or any activity where uninhibited contact occurs such as sharing an enclosure, a section of a transport vehicle, sharing equipment, food, or water sources; or contact with bodily fluids or excrement.

Location-Based Numbering System: The location-based number system combines a State- or Tribal-issued location identification (LID) number or a premises identification number (PIN) with a producer’s unique livestock production numbering system to provide a nationally unique and herd unique identification number for an animal.

Official Animal Identification: A device or means of animal identification approved for use by APHIS to uniquely identify individual animals. Examples of approved official animal identification devices are listed in 9 CFR 55.25. The official animal identification must include a nationally unique animal identification number that adheres to one of the following numbering systems:

1) NUES (the CWD program allows the use of either the eight-character or nine character format for cervids);
2) AIN;
3) Premises-based number system, which combines an official PIN with a producer’s livestock production numbering system (both must appear on the official tag) to provide a unique identification number; or
4) Any other numbering system approved by the Administrator for the identification of animals in commerce.

Official CWD Test: Any test for the diagnosis of CWD approved by the Administrator and conducted in a laboratory approved by the Administrator in accordance with 9 CFR 55.8.

Owner: An individual, partnership, company, corporation, or other legal entity that has legal or rightful title to an animal or herd of animals.

Pass -through Epi-linked Herd: A herd in which a CWD-exposed animal has resided within the last 5 years but no longer resides.

Premises: A location where livestock or poultry are housed or kept.

Premises identification number (PIN): A nationally unique number assigned by a State, Tribal, and/or Federal animal health authority to a premises that is, in the judgment of the State, Tribal, and/or Federal animal health authority, a geographically distinct location from other premises. The premises identification number is associated with an address, geospatial coordinates, and/or location descriptors which provide a verifiably unique location. The premises identification number may be used with a producer's own livestock production numbering system to provide a unique identification number for an animal. It may also be used as a component of a group/lot identification number. The premises identification number may consist of:

1) The State's two-letter postal abbreviation followed by the premises' assigned number or
2) A seven-character alphanumeric code, with the right-most character being a check digit. The check digit number is based on the ISO 7064 Mod 36/37 check digit algorithm.

Quarantine (or Hold Order): An order issued by a State restricting movement of animals from or onto a premises for a given period of time.

State Representative: A person regularly employed in the animal health work of a State and who is authorized by the State to perform the function involved. This could include a wildlife agency official.

Status Date: The day, month, and year on which the respective State or APHIS employee approves a change in the status of a herd in regard to CWD.

Suspect Positive CWD Test: The result of an approved CWD test conducted at an approved laboratory in which the presumptive identification of abnormal protease resistant prion protein (PrP^{res}) has been detected in the tissue samples and that result must be confirmed positive by NVSL.

Suspended Status: A temporary status given to a herd that is being epidemiologically assessed for CWD-exposure.

Veterinary Services (VS): The APHIS unit authorized to conduct prevention, control, and eradication programs for diseases of livestock and poultry.

Part A. Herd Certification Program

1. State Participation

1.1 Participating Approved State: Application and Requirements

States must submit an application, including a completed VS Form 11-2 and supporting documentation, describing their ability to meet the national CWD HCP requirements. In reviewing a State's eligibility to be designated as an Approved State, the Administrator or designee will evaluate the State statutes, regulations, and policies pertaining to the State agency responsible for farmed or captive cervids, as well as relevant reports and publications of the State animal health and/or wildlife agencies. The Administrator or designee will also review a written statement from the State representative describing their CWD control and cervid herd certification activities in farmed or captive cervids. When assessing whether the State program qualifies, the Administrator or his or her designee determines whether the State:

1) Has the authority, based on State law or regulation, to quarantine and restrict intrastate movement of all CWD-positive, CWD-suspect, and CWD-exposed animals.

2) Has the authority, based on State law or regulation, to require the prompt reporting of any animal suspected of having CWD; and to forward test results for any animals tested for CWD to APHIS employees and State representatives.

3) Has signed a Memorandum of Understanding (MOU) with APHIS that delineates the respective roles of each party in CWD HCP implementation. A link to the MOU template can be found in Appendix I.

4) Has placed all known CWD-positive, CWD-exposed, and CWD-suspect animals and herds under movement restrictions, allowing movement only for destruction with appropriate carcass disposal, or under permit.

5) Has effectively implemented policies to:

   A. Promptly investigate all animals reported as CWD-suspect animals within 7 business days of official notification to the State.

   B. Designate herds as CWD-positive, CWD-exposed, or CWD-suspect and promptly restrict movement of animals from such herds after an APHIS employee or State representative determines that the herd contains or has contained a CWD-positive animal.

   C. Remove herd movement restrictions only after completion of a herd plan.

D. Conduct an epidemiological investigation of CWD-positive, CWD-exposed, and CWD-suspect herds that includes the designation of suspect and exposed animals in accordance with 9 CFR part 55 and Part B of these CWD Program Standards).

E. Initiate and conduct epidemiological investigations to trace movements of CWD-positive animals and CWD-exposed animals in affected herds.

F. Report, within 45 calendar days following notification of a CWD-positive animal, any out-of-State traces to the appropriate State representative and APHIS employee.

G. Conduct epidemiological investigations on trace movements based on slaughter sampling. Investigation should be initiated promptly following notification of a CWD-positive animal at slaughter.

6) Effectively monitors and enforces State quarantines or hold orders and State reporting laws and regulations for CWD, documenting any noncompliance with quarantines, hold orders, or reporting.

7) Has designated at least one State representative to coordinate CWD HCP activities in the State.

8) Has programs to educate those engaged in the interstate movement of farmed or captive cervids regarding the identification and recordkeeping requirements of 9 CFR part 81.

9) Requires, based on State law or regulation, official identification of all animals in herds participating in the CWD herd certification program, effectively enforces this requirement, and documents any noncompliance with this requirement.

10) Maintains the following information in a State database recognized by the Administrator as meeting the following data requirements in an accurate and timely manner:

A. Premises information, assigned premises numbers, and owner information (location, address, and contact information) for all farmed or captive cervid herds participating in the CWD HCP in the State.

B. Program status of all enrolled herds.

C. Any restrictions to herd statuses including designation as a CWD-positive, exposed, suspect or epidemiologically linked to a positive herd.

D. All program actions such as changes to herd status, depopulation, and adoption of herd plans.

E. Individual animal information on all farmed or captive cervid herds participating in the CWD HCP in the State.

F. Individual animal information on all out-of-State farmed or captive cervids to be traced.

11) Requires that tissues from all CWD-exposed and suspect animals from affected herds that die or are depopulated or are otherwise killed be submitted to a laboratory authorized by the Administrator to conduct official CWD tests.

12) Requires appropriate disposal of the carcasses of CWD-positive, CWD-exposed, and CWD-suspect animals.

13) Enforces all testing and disposal requirements, and documents any noncompliance.

14) Ensures that herds comply with program requirements including physical herd inventories at least every 3 years, annual herd and premises inspections, and verification of required CWD surveillance.

1.2 Provisional Approval

Provisional approval may be granted to States that do not meet all the national CWD HCP minimum requirements on application to the program. APHIS and the State will work to develop a plan with an appropriate time frame to meet program requirements.

1.3 Annual HCP Reports from Approved States

Comprehensive annual reports of HCP status and activities of enrolled herds are provided to the respective APHIS District Field Office for review and endorsement for the year beginning July1 through June 30. The report will be submitted along with an application for Chronic Wasting Disease HCP approval, renewal or reinstatement of a state (VS Form 11-2).The annual report and VS 11-2 will be reviewed and signed by the Assistant Director and a designated State representative and submitted to the Cervid Health program staff. The reports will be used to monitor compliance with HCP program requirements and disease control efforts in Approved States.

The Cervid Health Program staff will provide guidance to States on annual reporting formats prior to the end of the reporting period. The following data will be included in the Annual HCP reports:

1) Enrolled herds–by State and certification status, species, number of animals in each herd, and number inspected.

2) CWD samples and tests–number of animals tested during the reporting period, species, herd type (breeder, hunting operation, etc.) and test results. CWD-

positive herds–under quarantine, depopulated and released from quarantine, not under quarantine, under herd plans, number of animals in each herd.

3) CWD-exposed herds–under quarantine, depopulated and released from quarantine, not under quarantine, under herd plans, number of animals in each herd.

4) Epidemiological information–Intrastate and interstate trace animal movements of CWD-exposed animals initiated, pending, and completed.

1.4 Review of Approved State HCP

In addition to annual review of HCP reports, APHIS may also periodically review an Approved State's CWD HCP program. States may be reviewed on request by APHIS or the Approved State. Review activities may include:

1) Evaluating State program activities to verify compliance with Federal requirements and identifying opportunities for program improvement.

2) Evaluating enrolled herd owner compliance with HCP requirements including reviewing laboratory reports, herd inventories, surveillance sampling, and other records and documents.

3) Reviewing reports and records related to epidemiological investigations of CWD-positive, CWD-exposed, or CWD-suspect herds.

4) Assessing compliance and completeness of data entered into an approved State database.

5) Conducting site visits as necessary.

APHIS will issue a summary report to the Approved State that will include the findings of the review including recommendations to achieve compliance with the National HCP Program or to improve the overall effectiveness and efficiency of the program in the State. APHIS will work with States to develop a plan to respond to the findings, and a specified period of time to complete any proposed actions.

1.5 Withdrawal of State Approval

APHIS may withdraw State approval if the State's action plan to achieve compliance is not completed or not completed during the specified period of time agreed on by APHIS and the State. The State may reapply for State approval once they can meet all the national CWD HCP minimum requirements.

2. Herd Participation

2.1 Participating Herd: Requirements for Enrollment

The requirements for participation in the national CWD HCP are found in 9 CFR part 55 subpart B.

1) Herd owners already participating in an Approved State CWD HCP will maintain the same enrollment date for the National CWD HCP as the first date that the herd participated in the Approved State program.

2) Herd owners enrolled in the Approved State CWD HCP agree to maintain their herds in accordance with the following requirements:

   A. Each animal in the herd must be identified before reaching 12 months of age using means of identification described in Section A 3.2 of these Program Standards.

   B. The herd premises must have perimeter fencing adequate to prevent ingress or egress of cervids. This fencing must comply with any applicable State regulations, and follow the guidance provided in Section A 4 of these Program Standards.

   C. The owner must immediately report all deaths of farmed or captive cervid aged 12 months or older (including animals killed on premises maintained for hunting, and animals sent to slaughter) to a State or to an APHIS employee.. However, State representatives or APHIS employees may approve mortality reporting schedules other than immediate notification when herd conditions warrant it in the opinion of both APHIS and the State.

   D. Carcasses of animals must be made available for tissue sampling and testing in accordance with instructions from the State representative or APHIS employee.

   E. Herd inventory records should be updated and reconciled at least annually and submitted to the Approved State representative.

   F. The owner must immediately report from time of discovery any animals that escape, disappear, or are otherwise missing from the premises to a State representative or an APHIS employee. States may routinely allow up to 72 hours for reporting such incidents. This also may allow time for the herd owner to recapture the animal and work with the Approved State for decisions on disposition of the animal or animals. Likewise, entry of any wild cervids into the facility should also be reported as above.

G. Records, including a complete inventory of animals, must be kept in accordance with Section A 3.3 of these Program Standards. Herd owners must make animals and records available to accredited veterinarians, APHIS employees, or State representatives for inspection. Owners are responsible for assembling, handling, and restraining animals for physical herd inventories or other inspections under conditions that will allow the accredited veterinarian, APHIS employee, or State representative to safely read all identification on the animals. The owners are responsible for the costs that may be incurred to present the animals for inspection and must agree that any liability or injury to the animals during handling rests with the owner.

   Farmed cervids commingled (see definition) with other farmed cervids assume the status of the lowest program status animal in the group. If an owner wishes to maintain two or more separate herds (see definition), he or she must maintain separate herd inventories, records, working facilities, water sources, equipment, and land use. There must be a buffer zone or geographic zone of at least 30 feet between the perimeter fencing around the separate herds, and no commingling of animals may occur. Movement of animals between herds must be recorded as if they were separately owned herds.

H. New animals may be introduced into the herd only from other herds enrolled in the CWD herd certification plan and under the conditions outlined in Section A 2.3.

Failure to comply with any of the listed HCP requirements will affect the herd status and could result in suspension or removal from the national CWD HCP.

2.2 Herd Owner Enrollment and Advancement

The enrollment date will be the day, month, and year in which an owner’s herd is officially enrolled in the HCP. This date is important because it will be used to calculate when herds may advance to a higher herd status under the HCP after completing successive years without CWD being diagnosed in the herd. For a herd that only adds animals from herds with the same or greater status, the enrollment and status dates will remain the same. However, if a herd adds animals from a herd with a lesser status the enrollment and status dates for the receiving herd will reflect the lowest status date. The enrollment date is a fixed date, while the status date may change based on herd additions or status progress.

When initially enrolled in an Approved State CWD HCP all herds will be placed in First Year status. Each year, on the anniversary of the enrollment date or status date (whichever is later) of meeting the HCP requirements, the herd status is upgraded by 1 year; i.e., Second Year status, Third Year status, Fourth Year status, and Fifth Year status. After 5 continuous years of compliance (the end of the Fifth status year) with no findings of CWD in the herd, the herd status is changed to Certified. The herd remains in Certified status as long as continuous enrollment is maintained in the program and the herd continues to meet all of the program requirements. Enrolled herds that have achieved Certified status are eligible to move interstate in accordance with 9 CFR 81.3.

Herds that are established and sourced solely from other Certified herds will be enrolled as Certified herds and must continue to demonstrate compliance with program requirements to maintain Certified status.

Eligibility for advancement from one status to the next is based on compliance with program requirements, including the submission of surveillance samples. Should the herd owner not be in compliance with 9 CFR part 55, State representatives and APHIS employees may withhold advancement, lower, suspend, or revoke the status.

2.3 Additions of Animals to a Herd: Effects on Status

A herd may add animals from herds with the same or a greater status in the national CWD HCP with no negative impact on the status of the receiving herd.

If animals are acquired from a herd with a lesser status, the receiving herd reverts to the lower status. If a herd participating in the program acquires animals from a nonparticipating herd, the receiving herd reverts to First Year status with a new status date listed as the date of acquisition of the animal. The enrollment date in the national CWD HCP would remain unchanged but the herd status level would be modified (and modification date recorded).

If a herd acquires animals from herds with a lower or nonparticipating status, the owner must notify a State representative or APHIS employee within 5 business days of such acquisition. New herds assembled from multiple sources will be assigned the status date of the lowest status herd.

Other sources of equivalent or higher status animals may include cervid herds enrolled, at an appropriate level, from an CWD HCP in another country where APHIS recognizes the HCP to be at least equivalent to the APHIS national CWD HCP.

2.4 Additions of Genetic Material (Germplasm) to a Herd: Effects on Status

There is currently no scientific evidence that germplasm may transmit CWD.

2.5 Inspections and Inventories

Inspections and physical herd inventories ensure herd compliance with HCP requirements. Herds may not advance in status until the annual inspections have been completed, submitted, reconciled, and approved. Inspections are performed by a State official, an APHIS employee, or an accredited veterinarian. Inspections are conducted annually and physical herd inventories are conducted at least every 3 years.

The inspector will:

At the Initial Inspection:

- Visually observe each cervid, and the herd as a whole, for signs of CWD.
- Verify and record the two unique animal identification numbers for each individual, one of which is a nationally unique official animal identification present on the date the herd is initially enrolled in the CWD HCP.
- The herd inventory must be performed not more than 12 months prior to the herd's date of enrollment.
- Confirm that the perimeter fencing is adequate to prevent ingress and egress of cervids, is at a minimum 8 feet high, structurally sound, in good repair, and complies with any applicable State regulations.

At the Annual Inspection:

- Must be conducted 11 to 13 months after the last inspection.
- The herd is visually observed for signs of CWD.
- Records are examined for completeness and accuracy.
- The herd inventory must be reconciled with the previous year's inventory and all dispositions and acquisitions must be documented.
- Verify that all sampling requirements have been met. If not, then document missed or poor quality samples and describe action recommended.
- Inspect the perimeter fencing and document repairs if needed.

At the Physical Herd Inspection:

- Conducted no more than 3 years after the last complete physical herd inventory.
- In addition to the items listed under the annual inspection, all identification will be visually verified and matched to the herd's written or electronic records.
- Animals may be temporarily gathered in pens or other means used for viewing. **Any animals in which ID cannot be visually inspected will need some form of restraint for confirmation.**

2.6 Loss of Certification Status

Herds will lose national herd certification status when the Administrator or a designee, in consultation with the respective Approved State representative, determines that the herd owner failed to comply with the program requirements.

2.7 Relocation of a Herd

If a herd moves, either within a State or to another State, it must meet all Approved State intrastate or Federal interstate movement requirements. In addition, the appropriate State representative or APHIS employee administering the Federal CWD rule should be notified of the relocation within 30 days.

2.8 Cancellation of Participation

Mandatory Cancellation

The Administrator, in concurrence with the Approved State, may cancel the enrollment of a herd by giving written notice to the herd owner. The Administrator may cancel enrollment after determining that the herd owner failed to comply with any HCP requirements.

Before enrollment is canceled, an Approved State representative or an APHIS employee will inform the herd owner of the reasons for the proposed cancellation and of the 10-day appeal deadline. The herd owner may appeal the proposed cancellation in writing to the Administrator within 10 business days after being notified. The appeal must include all of the reasons and supportive evidence with documentation needed to challenge the proposed cancellation. The Administrator may grant or deny the appeal in writing as promptly as circumstances permit, stating the reason for his or her decision. If there is a conflict as to any material fact, a hearing will be held to resolve the conflict. The Administrator sets the rules of practice concerning the hearing.

In the event of cancellation, the herd owner may reapply to enroll in the national CWD HCP but will not reach Certified status until 5 years after APHIS approves the herd owner’s new application for enrollment regardless of the status of the animals in the herd.

Voluntary Cancellation

An owner may decide to cancel participation in the CWD HCP at any time unless otherwise required by State regulations or a signed herd plan. The cancellation should be in writing to a State representative or APHIS employee. Owners who voluntarily cancel their participation may re-enroll at any time as a First-Year status herd and will receive a new enrollment and status date.

3. Registration, Identification, and Recordkeeping

The regulatory authority for registration, recordkeeping, and identification for each animal within enrolled herds is found in 9 CFR 55.23.

3.1 Premises Identification

All participating premises must have a unique Premises Identification Number (PIN).

3.2 Animal Identification

In accordance with 9 CFR 55.25, all animals in the herd must be identified with two unique animal identification numbers for each individual. One of these animal identifications must be a nationally unique official animal identification.

The official animal identification must be a device using an APHIS-approved animal identification numbering system that uniquely identifies individual animals. Information on official animal identification and devices can be found on the APHIS Traceability Web site.

The official animal identification device must be approved by APHIS, and must be a legible ear tattoo, tamper-resistant ear tag, electronic implant, legible flank tattoo, or other approved device. If a microchip is used and the animals are slaughtered under State or Federal meat inspection it should be used in compliance with applicable State or Federal regulations.

The official animal identification must be linked to that animal and herd in a State database. The second animal identification must be unique for the individual animal within the herd and also must be linked to the same animal and herd in the State database. The unique Animal Identification Number may be used on two separate identification devices on the same animal to fulfill the identification requirements if desired.

Natural additions to the herd must be identified before 12 months of age. However, all animals regardless of age must be properly identified as described in this section to move interstate.

If, at the time of enrollment in the Approved State CWD HCP, identification of animals in a herd does not meet the above criteria, the herd owner must bring the herd and animal identifications into compliance as soon as possible on a schedule specified by the State representative or APHIS employee.

APHIS recommends that all animal identification devices be visible on the animal from an appropriate distance to allow visual verification of the identification number on the device without animal restraint. Any animals in which identification cannot be visually inspected will need some form of restraint for confirmation during physical herd inventories.

All animals from enrolled herds that are sent to hunt facilities must retain official identification for surveillance testing.

In accordance with 9 CFR 86.4, removal of official identification devices is prohibited except at the time of slaughter, at any location upon the death of an animal, or as otherwise approved by the State or Tribal animal health official, or a VS Assistant Director when a device needs to be replaced.

The Food and Drug Administration (FDA) Center for Veterinary Medicine regulates the marketing of implantable transponder devices (electronic identification devices/EID) for use in animals. Please contact the FDA or the manufacturer or distributor for information on approved EIDs. USDA's Food Safety and Inspection Service (FSIS) should be contacted regarding anatomic placement of the EIDs in animals that may be presented for slaughter in official slaughter facilities to determine if these devices pose a potential physical food safety hazard.

3.3 Owner Records: Herd Inventory

Each owner must maintain a current complete herd inventory which must include, at a minimum, the following information and records for each animal:

1) All identification devices (tags, tattoos, electronic implants, etc.).
2) Age.
3) Species.
4) Sex.
5) The date of acquisition and source of each animal that was not born into the herd (owner name, city, State).
6) The date of removal and destination of any animal removed from the herd (owner name, city, State).
7) Birth date.
8) Date of death (and cause, if known) for animals dying within the herd.
9) Date of CWD sample submission, submitter, owner, premises, and animal information, and official CWD test results from NVSL or approved laboratory for samples required by the program.

All records, electronic or written, must be kept for 5 years after the cervid has left the herd or has died. Records must be made available to an APHIS employee or State representative at their request and presented at the time of each annual inspection or inventory.

4. Fencing Requirements

The regulatory authority for fencing requirements of enrolled herds is found in 9 CFR 55.23(b)(2). Fencing alone does not delineate individual herds, which must be separated by a distance of 30 feet or greater, as described in 9 CFR 55.23(b)(5).

APHIS considers perimeter fencing with the following characteristics to be adequate to prevent ingress or egress of cervids:

1) Structurally sound.

2) Maintained in good repair.

3) Of sufficient construction to contain the animals.

4) Compliant with any other existing State regulations or requirements.

NOTE: For herds established after the effective date of the CWD rule (August 13, 2012), the fence should be a minimum of 2.4 meters (8 feet) high.

Cervid producers enrolled in the HCP may voluntarily elect to use additional barriers and/or other biosecurity measures to minimize escapes and/or to mitigate disease transmission risks associated with direct contact between free-ranging and farmed cervids.

State representatives have the discretion to require the use of additional barriers and/or other biosecurity measures deemed necessary to mitigate the risks of CWD transmission.

In the case of CWD-positive, suspect, exposed, and epi-linked herds, APHIS and the State representative will assess the risk of CWD transmission between farmed and free-ranging cervids on a case-by-case basis. They may include requirements for additional barriers and/or other biosecurity measures deemed necessary to mitigate the risks of CWD transmission in the herd plan.

5. Surveillance and Sampling

The regulatory authority for surveillance and sampling of animals in enrolled herds is found in 9 CFR 55.23(b)(3).

> To achieve certified status, farmed cervid herds must conduct CWD surveillance on all deaths of cervids aged 12 months or older, including animals in the enrolled herd, animals that are slaughtered on premises or at a slaughter establishment, and animals from an enrolled breeding herd that moves to a hunt facility under the same ownership for at least 5 consecutive years, unless the herd owner purchases or assembles a herd of animals from herds with certified status and concurrently enrolls the resulting herd in a State HCP.

If the enrolled herd does not have any animal deaths meeting surveillance criteria for the year, the herd is considered to be in compliance with surveillance requirements for the year.

5.1 CWD-Suspect Animals

The owner must immediately report to a State representative, accredited veterinarian, or an APHIS employee all suspected cases of CWD. These are to include any animal exhibiting signs of a neurological or wasting disease as described below. These animals should be euthanized or closely monitored until death and the carcasses must be made available for tissue sampling and testing. Clinical CWD suspects that die or are euthanized should be tested for CWD regardless of age. Animals with non-negative results on an unofficial test are also considered to be CWD-suspect animals and must be reported.

The clinical signs associated with CWD are nonspecific and could be caused by other diseases affecting farmed or captive cervids; thus, laboratory confirmation is required for CWD diagnosis. Not all animals display all clinical signs of disease. Duration of clinical signs varies from a few days in unusual cases to as long as a year, but is most often 2 to 3 months.

Usually, the earliest clinical signs displayed are behavioral changes which may include alterations in interaction with humans and members of the herd. These subtle changes are often only recognized by caretakers familiar with the individual animal. With disease progression, behavioral and physical changes may be noted including periods of stupor and depression, altered stance, and progressive weight loss. At the terminal stage of disease, animals are emaciated and may exhibit increased drinking and urination, excessive salivation, lack of coordination, and trembling. However, concurrent disease, especially aspiration pneumonia, may cause an affected animal to die while still in good to fair body condition.

Animals with progressive neurological disease or wasting syndromes that are not responsive to treatment should be considered CWD clinical suspects and consequently be euthanized and tested. If an owner of a clinical suspect declines to allow euthanasia, the animal should be tested in accordance with program requirements after it dies.

5.2 Mortality Reporting and Routine Surveillance

To achieve and maintain herd certification status, enrolled herd owners are required to conduct CWD testing as described in 9 CFR 55.23(b)(3). Herd owners must report and make the following animals available for sample collection and CWD testing,

1) All on-farm deaths of farmed or captive deer, elk, and moose aged 12 months or older,

2) All animals 12 months or older that are slaughtered on the farm,

3) All animals, under their ownership, 12 months or older that are slaughtered at a slaughter establishment,

4) All animals, under their ownership, 12 months or older from an enrolled breeding herd that move to a hunt facility under the same ownership,

for at least 5 consecutive years, unless the herd owner purchases or assembles a herd of animals from herds with certified status and concurrently enrolls the resulting herd in a State HCP.

State representatives or APHIS employees may approve mortality reporting schedules other than immediate notification when herd conditions warrant it. Herd inventory records should be updated at least annually and reconciled to include mortalities and testing results for samples submitted.

5.3 Sample Collection and Submission Procedures

It is the owner's responsibility to ensure complete, good quality tissue samples are collected and all required samples are submitted. Failure to comply with the surveillance requirements in this section may result in loss of program status or other actions applicable under Approved State or Federal regulation.

Tissue samples may only be collected by State officials, APHIS employees, accredited veterinarians, or certified CWD sample collectors. Alternatively, owners may remove and submit the entire head with all attached identification devices to an approved CWD laboratory for tissue collection. Samples should be submitted to an approved laboratory within 7 days of collection.

Detailed instructions regarding sample collection and submissions can be found in Appendix V.

The obex and retropharyngeal lymph node should be collected regardless of sample condition (e.g. autolyzed, frozen, etc.) and submitted to the approved

laboratory to comply with the routine herd surveillance requirement. However, there may be circumstances when only one tissue sample can be collected from an animal. In those circumstances, the producer should notify the Approved State official to explain the reason. If that single sample submission is determined by the laboratory to be unsuitable or untestable, then it will be recorded as a missed sample (not tested) and that animal will not be counted in the mortality surveillance for herd certification status. A positive IHC or ELISA test result on any sample submitted to the approved laboratory will be considered a CWD-suspect test result to be confirmed by IHC at NVSL.

5.4 Consequences of Poor Quality and Missing Samples

Surveillance of all animal mortalities in a herd is the key to increasing our confidence that HCP-certified herds are at low risk for CWD infection. Poor quality samples and missing samples undermine our ability to assess the CWD status of the herd.

Poor quality samples include samples that are severely autolyzed, from the wrong portion of the brain, the wrong tissue, or not testable for other reasons. Approved laboratories should closely monitor sample quality. They should provide timely feedback to the producer, certified sample collector, State officials, and APHIS employees regarding the receipt of poor quality samples. Approved State officials should provide oversight on sample collection by certified sample collectors and address any skill inadequacies which may require additional training or loss of certification as a sample collector.

Missing samples occur when samples from any animal 12 months of age or older in an enrolled herd that dies, is slaughtered, escapes, or is lost are not submitted for diagnostic testing for CWD.

Approved States (in consultation with APHIS) should develop risk-based assessments to implement consequences for poor quality/incomplete samples and recurring missed samples of test-eligible animals in enrolled herds. If *neither* the obex nor the retropharyngeal lymph node in a test-eligible animal can be tested due to being missing or of poor quality, then consequences may include, but are not limited to

1) A requirement to replace missed or poor quality samples with testable post-mortem samples from an equal number of animals of the same sex and species that resided in the herd for at least as long as the untested animals; or

2) A reduction in herd status date (with loss, reduction, or delay in herd certification); or

3) A direct suspension of herd status for some period of time.

The following tables are provided as **examples** of adjustments that **could** be made to CWD herd status to account for poor quality, incomplete, or missing samples. This example considers the current status of the enrolled herd, the number of poor quality/missing samples, and the percentage of annual removals from the herd. Annual

Removals are defined as all adult animals (12 months or older) that were removed or lost from inventory for ***any*** reason since the previous annual inventory. When animals are removed from a herd, they are lost to surveillance testing.

NOTE: In the National Animal Health Monitoring Service Cervid 2014: Health and Management Practices on U.S. Farmed Cervid Operations, 2014, the average removal rate (sales, hunt-harvest, slaughter, etc) was 21.3 percent per year, with deer operations at 22.3 percent and elk operations at 20.3 percent.

Herds without Certified Status: HCP herd status will be reduced for *each poor quality or missing sample* as follows:

% Annual Removal Rate from Herd	Status Reduction
0 to 20%	1 year
21 to 40%	1.5 years
41% or more	2 years

Herds with Certified Status: HCP herd status will be reduced for *each* animal that dies, is slaughtered or hunt-harvested, escapes, or is lost and is not tested for CWD (including due to poor quality, incomplete, or missed samples) as follows:

% Annual Removal Rate from Herd	Status Reduction
0 to 20%	0.5 year
21 to 40%	1 year
41% or more	1.5 years

Examples:

1) A certified herd with a 10 percent annual removal rate fails to test an animal that died in the herd. The owner also declines to euthanize and test a comparable animal from the herd as a replacement for the missed sample. In this case, the herd would be reduced to uncertified status and would be unable to move animals interstate for 0.5 year. The herd inventory would be repeated after the 0.5 year (6 months) and the herd could regain certified status assuming it continued to comply with program requirements.

2) A certified herd with a 10 percent annual removal rate fails to test 3 animals that died in the herd. They also decline to euthanize and test comparable animals

from the herd as a replacements for the missed samples. In this case, the herd would be reduced to uncertified status and would be unable to move animals interstate for 1.5 years. The herd inventory would be repeated after 1.5 years (18 months) and the herd could regain certified status assuming it continued to comply with program requirements.

3) A certified herd with a 50 percent annual removal rate fails to test an animal that died in the herd. They also decline to euthanize and test a comparable animal from the herd as a replacement for the missed samples. In this case, the herd would be reduced to uncertified status and would be unable to move animals interstate for 1.5 years. The herd inventory would be repeated after 1.5 years (18 months) and the herd could regain certified status assuming it continued to comply with program requirements.

4) An enrolled (not yet certified) herd with a 15 percent annual removal rate fails to test 2 animals that died in the herd. They also decline to euthanize and test comparable animals from the herd as replacements for the missed samples. In this case, the herd would be reduced in status by 2 years.

   An enrolled (not yet certified) herd with a 15 percent annual removal rate fails to test 2 animals that died in the herd. They agree to euthanize and test 2 comparable animals from the herd as replacements for the missed samples. In this case, the herd would retain their status as long as the test results are “not detected”.

States may choose to develop and implement their own risk-based approach for consequences for poor quality or missing samples.

5.5 Exceptions

Exceptions to the testing requirement may be granted by APHIS or the Approved State Official for extenuating circumstances beyond the control of the herd owner as follows:

CWD sample collections may be limited to two animals per occasion when APHIS or the Approved State Official determines that the animals died from a mass casualty/mortality event (where numerous animals die over a short period of time from the same apparent cause) such as during a natural disaster or an infectious disease outbreak (such as epizootic hemorrhagic disease), or from a known zoonotic disease where sample collection would pose a public health risk. In these cases, the certified sample collector will sample the animals believed to be at higher risk for CWD. Higher-risk animals would include older animals, males preferentially over females, or those animals having any known pre-existing health conditions or in poor body condition.

5.6 Tissue for DNA Comparison Testing

APHIS strongly recommends that a piece of fresh (not in formalin) tissue attached to an official animal identification (ID) be submitted with each sample that is submitted for CWD testing. If part of the ear cannot be removed (e.g., for taxidermy purposes), then a new identification tag can be affixed to the hide skin and recorded in the animal's official record, and the tagged hide section submitted with the diagnostic specimens.

This will allow APHIS to perform DNA comparison testing (i.e. identity testing) and genotyping if the animal tests positive for CWD. APHIS will perform DNA comparison testing for all index cases in newly identified CWD-positive herds.

Confirming the identity of the CWD-positive animal increases confidence that the State is implementing the regulatory actions described in 9 CFR 55 and Part B of these Program Standards in the appropriate herd. There are four possible outcomes of the DNA comparison testing (See also Appendix V):

- Official identification with fresh tissue attached was not submitted with the CWD-positive sample -- States should proceed with regulatory actions based on the official identification provided on the VS 10-4 form submitted with the sample.
- The DNA comparison testing does not yield a valid result – States should proceed with regulatory actions based on the official identification provided on the VS 10-4 form submitted with the CWD-positive sample.
- The CWD-positive tissue matches the tissue submitted with the official identification -- States should proceed with regulatory actions.
- The CWD-positive tissue does not match the tissue submitted with the official identification -- States should further investigate the likely source of the CWD-positive sample before proceeding with regulatory actions. If the identity or source of the CWD-positive sample cannot be determined with confidence after a thorough investigation, the State may choose not to take further regulatory action. The State may choose to implement consequences for poor quality samples as described in Program Standards Part A Section 5.4.

An enrolled herd owner may request identity testing for other CWD-positive animals at the owner's expense. The herd owner must request identity testing, in writing, to the Assistant Director (AD) and the State veterinarian. The request must include the owner name, address, animal and herd information, test information and reason for request. VS will only consider the results of DNA comparison testing performed at the request of a herd owner for regulatory purposes if the comparison is performed using fresh tissue attached to an ID that was submitted with the CWD-positive sample to NVSL.

6. Diagnostics

The regulatory authority for official CWD tests and laboratory approval is found in 9 CFR 55.8.

6.1 Testing Authority and Approved Laboratories

Testing Authority

Laboratories will be approved by NVSL, as designated by the APHIS Administrator, to conduct official CWD testing in accordance with 9 CFR 55.8. All suspect positive test results must be confirmed by NVSL.

Approved Laboratories

Only laboratories that are members of the National Animal Health Laboratory Network (NAHLN) will be approved to conduct official CWD diagnostic testing. Requirements for laboratory approval and a list of laboratories approved to conduct CWD testing can be found on the NAHLN Web Site (https://www.aphis.usda.gov/animal_health/nahln/downloads/cwd_elisa_lab_list.pdf).

Not all laboratories are approved to perform all officially recognized types of CWD assays. The VS Cervid Health staff, the NVSL Director, and the NAHLN Coordinator will maintain a list of officially recognized CWD assays and when appropriate the tissues approved for laboratories that conduct these tests for CWD. The list will be available on request to all interested parties.

6.2 Official CWD Tests

An official CWD test is approved by the Administrator in accordance with 9 CFR 55.8. To be considered as an official test for CWD, a test method must be:

1) Licensed by the Center for Veterinary Biologics (CVB), if required (i.e., ELISA tests, etc).

2) Performed by APHIS-approved laboratories, at NVSL, or at another laboratory to which NVSL has referred a case for confirmatory testing.

3) Performed following NVSL protocols.

The following are considered official tests for CWD when used as described in these Program Standards:

Approved CWD Test Method	Tissue Tested	Approved Use
Immunohistochemistry (IHC) test	Medial retropharyngeal lymph node (MRPLN) and obex collected post-mortem and preserved in formalin[1]	• Routine herd surveillance • Testing in conjunction with epidemiological investigations and herd plans for CWD-positive, suspect, exposed, and epi-linked herds
Immunohistochemistry (IHC) test	Ante-mortem biopsy of white-tailed deer rectoanal-associated mucosa-associated lymphoid tissue (RAMALT)	This is an official test in white-tailed deer **only** when outlined in a herd plan and: • Genotype at codon 96 is established • Used as a whole herd test as indicated in herd plans for CWD-exposed herds, and epi-linked herds as described in Part B **and** • Performed at NVSL
Immunohistochemistry (IHC) test	Ante-mortem biopsy of white-tailed deer MRPLN	This is an official test in white-tailed deer **only** when outlined in a herd plan and: • Genotype at codon 96 is established • Used as a whole herd or individual test as indicated in herd plans for , CWD-exposed herds, and epi-linked herds as described in Part B **and** • Performed at NVSL
Enzyme-linked immunosorbent assay (ELISA) by Bio-Rad	Fresh medial retropharyngeal lymph node (MRPLN) and obex collected post-mortem[1]	This is an official HCP test only when used for: • Slaughter surveillance in farmed cervids; or • Carcass segregation for disposal; or

[1] Although medial retropharyngeal lymph nodes (MRPLNs) may be early CWD detection sites in deer and elk, it is not uncommon to find elk that are obex-positive and MRPLN-negative. Therefore, confidence in CWD detection is increased when **both** obex and MRPLNs are tested.

		• Other purpose as approved in advance by APHIS **and** • Is performed at NVSL or at a NAHLN laboratory approved to conduct the ELISA Many States use the ELISA to conduct wildlife surveillance. This use is not subject to APHIS approval.
Western blot	Fresh medial retropharyngeal lymph node (MRPLN) and obex collected post-mortem[1]	This is an official test **only** when performed at NVSL

6.3 Approval of Official Diagnostic Tests

Prior to evaluation for official use, the manufacturer should obtain a product license from the CVB, if needed.

Companies/researchers are encouraged to contact the Cervid Health Team to review preliminary data and discuss additional data needs for candidate tests prior to submission.

The test manufacturer should submit an application package containing the following information to the Cervid Health Team:

1) A standardized protocol that includes a description of the test, sample type, all methods associated with preparing the sample and conducting the test, reagent specifics, required materials and equipment, and control and quality assurance measures.

2) A description of the proposed use of the test in the CWD HCP program and the suitability of the test for the stated purpose. Specifically include cervid species, post- or ante-mortem use, and conditions for use (e.g., whole herd versus individual animal, routine surveillance testing versus use in herds under epidemiological investigation, etc.).

3) Data/scientific evidence to demonstrate:

   A. Diagnostic sensitivity of the test evaluated in a range of infected animals including:

1. Animals early in the clinical progression, such as:
   a. Animals that are MRPLN-only positive,
   b. Elk that are obex-only positive, or
   c. Animals of all three genetic polymorphisms (96 for white-tailed deer, 132 from elk).

2. Animals late in the clinical progression, such as:
   a. Animals that are MRPLN- and obex-positive, or
   b. Animals of all three genetic polymorphisms (96 for white-tailed deer, 132 from elk).

3. Data provided should include the genotype (96 for white-tailed deer, 132 from elk) and complete post-mortem testing results for IHC on obex and MRPLN for each animal.

4. Description of the calculation.

B. Diagnostic specificity in animals believed to be non-infected based on HCP herd certification status and results from mortality testing from at least the last 5 years.

C. Repeatability of the test result. This refers to the ability of a test to repeatedly produce the same result on a given sample. Evidence to demonstrate repeatability includes detailed information about the collection of the data, including controls and control data.

D. Reproducibility of the test results at other laboratories. This refers to the ability of a test to repeatedly produce the same result on a given sample when the test is performed at multiple laboratories by multiple people. In addition to the supporting data, a letter of support and certification of test results from participating laboratories is suggested.

4) Other data and documentation, as requested by APHIS.

5) Field trials and/or pilot projects using the test may be recommended/required prior to final approval.

The Cervid Health Team will coordinate with NVSL, NAHLN, CVB and other scientific experts within APHIS and USDA to review the application package and evaluate the test based on, but not limited to, the criteria described in 9 CFR 55.8. APHIS may approve the new test methods or request additional data, including results from field trials.

APHIS may limit use of the test to certain species or types of animals or for use in specific situations. APHIS will clearly describe the conditions for official use of the approved test.

6.4 Test Results

As described in Section A 5.6, sections of brainstem/obex, MRPLN, and RMALT are evaluated by an official test in an approved laboratory to demonstrate the presence of the infectious CWD prion. Samples in which the infectious CWD prion is detected in testing at approved laboratories are considered to be CWD suspect pending confirmatory testing at NVSL. All suspect diagnostic test results from an approved laboratory must be confirmed by NVSL to establish a diagnosis of a CWD positive animal.

Brainstem or lymph tissues from an animal in which CWD prions are not detected by an official test does not mean absence of infection, only that prion was not detected in those tissues from that animal at the time of testing. Based on current transmissible spongiform encephalopathy research and pathogenesis studies, it is possible to have CWD prions present at levels below the analytical sensitivity of the test. CWD prions may be present in tissues other than those that were examined. Hence, “not detected” test results may not indicate the true status of the animal if it is in the early stages of the infection.

6.5 Rejected Samples

Samples may be rejected as unsuitable for diagnostic purposes for a wide variety of reasons. These poor quality samples will not contribute to required herd surveillance and may result in the consequences described in Section 5.9. Common examples of rejected samples include:

1) No identification submitted with the sample.

2) Incorrect tissue type.

3) Autolyzed (degraded) samples.

4) Samples where the tissue is unidentifiable.

5) Brain samples that do not include the obex.

6) Sample of insufficient size.

7) Sample contains an insufficient number of lymphoid follicles.

The reason for rejected samples can be described on official laboratory reports as follows:

1) ISF: Insufficient follicles (<6 follicles and no positive staining present).

2) LOC: Location (used for CNS exclusively, no DMNV (Dorsal Motor Vagus Nucleus) identifiable, wrong brain region).

3) ISF: Loc: (RB (Rectal Biopsy); <6 follicles and >50 percent squamous epithelium, rather than rectal mucosa).

4) U: Unsuitable (no significant lymphoid tissue, e.g. salivary gland).

5) S: Suspect (NAHLN lab sees suspicious stain).

6) NT: Not tested (not tested because unnecessary).

7) UNA: Unacceptable (poor quality sample).

6.6 Reporting of Results

Positive test results are to be reported by NVSL to the submitting NAHLN lab, State animal health official, the Assistant Director in the State where the herd resides, and the National Cervid Health program staff.

All other test results are to be reported by the testing laboratory to the submitter with copies provided to the corresponding Approved State Official for farmed cervids in the State where the herd resides.

7. Interstate Movement

The requirements for interstate movement of live cervids with regard to CWD are described in 9 CFR 81.2 and 81.3. These requirements apply to both farmed cervids and wild-caught cervids that are moved interstate to eventually be released back into the wild.

The following conditions must be met for live farmed cervids to be eligible for interstate movement:

1) The animals are enrolled and the herd has achieved Certified status in an approved State CWD HCP.

2) Each animal in the shipment must have at least two forms of unique identification attached, one of which must be an official animal identification with a nationally unique identification number, as described above in Section (3.2) Animal Identification.

3) A certificate of veterinary inspection (CVI) must be issued for interstate movement. It must contain the following information:

   A. All identification numbers of each animal in the shipment.

   B. Total number of animals covered by the certificate.

   C. Purpose for which the animals are to be moved.

   D. Consignor and herd of origin with complete addresses.

   E. Consignee and point of destination with complete addresses.

   F. A statement by the issuing accredited veterinarian or State or Federal veterinarian that the animals in the shipment have achieved Certified status in the CWD HCP and that the animals were not exhibiting clinical signs associated with CWD at the time of examination. The consignor or owner should contact the State representative in the State of destination to determine if there are any additional requirements.

Cervids eligible to move interstate in accordance with CWD regulations, and meeting the conditions specified in 9 CFR 81.5, can transit States en route to their destination. The regulations at 9 CFR 81.5 (only) preempt State and local laws or regulations.

1) 9 CFR 81.3 identifies specific exemptions to these requirements, including exemptions for Animals moved directly to a recognized slaughter establishment. The consignor or owner also should contact the State representative in the State of

destination to determine if they meet all import requirements.

2) Research animals.

3) Interstate movements approved by the Administrator on a case-by-case basis.

States or Tribes may transport wild-caught cervids (elk, deer, moose, or other cervidae) from one State or Tribal location to another for release to establish new or augment existing free-ranging herds. The movement is subject to approval by the animal health officials of the receiving State and APHIS. VS Guidance 8000 “Surveillance and Testing requirements for Interstate Transport of Wild Caught Cervids” establishes a uniform process of disease risk assessment and recommended minimum standards for testing to help prevent the spread of CWD, bovine tuberculosis (TB) and brucellosis when wild cervids are captured for interstate movement and release.

Transport of game meat and other products derived from farmed cervids for purposes of interstate commerce is regulated by the Food and Drug Administration and is not addressed in the APHIS CWD regulations or these Program Standards. Similarly, transport of carcasses and other parts derived from hunt-harvested wild cervids is regulated by appropriate State agencies and is not addressed in the APHIS CWD regulations or these Program Standards.
:

Part B. Guidance on Responding to CWD

The CWD regulations in 9 CFR part 55 describe minimum requirements for States in response to the finding of a CWD-positive animal. These Program Standards describe acceptable methods to meet these minimum regulatory requirements. The methods in these Program Standards have been approved by the APHIS Administrator. Alternatively, States may propose other methods/approaches to meet the regulatory requirements. These alternative proposals should be submitted in writing to APHIS for approval.

1. Epidemiological Investigations

The purpose of the investigation is to identify animals and herds that were exposed to the CWD-positive animal during the last 5 years. Quarantines and/or movement restrictions limit the potential for further spread of the infection until the infection status of the exposed animal or herd can be assessed.

Upon NVSL confirmation of a CWD-positive animal, the Approved State, in cooperation with APHIS, should conduct an investigation to determine the locations where the CWD-positive and the CWD-exposed animal(s) resided during the last 5 years. The investigation should start within 7 business days of the laboratory confirmation.

All out-of-State traces should be promptly reported to the appropriate State authorities within 45 calendar days following notification of a CWD-positive animal. All notification should be provided in writing to the respective State or States and a copy provided to the AD in the corresponding District Field Office even if the initial contact was verbal.

In addition to tracing movements of animals, other factors should be considered in the epidemiological investigation. These factors are addressed in Appendix III, CWD Epidemiology Investigation and Report Templates. They may include, but are not limited to: the genetics of CWD-positive animal or animals, the tissue or tissues that tested positive, the length of time the CWD-positive animal or animals spent in the herd or herds, and the testing history.

Ideally, the investigation will determine the source of infection; however, this is not always possible. If the investigation determines the likely source of infection, then the statuses and need for quarantine of herds and animals involved in the investigation should be re-evaluated.

2. Quarantine

The State representative should issue quarantine or hold orders for CWD-positive and CWD-exposed herds. Trace-forward Epi-Linked and Trace-back Epi -linked herds will be placed under quarantine until the epidemiological investigation determines the status of the CWD-exposed animal(s). A Quarantine or hold order is not required for a Pass-through herd until the status of the CWD-exposed animals that resided in the herd is determined. CWD-exposed animals must be quarantined and held on the premises where they currently reside unless a State or Federal permit for movement (such as VS Form 1-27) has been obtained.

If a quarantined herd is not depopulated, the herd should remain in quarantine for 60 months (5 years) from the last exposure to the CWD-positive animal or in the case of an epi-linked herd the last exposure to a CWD-exposed animal , as otherwise stipulated in the herd plan (e.g. following 2 whole-herd ante-mortem tests), or at the discretion of the State representative for a period of time as determined by a risk evaluation based on the findings of the epidemiological investigation. State representatives may also modify a quarantine to permit movement of CWD-exposed animals onto a CWD-positive quarantined premises, such as a terminal hunting facility, where all cervids are harvested within 90 days of introduction and tested for CWD.

Quarantine may be released only after all herd plan requirements have been met and completed, or as determined by the State representative.

3. Classification of Animals and Herds During an Epidemiological Investigation

Any CWD-susceptible cervid that has, by definition, commingled with the CWD-positive animal in the last 5 years is considered to be CWD-exposed. All herds that contain or contained CWD-exposed animals will immediately be placed in Suspended status until further epidemiology can be assessed. The Suspended herds will then be classified as follows (also see Appendix VI):

3.1 CWD-Positive Herd

The herd where the CWD-positive animal resided upon diagnosis is considered a CWD-positive herd and will immediately lose HCP herd status. The herd may re-enroll in the HCP only after entering into a herd plan.

Options for responding to a CWD-positive herd:

1) Complete depopulation and post-mortem CWD testing of the herd. Depopulation may include hunter harvesting and/or slaughter with movements under permit, or

2) Quarantine for 5 years since last CWD-positive case, with or without selective culling of animals. The herd will remain under Suspended status until a herd plan is developed and implemented (see Herd Plan section below).

3) Ante-mortem CWD testing and genotyping using NVSL protocol and APHIS-approved procedures may be included in the herd plan for disease management purposes (see Appendix II) and to reduce environmental contamination.

3.2 CWD Exposed Herd(s)

If the epidemiological investigation determines that the CWD-positive animal resided in another herd (or multiple herds) within the last 5 years, then the herds are considered CWD-exposed herds and will immediately lose HCP status. The herd may reenroll in the HCP only after entering into a herd plan.

Options for responding to a CWD-exposed herd:

1) Complete depopulation and post-mortem CWD testing of the herd. Depopulation may include hunter harvesting and/or slaughter with movements under permit, or

2) Quarantine for 5 years since the last exposure to a CWD-positive animal, with or without selective culling of animals. The herd will remain under Suspended status until a herd plan is developed and implemented (see Herd Plan section below). Time in quarantine may be lessened for:

   A. If the CWD-exposed herd contains only white-tailed deer – Whole herd ante-mortem IHC RAMALT CWD testing and genotyping using NVSL protocol and

APHIS-approved procedures as included in the herd plan (see Appendix II).

B. If the CWD-exposed herd contains only white-tailed deer – Whole herd ante-mortem IHC MRPLN biopsy CWD testing and genotyping using NVSL protocol and APHIS approved procedures as included in the herd plan (see Appendix II).

C. At the discretion of the State representative for a period of time as determined by a risk evaluation based on the findings of the epidemiological investigation.

3.3 Trace-Forward, Trace-Back and Pass-Through Epidemiological-Linked Herds

If the epidemiological investigation determines that CWD-exposed animals that resided with a CWD-positive animal within 5 years prior to the diagnosis of CWD have since moved to or through other herds, then those herds are considered to be epidemiologically linked.

Options for responding to a Trace-forward or a Trace-back epidemiologically-linked herd:

1) If all of the CWD-exposed animals have died, were tested for CWD, and had “not detected” results, then the epidemiologically-linked herd is removed from Suspended status and maintains its original HCP status, including time spent in Suspended status.

2) If CWD-exposed animals are still present in the herd, then those animals may be euthanized and tested for CWD. If all CWD-exposed animals are accounted for and no samples tested positive for CWD, then the herd is removed from Suspended status and maintains its original HCP status, including time spent in Suspended status.

   If any of the CWD-exposed animals have died and were not tested for CWD, or if the CWD-exposed animals no longer reside on the premises, or if the CWD-exposed animals are still present in the herd, but the owner does not agree to euthanasia and testing, then the herd will remain under Suspended status until a herd plan is developed and implemented (see Herd Plan section below). The herd should be quarantined for 5 years since the exposed animal(s) was exposed to a CWD-positive animal, with or without selective culling of animals. Time in quarantine may be lessened for:

   A. If the herd contains only white-tailed deer – Whole herd ante-mortem CWD testing and genotyping using NVSL protocol and APHIS approved procedures as included in the herd plan (see Appendix II).

   B. If the herd contains only white-tailed deer – Ante-mortem IHC MRPLN biopsy testing and genotyping of all CWD-exposed deer using NVSL protocol and APHIS approved procedures as included in the herd plan (see Appendix II).

C. At the discretion of the State representative for a period of time as determined by a risk evaluation based on the findings of the epidemiological investigation.

Options for responding to a Pass-through epidemiological linked herd:

1) Response to a Pass-through epidemiological linked herd will be determined by the status of the CWD-exposed animal(s) that has passed through the herd.
2) If the status of the CWD-exposed animal(s) that passed through the herd cannot be determined for whatever reason then the response will be determined by a risk evaluation based on the findings of the epidemiological investigation.

4. Reporting

Sharing accurate, timely, complete information about ongoing CWD epidemiological investigations among Federal and State animal health officials helps to control the spread of CWD by quickly and accurately identifying exposed animals and placing movement restrictions on animals and herds. It also provides State animal health officials with information they may use to release or reduce quarantines for herds under investigation, as appropriate.

Appendix III provides a template that States may use to report findings from their epidemiological investigation to APHIS and other State representatives. States are required to submit both a preliminary and a final report for herds enrolled in the HCP. Additionally, States must submit these reports for any herd that requests Federal indemnity. This reporting requirement will be included in the herd plan. States should submit a preliminary report for a newly identified CWD-infected herd to APHIS within 7 business days of NVSL confirmation of the CWD-positive animal. States should submit a final report for CWD-positive herds as part of their annual HCP report.

APHIS may request clarification or additional information on CWD-positive herds as needed for risk assessments, indemnity requests, or other reasons.

5. Herd Plans

A herd plan describes in detail the actions to be taken to control the spread of CWD from and within CWD-positive, exposed, epi-linked or suspect herds. It is a herd and/or premises management agreement based on a risk evaluation of the affected premises and herd and developed by APHIS in collaboration with the herd owner, State representatives, and other affected parties. The herd plan is not valid until it has been signed by the Assistant Director, the State representatives, and the herd owner. Herd plans should be signed within 60 days of a confirmed diagnosis of CWD.

A written, signed herd plan is required for herds to receive Federal indemnity. Quarantined herds must complete the requirements described in a herd plan before quarantines are released.

At a minimum, the herd plan should include:

1) Specified means of identification for each animal in the herd.

2) Regular examination (time period as determined by a State official or APHIS employee) of animals in the herd by a veterinarian for signs of disease.

3) Reporting to a State official or APHIS employee of any signs of central nervous system or wasting disease in herd animals.

4) Maintaining records of births and deaths as well as of the acquisition and disposition of all animals entering or leaving the herd, including the date of acquisition or removal, name and address of the person from whom the animal was acquired, and the cause of death, if the animal died while in the herd.

5) Testing of all mortalities, regardless of age (9 CFR 55.24 (2)(ii)). Records should be maintained for all samples submitted for CWD testing.

A herd plan may also contain additional requirements to prevent or control the possible spread of CWD, depending on the particular condition of the herd and its premises, including, but not limited to:

1) Depopulation of the herd if funds for indemnity are available. Depopulation also may be accomplished by moving animals from CWD-positive, suspect, epi-linked and exposed herds (by permit and under seal) to a slaughter facility or to an appropriate hunt facility at the discretion of the State officials.

2) Specifying the time for which a premises must not contain cervids after CWD-positive, CWD-exposed, or CWD-suspect animals are removed from the premises.

3) Removal of CWD-exposed or CWD-suspect animals from the premises if funds for indemnity are available or at the discretion of State officials.

4) Fencing requirements and time period for regular inspection of fences.

5) Selective culling of animals.

6) Restrictions on use and movement of possibly contaminated livestock equipment.

7) Procedures for cleaning and decontamination of premises, including the use of bleach and/or lye for EPA required reporting.

8) Whole herd ante-mortem CWD testing and genotyping using NVSL protocol and APHIS-approved procedures.

9) Requirement to provide information needed to complete the preliminary and final epidemiology reports (see Appendix III).

10) Current Centers for Disease Control and Prevention (CDC) guidelines for prevention of potential human exposure to CWD.

11) Other requirements.

A herd plan may be reviewed and changes proposed at any time by any signatory party in response to changes in the situation of the herd or premises. The plan may also be changed if the understanding of the nature of CWD epidemiology, or techniques to prevent its spread, improves. However, any proposed changes must be reviewed and approved by all signatories before they are adopted.

Additional information on CWD environmental contamination and recommended procedures for cleaning and decontamination of premises that may be included in herd plans for CWD-positive herds is provided in Appendix IV.

6. Federal Indemnity

6.1 Eligible Animals

Federal indemnity may be available for the purchase, destruction, and disposal of CWD-positive, exposed, and suspect animals.

APHIS will pay reasonable costs for destruction and carcass disposal for animals that are indemnified.

Once the animals are euthanized, the carcasses become the property of APHIS, and APHIS may collect tissue samples as desired.

At the State's discretion, a person may remove the skull plate with antlers attached and cleaned of all soft tissue and blood from the premises if the material is being moved to a taxidermist for processing and after the animal is tested "not detected" for CWD.

6.2 Appraisals

An appraisal must be conducted by a government or a private appraiser (VS Memorandum 534.1). The appraisal report and detailed supporting documentation must be submitted to the Cervid Health Team for review.

6.3 Indemnity Requests

The Assistant Director responsible for the State in which the animals reside should provide the following to the Cervid Health Team when submitting a request for Federal indemnity:

1) Completed indemnity request form signed by the Assistant Director.

2) The appraisal report with detailed supporting documentation, such as:

    A. The white-tailed deer appraisal calculator.

    B. Pedigrees.

    C. Sale receipts or invoices.

    D. Documentation of antler scores.

3) VS Form 1-23 and a herd plan signed by the herd owner and the Assistant Director.

4) Preliminary epidemiological report (see Appendix III).

6.4 Evaluation and Prioritization of Requests for Federal Indemnity Funds

Whole-herd depopulation and post-mortem testing of all cervids on the premises is often the preferred response to control the spread of CWD within and from CWD-positive and exposed herds. A limited amount of Federal indemnity funding is available to compensate producers and encourage depopulation. In recent years, the amount of available Federal indemnity funding has been insufficient to depopulate all CWD-positive herds identified in a single year. Further, indemnity funds have not been available to remove CWD-exposed animals for diagnostic testing to determine their infection status and the exposure status of specific herds involved in epidemiological investigations.

In light of these financial constraints, it is increasingly important for APHIS to prioritize how limited funds are used to provide indemnity in a way that:

1) Reduces the potential for disease transmission and environmental contamination.

2) Strategically removes CWD-exposed animals to inform risk evaluation and decision making regarding movement restrictions and other risk mitigations.

3) Encourages participation and compliance in the HCP.

APHIS will consider requests for Federal indemnity for CWD-positive, -exposed, and suspect animals and herds on a case-by-case basis. APHIS, in consultation with State representatives, will consider a number of interrelated factors as we comprehensively evaluate each case to make a decision about providing Federal indemnity. The factors we will consider and the relative priority of possibilities within each factor include (but are not limited to):

1) Availability of funds for indemnity.

2) Herd size (as it is related to the availability of funding).

3) Herd Status (CWD-positive herd >> Whole herd depopulation for herds with only CWD-exposed or suspect animals).

4) Type of Herd (Breeding herd >> Hunt preserve).

5) HCP Status (Enrolled and compliant >> Not enrolled or Enrolled but not compliant).

6) CWD detection in the local area (CWD not detected in wildlife or farmed cervids >> CWD detected in farmed cervids only >> CWD detected in wildlife).

7) Cervid density in local area (High >> Moderate >> low density).

8) Value of post-mortem testing of animals to understand epidemiology and inform

decision making (Animal removal will likely impact knowledge/decisions about multiple herds >> will only inform knowledge/decisions about herd animal is residing in).

7. Carcass Disposal

Destruction or inactivation of infectious prions is difficult and few methods have been documented as completely successful. In addition, there are currently no quality assurance or quality control methods to ensure prion inactivation.

Carcasses from CWD-positive, suspect, or exposed animals or herds should be disposed of in compliance with all Federal, State, and local regulations. Additional information about State requirements for carcass disposal is available on the Veterinary Compliance Assistance Web site. APHIS, upon request, can provide technical support and guidance to assist in identifying and implementing a local disposal plan.

Carcasses must be carefully transported to treatment or burial sites to prevent environmental contamination. Precautions should be taken to prevent ashes, blood, tissues, or feces from leaking from transport vehicles. All vehicles should be cleaned and disinfected after each use as described in Appendix IV.

The following list describes acceptable options for the disposal of carcasses from animals euthanized as part of a diagnostic or depopulation effort for CWD. Incineration, alkaline digestion, disposal of materials in appropriate landfills, and onsite burial, or a combination of these methods, are generally the most suitable options. These options are based on the available science of CWD inactivation. Changes to the list of options may be made as new information becomes available.

7.1 Incineration

Carcasses may be incinerated in an Environmental Protection Agency (EPA)-approved conventional incinerator, air curtain incinerator, or cement kiln. Prions can be destroyed through incineration provided the incinerator can maintain a temperature of 900° F for 4 hours. Incineration of animals onsite with a mobile incinerator is an option as it presents the least risk of spreading contaminated materials by moving carcasses. However, mobile incinerators require large amounts of fuel to maintain an even, high temperature appropriate for prions.

After incineration, ashes should be buried in an active, licensed landfill at a depth that meets local and State regulations to prevent scavenging or contamination of groundwater.

7.2 Alkaline hydrolysis

Carcasses of infected animals can be destroyed in a sterile alkaline solution using an alkaline hydrolysis digester. This consists of an insulated steam-jacketed stainless steel vessel which operates at up to 70 psi and 300° F into which sodium hydroxide and water is added, heated, and continuously circulated. This process degrades proteins and the temperature, together with alkali concentrations, deactivates prions.

After digestion, treated material may be buried in an active, licensed landfill at a depth that meets local and State regulations.

7.3 Landfill

Carcasses may be buried in a licensed, active landfill that meets local and State regulations for animal carcass disposal. However, this method will NOT inactivate the prions.

The definition of infectious waste varies among States, which could affect the standards associated with collection, handling, and disposal of waste that can include tissue, body parts, heads, and carcasses as well as contaminated laboratory materials. Consult with local and State authorities when pursuing this option.

In addition, individual animals could be tested for CWD using an ELISA with carcass disposal delayed until results are obtained. Subsequently, carcasses from positive animals can be disposed of with incineration or alkaline hydrolysis with burial of the treated materials. Carcass burial in a landfill in compliance with local and State regulations may be used for other animals with “Not Detected” results.

7.4 Onsite Burial

Carcasses may be buried onsite at a depth that meets local and State regulations for animal carcass disposal. However, this method will NOT inactivate the prions.

In addition, individual animals could be tested for CWD using an ELISA with carcass disposal delayed until results are obtained. Subsequently, carcasses from positive animals can be disposed of with incineration or alkaline hydrolysis with burial of the treated materials. Carcass burial onsite in compliance with local and State regulations may be used for other animals with “Not Detected” results.

Appendix I: Links to Forms and Documents

Forms and templates for application to the Approved State CWD Herd Certification Program include:

- VS Form 11-2 (Application for Chronic Wasting Disease Herd Certification program (CWD HCP) approval, renewal, or reinstatement of a State)
- MOU Between State and APHIS for CWD HCP

The Final CWD Rule:

- 9 CFR part 55
- 9 CFR part 81

A list of Approved State CWD HCPs

VS Form 10-4 Laboratory Submission Forms

VS Form 10-4A Additional Page for Sample Submissions

CWD Program – "CWD Sample Collection Guidance"

Additional information about the Cervid Health Program

Appendix II: Guidelines for Use of Whole Herd Ante-Mortem Testing of Herds that Contain or Contained CWD-Exposed Animals

Biopsy of the medial retropharyngeal lymph node (MRPLN) or the rectal anal mucosal associated lymphoid tissue (RAMALT) for the detection of the abnormal prion protein (protease resistant misfolded prion) associated with CWD is an official test *only in white-tailed deer*, and **only** when:

1) Genotype at codon 96 is established;

2) Used with herd plans for CWD-exposed herds, and epidemiologically- linked herds as described in Part B. , **and**

3) When performed at NVSL.

A case-by-case agreement will outline the specific timing and procedures to be used in a particular situation and will be included in the overall herd plan.

The following is a draft herd agreement for ante-mortem RAMALT testing that could be modified for the specific situation and incorporated into a herd plan:

Draft Herd Agreement for CWD Exposed Herds to Use Rectal Biopsy Testing as a Risk Assessment Herd Management Tool

Preface: Biopsy of rectal anal mucosal associated lymphoid tissue (RAMALT) for the detection of the abnormal prion protein (protease resistant misfolded prion) associated with CWD has a high specificity but a relatively low sensitivity for the detection of CWD in individual animals in comparison to post-mortem testing. Serial, whole-herd testing using RAMALT increases the confidence of detecting at least one positive animal in a potentially exposed herd. Sampling must be conducted by proficient collectors with adequate animal restraint.

The genotype of the animal is known to be associated with the tissue distribution of the abnormal prion over time (GG on codon 96 will have earlier and more extensive tissue distribution than GS on codon 96). The timing of the second whole herd testing will therefore depend on the genetic makeup of the herd. Current research suggests that the dose load and route of infection may also impact the time from exposure to detection.

Assumptions:

1) Genotype of codon 96 influences the interpretation of the RAMALT results.

2) At least two whole herd CWD tests using RAMALT samples must be conducted in series.

3) If more than 10 percent of the animals in a whole herd test have insufficient follicles for diagnostic purposes, then those animals must be resampled until a minimum of 90 percent of the entire herd is successfully sampled. A minimal number of samples with insufficient follicles is inherently accepted as part of the RAMALT technique.

APHIS Approved Procedure:

1) Initial whole herd test will be conducted not less than 24 months after the last known exposure to a CWD-positive animal. Whole-herd RAMALT biopsy, and whole blood samples for codon 96 genotyping, will be collected on all animals equal to or greater than 12 months of age as described in Appendix II. Biopsy samples will be sent to NVSL and blood samples will be sent to an APHIS-approved genetics laboratory.

2) Timing of the second whole herd RAMALT test will be determined by the results of the herd genotyping.

   A. The second whole herd test for herds with over 70 percent GG animals will be at least 3 years after the last known exposure and at least 6 months after the initial whole herd test.

   B. The second whole herd test for herds with 50 percent to 70 percent GG animals will be at least 3.5 years after the last known exposure and at least 6 months after the initial whole herd test.

   C. Herds with fewer than 50 percent GG animals will not be permitted to use ante-mortem RAMALT testing.

3) All sample collection shall be done by a State or Federal veterinarian or a licensed, accredited veterinarian under the supervision of a State or Federal veterinarian, and the samples shall be considered to be the property of USDA.

4) All CWD diagnostics shall be performed by NVSL. Genetic testing of whole blood should be performed at an approved laboratory.

5) If more than 10 percent of the animals in a whole herd test have insufficient follicles for diagnostic purposes, then those animals must be resampled until a minimum of 90 percent of the entire herd is successfully sampled.

6) All costs associated with sample collection, genetic testing, and diagnostic testing are the responsibility of the herd owner.

7) The loss of any animal, function, or part of an animal that could arise as a result of handling or sample collection associated with this agreement shall be borne by the herd owner and not by the State or USDA.

8) Any method of chemical restraint used for testing shall be performed or administered by a licensed accredited veterinarian approved by the State and USDA.

9) The herd owner agrees to be in, and remain in, compliance with the terms of the State CWD HCP, and continue to maintain appropriate licensure with the State. In addition, any animal 6 months of age or older, that dies during the period of the herd plan, must be made available for sample collection.

10) If a positive result is found on rectal biopsy, the herd will remain under quarantine and will be designated a CWD-positive herd.

11) Notwithstanding paragraph 9, if the herd is negative on both whole herd tests, the State and USDA will evaluate the test results and agreement compliance for quarantine release. If the herd has remained in compliance with all terms of the herd plan, the quarantine will be released.

Appendix III: CWD Epidemiology Investigation and Report Templates

Preliminary Epidemiology Report Worksheet

APHIS requests that States provide the following preliminary information to APHIS within 7 business days of NVSL confirmation of a CWD-positive animal in a newly identified CWD-positive herd. APHIS may request clarification or additional information on CWD-positive herds as needed for risk assessments, indemnity requests, or other reasons. Submit the completed worksheet to: VS.SP.Cervid.Health@aphis.usda.gov

State_____County________________Herd ________________

Owner _____________________

Please complete one form for each CWD-positive herd that you have identified in your State.

Index Case (defined as the first positive case identified in a herd) ☐ Check if traced from another positive herd

1. Age at the time of death/euthanasia? ___Yr____Mo
2. Sex?____M____F
3. Species? ________________
4. Was the index case a natural addition?___or a purchased addition?____(check one)
   If natural addition, date of birth____/___/_____

   If purchased, date added to herd ___/___/_____

   If purchased, from where?________________________(herd/name)
   _____(State)
5. Date of death/euthanasia?___/___/_____
6. Date CWD samples were taken?___/___/_____
7. Was the index case exhibiting clinical signs at the time of death/euthanasia? Y/N/Don't know
8. Obex test result? Positive___Not detected____Location____Not sampled ___
   Lymph node test result? Positive__Not detected____Location ___
   Not sampled ___
   ________________ test result? Positive ___ Not detected ___ Location ___

   Genetics testing results?____@codon_________@codon____Not tested ____

Positive Premises (defined as the premises on which the index case resided at the time of diagnosis)

1. Date cervid herd was established? ___/___/_____
2. Type of operation (check all that apply)?____Breeding____Hunting_____Other
   (If Other, specify type_____________________)
3. Most recent known/reported captive cervid inventory at the time the index case was diagnosed: Date of inventory____/____/_____

Cervid Herd Inventory at the Time of Index Case Diagnosis					
Species	**1 year old and over**		**Under 1 year old**		**Total Inventory**
	Males	**Females**	**Males**	**Females**	
Elk					
White-tailed deer					
Other (_________________)					

4. Total size of the area where captive cervids were held?___________acres
5. Size of the enclosure where the index case was held?___________acres
6. Were animals from the index herd housed on more than one location? Y/N/Don't know
   If yes, please explain
   ____
7. Was the premises double-fenced at the time the index case was diagnosed? Y/N/Don't know
8. Is equipment or vehicles shared by other premises?
9. If it is a breeding operation, is sexed semen, AI, or embryo transfer used?
10. Was/Were the animal/s bottle fed?
11. Was the premises managed as a closed herd at the time of diagnosis? Y/N/Don't know
    If yes, for what length of time prior to the index case diagnosis?___Yr_____Mo
    If the herd was not managed as a closed herd, how many other herds were cervids sourced from in the 5-year period prior to the index case diagnosis?
    In-State sources # of premises _____ # of animals _____
    Out-of-State sources # of premises ______ # of animals _____

(Please include any known details of sources)How many other herds were cervids moved to in the 5-year period prior to the index case diagnosis?

In-State departures	# of premises _____	# of animals _____
Out-of-State departures	# of premises _____	# of animals ____

(Please include any known details of departures)

12. Were any ancillary businesses associated with the positive premises? (e.g. urine collection, taxidermy, wildlife rehabilitation, fawn raising)? Y/N/Don't know
(If Yes, specify type(s))
____)
13. Was the index herd enrolled in a Herd Certification Program (HCP) at the time that the index case was diagnosed? Y/N If yes, date of enrollment? ___/___/_____
If yes, was the herd in compliance with the requirements of the HCP at the time the index case was diagnosed? Y/N/Don't know
If the herd was not in HCP compliance at the time the index case was diagnosed, please explain:
____
14. At the time that the index case was diagnosed, was the index herd located:
Within 10 miles of known CWD positives in ***wildlife***? Y/N/Don't know
Between 11 and 50 miles of known CWD positives in ***wildlife***? Y/N/Don't know
15. At the time that the index case was diagnosed, was the index herd located:
Within 10 miles of known CWD positives in other ***captive cervids***? Y/N/Don't know
Between 11 and 50 miles of known CWD positives in other ***captive cervids***? Y/N/Don't know
16. What is the wild cervid population density outside of the positive premises?
17. Any other known risk factors or important information regarding the positive herd?

Final Epidemiology Report Worksheet

A final report of the epidemiological investigation is required for all HCP-enrolled CWD-infected herds and for all herds that receive APHIS indemnity funds. Ideally, States will submit final epidemiology reports from all CWD-positive herds to facilitate future disease mitigation efforts. States should submit the final report for CWD-positive herds as part of their annual HCP report.

State_____County________________Herd ________________

Owner _____________________

Please complete one form for each CWD-positive herd that you have identified in your State.

Index Case (defined as the first positive case in a herd) ☐ Check if traced from another positive herd

1. Age at the time of death/euthanasia? ___Yr____Mo
2. Sex?____M____F
3. Species? ________________
4. Was the index case a natural addition?____or a purchased addition? _____ (check one) If natural addition, date of birth____/___/_____
   If purchased, date added to herd ___/___/_____
   If purchased, from where? ________________________(herd/name) _____ (state)
5. Date of death/euthanasia?____/___/_____
6. Date CWD samples were taken?____/___/_____
7. Was the index case exhibiting clinical signs at the time of death/euthanasia? Y/N/Don't know
8. Obex test result? Positive___Not detected____Location____Not sampled ___
   Lymph node test result? Positive___Not detected____Location ___
   Not sampled ___
   ________________ test result? Positive ___ Not detected ___ Location ___

   Genetics testing results?____@codon________@codon____Not tested ____

Positive Premises (defined as the premises on which the index case resided at the time of diagnosis)

1. Date cervid herd was established? ___/___/_____
2. Type of operation (check all that apply)?___Breeding___Hunting____Other (If Other, specify type____________________)

3. Most recent known/reported captive cervid inventory at the time the index case was diagnosed: Date of inventory___/___/_____

Cervid Herd Inventory at the Time of Index Case Diagnosis					
Species	**1 year old and over**		**Under 1 year old**		**Total Inventory**
	Males	**Females**	**Males**	**Females**	
Elk					
White-tailed deer					
Other (________________)					

4. Total size of the area where captive cervids were held?__________acres
5. Size of the enclosure where the index case was held?__________acres
6. Were animals from the index herd housed on more than one location? Y/N/Don't know
   If yes, please explain
   ____
7. Was the premises double-fenced at the time the index case was diagnosed? Y/N/Don't know
8. Was the premises managed as a closed herd at the time of diagnosis? Y/N/Don't know
   If yes, for what length of time prior to the index case diagnosis?____Yr____Mo
   If the herd was not managed as a closed herd,
   How many other herds were cervids sourced from in the 5-year period prior to the index case diagnosis?
   In-State sources # of premises _____ # of animals _____
   Out-of-State sources # of premises _____ # of animals_____

   (Please include any known details of sources)

   How many other herds were cervids moved to in the 5-year period prior to the index case diagnosis?
   In-State departures # of premises _____ # of animals _____
   Out-of-State departures # of premises _____ # of animals ____

(Please include any known details of departures)

9. Were any ancillary businesses associated with the positive premises? (e.g. urine collection, taxidermy, wildlife rehabilitation, fawn raising)? Y/N/Don't know
   (If Yes, specify type(s))
   ____
10. Was the index herd enrolled in a Herd Certification Program (HCP) at the time that the index case was diagnosed? Y/N
    If yes, date of enrollment?___/___/_____
    If yes, was the herd in compliance with the requirements of the HCP at the time the index case was diagnosed? Y/N/Don't know
    If the herd was not in HCP compliance at the time the index case was diagnosed, please explain:
    ____
11. At the time that the index case was diagnosed, was the index herd located:
    Within 10 miles of known CWD positives in ***wildlife***? Y/N/Don't know
    Between 11 and 50 miles of known CWD positives in ***wildlife***? Y/N/Don't know
12. At the time that the index case was diagnosed, was the index herd located:
    Within 10 miles of known CWD positives in other ***captive cervids***?
    Y/N/Don't know
    Between 11 and 50 miles of known CWD positives in other ***captive cervids***?
    Y/N/Don't know
13. What is the wild cervid population density outside of the positive premises?
14. Was this herd depopulated? Y/N
    If yes, date of depopulation? ___/___/_____
    If no, date quarantined? ___/___/_____
15. If this herd was depopulated, inventory at the time of depopulation:
    Date of inventory___/___/_____
    Check box if same as inventory listed in item 12 above: ☐

Cervid Herd Inventory at the Time of Depopulation					
Species	**1 year old and over**		**Under 1 year old**		**Total Inventory**
	Males	**Females**	**Males**	**Females**	
Elk					
White-tailed deer					

Other (________________)					

CWD Test results from the depopulated inventory (rows below should add up to total inventory in item above):
Obex test results? #Positive ___ #Not detected ___ #Location ___
#Not sampled ___

Lymph node test result? #Positive ___ #Not detected ___ #Location ___
#Not sampled ___

__________ test result? #Positive ___ #Not detected ___ #Location ___
#Not sampled ___

16. Did any cervids die prior to depopulation of the herd or while the herd was being held under quarantine (including euthanasia deaths)? Y/N/Don't know
If yes, how many? (please complete the following table):

Number of Cervids that Died or were Euthanized Prior to Depopulation or While Held under Quarantine					
Species	**1 year old and over**		**Under 1 year old**		**Total**
	Males	**Females**	**Males**	**Females**	
Elk					
White-tailed deer					
Other (________________)					

CWD Test results (rows below should sum to total above):
Obex test results? #Positive____ #Not detected ___ #Location ___ #Not sampled ___

Lymph node test result? #Positive ___ #Not detected ___ #Location ___
#Not sampled ___
__________ test result? #Positive ___ #Not detected ___ #Location ___
#Not sampled ___

17. For **all CWD POSITIVE cervids** (TOTAL herd numbers) that died or were euthanized following the index case diagnosis (during depopulation or otherwise AND including the index case), please provide:
    a. TOTAL number of CWD-positive animals: ________________
    b. Of the total number of CWD-positive animals above, how many were:
        0-24 months of age? : ____________
        25-48 months of age? : ____________
        49+ months of age? : ____________
    c. Total number of positive males: ___________
    d. Total number of positive females: ___________
    e. Were all positives the same species? Yes / No
       If no, please provide the total number of positive:
        Elk_____White-tailed deer_____Other (______________) ____
    f. Total number of positive natural additions: ____________
    g. Total number of positive purchased additions: ____________
       Were all positive purchased animals from the same place? Yes/No
        1. If yes, total number of animals purchased? _________
           From herd______________________in State ________
        2. If no, number of facilities from which positive animals were purchased? __________

           Provide number of animals purchased from each herd and the State of origin ____
    h. Total number of animals showing clinical signs at time of death: ___________
    i. Genetics testing results on positives? Y/N/Don't know
       If yes (WTD), # GG @ codon 96? ____ # GS @ codon 96?_____
       # SS @ codon 96? ____

       If yes (Elk), # LL @ codon 132? ____ # LM @ codon 132? ____
       # MM @ codon 132? ___

18. How many CWD-exposed cervids were identified in the epidemiological investigation?
In-State traces #____________ Out-of-State traces # ____________
☐ Check box if unable to trace due to poor records, etc.

How many of the identified CWD-exposed cervids were tested for CWD? ____
Were any exposed cervids diagnosed as positive for CWD? Y/N/Don't know If yes, how many were diagnosed as positive for CWD? _____

For the most recent years prior to the index case being diagnosed, please provide:

Number of Years Prior to CWD Index Case Diagnosis	Reported Inventory	# Sold or Transferred from Herd	#Purchases (or Other Non-Natural Additions)	#Slaughtered and/or Hunter Harvested (and # CWD sampled)	# Natural Deaths (and # CWD Sampled)	#Valid Reported CWD Test Results (i.e. do not count location or untestable results)
1 Year Prior				(____)	(____)	
2 Yrs. Prior				(____)	(____)	
3 Yrs. Prior				(____)	(____)	
4 Yrs. Prior				(____)	(____)	
5 Yrs. Prior				(____)	(____)	

Please include a copy of any epidemiological reports conducted on this herd and copies of any lab test results or other pertinent findings.

Appendix IV: Biosecurity and Decontamination Procedures for Farmed Cervid Facilities

Chronic wasting disease (CWD) is an infectious disease of cervids that can be transmitted directly, animal to animal, and indirectly via contact with the environment and objects within it. The time between CWD exposure, proliferation in the body, and shedding in excreta (saliva, urine, feces, and blood) has yet to be definitively determined in cervids. However, studies using highly sensitive amplification assays have shown that infectious material is shed into the environment via these pathways at levels sufficient to cause significant site contamination over time. Once in the environment, prions are highly persistent, and can remain a source of CWD exposure for extended periods of time. Studies with scrapie in sheep suggest long environmental persistence times, greater than 10 years. Because of these factors it is prudent to use basic biosecurity practices, and attempt to decontaminate objects and equipment that may have become contaminated. There are currently no means available to decontaminate soil.

The recommended decontaminated procedures outlined below are believed to reduce the overall CWD burden on objects and equipment on a site. These recommended procedures may change as new scientific information becomes available.

1) Biosecurity: General Principles and Approach

Biosecurity refers to measures or management practices taken to try to stop the spread of harmful biological agents. Although not guaranteed to prevent disease spread, the following suggested measures are believed to reduce potential exposure of captive cervids to CWD and other infectious diseases:

A. Direct Contact: Contact with cervids and other wildlife

1. Monitor and maintain perimeter fences. Repair holes and washouts to prevent the entry of wildlife.

2. Place feeders away from perimeter fences as to not attract wild cervids to the fenceline where direct contact can occur between wild and captive cervids.

3. Reduce or eliminate forage immediately outside the perimeter fence to make fence lines less attractive to wild and captive cervids.

4. Consider installing a strand of electric fence along perimeter fences to discourage contact between captive and wild cervids.

5. If wild birds are a problem at feeders or waterers consult State wildlife agencies to develop deterrent strategies.

6. Remove dead animals from the landscape as soon as they are discovered. Do not form carcass or “dead” piles to dispose of dead animals. The carcasses attract scavengers, which can translocate infectious agents. See section B of this document for proper disposal methods.

B. Indirect Contact: Contact with potentially contaminated objects or materials

1. Store feed and hay so it is not accessible to wild cervids.

2. Personnel working on the site should have designated boots and outerwear that are not worn elsewhere.

3. Delivery vehicles and transport vehicles should be cleaned and decontaminated before and after going onto the site. Instructions for decontamination can be found below.

4. Producer vehicles such as cars, trucks, transport vehicles, tractors, skid loaders, and ATVs should be cleaned and disinfected **prior to**, **and after**, use on other sites (see recommended procedures in section 2.A. below). A pressure washer is useful to remove mud and feces from wheels and equipment prior to decontamination.

5. Ideally all veterinary supplies and equipment should be disposable. If that is not possible, great care should be taken to try to decontaminate instruments between animals and herds.

6. Equipment (feeders, water troughs, chutes, buckets, antler removal equipment, bolus guns, multiple-dose syringes, etc) should not be shared between herds.

7. Do not bring cervid carcasses, tissues, or byproducts onto the sites where direct or indirect contact with the cervids, or their associated equipment, could occur.

2) Decontamination: Principles and Approach

The recommended decontamination procedures outlined below are believed to reduce the overall CWD burden on objects and equipment on a site with known CWD contamination. Decontamination procedures are directed at items and locations within the facility most likely to harbor the agent. Areas where CWD-positive animals have resided will be the most contaminated. These areas should be evaluated by:

A. Assessing the facility in detail to document areas of animal congregation or particular movement patterns.

B. Characterizing the entire facility in terms of concentration of animals over time.

This includes identification of fence lines (past and present), pens, corrals or handling facilities, watering and feeding areas (including natural water sources), points of concentration in a landscape (i.e. sheltered areas, woodlots etc.), drainage areas, and calving areas.

C. Identifying where known positive animals resided relative to the areas of animal concentration.

3) Recommended Procedures for Decontamination of Premises and Associated Equipment

A. Pastures

Small pastures where CWD-positive animals have resided or particular areas in a pasture where animals are known to have congregated may be treated as follows:

1. If practical, till soil under or do not use area to graze CWD-susceptible animals.

2. Organic material (hay, accumulations of manure, etc.) in congregation areas should be buried. Congregation areas include animal shelters, feeding grounds, and water sources (if applicable).

B. Dry Lot

Where CWD-positive animals have been held should be treated as follows:

1. Remove organic materials (manure, feed, bedding, and other organic material). This material may be buried deeply onsite in areas not accessed by farmed or wild animals, incinerated, or digested by alkaline hydrolysis. Composting may be used to reduce the volume of organic materials. Composted material should be buried deeply, incinerated, or digested by alkaline hydrolysis after composting is complete. Composting alone does not inactivate prions.

2. In addition, as recommended in Scrapie policy guidance removal of the top 1 to 2 inches of soil may help to reduce surface contamination. The soil removed may be buried deeply or incinerated.

C. Earth Surfaces Inside Structures

1. Remove and dispose of the organic material as described for dry lot.

2. When practical, remove the top 1 to 2 inches of soil to help reduce surface contamination. Bury the removed material in areas not accessed by farmed or wild cervids.

D. Non-earth Surfaces

Cement floors, wood, metal, tools, equipment, instruments, grain feeders, hay feeders, panels, chutes, working facilities, transport vehicles, skid loaders, and ATVs may be treated as follows:

1. Remove all organic material and deeply bury the removed material onsite in areas not accessed by farmed or wild cervids.

2. Clean and wash surfaces of items using hot water and detergent to remove dirt and debris. A high- pressure washer after initial manual removal of organic debris and cleaning surfaces is recommended for thorough cleaning of large equipment items.

3. Allow all surfaces, tools, and equipment to dry completely before disinfecting using the following suggested methods below for clean dry surfaces:

E. To Clean Dry Surfaces:

1. Apply a solution of 2 percent available chlorine (equivalent to approximately 20,000 ppm available chlorine at room temperature (at least 18.3° C [65° F]) for 1 hour of wet contact time. This can be achieved by mixing 50 ounces [6 1/4 cups] of household bleach (sodium hypochlorite) with enough water (78 ounces or 9¾ cups) to make 1 gallon of solution. Rinse to remove solution after 1 hour. Multiple applications may be required to ensure the 1 hour contact time. Due to variations in chlorine bleach concentrations, care must be taken to verify that the minimum of 20,000 ppm is achieved.If chlorine bleach is not available, a 1 molar or 4 percent sodium hydroxide (5 ounces sodium hydroxide dissolved in 1 gallon of water) solution may be used at room temperature (at least 18.3° C [65° F]) for at least 1 hour of wet contact time. Rinse to remove solution after 1 hour. Multiple applications may be required to insure the 1 hour contact time.

2. Synonyms for sodium hydroxide (NaOH) are caustic soda, soda lye, and sodium hydrate. Sodium hydroxide is a white, brittle solid that dissolves readily in water to form a strong alkaline and caustic solution and is used as an alkalinizing agent. Sodium hydroxide is very caustic and in solution is ***extremely corrosive***. For environmental reasons, only use this disinfection method when the preceding method is not available.

4) Restocking

Generally, restocking with CWD-susceptible species is not recommended. If restocking with CWD susceptible species occurs, then additional biosecurity practices such as additional fencing or other barriers to minimize CWD exposure should be considered. Cervid herds should immediately enroll in the Approved State CWD HCP. All mortalities 12 months of age or older must be reported, investigated, and CWD tested.

5) Decontamination Safety Precautions

Professional judgment should be exercised in the choice and use of disinfectants. All disinfectants are hazardous to humans, animals, and the environment in varying degrees. Label directions should be carefully read and followed. If corrosive disinfectants are used directly on metal items, the items must be thoroughly rinsed with fresh water to minimize damage.

Disinfectants, especially in concentrated form, may irritate the skin, eyes, and respiratory systems. Protective equipment such as coveralls, rubber boots, rubber gloves, masks, or respirators as well as eye protection should be worn while mixing and applying disinfectants. If areas of the body are exposed directly to a disinfectant, they should be washed thoroughly with water. Any employee should notify his or her supervisor if excessive human or animal exposure to disinfectants occurs or if there is an accidental release into the environment.

6) Required Reporting of Bleach and Lye Use

The EPA requires reporting of bleach and lye use in the environment. To fulfill this reporting obligation, APHIS and/or State officials are requested to contact the Cervid Health Team to report the amounts of bleach and lye that were used.

Appendix V: Sample Collection

Herd owners are responsible for notifying State representative when animals require sampling and for refrigerating the head for sampling.

Instructions for Veterinarians and Certified CWD Sample Collectors

1) Safety Precautions

The collector should take the following safety precautions to minimize exposure to pathogens:

A. Wear personal protective equipment (PPE) at all times. (See Section 2 below.)

B. Cover cuts, abrasions, and wounds with waterproof dressing if not covered by PPE.

C. Wear gloves while handling specimens and formalin. Optionally, use face and respiratory protection, including a well-fitted respiratory mask and face shield or goggles to protect from infective droplets or tissue particles.

D. Use 10 percent neutral buffered formalin in a well-ventilated area.

E. Take steps to avoid creating aerosols, splashes, and dusts.

F. Wash hands and exposed skin following collection procedures.

G. Wash and disinfect protective clothing and equipment thoroughly after use. Use equal parts bleach and water to make 1 gallon of disinfectant solution; this solution needs have a wet contact time of 1 hour to be effective. This may require multiple applications. It is best if disposable items are used and then discarded after use.

H. If rabies is suspected, do **not** proceed with any tissue collection. Instead, contact the approved laboratory for instructions on submission of the entire head to the laboratory for rabies testing. After rabies testing is completed, the laboratory will proceed with CWD sampling on rabies-negative brains.

2) Personal Protective Equipment

Personal protective equipment (PPE) is designed to minimize exposure to pathogens while collecting samples.

The Occupational Safety and Health Administration defines PPE as “specialized clothing or equipment worn by employees for protection against health and safety hazards." PPE is designed to protect many parts of the body (i.e., eyes, head, face, hands, feet, and ears).

PPE is selected based on the environment, physical hazards, and ability to complete the task, and is a balance between protection and comfort and should protect an individual from the physical hazards of the collection environment while allowing the individual to comfortably collect specimens. The following PPE is recommended for the collection of CWD specimens, particularly during post-mortem collections:

A. Skin Protection

   Protect your skin from contact with fluids during specimen collection. Wear waterproof coveralls, preferably disposable, or coveralls with a waterproof apron and forearm protectors.

B. Eye and Face Protection

   Protect your eyes and face from any aerosols, splashes, or dusts that may be created while collecting specimens. Eye protection includes safety glasses, safety goggles, or a face shield.

C. Hand Protection/Gloves

   1. Wear metal or mesh gloves. A cut-resistant glove (Hantover, Koch, or Packer) on the hand that is not holding the knife is recommended. Find a cut-resistant glove that fits against your skin and then wear a rubber glove on top of it.

   2. Wear latex or nitrile examination gloves or thick rubber gloves on the hand holding the knife.

D. Foot Protection

   Protect your feet from injuries or exposure, such as spills or splashes, by using rubber boots.

E. Respiratory Protection

   Face masks or respirators are recommended if the environment includes aerosols, splashing, or flying debris as may be encountered with certain methods of brain removal or tissue handling. Zoonotic diseases such as rabies and listeria may be present in the carcass during CWD collection.

3) Paperwork to be Included with Diagnostic Tissue Submission

Accurately complete the specimen collection form (VS Form 10-4 or electronic 10-4, or equivalent submission form). **Note:** Complete VS Form 10-4 with the approval of the

State official or accredited veterinarian who will in turn obtain the approval of the Assistant Director. A link to VS Form 10-4 can be found in in Appendix I.

Suspect and presumptive-positive animals should be submitted on separate VS Form 10-4s from routine surveillance samples and shipped promptly to allow NVSL to prioritize testing these cases.

A. Indicate the reason for submission: Routine herd surveillance, exposed animal, suspect herd/animal.

B. Indicate whether the animal was exhibiting clinical signs. If the animal exhibited clinical signs, list the signs in the Additional Data Section of the VS Form 10-4 or equivalent form.

4) Document the Following:

A. Herd identification, species, breed, and sex of animal.

B. Information from all ID devices, tattoos, and any brands on the animal.

C. Age of animal based on owner records.

5) Make Four Copies of the Completed VS Form 10-4 or Equivalent Form:

A. One for your files (submitter's copy),

B. One for the animal owner or collection site,

C. One for the VS District Office, and

D. One to be submitted with the specimen.

6) Paperwork to be Included with Blood Samples for Codon 96 Genetic Analysis with Ante-mortem Testing of Herds that Contain or Contained CWD-Exposed Animals

Blood samples collected with ante-mortem diagnostic assays must be sent to an approved genotyping laboratory (see Title 9, *Code of Federal Regulations* (9 CFR) section 54.11 – Approval of laboratories to run official scrapie tests and official genotype tests (9 CFR 54.11). Contact the laboratory in advance for submission forms and proper tissue collection and shipping protocols.

7) Sample Quality

All samples should be collected and submitted to the lab irrespective of the state of autolysis. Approved labs should evaluate the condition of the autolyzed samples to determine if the samples are of sufficient quality to be reliably tested or if the samples should be sent directly to NVSL.

Laboratory diagnosticians will determine the suitability of the samples for CWD testing with guidance from NVSL as necessary. Any concerns for sample quality and suitability, and subsequent interpretation of test results, will be discussed on a case-by-case basis with the Approved State CWD HCP Official and APHIS.

8) Sample Labeling

A. Properly label all specimen collection containers. The information on the label provides detailed information to the laboratory regarding the specimens. The sample number or sample bar code on the container must be the same as on the completed VS Form 10-4 (or equivalent form).

B. Clearly label both the top and the sides of the sample container. Identify the sample by using a permanent marker, or affixing a bar code label (if available), or other printed label.

C. Verify that the sample number that appears on the top and side of the sample container is the same as VS Form 10-4.

D. The side label should include the following:

    1. Date of collection.
    2. Producer name.
    3. Species.
    4. Type of specimen.
    5. Official animal ID number.
    6. Sample ID number (number assigned to this sample on the VS Form 10-4 or equivalent form).

Correctly package specimens to meet Federal transportation guidelines. For Category B (UN3373) packaging and shipping details, contact the receiving laboratory, or NVSL.

Ensure that the package containing any fresh tissues for CWD testing will be shipped with ice packs for overnight delivery to the laboratory during normal business hours.

9) Tissue Specimens and Preservation

Proper preservation and handling of specimens is critical to ensure accurate CWD test results. Specimens are submitted either formalin-fixed or fresh depending on the type of diagnostic test being used. It is recommended that samples be submitted for testing within 7 days of collection.

A. **Formalin-fixed specimens** are used for immunohistochemistry (IHC) testing and histopathology. Submerge the specimen in 10 percent neutral buffered formalin (follow the guideline of 10 parts buffered formalin per 1 part specimen). Use a single container for each animal. ***Do not freeze the formalin-fixed specimens***.

B. **Fresh tissue specimens** are used for Western blot, the ELISA assay, and for DNA/genetic analysis. *Fresh tissue specimens must be kept chilled*. Ensure the sample container correctly lists all specimens included. Use a single container for each animal.

C. **Blood samples** in EDTA tubes are required for codon 96 genotyping with approved antemortem diagnostic testing as described in a herd plan. *Blood samples must be kept chilled.* Ensure each tube is clearly marked with the animal ID number.

Ship the chilled tissues overnight on ice packs. If dry ice is used, follow all additional shipping regulations associated with using dry ice.

Additional samples may be requested by the State representative or APHIS officials, including samples requested for research.

10) Post Mortem Tissue Specimens

The obex and retropharyngeal lymph node should be collected regardless of sample condition (e.g. autolyzed, frozen, etc.) and submitted to the approved laboratory to comply with the routine herd surveillance requirement. APHIS *strongly* recommends that an eartag with a fresh piece of ear tissue attached be included with each sample that is submitted for CWD testing.

Required tissues and preservation methods for post mortem diagnostics can be found in the table below.

Fixed: **10% neutral buffered formalin** **(for histopathology, IHC testing)**	**Fresh:** **Chilled or Frozen** **(for DNA, Western blot, ELISA testing)**
Tissues to be Submitted	Tissues to be Submitted
MRPLN. Half of each of the left and right lymph node	**MRPLN*** Half of the left and right nodes
Obex Obex with 1-2 cm brain stem (including the apex of the "V" in the obex)	**Obex*** Obex with 1-2 cm brain stem
Tonsils (optional)	**Tonsils** (optional)
N/A	**Skin Sample*** Collect the official ID with a quarter-sized (aprox 1" x 1") piece of tissue (ear, hide, etc.) attached to each device♦. This will allow DNA verification and/or genotyping if necessary. *Fresh samples from the same animal can be placed into the same bag.

♦It is critical that consistent documentation and sample security ensure that the samples remain appropriately linked to the source animal from the time of sample collection to the end of the testing process. All specimen containers must be clearly and permanently marked to include official identification of the animal, name of owner, name of collecting official, and date. Laboratory tracking numbers must be included with all corresponding documents. If part of the ear cannot be removed (e.g., for taxidermy purposes), then a new identification tag could be affixed to the hide skin and recorded in the animal's official record, and the tagged hide section submitted with the diagnostic specimens. This practice will also allow APHIS to conduct genotype testing associated with susceptibility to CWD (e.g., codon 96 testing in white-tailed deer) if the animal tests positive.

11) Ante-mortem Tissue Specimens - White-tailed Deer ONLY

Ante-mortem sampling is done as part of a herd plan for CWD-exposed animals only. Required tissues and preservation methods for ante-mortem diagnostics can be found in the table below. All ante-mortem tissue and blood samples collected as part of herd plans in CWD-positive or exposed herds must be performed or directly monitored by a State animal health official (SAHO) or Veterinary Services (VS) representative to verify the identity of the animal, the tissues taken for biopsy, and the chain of custody of the biopsy and blood samples.

Whole blood collection by a State or Federal veterinarian or a licensed accredited veterinarian is required for determining the genetic polymorphism at codon 96 in white- tailed deer. This polymorphism has a significant impact on CWD propagation and consequently detection, and is used to determine repeat sampling times. Blood samples are to be sent to an approved genotyping laboratory and the results reported to the Cervid Health Team.

Fixed: 10% neutral buffered formalin (for histopathology, IHC testing	**Fresh: Chilled or Frozen (Avoid repeated freeze/thaw; for genotyping)**
Tissues to be Submitted	Tissues to be Submitted
MRPLN Biopsy 2cm X 1cm X 1cm (at least 40 follicles required)	**Blood** 3-5 mL of whole blood in EDTA tube
Rectal Biopsy 1 cm x 1.5 cm	

12) Collection Procedures for Post-Mortem MRPLN

The post-mortem collection of the MRPLNs can be completed using several methods. However, these collection procedures describe the preferred methods to prevent inadvertent damage to the tissues during collection.

A. The following equipment will help ensure proper specimen collection:

1. Sharp boning knives.

2. Disposable scalpel blades or disposable scalpels (a large scalpel blade is acceptable).

3. Brown-Adson or rat-tooth forceps.

4. Disposable cutting surfaces such as cardboard, plastic, or Styrofoam.

5. Small hand nippers can be used on the hyoid bones or you may cut through at the soft cartilage of the joint using a knife.

6. Sharp stainless steel scissors.

B. MRLPN removal

1. The MRPLNs are medial to the stylohyoid bones on the dorsolateral surface of the pharyngeal muscles and dorsal to the carotid artery.

2. With the head positioned upside down, locate the esophagus and trachea in relation to the foramen magnum (FM).

3. Lift the trachea and dissect muscles forward of the FM (rostrally). Locate the left and right medial retropharyngeal lymph nodes (MRPLN) halfway between each corner of the jaw bone and the FM, caudal to the nasopharynx, and deep to the salivary gland. Lymph node consistency is much firmer and rounder than the surrounding tissue.

4. Remove each left and right medial RPLN and longitudinally incise each LN to confirm lymphoid tissue.

   For IHC testing: Place the medial RPLNs in the same formalin jar with the obex.

   For ELISA testing: Place the fresh medial RPLNs in labeled whirl-pak bags (do NOT use formalin)**.**

13) Collection Procedures for Ante-Mortem MRPLN

A licensed, accredited, veterinarian must perform the sample collection as described in the herd plan. The accredited veterinarian must be monitored by a SAHO or VS representative to verify the identity of the animal, the tissues taken for biopsy, and the chain of custody of the biopsy and blood samples.

A. Tissue Collection

1. Anesthesia will be administered by a licensed accredited veterinarian or by personnel under the direct supervision of a licensed accredited veterinarian.

2. All biopsy collections will be performed using aseptic procedures at the surgical site, including surgical gloves, masks, sterile instruments, and other aseptic techniques.

3. Surgical instruments must be sterilized according to prion-specific disinfection or be disposed of after each use.

4. Biopsy – a single side or bilateral biopsy – may be performed.

5. With the head positioned upside down, identify the medial retropharyngeal lymph node located between the larynx and the floor of the skull. If the lymph node is cut through the center an outer layer (the cortex) and an inner layer (the medulla) will be visible. The lymph node is about 1-2 cm diameter x 2-3 cm long.

6. The whole lymph node or a section of the lymph node is surgically removed. Typically a biopsy of approximately 2 cm x 1 cm x 1 cm will be large enough to meet or exceed the required 150 square millimeter of total surface area and 40 total follicles when the biopsy is sectioned and examined microscopically.

7. The incision is closed with absorbable sutures in a 2-3 layer closure.

8. Place the biopsy in a jar of 10 percent neutral buffered formalin (10:1 ratio of formalin to tissue sample).

9. Submit MRPLN biopsies collected from CWD-positive or -exposed herds directly to NVSL.

14) Collection Procedures for Post-Mortem Obex (Via Foramen Magnum)

A. The following equipment will help ensure proper specimen collection:

1. Sharp boning knives.

2. Disposable scalpel blades or disposable scalpels (a large scalpel blade is acceptable).

3. Brown-Adson or rat-tooth forceps.

4. Meat-cutting bone saw, hacksaw, or electric saw when brain removal is required.

5. Disposable cutting surfaces such as cardboard, plastic, or Styrofoam.

6. Small hand nippers can be used or you may cut through at the soft cartilage of the joint using a knife.

7. Sharp stainless steel scissors.

8. Brain stem/obex spoon, grapefruit knife, or other brain stem scoop.

B. Obex removal

1. Incise the head of the animal at the atlanto-occipital joint (between skull and first vertebra). Cut behind the back of the ears and extend the cut around and through the front of the larynx. Sever the brain stem as far to the posterior as possible during the removal process.

2. Position the head upside down (ventral side up). Locate the occipital condyles and foramen magnum (FM). Locate the brain stem inside the FM. Trim the dura mater around the brainstem and cut the attached cranial nerve trunks.

3. Gently lift the brain stem with forceps and insert the spoon into the **dorsal** aspect of the FM between the brainstem and **dorsal** calvarium.

4. Advance the spoon 2-3 inches rostrally until it contacts bone to sever the cerebellum.

5. Reposition the spoon in the **ventral** aspect of the FM between the brainstem and the **ventral** calvarium. Advance the spoon until it contacts bone and transversely sever the brain stem.

6. Remove the brain stem using the spoon and forceps. Examine to ensure the proper obex sample (bifurcation or “V”) is preserved.

7. Further trim the brain stem section by making a transverse cut 3/4 inch in front of the “V” shape bifurcation and an equal distance behind the bifurcation for good fixation.

For IHC testing: Place the trimmed obex and brainstem pieces in a jar of 10 percent neutral buffered formalin (10:1 ratio of formalin to tissue sample).

For ELISA testing: Place the fresh obex sample and trimmed pieces in a conical tube (do NOT use formalin)**.** Samples should be placed individually in a labeled plastic bag and kept chilled or frozen.

Including official animal identification with a quarter-sized (aprox 1” x 1”) piece of tissue (ear, hide, etc.) attached to each device provides verification of sample identity and material for DNA analysis, if needed. The owner may observe the sampling and labeling procedures to assure his or her sample is properly identified.

15) Whole Head Submission

Refrigerated heads may be shipped to an APHIS-approved CWD laboratory. Prior notification and approval is required from the laboratory before shipping whole heads. Owners must ensure that fresh samples or heads can be refrigerated over weekends and holidays prior to shipping. Heads should be double bagged and shipped with ice packs overnight. Be sure to properly label shipment as biological specimens as per shipper requirements.

Whole heads submitted to a laboratory by the owner must include:

A. The owner's name, address, and phone number.

B. All animal IDs (official and herd).

C. Age of animal.

D. Sex of animal.

E. Description of any observed clinical signs.

16) Collection Procedures for Ante-Mortem Rectal Biopsy

Collection of rectal biopsies is to be conducted only by trained State, Federal, or accredited veterinarians following the recommendations given below to avoid cross infection of animals, and to ensure sample quality. The accredited veterinarian must be monitored by a SAHO or VS representative to verify the identity of the animal, the tissues taken for biopsy, and the chain of custody of the biopsy and blood samples.

CWD can be transmitted between animals through the use of contaminated instruments. Gloves and instruments must be changed between each animal. All instruments described below should be disposable. After use, instruments should be soaked in 1:1 bleach and water solution for 1 hour, then thrown away.

A. The following equipment will help ensure proper sample collection:

   1. Nitrile gloves.

   2. Disposable toothed Adson forceps.

   3. Disposable curved Metzenbaum scissors.

   4. Disposable rectal speculum (an extra pair of hands also works).

   5. Obstetrical lubricant containing 2 percent lidocaine or 0.5 percent proparacaine.

   6. Individually labeled tissue cassettes with foam inserts, labeled with pencil, *not* marker or pen.

   7. Specimen collection containers with 10 percent buffered formalin.

   8. Head lamp.

B. Collection of biopsy sample:

1. Animals need to be immobilized safely in a chute or chemically.

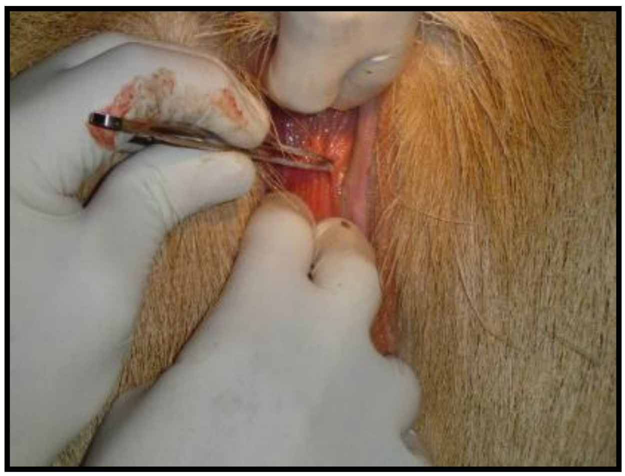
2. The rectal speculum is put in place, or the rectum held open.

3. The obstetrical lubricant with lidocaine is inserted approximately 10 cm into the rectum.

4. Five or more seconds after application of lubricant, pull the rectal epithelium away from the submucosa with forceps approximately 1 cm anterior to the mucocutaneous junction on the lateral wall (fig. 1A, B). Try to avoid sampling at 12 (tail) or 6 (feet) o'clock. Quickly snip an 1.5 cm X 1 cm biopsy.

5. Place the biopsy mucosal side down on the one of the foam inserts in the tissue cassette, carefully spread the sample out, place the other foam insert on top, close the cassette, and drop the cassette into the labeled formalin sample container (fig.1C).

6. Rectal biopsy samples collected from CWD-positive or -exposed herds must be sent to NVSL.



A.

B.

C.

Figure 1. Grasping of rectoanal mucosa-associated lymphoid tissue (A.) Collection of rectal biopsy (B.) Placement of rectal biopsy in tissue cassette (C.) Photos courtesy of Dr. Thomas Gidlewski.

17) Collection Procedures for Blood Sample with Ante-Mortem Testing of Herds that Contain or Contained CWD-Exposed Animals

Whole EDTA blood collection is required for determining genetic polymorphisms at codon 96 in white-tailed deer together with ante-mortem diagnostic assays. Collection is only to be performed by a State or Federal veterinarian or a licensed, accredited veterinarian under the supervision of a State or Federal veterinarian. Polymorphism at codon 96 has a significant impact on CWD propagation, and consequently detection, and is used to determine intervals for sampling times in herds.

A. Collection of blood sample:

1. Animals need to be immobilized safely in a chute or chemically.

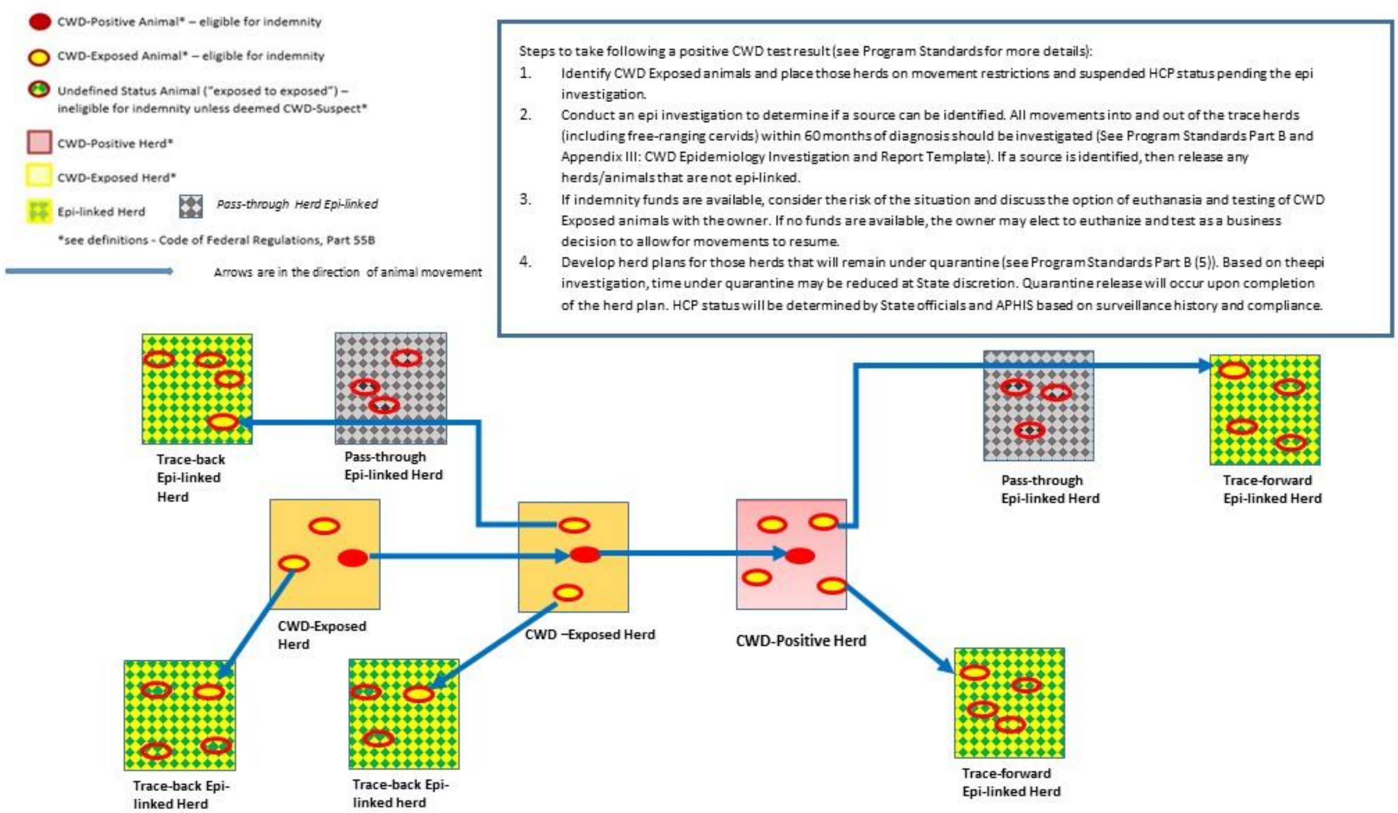
2. 3-5 ml of blood is collected into a commercial EDTA blood tube (purple top tube), then immediately inverted several times to ensure mixing of EDTA and blood.

3. Blood samples should be immediately placed in a cooler with ice or ice packs.

4. Blood samples should be sent overnight with ice or ice packs, with the associated sample submission form, to an approved genotyping laboratory.

Appendix VI: Diagram for Response to a CWD-Positive Case

The following diagram may be used to assist in response to a CWD-positive animal. All CWD-exposed cervids should be traced forward and back to include the 5 years since the exposure to the CWD-positive animal occurred.



CWD-Positive Herd

HCP Status: Loss of HCP herd status – Herd plan needed to re-enroll. No interstate movements allowed until certified status is attained.
States should submit a preliminary epidemiological report within 7 business days from NVSL confirming a CWD-positive cervid. States are also required to submit a final report for herds enrolled in the HCP and for any herds requesting indemnity.

Indemnity: CWD-Positive and CWD-Exposed animals are eligible for indemnity.

Options:

- Recommend depopulation and testing of entire herd.
- Quarantine herd until 5 years of CWD surveillance (100% of all deaths, including hunter-harvested and slaughtered) is successfully completed after the last exposure to the CWD-Positive animal.
- Selective culling of CWD-Exposed animals in this herd may be used in conjunction with the 5 year surveillance if deemed appropriate based on epidemiology.
- Whole herd ante-mortem testing and genotyping using NVSL protocol and APHIS approved procedures may be included in the herd plan for disease management purposes. Herd plans must include the ante-mortem testing protocol specific to each situation.

*See Appendix II in the Program Standards for more details.

CWD-Exposed Herd

HCP Status: Loss of HCP herd status – Herd plan needed to re-enroll. No interstate movements allowed until certified status is attained.
States are required to submit a preliminary and final epidemiological report for herds enrolled in the HCP and for any herds requesting indemnity.
NOTE: Prior CWD testing completed after the CWD-Positive animal left the premises may count towards the 5 year requirement if all deaths were tested and herd is in compliance with other HCP requirements.

Indemnity: CWD-Exposed animals are eligible for indemnity.

Options:

- Depopulation and testing of entire herd unless the epidemiological investigation determines the likely point of infection of the positive animal was outside of this herd.
- Quarantine herd until 5 years of CWD surveillance (100% of all deaths, including hunter-harvested and slaughtered) is successfully completed after the last exposure to the CWD-Positive animal or for a period of time determined by a risk evaluation at the discretion of the State officials.
- Whole herd ante-mortem CWD testing and genotyping using NVSL protocol and APHIS approved procedures. This may reduce the length of time under quarantine. Herd plans must include the ante-mortem testing protocol specific to each situation.
- *See Appendix II in the Program Standards for more details.

Epi-Linked Herd

HCP Status: HCP herd status is maintained if CWD-Exposed animal(s) are euthanized and test results are "not detected". Otherwise, interstate movement is restricted until CWD certified status is re-established.
NOTE: Prior CWD testing completed after the CWD-Exposed animal(s) arrived on the premises may count towards the 5 year requirement if all deaths were tested and herd is in compliance with other HCP requirements.

Indemnity: Epi-linked animals may be eligible for indemnity if they are deemed CWD-Suspect animals.

Options:

- Euthanize and test of CWD- Exposed animals. If all animals test negative (not detected), then recommend removal of any quarantines/movement restrictions.
- Quarantine the whole herd in which the CWD-Exposed animals resided for 60 months (5 years) from the last exposure or for a period of time as determined by a risk evaluation at the discretion of the State officials.
- Whole herd ante-mortem CWD testing and genotyping using NVSL protocol and APHIS approved procedures. This may reduce the length of time under quarantine. Herd plans must include the ante-mortem testing protocol specific to each situation.

A Quarantine or hold order is not required for a Pass-through herd until the status of the CWD-exposed *animals that resided in the herd is determined.*

*See Appendix II in the Program Standards for more details

Appendix VII: Diagram for DNA Comparison Testing and Interpretation

Appendix VIII: Standard Operating Proceedure for Chronic Wasting Disease Sample Collection in Meat Processing Facilities

1. Background

The Chronic Wasting Disease (CWD) herd certification program requires that all animals sent to slaughter under the same ownership are sampled and tested for CWD. Proper sample collection, submission and reporting of results ensures the integrity of the testing if animal disease tracing is required. Proper collection also ensures compliance with the herd certification program.

2. Purpose

The purpose of this document is to provide clarification on sampling, submission and reporting procedures for cervid CWD samples collected at meat processing facilities. Sample collection, sample shipping, and sample testing are the financial responsibility of the herd owner. Adherence to the process described below will improve reporting of results thereby reducing carcass retention time at meat processing facilities. This process should also provide proper documentation for compliance with the CWD herd certification program.

3. Document Status

This is a new document

4. Authorities and References

9 Code of Federal Regulations 81.2
NAHLN Laboratories
CWD Program Standards

5. Advance Planning

A. The herd owner should notify the processing facility with the proposed date and number of animals in advance. When possible, plan for a Monday or Tuesday processing day.
B. The herd owner must identify and notify the Certified CWD Sample Collector or accredited veterinarian in advance.
C. The processing facility management should notify on-site Federal or State food safety inspection personnel one week in advance.
D. The Certified CWD Sample Collector or accredited veterinarian must secure and/or order sample collection equipment and shipping container at least one week in advance. Collection and shipping supplies are not provided by the National Veterinary Services Laboratory (NVSL).
E. The Certified CWD Sample Collector or accredited veterinarian must identify an approved laboratory for sample submission.

F. The lab selected must be approved to conduct the ELISA test. A list of labs approved to conduct the CWD ELISA test can be found here: https://www.aphis.usda.gov/animal_health/nahln/downloads/cwd_lab_list.pdf
G. The Certified CWD Sample Collector or accredited veterinarian must contact the NAHLN lab two weeks in advance to confirm test kits will be available on the scheduled sample collection date.

6. Sample collection

A. The ELISA test will be used for samples collected at slaughter. Required samples to be collected are the obex and half of both the left and right medial retropharyngeal lymph node. Samples for ELISA testing must be fresh rather than formalin fixed. Use a single sample container for each animal. Place the samples in conical tube or suitable container and apply black tape around the lid to prevent loosening during shipment. Place the sealed container in a plastic bag – preferably a zip-lock type bag.

B. A side label, written or affixed, should be applied to each sample container
   Date of collection.
   Producer name
   Species
   Type of specimen
   Sample number
   Official animal identification (ID) number: collection and recording of official identification is mandatory

C. Collect all identification devices from the animal and submit with the sample. Collect the official ID with a quarter-sized (approximately 1" x 1") piece of tissue (ear, hide, etc.) attached to each device. Submit this tissue fresh rather than formalin fixed. This will allow DNA verification and/or genotyping if necessary.

D. Attach an ID device such as a numbered retain tag to the carcass that can be used to correlate to the lab report. In many situations, an FSIS gang tag can be applied to the carcass and corresponding tag can be listed on the submission form as identification.

7. Laboratory submission form

A. Complete a lab submission form for each producer. Describe clinical findings and history when applicable. The following information should be included on the submission form::

   1) Ensure email address of submitter
   2) Type of test - CWD ELISA test
   3) A referral number should be applied as follows:
      (State)(Collector's initials)(6 digit date of collection)
      Example OK-BRS-031218
   4) If the carcass or meat is being retained by FSIS pending results, enter **RETAINED. Include email address of submitter.**

8. Sample shipping

A. The submitter must contact the lab on the day of shipment.

B. Fill void area in the shipping container with paper towel when packing the sample. Include the laboratory submission form and ID devices in the shipping container with the sample. Include an ice pack in the shipping container to keep the sample cool.
C. Samples should be shipped to NAHLN labs on Monday and Tuesday. This will allow processing of samples on Tuesday and Wednesday, respectively.
D. Ship the samples using an overnight courier.
E. Provide the lab with the tracking number from the courier air bill.
F. Inform the lab that animals associated with samples are retained pending results.

9. NAHLN Laboratory reporting

A. The ELISA test will be used for samples collected at slaughter.
B. To reduce retention time by FSIS, NAHLN labs are asked to report results within 2 business days of sample receipt.
C. The test results will be reported by the NAHLN lab to the submitter via the email address provided on the submission form.

10. Collector/Submitter reporting

The submitter listed on the submission form shall provide a copy of the official results to on-site FSIS personnel and plant management immediately upon receipt. It is the responsibility of the submitter to obtain contact information for FSIS personnel and plant management.

11. Inquiries

Please direct any inquiries to:
National Cervid CWD Disease Specialist
USDA APHIS Veterinary Services
Sheep, Goat, Cervid, and Equine Health Center
VS.SP.Cervid.Health@aphis.usda.gov

July 2004

Expert Scientific Panel on Chronic Wasting Disease

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CHRONIC WASTING DISEASE IN CANADIAN WILDLIFE: AN EXPERT OPINION ON THE EPIDEMIOLOGY AND RISKS TO WILD DEER

Prepared by:

Expert Scientific Panel on Chronic Wasting Disease

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Submitted to:

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Western College of Veterinary Medicine
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52 Campus Drive
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July 2004

Final Report

Executive Summary

This document represents a summary of discussion, conclusions, and recommendations of an Expert Scientific Panel convened to: 1) provide a synopsis of chronic wasting disease (CWD) in free-living cervids in Canada, 2) evaluate the ecological and socio-economic implications of CWD in Canada, and 3) make recommendations on research and management actions to minimize and mitigate the effects of CWD in cervid species.

The emergence of chronic wasting disease, a transmissible spongiform encephalopathy potentially affecting mule deer, white-tailed deer and elk, is arguably the most important issue in the management of free-living cervids in North America. The disease has the potential to reduce cervid populations in the long-term, and to create major socio-economic impacts as observed in other areas in North America.

CWD has been detected in western Canada only recently, first in 1996 in farmed cervids and subsequently in 2000 in free-living cervids in Saskatchewan. Epidemiological investigations and surveillance programs of farmed cervids identified 40 game farms in Saskatchewan and 3 game farms in Alberta with the disease. CWD is thought to have been introduced into farmed cervids in Saskatchewan during the late 1980s by the importation of CWD-infected elk from South Dakota. Management programs to eradicate the disease in farmed cervids appear to have been successful and there are currently no known infected farms in Canada. Environmental contamination of some CWD-infected premises continues to pose a potential threat to wildlife. Of most significance, the presence of CWD in wild deer in some areas is a potential source of infection for farmed cervids and poses a continued threat to the long-term economical viability of cervid farming.

In Canada, CWD in free-living cervids appears restricted to three relatively distinct geographic foci in Saskatchewan, although surveillance efforts in many areas are inadequate to detect the disease at low prevalence. Hence, the disease may yet be detected in other areas. Intense, risk-based surveillance to determine the distribution of this disease should be a high priority over the next few years. Demonstration of a more widespread distribution of CWD within Saskatchewan or elsewhere in Canada would affect management response to this disease.

Results over the last two years in the Saskatchewan Landing area, Saskatchewan, indicate CWD is well established in the local mule deer population. In spite of initial attempts to reduce deer densities by increasing hunting harvest, deer densities in most areas of western Canada are more than sufficient to allow CWD to spread and increase in prevalence.

The range of species that may be infected with CWD is not known with certainty. Information from the USA would indicate all mule deer, white-tailed deer and elk are susceptible to the disease. Infection in moose has been recently confirmed experimentally, but similar data for caribou are not available. CWD does not appear to pose a risk to cattle or bison. The risk to humans appears to be extremely low. Nonetheless, the World Health Organization and other government health agencies recommend that any animals with a TSE disease not be consumed by humans.

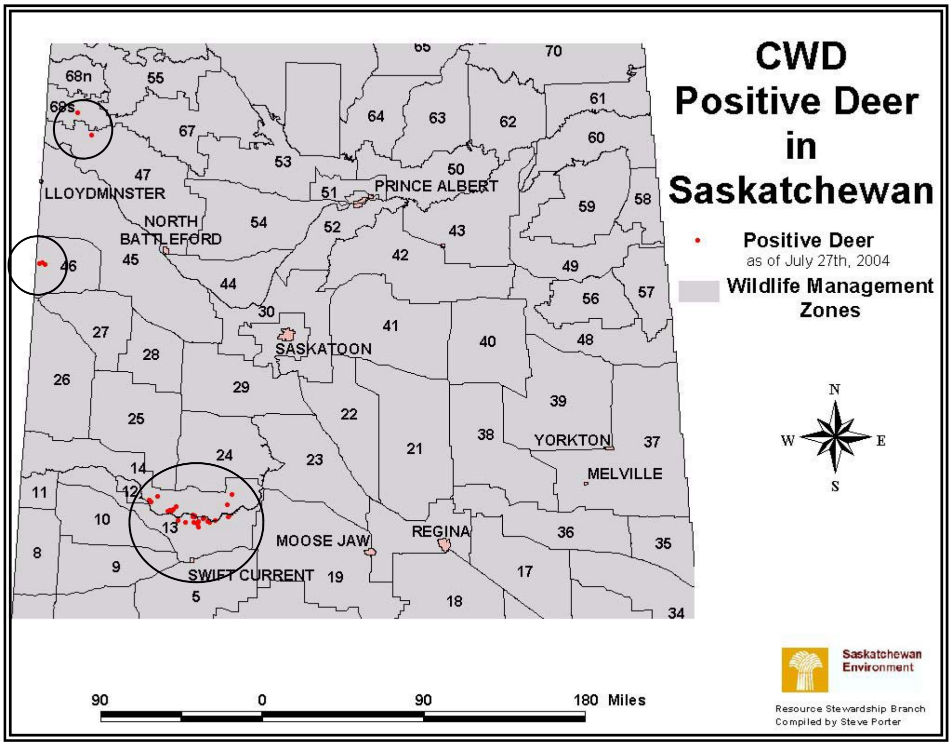
The panel concludes that the emergence of CWD in free-living mule deer and white-tailed deer in Saskatchewan warrants an aggressive regional and national management and research response to prevent further spread of CWD and to control or eliminate the disease in wild cervids. The recent introduction of CWD in Canada, and its restricted distribution, provides us with a unique opportunity to manage CWD before it is too late.
Once established in a population of free-living cervids, control or eradication of CWD is extremely difficult. Preventing establishment of new foci of CWD should be given the highest priority, which entails preventing the movement of CWD-infected cervids and infectious material to new areas. To prevent natural spread from endemic areas, and to reduce potential environmental contamination with infectious prions, severe population reductions of deer, to levels of <1 animal/km^2 of critical habitat, will likely be required for at least a decade. Complete removal of deer in local areas may eliminate focal introductions of CWD. Deer densities that can prevent spread of CWD, and sizes of buffer zones to contain CWD, are largely unknown at this time. Management programs will need to be developed using a research framework, and updated as we learn about this disease.

Canada is at a critical juncture in its response to CWD in free-living cervids. The Panel recognizes the success of the federal CWD program for game farms and envisions a comparable investment in the management of CWD in wildlife. Significant investment in CWD management and research by federal and provincial governments, within a national framework, is required and urgent in order to develop an effective response to this emerging disease.

TABLE OF CONTENTS

PREAMBLE

Chronic wasting disease (CWD) was first diagnosed in Saskatchewan in 1996 in a farm-raised elk (wapiti). In 2000, the disease was detected in a wild mule deer in Saskatchewan, and by the end of the 2003 hunting season, a total of 34 wild deer in Saskatchewan had been diagnosed with the CWD, the only wild deer populations in Canada thus far known to be affected with the disease. Affected animals have been detected at three relatively discrete geographic locations, but by far the greatest number (29) have come from the Saskatchewan Landing Area north of Swift Current (Map).



Chronic wasting disease is a newly-recognized disease of cervids with the potential to harm wild populations and to impose significant economic costs on Canadian society. Yet, it also is one of a group of diseases called transmissible spongiform encephalopathies, or TSEs, which are entirely new to science, and thus every aspect of CWD is shrouded in uncertainty. The Canadian Cooperative Wildlife Health Centre (CCWHC), an inter-agency partnership based at Canada's four colleges of veterinary medicine, has a mandate to provide sound scientific advice to its agency partners and to the public on important wildlife disease issues. In the face of the current new epidemic of CWD in wild cervids in Canada, the CCWHC assembled an international panel of scientists (Appendix 1) with the expertise required to evaluate CWD in Canadian wildlife and to recommend management, surveillance and research activities that would have the best chance of mitigating the full range of potential negative socioeconomic impacts associated with CWD in wild deer and elk in Canada. The occurrence of CWD in farmed cervids in Canada, and potential for transmission of CWD between farmed and wild cervids, was included in the panel's deliberations.

The Panel was asked to make full use of its collective expertise and the published scientific literature on CWD, on disease management, disease surveillance and the biology of North American cervids. Detailed information about the occurrence of CWD in Canada in both wild and domestic cervids was provided to the Panel in the form of written material from a range of Canadian sources (Appendices 2, 3 and 4). On 10-12 June, 2004, the Panel members assembled in Saskatoon. The Panel received information and questioned agency and other stakeholder representatives during an open forum on 10 June, and then prepared its report *in camera* on 11-12 June and through electronic exchanges thereafter.

The result of the Panel's deliberations is presented in this report. The Panel views CWD in Canadian wildlife to be a serious epidemic. The report outlines the nature and scale of the activities required to reduce the impact of CWD in Canada, and urges a coordinated national approach through which all relevant jurisdictions invest collectively in a unified program of management, research and mitigation.

Ted Leighton DVM, PhD
Executive Director
Canadian Cooperative Wildlife Health Centre
Headquarters Office, Saskatoon, SK

1. BACKGROUND

Chronic wasting disease (CWD) was first recognized in Canada in a herd of farmed elk (*Cervus elaphus*) in 1996. Further testing revealed that CWD was present on 40 game farms in Saskatchewan and three in Alberta. CWD is a reportable disease in Canada under the *Health of Animals Act*. Hence, an eradication program for CWD in farmed cervids was implemented in 2000 by the Canadian Food Inspection Agency. Results of eradication and surveillance activities in 2000-2004 support the view that successful eradication of CWD in farmed cervids is probable.

In wild deer populations, CWD was detected in mule deer (*Odocoileus hemionus*) in 2000, with confirmed cases in three discrete areas of Saskatchewan. For example, 21 mule deer with CWD were detected in a relative small zone in southern Saskatchewan (referenced hereafter as Saskatchewan Landing) during the hunting season of 2003. However, there have been no confirmed cases of CWD in wild deer populations within Canada outside of Saskatchewan.

The overall objective of the Panel is to provide an *expert opinion* on the best way to research and manage CWD in wild deer populations in Canada. We hope that our report will offer guidance to federal and provincial regulatory agencies in drafting policies to contain or eradicate CWD in free-ranging deer populations. A second but equally important objective of the Panel is to provide a package of information to the general public about risks associated with CWD based on data and experience gained internationally in the last decade or so.

In this report, the generic terms "deer species" or "cervids" refer to ungulate species and sub-species within the taxonomic family Cervidae.

2. MANDATE OF THE PANEL

- To improve collective understanding of CWD in Canadian wildlife.

- To review risk factors and implications of CWD to wild cervid populations, including future development of the disease throughout Canada.

- To provide an expert opinion on the potential risks of CWD to humans.

- To propose recommendations to manage impacts of CWD, focusing on surveillance and monitoring programs, prevention, eradication, containment, and human health.

- To encourage a National and International cooperative framework to assess risks and manage CWD in wild deer populations.

3. EPIDEMIOLOGY AND MANAGEMENT OF CWD

CWD belongs to a group of fatal, neurodegenerative disorders in humans and animals called transmissible spongiform encephalopathies or TSEs. Other TSEs include scrapie in sheep, bovine spongiform encephalopathy (also called "mad cow disease") in cattle, and Creutzfeldt-Jakob disease in humans. TSEs are thought to be caused by an abnormal form of proteinaceous agents called **prions** that are devoid of nucleic acid. Although CWD is not infectious in the classic sense, in practice it acts like an infectious agent. According to the prion hypothesis, infection occurs by conversion of normal prion proteins (PrP^{c}) into the disease-associated, misfolded form (PrP^{res}) that is highly resistant to degradation by proteolytic enzymes. Disease is characterized by slow accumulation of abnormal prions in lymphoid and nervous tissue. Clinical signs of the disease typically appear after >1.5 years, as accumulation of prions causes microscopic spongiform lesions in the brain. Animals in the later stages of the disease exhibit behavioral changes and progressive loss of body condition. The clinical signs of CWD are not unique however, and CWD can be confused with other diseases.There is no immune response produced in an affected host. Currently there are no treatments or vaccines for prion diseases, and all infections are believed fatal.

CWD is the only TSE agent that is transmissible in free-ranging cervid species, including elk, mule deer, and white-tailed deer (*Odocoileus virginianus*). The disease was initially recognized in Colorado and Wyoming, first in captive cervids in the 1960s and subsequently in free-ranging cervids in 1981. The actual length of time that CWD has been present in North American is unknown. Distribution of the disease in North America is largely unknown, because adequate sampling and surveillance have not been conducted in most areas of the continent. Currently, CWD is found in free-ranging cervids in portions of Colorado, Nebraska, South Dakota, Wyoming, Saskatchewan, New Mexico, Illinois, Utah, and Wisconsin.

Specific details regarding the transmission of CWD remain uncertain; however, in most respects CWD behaves like an infectious disease. Contact between infected and non-infected animals via saliva, urine, and feces are the most likely direct routes of transmission. Transmission via contact between susceptible and infectious individuals probably requires more than transient exposure. It is not known when an infected animal begins shedding disease-causing prions, but it likely occurs long before clinical signs of disease and may be progressive through the course of the disease. Studies on CWD transmission in captive deer and elk indicate that lateral transmission (i.e., among a group of potential hosts sharing a common environment) occurs by direct contact and ingestion of abnormal prions. Vertical transmission (i.e., from mother to offspring via placental transmission or milk) does not seem to be a major route of infection. Transmission occurs among susceptible cervid species and from infected cervids to the environment, then to susceptible animals. However, the mechanisms for direct or environmental routes of transmission and their relative importance in free-ranging cervids are not understood. Abnormal prion proteins have remarkable persistence in the environment and are highly resistant to a range of treatments that typically kill or inactivate conventional infectious agents. Because CWD is readily transmitted among captive deer and elk concentrated in pens, it is believed that transmission is facilitated by the concentration of animals related to artificial feeding and baiting. Relative susceptibility to transmission among cervids and for other wildlife species has not been established. Unlike scrapie in sheep, research indicates that genetic resistance in deer and elk is unlikely; however, the potential for genetic influences on susceptibility remains under investigation.

Little is known about the rate of increase in prevalence and geographic spread of CWD or the factors that affect these rates. Increases in CWD prevalence and geographic spread in Colorado and Wyoming have been relatively slow. Epidemiological modeling suggests that prevalence in Colorado and Wyoming may have increased 0.5 to 0.7% annually during the 1980s and 1990s. In addition, CWD has increased in prevalence and in geographic spread throughout areas in Colorado, Wyoming, and Nebraska despite the relatively low density of cervids present in these areas (2-5 animals per km^2). Although uncertainty remains about the mechanism of CWD spread across landscapes, it is generally believed that dispersing animals are one likely avenue of disease spread. In addition, human activities, particularly translocation of captive and free-ranging animals, have resulted in CWD range expansions, and once established, the disease may be maintained through environmental contamination for an unknown period of time. Currently, there is no evidence that CWD will spontaneously disappear or be controlled without management intervention. In contrast, there is significant potential for expansion of the geographic range of the disease.

The likelihood of interspecies transmission of prion diseases is influenced by the degree of homology of the infective prion proteins (PrP^{res}) with that of the host prion protein (PrP^{c}), giving rise to the concept of a "species barrier" which must be overcome before an infective prion strain from one species causes disease in another species. In addition, different strains of prions may occur within one animal species. At present, research on biological strain typing involves a variety of methods including biological models using laboratory rodents, molecular, and immunohistocemistry (IHC) methods. *In vitro* conversion experiments indicate that CWD prions can convert human as well as bovine and sheep prion proteins into its abnormal conformer (PrP^{res}), albeit at a very low rate. However, this research is not conclusive because many other factors (e.g., dose, strain of the agent, route of exposure) may also determine the level of the species barrier. CWD has been experimentally transmitted after intracerebral inoculation to a number of animals, including cattle. However, cattle did not become infected when exposed orally to infective prion proteins specific to CWD. At present, it can be concluded that the species barrier may not completely protect other cervid species, including caribou and moose, from CWD.

Most cases of CWD in cervids are diagnosed by *post mortem* laboratory testing on lymphoid or brain tissues. Studies indicate that, compared to brain tissue, lymphoid tissue accumulates CWD prions at early stages of disease development in most cervid species. Thus, testing lymphoid tissue allows for earlier detection of disease. Current recommendations based upon the accumulation of CWD prions in cervid species include testing of retropharyngeal lymph node and brain obex (with intact dorsal motor nuclei of the vagus) for the diagnoses of CWD. *Ante mortem* diagnosis using tonsillar biopsies has also been used to detect CWD in live deer. Tonsillar biopsy also appears to be a valid method for detecting CWD during the incubation stage. Although tonsillar biopsy may be used as an *ante mortem* and pre-clinical diagnosis, this approach requires capture of live animals, is only suitable in limited situations, and is not generally recommended for CWD surveillance. Other *ante mortem* tests are currently under investigation. However, diagnoses of CWD using *post mortem* tissues rely on classical TSE test methods of Western blot and immunohistochemistry as reference and confirmatory tests. Recently, additional high-throughput assays were licensed in the United States for diagnostic screening for CWD in three species of cervids. Only one of these tests has been evaluated satisfactorily in Canada.

4. ORIGINS OF CWD IN CANADIAN WILDLIFE

The origin of the prion strain that causes CWD in deer and elk remains unknown: whether CWD has always been a natural disease of native North American cervid species or is a new manifestation of another animal prion strain (e.g., scrapie) cannot be determined from available information, and may never be known with certainty. However, based on current distribution and prevalence of CWD in Canada and the USA, it appears most likely that CWD was recently introduced into free-living cervids. Consequently, the panel supports the management perspective that CWD was not present historically in free-living Canadian cervids, and thus that this disease is not part of native ecosystems.

Published accounts, historical records, and results of ongoing epidemiological investigations suggest that captive, CWD-infected deer and elk were likely imported into Canada from the USA at least twice over the last 30 years; although not reported, additional introductions seem plausible. The earliest incursion of CWD into Canada in the 1970s (or earlier) appears to have been confined to mule deer in a single zoo in Ontario, without further spread. The second incursion in the 1980s (or earlier) began on at least one game farm in Saskatchewan where infected elk had been imported, with subsequent spread among game farms. Because available epidemiological findings cannot explain fully all of the documented CWD outbreaks in captive deer and elk on Canadian game farms, other undocumented incursions and/or other sources of infection may have occurred in the last few decades.

The known foci of CWD in free-ranging deer in Saskatchewan are most likely a result of unintentional spill-over from infected game farms. As presently understood, the geographic pattern of CWD distribution in native deer suggests at least two independent spill-over events where CWD became established in local free-ranging populations: an infected game farm was almost certainly the source for one of these, and seems the most likely source for the other. Current knowledge supports the notion that CWD epidemics in free-ranging deer in Canada have spread geographically, and that CWD is well-established in at least one free-ranging deer population (Saskatchewan Landing). There appear to be no natural barriers to further spread of CWD in Canada.

5. POTENTIAL IMPACTS ON WILDLIFE POPULATIONS, HUNTING AND VIEWING OPPORTUNITIES, AND ASSOCIATED ECONOMIC REVENUES IN CANADA

To date, natural cases of CWD have been found only in mule deer, white-tailed deer, and Rocky Mountain elk (*Cervus elaphus nelsoni*), but it is likely that subspecies of these cervid species are also susceptible. Although no natural cases of CWD-affected caribou (*Rangifer tarandus*) or moose (*Alces alces*) have been reported, CWD recently has been induced experimentally in moose by ingestion of infected tissues. Susceptibility of caribou to CWD remains unknown, but some level of susceptibility seems likely based on the similarities between the normal cellular prion protein of caribou and the normal cellular prion protein of mule deer. Although current CWD surveillance programs in Canada target deer and elk, moose and caribou probably should not be ignored because dispersal behavior of moose, and large herd sizes, seasonal aggregations and range fidelity of caribou suggest a high potential for CWD to spread in Canada if it were to be introduced into either of these species.

Implications of CWD for wild populations remain unclear. The disease is fatal, and affected animals will invariably die because no known treatment or vaccine currently exists. Although time to death can vary from a few days to about a year in captive animals once clinical signs of CWD appear, time to death is probably shorter in free-living animals given the factors that affect the longevity of diseased animals in the wild. There is no current information to suggest that the disease strongly affects the overall dynamics of infected populations in the short term, but the disease has not been observed long enough to know the ultimate population effects. Modeling projections from data collected in Colorado suggest that mule deer populations at the center of the affected area may decline in 40-50 years. However, insights from the modeling efforts to date are hindered by an unclear idea of how the disease is transmitted, and an incomplete understanding of the relationships between transmission rates and factors such as population density and size, age and sex structure, degree of spatial aggregation, seasonal movements, and social organization. Key to understanding the effects of CWD on free-living cervids are host densities or spatial structures at which the disease can decline in prevalence, and movement patterns among infected populations that may foster geographic spread. If threshold densities for disease persistence are low, the host population will need to be severely reduced in order to restrict the spread of CWD, which may be logistically or politically infeasible. Complicating our understanding of the impact on CWD populations is the resilience of the CWD agent in the environment. Environmental contamination may allow the disease to persist even with substantial herd reductions. As we gain additional understanding of the factors that influence transmission, spatially explicit epidemiological models may offer further insights into the impacts of the disease and management approaches that can constrain its spread into new areas.

In the immediate future, local management responses to the presence of CWD seem more likely to influence the demography of affected herds than the disease itself. Limited ability to diagnose the infection in live animals, long incubation periods, subtle clinical signs, and the intensive sampling efforts required to detect the disease make it unlikely that CWD will be detected in free-living cervids prior to the point at which it can be eradicated without intensive control programs. As a result, where cases are detected, management goals are likely to focus on preventing spread, and thus will include some form of intensive control of the population or segments of the population. Control efforts for cervid populations may range from selective removal of clinical suspects to localized reductions in areas of high CWD prevalence and/or adjacent buffer areas. Where the goal is less than 50% overall population reduction, populations would be expected to rebound in the short-term given normal population reproduction and influx of animals from surrounding areas. In addition to the direct effect on population sizes, intensive reduction programs could cause local shifts in animal distributions or alter movement patterns and migratory behavior. Such behavioral responses may have implications not only for the well being of the targeted and adjacent herds, but may produce new challenges arising from increased trans-jurisdictional movements, differing administrative mandates, and public interests. Further, limitations on baiting and feeding cervids for CWD management may have consequences for local changes in distribution and productivity of some individuals or herds.

Although herd reduction programs based on more liberal seasons and permits may initially increase hunting opportunities, the long-term fate of the hunting culture in the face of CWD is unknown. Initial observations in Canada and the USA indicate that the majority of hunters will continue to hunt in their traditional or preferred area and process cervid meat for eating even if CWD has been detected in the wild. However, if the prevalence of CWD becomes high, results of a public attitudes survey in Wisconsin indicate that hunters may abandon the sport. Alternatively, it is feasible that hunters will request certified testing for CWD on an individual animal basis. Where a diagnostic test is positive, the Wisconsin survey of public attitudes indicated that the majority of hunters would be concerned about eating the meat. Further, most governmental agencies currently advise against consuming CWD-infected meat. No government programs similar to those in the game farming industry currently exist to compensate hunters for destruction of infected meat or other animal products. In areas where management is focused on reducing the number of CWD-affected animals, these programs are incompatible with management of deer populations primarily for trophy hunting. Thus, in areas where CWD is relatively common, there is the potential that changing hunter attitudes may reduce the ability of managers to use harvest of cervids as an effective wildlife management tool. A loss of hunting participation also would result in a loss of revenues associated with the sale of hunting licenses, which would have far-reaching implications for a wide variety of wildlife programs at both the national and provincial/territorial levels. In 1996, Canadians spent over $800 million hunting wildlife with nearly two-thirds of these expenditures made by large game hunters. Ultimately, public perception about the safety of handling and consuming suspect meat in areas of endemic CWD, and the quality of the hunting experience in the face of eradication programs, may impact hunter participation in those areas and even in areas with no reported incidence of CWD.

In addition to hunting, cervids are enjoyed by wildlife viewers. Management programs directed at reducing free-living cervids infected with CWD, particularly those in or near provincial and national parks, are likely to reduce viewing opportunities and associated revenues.

Secondary effects on other wildlife species from CWD-based management of cervids are of concern but are difficult to predict. The most likely impacts include shifts in prey selection by predators (primarily wolves, cougars, coyotes or bears) and scavengers (e.g., corvids and eagles) and local shifts in animal-vehicle collisions, herbivory, and competition with livestock.

Changes in these impacts are unknown and likely will be difficult to monitor, given current resources.

6. IMPLICATIONS OF CWD IN FREE-LIVING CERVIDS FOR FARMED ANIMALS IN CANADA

The coexistence of CWD-affected populations of free-living cervids with free-ranging or winter-fed cattle on public and private lands is not likely to have a direct impact on the cattle industry because no cross-species transmission of CWD has been reported, nor is it believed likely at this time. Nevertheless, concerns over the evolving nature of the disease are likely to keep the attention of ranchers focused on the disease. Although bovine spongiform encephalopathy (BSE) is not causally connected to CWD, occasional cases of BSE in Canadian or US cattle will likely stimulate questions and some level of concern about cattle exposure to the CWD agent. Scrapie, a naturally occurring prion disease of domestic sheep and goats, occurs in both Canada and the USA and has been the focus of control programs in both countries. As with BSE, scrapie has not been causally connected to CWD and occurrence of CWD should not hinder scrapie control efforts in Canada. In light of strain and epidemiological similarities between scrapie in sheep and CWD in deer, however, relationships between scrapie and CWD warrant further investigation. Secondarily, reduction in free-living cervids for CWD management may lead to increased predation on free-ranging cattle and sheep.

In contrast, the potential reservoir of CWD in free-living cervids will likely have significant and far reaching impacts on the cervid farming industry. Expansion of the industry would be constrained because of potential contamination in areas of infected free-living animals. Costs associated with fencing of new or established farms would increase dramatically. Double fencing, fence heights of 10 feet or more, and increased fence inspection undoubtedly would be necessary to ensure no fence-line contact with infected animals or ingressions of free-living cervids into pens and farm facilities. Further, fencing at these standards would need to be maintained for an extended time even after decontamination of CWD infected farms and restocking with CWD-free animals. Because improved fencing and maintenance cannot guarantee farmed cervids are not subject to exposure, the game farm industry likely will be in jeopardy unless effective preventive treatments become available. Even with the development of vaccines and *ante mortem* tests, the additional logistical difficulties and costs associated with precautionary activities to prevent infectious spread from the wild will rise significantly. In addition, public perception, both nationally and internationally, of the risks associated with game farm meat, velvet, and other products produced in areas of infected free-living cervids will likely impact game farms despite precautionary measures. Currently, game farm products produced in Canada are exported to various countries. Based on experiences with CWD and other TSEs, it is likely that agricultural trade sanctions, like the current Korean ban of elk velvet from Canada, would contribute to making the game farming industry in Canada potentially unsustainable in the long-term if CWD were to become wide-spread in free-living cervids in Canada.

Maintaining game farms in the presence of CWD in free-living cervids will require greater commitment of resources from governmental agencies given current regulatory responsibilities and the need to compensate game ranchers in cases of depopulation. At present, federal and provincial/territorial agencies jointly assume the costs associated with inspections, laboratory diagnostic tests, veterinary investigations, carcass disposal, depopulation, and site decontamination. The number of incidences when these services are required is likely to rise significantly in areas with infected free-living cervids.

7. IMPLICATIONS OF CWD IN FREE-LIVING CERVIDS FOR HUMAN HEALTH IN CANADA

The prion strain thought to cause CWD has not been linked to cases of human illness in either Canada or the USA, and consuming venison from areas where CWD is present does not appear to increase the likelihood of people contracting sporadic Creutzfeldt-Jakob disease (CJD; a human prion disease). Moreover, experimental studies have demonstrated a substantial molecular barrier to conversion of normal human prion proteins in the presence of CWD prion proteins. Such a response is similar to the molecular barriers to human prion protein conversions by the prion strains that cause scrapie or bovine spongiform encephalopathy (BSE). Despite the reassuring nature of the findings in studies of human health risks conducted to date, there is public concern about the implications of human exposure to CWD and other animal prion diseases. This concern, based on experiences with massive exposure of people to the BSE prion in the UK and other European countries that apparently led to about 150 cases of variant CJD, will likely influence public attitudes toward CWD for the foreseeable future. Regardless of how unlikely human illness arising from CWD exposure may be, the perception that CWD could be a human pathogen will shape public attitudes toward hunting and consuming deer and elk in areas where CWD occurs. The panel recognizes and supports international public health officials' recommendations against consuming any parts of animals known to be infected with a prion disease.

8. MANAGEMENT PERSPECTIVES

Management options and predicted outcomes.

CWD is the only TSE agent known to affect wild cervid populations. Whereas experience in managing or eradicating scrapie in domestic sheep can be applied to managing CWD in farmed deer and elk, there is no similar experience with TSEs in wild populations. States such as Colorado and Wisconsin have recently undertaken CWD management programs aimed at eradicating or minimizing spread of the disease in wild cervids. Although the prevalence (the proportion of the population that is affected) of CWD has been reduced in some areas, it is still not clear how best to manage the disease in wild populations. Results from these programs are still preliminary, but can be used to guide other management programs and predict outcomes.

Two characteristics of this disease make it particularly difficult to manage. First, empirical data indicate CWD transmission can occur at low deer densities; this attribute necessitates high levels of population reduction or complete removal of deer in order to eradicate the disease. Second, evidence indicates infectious prions persist in the environment for years. Therefore, in areas with high levels of environmental contamination, deer densities must be maintained at low levels for at least 5 to 10 years in order to ensure the disease is not introduced from the environment into re-established deer populations. Due to these two characteristics, once CWD becomes established in wild populations, eradication of CWD is difficult with current management options.

As eradication of CWD is extremely difficult, preventing establishment of new foci of disease must be seen as the primary objective of any CWD management program. All measures should be taken to prevent movement of potentially CWD-infected cervids or infectious material to new areas. These measures should apply to both agricultural and non-agricultural environments.

Where CWD is already established in wild populations, the management objective should be to reduce the prevalence of CWD in the population in order to reduce levels of environmental contamination, to reduce the probability and rate of spread, and to "buy time" until new methodological approaches for eradication are available. In the Panel's view, current levels of population reduction in CWD-infected areas of Saskatchewan will not prevent the disease from increasing in prevalence and spreading over time.

Preliminary information from Wyoming and Colorado suggests that containment of CWD likely will require reducing cervid densities to well below 1-2 deer/km^2 of critical habitat (i.e., winter range) across large areas. The area managed for reduction should consist of the area in which the disease has been detected, the core, and a surrounding area, or buffer zone, where deer from the core are likely to migrate or disperse. The size of the buffer zone must be based on knowledge of local movements and should ensure that the vast majority of deer moving out of the core area will disperse to areas where deer densities are sufficiently low that the probability of disease transmission would be extremely low. Removal of females and mature males in areas of high infection rates appear to be specific strategies that could minimize spread. In addition, specific strategies to cull animals showing clinical signs and to cull dispersing animals (i.e., yearling bucks) also may help to reduce spread. These high levels of population reduction will need to be maintained until alternative strategies are available to eradicate the disease.

Surveillance programs around infected areas must be sufficient to detect CWD at extremely low levels in order to identify new foci of disease. Complete depopulation of deer in an area around these foci, or so called "sparks," has a higher probability of preventing establishment of the disease, if detected early. Establishment of new endemic areas of CWD with long-term management programs as described above is highly undesirable. Consequently, preventing spread and stamping out sparks should receive the highest priority.

Management programs should be seen as experiments and must be designed to monitor outcomes, such as changes in deer densities, alterations in the age structure of populations, changes in disease transmission rates, size of the affected area, changes in disease prevalence, etc. These monitoring programs must be consistent and long-term in order to determine which management strategies work and which do not. Although CWD management experiments are being implemented in other parts of North America, they need to be replicated in order to validate the results. The slow moving nature of the epidemic makes management "failure" difficult to detect and therefore monitoring programs must be carefully designed and well funded. Management programs should be adaptive in order to take advantage of new information as it becomes available.

Current approaches to surveillance and risk assessments

The document "Surveillance strategies for detecting chronic wasting disease in free-ranging deer and elk: results of a CWD surveillance workshop, Madison, Wisconsin, December 10-12, 2002" provides an excellent overview of this topic. It is available at "http://www.nwhc.usgs.gov/research/chronic_wasting/CWD_Surveillance_Strategies.pdf".

Current surveillance programs to detect CWD in wild cervids are primarily based on testing deer and elk harvested through hunting. In order to minimize the costs of CWD surveillance, wildlife or deer management zones with a perceived high risk of CWD are typically sampled more intensively; whereas, other low risk zones are sampled less intensively, if sampled at all. Classification of a zone as high risk is based on proximity to known cases of CWD in farmed or wild cervids, or proximity to game farms with a history of CWD. Although the risk factors for CWD are poorly understood, proximity to populations known to be infected with CWD is an obvious risk factor due to potential movement or dispersal of animals. Other risk factors such as degree of aggregation of cervids should be considered in developing surveillance programs. In some provinces, risk assessments have been completed but the results have not been adequately incorporated into surveillance programs. For example, Saskatchewan Environment proposed a surveillance program at the International CWD Workshop in Saskatoon, SK, August 2003, based on proximity to cases of CWD, density of critical deer habitat and levels of artificial feeding or baiting; however, this risk-based surveillance program has not been fully implemented. Ontario is using a clearly defined risk-based approach in its CWD surveillance program. The Panel strongly encourages such approaches.

In several provinces, targeted surveillance of deer and elk showing signs of wasting and/or neurological disease is being used as a relatively inexpensive method of surveillance in low risk zones. Although useful, this strategy has significant limitations, especially in areas of low human densities where the probability of detecting animals with clinical signs is low. Results from this type of surveillance alone should not be relied upon to determine the occurrence of CWD in an area; rather, this approach should be used as a supplement to other surveillance methods if the goal of surveillance is to demonstrate absence of disease or early detection.

Sample sizes for hunter surveillance programs are typically established to detect relatively low (e.g. 1%) prevalence of disease with 95% confidence within a wildlife or deer management zone. Areas smaller than a wildlife management zone are intensively sampled in some cases due to the perception that these smaller areas are at high risk of disease. Given the clustered distribution of CWD and its relatively slow rate of spread, sampling at smaller spatial scales is appropriate in many situations. A short-coming in most, if not all, of the surveillance programs is a lack of precise location information for all wild deer and elk tested for CWD. Wildlife or deer management zones are typically too large to estimate prevalence of disease or monitor the introduction and spread of disease in an area. Precise location information allows spatially explicit modeling of disease dynamics.

A detection threshold of 1% in areas adjacent to known CWD infected deer populations is insufficient if the goal is to detect newly established foci and attempt to eradicate sparks. Sample sizes to detect disease at levels below 1% are recommended in these areas and samples should be pooled for no more than 2-3 years in order to detect early spread of CWD into these areas. Unfortunately, required sample sizes for extremely low prevalence may exceed sustainable harvest levels or public support in areas where CWD is not known to already occur.

Detection-based sampling should target adult animals (i.e., one year or older) as they are more likely to have detectable accumulations of abnormal prion proteins if they are infected. However, for research on the epidemiology of CWD, or for specific management needs, testing of fawns can be useful.

Current and evolving methods of testing

Diagnostic test procedures for detecting abnormal prion proteins in sampled individuals are constantly improving. Initially, diagnosis of CWD was based on observing spongiform (i.e. “sponge-like”) change in brain tissue with the light microscope. However, these changes are only observed in animals in later stages of the disease and therefore this method does not detect earlier preclinical cases. Immunohistochemical stains specific for abnormal prion proteins (PrP^{res}) greatly improve the sensitivity and specificity of tests for CWD and permit early detections of CWD. Infection trials in mule deer and white-tailed deer have shown that abnormal prion proteins accumulate first in tonsil and retropharyngeal lymph nodes, followed by deposition in the dorsal motor nucleus of the vagal nerve in the obex region of the brain. As the disease progresses, abnormal prion proteins are found in other areas of the brain stem as well. A similar pattern of disease progression is observed in elk, but whether this is consistent among individual elk is still under study.

Sensitivity of the test procedure is dependant on which tissues are tested; of the three tissues most commonly sampled (retropharyngeal lymph node, tonsil, and medulla oblongata at the obex), retropharyngeal lymph nodes are the most sensitive (i.e.tests performed on this tissue detect earlier preclinical cases) and obex (i.e brainstem) is the least sensitive. Surveillance programs should clearly state the testing procedures and the criteria used to classify an animal as “test negative”. These criteria should be standardized and validated amongst laboratories. In the past, different criteria have been used to define an animal as test negative. Hence, caution should be used when interpreting historical surveillance results, especially results from different laboratories. Less sensitive tests reduce the probability of detecting CWD, and consequently negative results are less meaningful than they would be if more sensitive tests were used.

The new “rapid” CWD tests detect abnormal prion proteins in unfixed tissues by using Western blot (WB) or enzyme-linked immunosorbent assay (ELISA) techniques. The sensitivities of these tests are similarly dependant on which tissues are analyzed. Sensitivities and specificities of these tests for a particular surveillance program should be determined and clearly stated when presenting results. The rapid tests have a high sensitivity but lower specificity which leads to false positives. Immunohistochemistry has high sensitivity and specificity and is appropriate as a secondary test in order to reject false positives identified via initial screening. Appropriate samples need to be collected to ensure that positives from rapid tests can be confirmed with immunohistochemistry. When CWD surveillance is based on testing only retropharyngeal lymph nodes, formalin fixed and frozen brain samples should still be collected from each animal in order to confirm infection in positive animals and allow for strain typing of the abnormal prion proteins. This information is needed to understand the epidemiology of CWD in wild populations.

9. INFORMATION AND MANAGEMENT NEEDS FOR CWD

There are substantial information gaps to be addressed before the potential impact of CWD on Canadian wildlife can be forecasted accurately, and effective management implemented accordingly.

In the short term (within 1-3 years), defining the extent of the current epidemic is a key priority, requiring surveillance for CWD in wild cervids be timely and of the highest sensitivity. This goal requires:

- Developing better spatially explicit risk assessments to improve the detection power of surveillance programs. This type of risk assessment has been developed previously [e.g. Saskatchewan Environment, Ontario Ministry of Natural Resources], however it needs to be fully implemented.
- Improving efficiency of surveillance by combining information among species and sources of information
- Improving current surveillance to include the location of CWD-negative as well as CWD-positive animals, for both free-ranging and captive herds.

Currently, short of total depopulation and/or wildlife barrier fencing, it is unknown what type of management intervention can reliably prevent the spatial spread of CWD in wild cervids. Quantitative modeling in combination with available data provides the best approach to exploring management scenarios.

- Models should build on existing models (e.g., Gross & Miller 2001), as well as critiques of such models (e.g., Schauber & Woolf 2003).
- Model selection should be empirical, incorporating the latest available information arising from research and management of CWD in cervids.
- Models to evaluate management interventions should be stochastic and be spatially explicit, including habitat-dependent movements of host animals.
- Model predictions of the threshold population density of hosts, or of management regimes, such as culling, that will lead to reduction in prevalence and spread of CWD and/or its eradication, should guide management actions and monitoring in an adaptive management framework. (It is recognized that population densities close to zero may be required)
- Models with the purpose of forecasting the impact of CWD on Canadian cervid populations, in the broader context, should include the interactions with large predators on disease dynamics.

Even under the best case scenarios of the current outbreak of CWD in mule deer in the Saskatchewan Landing area, preliminary modeling indicates substantial reductions in deer population density (≤1 animal km^{-2} of critical habitat) will be required to have any chance of disease containment. This level of population reduction likely cannot be accomplished by recreational hunting alone. There is a need to:

- Determine the rates and patterns of disease transmission and spread in order to design effective control strategies.
- Obtain information on human dimensions and perceptions of CWD in Canada.
- Explore methods for achieving a rapid (<2-3 yrs) and substantial (≤1 deer km^{-2}) reduction in the population density of cervids over large areas (>1000 km^2), and the public acceptability of which methods, if any, can meet these targets.

There is a great need to better define potential host species for CWD, and more importantly, which hosts are most important in maintenance of CWD in an area, either individually or in combination with other sympatric hosts. Research on transmission of CWD among species, including humans, livestock and other wildlife should include the following:

- Continue efforts to quantify the risks posed to humans from consuming meat from the carcasses of CWD-infected animals.
- Quantify both intra- and inter-specific transmission of CWD between moose and caribou.
- Multi-host models should be developed to quantify the contribution of various transmission pathways within and among cervid species.
- A target list of other wildlife of concern (e.g., bison, muskoxen) should be developed, and prioritized for research.

There are several gaps in knowledge that continue to hamper understanding and management of CWD. It would be extremely advantageous to:

- Develop a rapid and inexpensive *ante mortem* field test for CWD.
- Develop tests to detect and quantify environmental contamination by abnormal prion proteins (i.e., CWD agent).
- Determine whether strain variation exists and can be used to assist in determining the origin of disease, and tracking of disease spread.
- Better understand the routes and rates of direct and indirect transmission of CWD prions. This goal will require focal research studies in order to better predict CWD spread in wild cervid populations. Specifically, we need further studies to assess how population spatial structure, movement rates and other ecological factors influence the establishment and spread of CWD in wild cervid populations.

10. CONCLUSIONS

It is imperative that a national plan is developed for monitoring, managing and researching CWD in wild cervids in Canada. The panel wishes to highlight the following conclusions, herein presented in point form for ease of understanding:

- The panel views the CWD issue to be of national importance.
- Unless some concerted and effective management action is undertaken in the near future, CWD will become widespread with the potential for major consequences to wildlife, game farming, and a variety of socio-economic interests in Canada.
- The panel recognizes the success of the federal CWD program for game farms and recommends a comparable investment in the management of CWD in wildlife.
- Notwithstanding the provincial jurisdiction over wildlife management, the panel sees the need for federal assistance in developing a national program to manage CWD in collaboration with provincial jurisdictions.
- Eradication is a desirable goal but extremely difficult to achieve in wild populations given current knowledge, technologies, and resources.
- Achieving a low or negligible level of prevalence of CWD is an appropriate strategy to reduce transmission rates, reduce the potential for spread, and to minimize the amount of transmissible prions in the environment.
- The panel recognizes the core elements for managing and preventing the spread of CWD to include:
  - Implement comprehensive surveillance for CWD in wildlife and game farms.
  - Prevent transmission of CWD between free-living cervids and animals in game farms.
  - Avoid artificial animal concentrations (e.g., baiting and artificial feeding)
  - Conduct scientific investigations that guide management of CWD
  - Control populations of free-living cervids to achieve disease management objectives.
  - Develop policies and regulations for animal translocations and other activities to prevent the spread of CWD.
  - Conduct scientific investigations to understand the epidemiology of CWD in wildlife populations.
- Recognizing the uncertainties associated with CWD, managing agencies should adopt an adaptive management approach to incorporate new information as it becomes available.

11. RECOMMENDATIONS

The Panel feels that there is a sense of urgency in taking actions to contain or eradicate CWD in Canadian wild deer populations. The Panel members are unanimous in supporting the following recommendations; they are grouped in sections but presented in no particular order of priority.

A: Management of game farms

1. Develop and implement policies to prevent transmission of CWD between game farm facilities and wildlife. Actions should include:
    - Do not permit new game farms in infected areas.
    - Use double fencing in infected areas.
    - Ensure previously infected farms are not accessible by wild cervids for a minimum of 5 years.
    - Develop policies and regulations for animal translocations that may lead to spread of CWD.

2. Maintain current surveillance and management programs for CWD in farmed cervids.

3. Conduct additional retrospective epidemiological tracing of all farms for more comprehensive risk assessments in cooperation with US authorities.

4. Mandatory CWD testing of all cervid mortalities on game farms.

5. Mandatory participation in CFIA and provincial surveillance programs for CWD.

6. Any transportation permit should be approved by both the import and export authorities.

7. Share information on surveillance results and epidemiological investigations among agencies with jurisdictions over wildlife and game farm animals in a timely fashion.

B: Management of free-living cervids

1. Develop and implement policies to minimize artificial aggregations of free-living cervids to reduce transmission of CWD. Actions should include:
    - Prevent access to hay stacks, salt blocks, and artificial water sources by wildlife in high risk areas.
    - Ban baiting or artificial feeding for cervids in high risk areas.

2. Develop and evaluate management programs for reducing prevalence and spread of CWD in cervids by:
    - Eradicating "sparks" (i.e., new foci of infection) through local depopulation and intensification of monitoring in surrounding areas.
    - Controlling CWD in infected areas through population reduction to a target density of 1 cervid/km^2 in "critical" habitat (i.e., winter range) with reassessment based on surveillance results.

2. Monitoring and surveillance of CWD:
    - Develop and implement a risk-based surveillance program on a national scale, e.g., SK and ON models.
    - Implement an aggressive surveillance program in the next 1-3 years to

document the distribution of CWD in free-ranging cervids in Canada.
- To prevent the spread of CWD, collect sample sizes in areas adjacent to infected areas that would allow the detection of prevalence at a level of 0.5% (5 infected individuals per 1000) with a 95% confidence level. The window of sampling can be up to 3 years.
- Adopt standardized diagnostic testing procedures at the national level.

C: Research needs

1. Evaluate the distribution of abnormal prion proteins (PrP^{res}) specific to CWD in different body parts of infected animals, and its implication to infectivity within a context of pathogenesis.

2. Assess the potential for transmission of CWD within moose and caribou populations.

3. Design an integrated research program to quantify the contribution of various transmission pathways within and among cervid species.

4. Develop spatially explicit models of CWD transmission and spread to guide management actions and monitoring in an adaptive management framework.

5. Collaborate in development and evaluation of diagnostic epidemiological tools including *ante mortem* tests, strain typing and environmental detection of prions.

D: Communications

1. Expand communication tools about the CWD issues and programs, including regularly maintained and linked websites, fact sheets about CWD distribution, and media releases. The targeted clientele should be broad based, including landowners, scientists, hunters, consumers, etc.

12. ACKNOWLEDGEMENTS

We thank all presenters who gave us the benefit of their advice with regard to CWD in Canada. The Panel was impressed by the quality of the written and oral presentations during the public sessions. The submitted briefs presented a national context to the CWD issue in Canada, both in wild deer populations and in farmed animals, and were essential to the Panel's evaluation.

The Panel acknowledges the particular support of Ted Leighton, Marnie Paskaruk, Patrick Zimmer, and Jacqui Brown during public hearings and follow-up discussion. We express sincere thanks to the Canadian Cooperative Wildlife Health Centre for organizing this workshop and facilitating our work. Funding for the Panel was provided by the Canadian Wildlife Federation and by Environment Canada on behalf of the Canada Wildlife Directors Committee. Anna L. Leighton provided editorial assistance to improve the clarity of the text.

13. LITERATURE REFERENCED

Belay, E.D., R.A. Maddox, E.S. Williams, M.W. Miller, P. Gambetti, and L.B. Schonberger. 2004. Chronic wasting disease and potential transmission to humans. Emerging Infectious Diseases 10(6): 977-984. http://www.cdc.gov/ncidod/EID/vol10no6/03-1082.htm

Bishop, R.C. 2003. The economic effects of chronic wasting disease (CWD) in Wisconsin. Department of Agricultural and Applied Economics, University of Wisconsin-Madison, Staff Paper No. 463.

Bruce, M. E., A. Chree, I. McConnell, J. Foster, G. Pearson, and H. Fraser. 1994**.** Transmission of bovine spongiform encephalopathy and scrapie to mice: strain variation and the species barrier. Philosophical Transactions of the Royal Society of London B 343: 405-411.

Gross, J. E., and M. W. Miller. 2001. Chronic wasting disease in mule deer: disease dynamics and control. Journal of Wildlife Management 65: 205-215.

Hamir, A.N., R. C. Cutlip, J. M. Miller, E. S. Williams, M. J. Stack, M. W. Miller, K I. O'Rourke, and M. J. Chaplin. 2001. Preliminary findings on the experimental transmission of chronic wasting disease agent of mule deer to cattle. Journal of Veterinary Diagnostic Investigations 13: 91-96.

Johnson, C, J, Johnson, M. Clayton, D. McKenzie, and J. Aiken. 2003. Prion protein heterogeneity in free-ranging white-tailed deer within the chronic wasting disease affected region of Wisconsin. Journal of Wildlife Diseases 39: 576-581.

Menard, J., K. Jensen, and B.C. English. Projected economic impacts of a chronic wasting disease (CWD) outbreak in Tennessee. Agri-Industry Modeling and Analysis Group Industry Brief. May 2004 http://web.utk.edu/~aimag/pubs/CWD.pdf

Miller, M. W., and E. S. Williams. 2003. Horizontal prion transfer in mule deer. Nature 425: 35-36.

Miller, M. W., E. S. Williams, N. T. Hobbs, and L. L. Wolfe. 2004. Environmental sources of prion transmission in mule deer. Emerging Infectious Diseases 10: 1003̃1006.

Miller, M. W., E. S. Williams, C. W. McCarty, T. R. Spraker, T. J. Kreeger, C. T. Larsen, and E. T. Thorne. 2000. Epizootiology of chronic wasting disease in free-ranging cervids in Colorado and Wyoming. Journal of Wildlife Diseases 36: 676-690.

National CWD Plan Implementation Committee. 2002. Implementation document for plan for assisting states, federal agencies and tribes in managing chronic wasting disease in wild and captive cervids. Nebraska Game and Parks Commission Draft 1.

O'Rourke, K. I., R.E. Besser, M. W. Miller, T. F. Cline, T. R. Spraker, A. L. Jenny, M. A. Wild, G. L. Zebarth, and E. S. Williams. 1999. PrP genotypes of captive free-ranging Rocky Mountain eld (*Cervus elaphus nelsoni*) with chronic wasting disease. Journal of General Virology 80: 2765-2769.

Petchenik, J. 2003. Chronic wasting disease in Wisconsin and the 2002 hunting season: gun deer hunters' first response. Bureau of Integrated Science Services Department of Natural Resources.

Peterson, M. J., M. D. Samuel, V. F. Nettles, Jr., G. Wobeser, and W. D. Hueston. 2002. Review of chronic wasting disease management policies and programs in Colorado. Colorado Wildlife Commission, Denver, Colorado, USA.

Priondata. 2002. Chronic wasting disease of deer: a review. June 11, 2002. UK. May 2004 http://www.priondata.org/data/A_CWDinfo.html

Prusiner S, B. 1991. Molecular biology of prion diseases. Science 252:1515-1522.

Raymond, G. J., A. Bossers, L. D. Raymond, K. I. O'Rourke, L. E. McHolland, P. K. Bryant, III, M. W. Miller, E. S. Williams, M. Smits, and D. Caughey. 2000. Evidence of a molecular barrier limiting susceptibility of humans, cattle and sheep to chronic wasting disease. The European Molecular Biology Organization Journal 19: 4425-4430.

Samuel, M.D., D.O. Joly, M.A. Wild, S.C. Wright, D.L. Otis, R.W. Werge, and M.W. Miller. 2003. Surveillance strategies for detecting chronic wasting disease in free-ranging deer and elk. Results of a CWD surveillance workshop. USGS-National Wildlife Health Center. May 2004 http://www.nwhc.usgs.gov/research/chronic_wasting/CWD_Surveillance_Strategies.pdf

Schauber, E. M., and A. Woolf. 2003. Chronic wasting disease in deer and elk: A critique of current models and their application. Wildlife Society Bulletin 31: 610-616.

Seidl, A., S.R. Koontz, M. Bruch, and L. Elder. 2003. Economic implications of chronic wasting disease. *In:* Agriculture and Resource Policy Report, Department of Agricultural and Resource Economics, Colorado State University, June 2003, APR03-07. May 2004 http://dare.agsci.colostate.edu/extention/pubs.html

Seidl, A., S.R., Koontz, L. Elder, and M. Bruch. 2003. Chronic wasting disease overview: hunter information. *In:* Agriculture and Resource Policy Report, Department of Agricultural and Resource Economics, Colorado State University, June 2003, APR03-04. May 2004 http://dare.agsci.colostate.edu/extention/pubs.html

Sigurdson, C. J., E. S. Williams, M. W. Miller, T. R. Spraker, K. L. O'Rourke, and E. A. Hoover. 1999. Oral transmission and early lymphoid tropism of chronic wasting disease PrP^{res} in mule deer fawns (*Odocoileus hemionus*). Journal of General Virology 80: 2757-

2764.

The Green Lane, Environment Canada. 2003. Expenditures on nature-related activities by Canadians *In:* Part A – Nature-related activities by Canadians in Canada. May 2004 http://www.ec.gc.ca/nature/DirectBenefits.htm

U.S. Department of Agriculture and U.S. Department of the Interior. 2002. Plan for assisting states, federal agencies, and tribes in managing chronic wasting disease in wild and captive cervids. Pp. 20.

U.S. Department of Agriculture and U.S. Department of the Interior. 2003. Progress report on the plan for assisting states, federal agencies and tribes in managing chronic wasting disease in wild and captive cervids (October 2002 – September 2003). Pp. 31.

Wild, M. A., T. R. Spraker, C. J. Sigurdson, K. I. O.Rourke, and M. W. Miller. 2002. Preclinical diagnosis of chronic wasting disease in captive mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*) using tonsillar biopsy. Journal of General Virology 83: 2617-2628.

Williams, E. S., and M. W. Miller. 2002. Chronic wasting disease in deer and elk in North America. Scientific and Technical Review of the Office International des Epizooties Aug 21 (2): 305-316.

Williams, E. S., M. W. Miller, and E. T. Thorne. 2002b. Chronic wasting disease: Implications and challenges for wildlife managers. Transactions of the North American Wildlife and Natural Resources Conference 67: in press

Williams, E. S., M. W. Miller, T. J. Kreeger, R. H. Kahn, and E. T. Thorne. 2002. Chronic wasting disease of deer and elk: a review with recommendations for management. Journal of Wildlife Management 66: 551-563.

Wolfe, L. L., M. M. Conner, T. H. Baker, V. J. Dreitz, K. P. Burnham, E. S. Williams, N. T. Hobbs, and M. W. Miller. 2002. Evaluation of antemortem sampling to estimate chronic wasting disease prevalence in free-ranging mule deer. Journal of Wildlife Management 66: 564-573.

Appendix 1: Panel members and affiliations

Dr. Messier is currently the Head of the Biology Department at the University of Saskatchewan. His major research interest is in population dynamics and ecology of mammals, specifically of polar bears in the Canadian arctic. His previous and current ecology research lab examines ecological questions on mammals ranging from Ord's Kangaroo rats, black-tailed prairie dogs, muskrat, skunks, raccoons, wolves, caribou, wood bison, grizzly bears, and polar bears.

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Dr. Trent Bollinger is a wildlife veterinary pathologist and Director of the Western and Northern Region of the Canadian Cooperative Wildlife Health Centre (CCWHC) at the Western College of Veterinary Medicine in Saskatoon, Saskatchewan. He has coordinated the chronic wasting disease surveillance program for the CCWHC over the last 5 years. His research focuses on the pathology and epidemiology of disease in wildlife.

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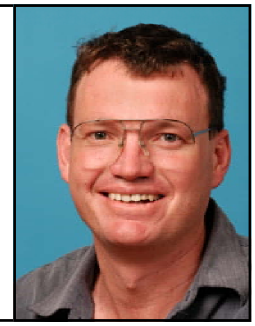
Dr Peter Caley currently works as a research scientist for the Risk Analysis and Biosecurity Team at CSIRO Entomology, Canberra. He is a leading researcher into quantifying the role of wildlife as reservoirs of infectious diseases, particularly bovine tuberculosis. His professional research interests include vertebrate ecology, epidemiology of disease in wildlife, risk assessment of invasive species, vertebrate pest control, biological statistics and ecological modelling.



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Dr. Evelyn H. Merrill is Associate Professor in the Department of Biological Sciences at the University of Alberta. She has conducted research on cervid foraging and habitat ecology for the past 20 years across ecosystems in Canada and the United States. Her current research focuses on cumulative impacts of industrial development and spatially explicit modeling of predator-prey dynamics in heterogeneous landscapes. She is a certified wildlife biologist and past associate editor for the Journal of Wildlife Management.

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Dr. Michael Miller has served as a wildlife veterinarian for the Colorado Division of Wildlife since 1989. In that capacity, he has researched a variety of topics related to the ecology and management of infectious diseases in free-ranging wildlife in Colorado and other states. Chronic wasting disease (CWD), the naturally-occurring prion disease of native North American cervids, has been the focus of a considerable part of Dr. Miller's research throughout the last decade. His studies, in collaboration with Dr. Elizabeth Williams and a host of other prion disease investigators, have included work on various aspects of CWD epidemiology, as well as on development and evaluation of surveillance systems and diagnostic tests used to detect and monitor infections in free-ranging populations of deer and elk. Dr. Miller is one of several collaborating scientists involved in surveillance-based adaptive management of CWD in North America, and has served in an advisory capacity to wildlife biologists designing surveillance programs to detect and contain new foci of CWD.

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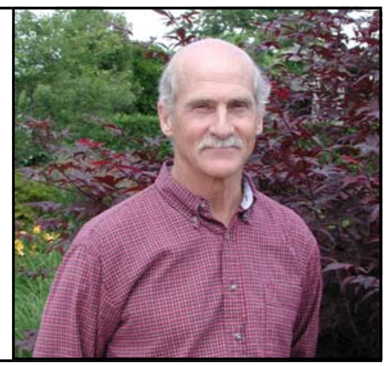
Michael D. Samuel is the Assistant Unit Leader at the USGS Cooperative Wildlife Research Unit and Associate Professor in Wildlife Ecology, at the University of Wisconsin-Madison. He has conducted research on wildlife disease problems for the past 15 years. Mike has been working on chronic wasting disease in Wisconsin since the disease was detected in 2002. His current research studies on CWD involve spatial demographic evaluation of disease patterns in Wisconsin, evaluation of factors influencing transmission in white-tailed deer, surveillance programs for detecting CWD, transmission to other wildlife species, feeding and baiting of deer, and epidemiological modeling.



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Dr. Emmanuel Vanopdenbosch joined the former National Institute for Veterinary Research, now called Veterinary and Agrochemical Research (VAR) Institute, at Brussels in 1977 where he specialized within the Department of Virology, in enzootic viral diseases of cattle, i.e. viral digestive, respiratory and reproductive disorders.
He became head of the Department of Virology and since 1998 head of the Department of Biocontrol, mainly in charge of TSE diagnosis and research, but also vaccine control, electron microscopy and histopathology.

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Appendix 2: Presentations made to the Panel

Ron Lind-Saskatchewan Environment (SE)
Margo Pybus-Alberta Fish & Wildlife
Allan Preston-Manitoba Agriculture
Todd Shury-Parks Canada
Lynn Bates-Canadian Food Inspection Agency (CFIA)
Colin Maxwell-Canadian Wildlife Federation (CWF)
Joe Schmutz-Centre for Studies in Agriculture, Law and the Environment (CSALE)

Appendix 3: Briefs received by the Panel

Saskatchewan:
Saskatchewan Environment – Submitted by Ron Lind
Saskatchewan Agriculture and Food – Submitted by Rob Kerr
Saskatchewan Wildlife Federation – Submitted by Peter Schlivert
Saskatchewan Health – Submitted by Ross Findlater
Saskatchewan Stock Growers Assoc. – Submitted by Bern Rothwell

Alberta:
Alberta Fish & Wildlife – Submitted by Margo Pybus
Alberta Ag & Food – Submitted by Gerald Hauer
Alberta Wildlife Society – Submitted by Kirby Smith
Alberta Fish & Game Association – Submitted by Martin Sharren

Manitoba:
Manitoba Conservation – Submitted by Vince Crichton

Ontario:
Ontario Ministry of Natural Resources – Submitted by Brent Patterson
Ontario Ministry of Agriculture & Food – Submitted by Bob Wright

New Brunswick:
New Brunswick Department of Natural Resources – Submitted by Rod Cumberland

Northwest Territories:
Resources, Wildlife and Economic Development – Submitted by Brett Elkin

Federal Government Agencies:
Canadian Food Inspection Agency – Submitted by Lynn Bates
Parks Canada – Submitted by Todd Shury

Non-Governmental Agencies:
Centre for Studies in Agriculture, Law and Environment – Submitted by Joe Schmutz
Canadian Wildlife Federation – Submitted by Leigh Edgar

Appendix 4: Participants on the open forum

Ted Leighton (Chair) – Canadian Cooperative Wildlife Health Centre
Connie Argue - CFIA
Lynn Bates - CFIA
Ken McDaid - Fair Chase League
Leigh Edgar – Canadian Wildlife Federation
Brett Elkin – Resources, Wildlife and Economic Development, Northwest Territories
Gerald Hauer – Alberta Agriculture and Food
Wayne Lees - CFIA
Ron Lind - Saskatchewan Environment, Fish and Wildlife Branch
George Luterbach - CFIA
Colin Maxwell – Canadian Wildlife Federation
Ole Nielsen (Edmonton)
Allan Preston – Manitoba Agriculture
Margo Pybus - Alberta Fish and Wildlife Branch
Peter Schlivert – Saskatchewan Wildlife Federation
Joe Schmutz - Important Bird Areas (CSALE)
Todd Shury - Parks Canada
Cathy Soos – Western College of Veterinary Medicine
Brian Longworth - Saskatchewan Stock Growers Association Rep.
Murray Woodbury - Western College of Veterinary Medicine
Al Arsenault-Saskatchewan Environment, Fish and Wildlife Branch

Horizontal Transmission of Chronic Wasting Disease in Reindeer

S. Jo Moore, Robert Kunkle, M. Heather West Greenlee, Eric Nicholson, Jürgen Richt, Amir Hamir,[1] W. Ray Waters, Justin Greenlee

We challenged reindeer by the intracranial route with the agent of chronic wasting disease sourced from white-tailed deer, mule deer, or elk and tested for horizontal transmission to naive reindeer. Reindeer were susceptible to chronic wasting disease regardless of source species. Horizontal transmission occurred through direct contact or indirectly through the environment.

Reindeer are susceptible to chronic wasting disease (CWD) after experimental oral challenge (*1*), and recently, CWD was identified in a free-ranging reindeer in Norway (*2*,*3*). Horizontal transmission is the primary mode of CWD transmission in deer. Direct horizontal transmission occurs when naive animals are exposed to infectious excreta (i.e., saliva, urine, feces) during close contact with CWD-affected animals (reviewed in *4*). Indirect horizontal transmission occurs through exposure to environments contaminated with infectious material (e.g., excreta or decomposed carcasses) (*5*,*6*).

The Eurasian reindeer (*Rangifer tarandus tarandus*) is closely related to the North American caribou (*R. t. caribou*, *R. t. granti*, *R. t. groenlandicus*). In North America, overlapping geographic ranges of free-ranging populations of potentially CWD-infected white-tailed deer (*Odocoileus virginianus*), mule deer (*O. hemionus*), or elk (*Cervus elaphus nelsoni*) present a risk for horizontal transmission to caribou. Exposure also could occur in farmed populations where contact occurs between reindeer and captive and/or free-ranging CWD-affected cervids. We investigated the transmission of CWD from white-tailed deer, mule deer, or elk to reindeer through the intracranial route and assessed them for direct and indirect horizontal transmission to uninoculated sentinels.

The Study

In 2005, we challenged reindeer fawns from a farm in Alaska, USA, where CWD had never been reported, by intracranial inoculation (*7*) with pooled brain material from CWD-affected elk from South Dakota (CWD^{elk}), CWD-affected mule deer from Wyoming (CWD^{md}), or CWD from white-tailed deer from Wisconsin combined with brain material from experimentally challenged white-tailed deer (CWD^{wtd}) (Table 1; online Technical Appendix, http://wwwnc.cdc.gov/EID/article/22/12/16-0635-Techapp1.pdf). Additional uninoculated fawns served as negative controls, controls for indirect transmission, and controls for direct transmission (Table 1; online Technical Appendix). We determined the prion protein gene (*PRNP*) genotype of each fawn (online Technical Appendix), and we tried to ensure that each *PRNP* genotype was present in each group (Table 2, http://wwwnc.cdc.gov/EID/article/22/12/16-0635-T1.htm). Control reindeer were housed in the same barn as inoculated reindeer but in separate pens that prevented direct physical contact (i.e., nose-to-nose) between control and inoculated animals (online Technical Appendix Figure 1). Indirect and direct contact control groups were formed 25 months after intracranially challenged reindeer were inoculated (online Technical Appendix Figure 1, panel B).

Clinical signs consistent with CWD were first observed 20.9 months after inoculation (Table 2). Common clinical features included found dead without clinical signs noted, loss of body condition, recumbency, and lethargy (Table 2; online Technical Appendix).

At death, a full necropsy was performed on all reindeer. Two sets of tissue samples were collected: 1 set was fixed in 10% buffered formalin, embedded in paraffin wax, sectioned at 5 µm for microscopy examination after hematoxylin and eosin staining or immunohistochemical staining using primary antibody F99/96.7.1 (online Technical Appendix). A second set of tissues was frozen, and selected tissues were used for immunodetection of scrapie prion protein (PrP^{Sc}) by Western blot (brain tissue only) as described previously (*7*) but with some modifications, or an ELISA (brainstem and/or retropharyngeal lymph node) using a commercial kit (IDEXX HerdChek BSE-Scrapie Antigen ELISA; IDEXX, Westbrook, ME, USA) according to the manufacturers' instructions (online Technical Appendix).

In the intracranially inoculated groups, when intercurrent deaths were excluded, reindeer with the NN138 polymorphism (reindeer nos. 2, 6, and 12) had the shortest survival times in each group (Table 2). Different inocula did not produce significantly different survival times (log-rank

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[1]Deceased.

Table 1. Animal data for reindeer (*Rangifer tarandus tarandus*) in a study of transmission of CWD*

Group no./animal no.	Genotype codon 002	129	138	169	176	Infectivity source	Exposure route
1							
1	MV	SG	NS	MV	NN	CWD^{wtd}	Intracranial
2	VV	GG	NN	VV	NN	CWD^{wtd}	Intracranial
3	VV	GG	NS	VV	ND	CWD^{wtd}	Intracranial
4	VV	GG	NS	VV	NN	CWD^{wtd}	Intracranial
5	MV	SG	SS	MV	ND	CWD^{wtd}	Intracranial
2							
6	VV	GG	NN	VV	NN	CWD^{elk}	Intracranial
7	MV	SG	NS	MV	NN	CWD^{elk}	Intracranial
8	VV	GG	NS	VV	NN	CWD^{elk}	Intracranial
9	VV	GG	NS	VV	ND	CWD^{elk}	Intracranial
10	NA	SG	SS	MV	NN	CWD^{elk}	Intracranial
3							
11	MV	SG	NS	MV	NN	CWD^{md}	Intracranial
12	VV	GG	NN	VV	NN	CWD^{md}	Intracranial
13	VV	GG	SS	VV	DD	CWD^{md}	Intracranial
14	MV	SG	SS	MV	NN	CWD^{md}	Intracranial
15	VV	GG	NS	VV	ND	CWD^{md}	Intracranial
4 direct							
16	VV	GG	NN	VV	NN	Horizontal (CWD^{wtd})	Cohoused with group 1
17	VV	GG	NN	VV	NN	Horizontal (CWD^{wtd})	Cohoused with group 1
18	VV	GG	NN	VV	NN	Horizontal (CWD^{wtd})	Cohoused with group 1
19	NA	SG	NS	MV	NN	Horizontal (CWD^{wtd})	Cohoused with group 1
4 indirect							
20	MM	SS	SS	MM	NN	Horizontal (CWD^{md})	Housed adjacent to group 3
21	VV	GG	NN	VV	NN	Horizontal (CWD^{md})	Housed adjacent to group 3
4 neg. controls							
22	VV	GG	NS	VV	NN	NA	NA
23	MV	SG	SS	MV	NN	NA	NA

*CWD, chronic wasting disease; D, aspartic acid; G, glycine; horizontal, horizontal transmission; M, methionine; md, mule deer (*Odocoileus hemionus*); N, asparagine; NA, not applicable; neg., negative; S, serine; V, valine; wtd, white-tailed deer (*Odocoileus virginianus*).

test, p = 0.0931), but we observed differences in the amount of vacuolation and PrP^{Sc} in the brain at the clinical stages of disease in CWD^{wtd}- and CWD^{elk}-inoculated reindeer, compared with CWD^{md}-inoculated reindeer (Table 2; online Technical Appendix). In the indirect contact animals, PrP^{Sc} was present in the brain but restricted to the dorsal motor nucleus of the vagus nerve and area postrema.

We observed different patterns of PrP^{Sc} deposition in the brain (Figure 1, panels A–D; online Technical Appendix), the most striking of which was dominated by aggregated deposits of various sizes, including plaque-like deposits (Figure 1, panels A,B). This pattern was seen in reindeer with the NS138 NN176 (no. 8, CWD^{elk}; no. 13, CWD^{md}) or SS138 DD176 (no. 4, CWD^{wtd}) genotypes. With regard to immunoreactivity in the retina (Figure 1, panels E, F; online Technical Appendix), in 2 of 3 reindeer with aggregated deposits in the brain (nos. 8 and 13), aggregated immunoreactivity also was observed in the inner plexiform layer of the retina (Figure 1, panel f).

Reindeer that were negative by immunohistochemical analysis in brain also were negative by Western blot and ELISA. Different Western blot migration patterns were observed in PrP^{Sc}-positive animals (Figure 2), but we found no clear association between migration pattern and challenge group or *PRNP* genotype.

PrP^{Sc} was widespread in lymphoid tissues from most reindeer (Table 2; online Technical Appendix). Reindeer with the NS138 genotype had a significantly lower average percentage of lymphoid follicles positive than did reindeer with NN138 (analysis of variance, p = 0.003) or SS138 (p = 0.003) deer. Excluding intercurrent deaths, PrP^{Sc} was detected in all 4 CWD^{wtd}-challenged reindeer, all 5 CWD^{elk}-challenged reindeer, all 4 CWD^{md}-challenged reindeer, both indirect contact reindeer, and 2 of 4 direct contact reindeer (Table 2).

Conclusions

Potential sources of infectivity for direct contact animals include urine, feces, and saliva from their CWD^{wtd}-challenged pen-mates, as has been shown for CWD-affected white-tailed deer (*6*,*8*,*9*). Pinpointing the source of infectivity in the indirect contact group is more difficult. Infectious prions can travel at least 30 m in airborne particulate (*10*), but because the negative control reindeer in the pen adjacent to the indirect contact reindeer did not become positive, a more direct route of transmission is likely in this case. Penning, feeding, and watering protocols were designed to prevent exposure of negative control and indirect contact reindeer to potential infectivity on feed and water buckets, bedding, or fencing (*6*,*11*). However, reindeer

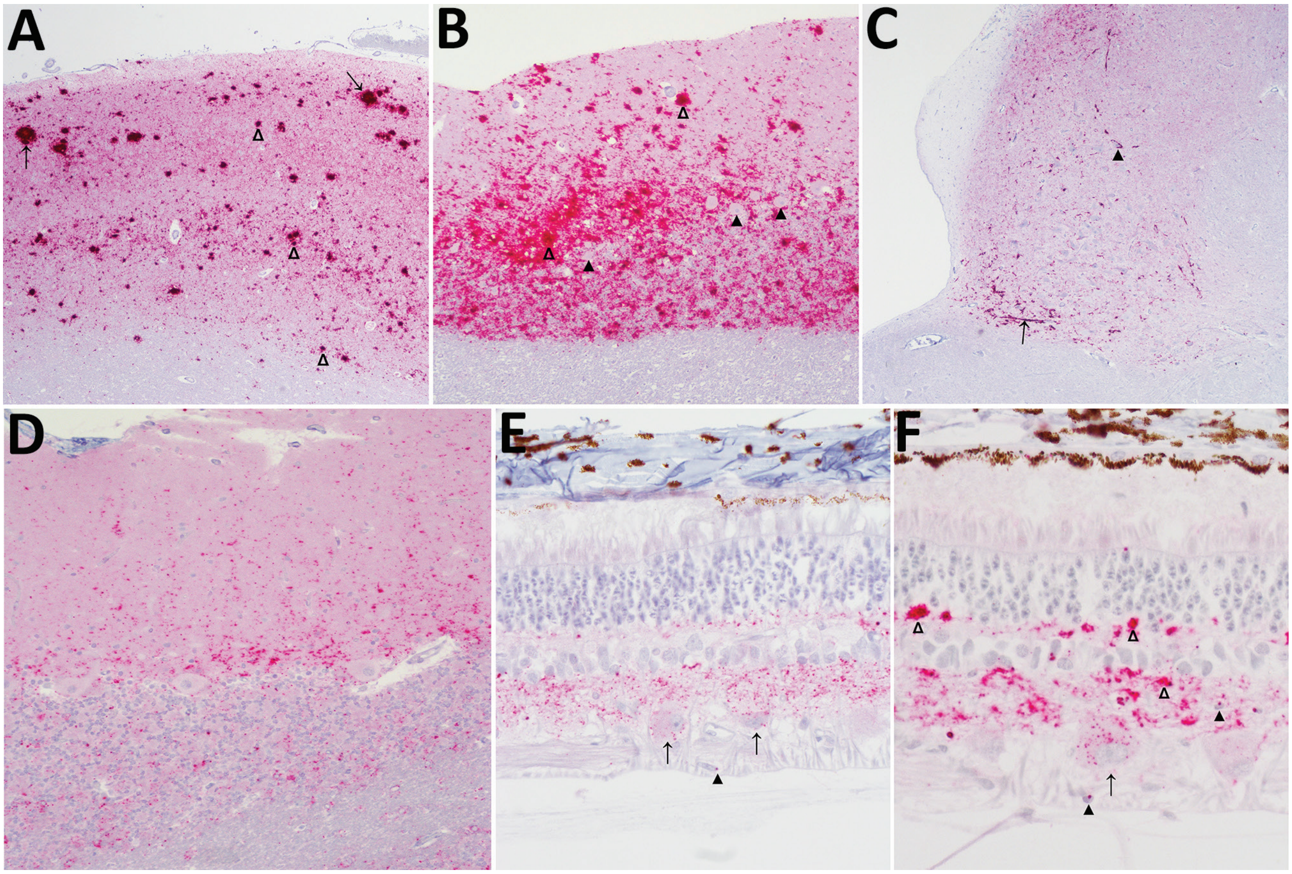

Figure 1. Immunohistochemical analysis for the prion protein showing scrapie prion protein (PrP^{Sc}) deposits in brains (A–D) and retinas (E, F) from reindeer (*Rangifer tarandus tarandus*) with chronic wasting disease. PrP^{Sc} immunodetection using the monoclonal antibody F99/97.6.1. A) Neocortex, showing prominent aggregated (open arrowheads) and plaque-like (arrows) deposits in reindeer no. 4. Original magnification ×5. B) Cerebellum, showing particulate immunoreactivity and aggregated deposits (open arrowheads) in reindeer no. 4. Note absence of intraneuronal immunoreactivity in Purkinje cells (solid arrowheads). Original magnification ×10. C) Brainstem at the level of the obex, showing prominent linear (arrow) and perineuronal (solid arrowhead) immunoreactivity in the dorsal motor nucleus of the vagus nerve in reindeer no. 21. Original magnification ×5. D) Cerebellum, punctate immunoreactivity in the molecular and granular layers and white matter in reindeer no. 12. Original magnification ×5. E) Intraneuronal immunoreactivity in retinal ganglion cells (arrows), punctate deposits in the inner and outer plexiform layers, scattered intramicroglial deposits (solid arrowheads) in reindeer no. 12. Original magnification ×40. F) Particulate to coalescing deposits in the inner and outer plexiform layers (open arrowheads), intraneuronal immunoreactivity in retinal ganglion cells (arrows), and scattered intramicroglial deposits (solid arrowheads) in reindeer no. 13. Original magnification ×40.

might have had access to bedding from adjacent pens that had spread into the central alleyway.

During the 5-year course of this study, reindeer were moved between pens several times to maintain an optimal number of animals per pen (online Technical Appendix Figure 1). Prolonged persistence of prion infectivity in the natural environment has been documented for both CWD (2 years [*5*]) and scrapie (up to 16 years [*12*]). In addition, thorough cleaning and disinfection might not be sufficient to remove all infectivity from the environment, leading to persistence of infectivity under experimental housing conditions (*13*).

In reindeer challenged orally with the agent of CWD, the SS138 genotype (serine/serine at *PRNP* codon 138) has been associated with susceptibility to disease and the NS138 (asparagine/serine) genotype with resistance (*1*). In the study we report, disease developed in reindeer with the NS138 genotype after intracranial inoculation, although the extent of lymphoreticular system involvement was significantly lower than in NN138 and SS138 reindeer. The potential association of the NN138 polymorphism with shorter survival times is interesting. However, as with all potential genotype versus phenotype interactions, care should be taken not to over-interpret these results given the small group sizes and the large number of *PRNP* genotype groups in this study.

Our results demonstrate that reindeer are susceptible to the agent of CWD from white-tailed deer, mule deer, and elk sources after intracranial inoculation. Furthermore, naive reindeer are susceptible to the agent of CWD after

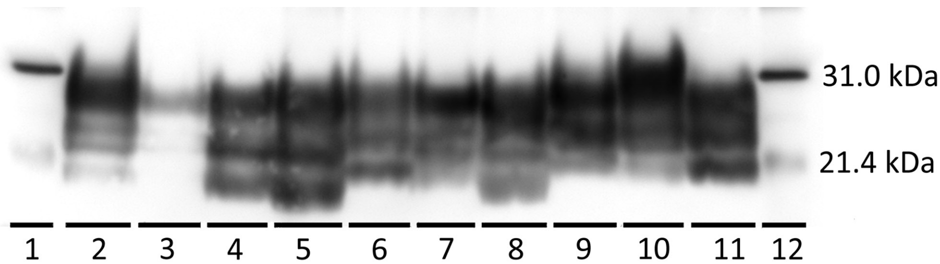

Figure 2. Western blot characterization of the inocula used to inoculate reindeer and brainstem samples from representative reindeer from each experimental group in study of chronic wasting disease transmission. Scrapie prion protein (PrP^{Sc}) immunodetection using the monoclonal antibody 6H4. Positive Western blot results demonstrate a 3-band pattern (diglycosylated, highest; monoglycosylated, middle; and nonglycosylated, lowest) that is characteristic of prion diseases. Lanes: 1, biotinylated protein marker; 2 and 3, indirect contact reindeer (animals no. 20 and 21, respectively); 4 and 5, reindeer inoculated intracranially with CWD^{md} (animals no. 15 and 12 respectively); 6, CWD^{md} inoculum; 7, direct contact reindeer (no. 7, cohoused with CWD^{wtd}-inoculated reindeer); 8, reindeer (no. 5) inoculated intracranially with CWD^{wtd}; 9, CWD^{wtd} inoculum; 10, reindeer (no. 10) inoculated intracranially with CWD^{elk}; 11, CWD^{elk} inoculum; 12, marker. CWD, chronic wasting disease; CWD^{elk}, CWD-affected elk; CWD^{md}, CWD-affected mule deer; CWD^{wtd}, CWD-affected white-tailed deer combined with brain material from experimentally challenged white-tailed deer.

direct and indirect exposure to CWD-infected reindeer, suggesting a high potential for horizontal transmission of CWD within and between farmed and free-ranging reindeer (and caribou) populations.

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References

1. Mitchell GB, Sigurdson CJ, O'Rourke KI, Algire J, Harrington NP, Walther I, et al. Experimental oral transmission of chronic wasting disease to reindeer (*Rangifer tarandus tarandus*). PLoS One. 2012;7:e39055. http://dx.doi.org/10.1371/journal.pone.0039055
2. Norwegian Veterinary Institute. The first detection of chronic wasting disease (CWD) in Europe. 2016 April 4 [cited 2016 Apr 5]. http://www.vetinst.no/sykdom-og-agens/chronic-wasting-disease/the-first-detection-of-chronic-wasting-disease-cwd-in-europe
3. Becker R. Deadly animal prion disease appears in Europe. 2016 [cited 2016 Jun 16]. http://www.nature.com/news/deadly-animal-prion-disease-appears-in-europe-1.19759
4. Haley NJ, Hoover EA. Chronic wasting disease of cervids: current knowledge and future perspectives. Annu Rev Anim Biosci. 2015;3:305–25. http://dx.doi.org/10.1146/annurev-animal-022114-111001
5. Miller MW, Williams ES, Hobbs NT, Wolfe LL. Environmental sources of prion transmission in mule deer. Emerg Infect Dis. 2004;10:1003–6. http://dx.doi.org/10.3201/eid1006.040010
6. Henderson DM, Denkers ND, Hoover CE, Garbino N, Mathiason CK, Hoover EA. Longitudinal detection of prion shedding in saliva and urine by CWD-infected deer by real-time quaking-induced conversion. J Virol. 2015;89:9338–47. http://dx.doi.org/10.1128/JVI.01118-15
7. Greenlee JJ, Smith JD, Kunkle RA. White-tailed deer are susceptible to the agent of sheep scrapie by intracerebral inoculation. Vet Res. 2011;42:107. http://dx.doi.org/10.1186/1297-9716-42-107
8. Mathiason CK, Hays SA, Powers J, Hayes-Klug J, Langenberg J, Dahmes SJ, et al. Infectious prions in pre-clinical deer and transmission of chronic wasting disease solely by environmental exposure. PLoS One. 2009;4:e5916. http://dx.doi.org/10.1371/journal.pone.0005916
9. Tamgüney G, Richt JA, Hamir AN, Greenlee JJ, Miller MW, Wolfe LL, et al. Salivary prions in sheep and deer. Prion. 2012;6:52–61. http://dx.doi.org/10.4161/pri.6.1.16984
10. Gough KC, Baker CA, Simmons HA, Hawkins SA, Maddison BC. Circulation of prions within dust on a scrapie affected farm. Vet Res. 2015;46:40. http://dx.doi.org/10.1186/s13567-015-0176-1
11. Maddison BC, Baker CA, Terry LA, Bellworthy SJ, Thorne L, Rees HC, et al. Environmental sources of scrapie prions. J Virol. 2010;84:11560–2. http://dx.doi.org/10.1128/JVI.01133-10
12. Georgsson G, Sigurdarson S, Brown P. Infectious agent of sheep scrapie may persist in the environment for at least 16 years. J Gen Virol. 2006;87:3737–40. http://dx.doi.org/10.1099/vir.0.82011-0
13. Hawkins SA, Simmons HA, Gough KC, Maddison BC. Persistence of ovine scrapie infectivity in a farm environment following cleaning and decontamination. Vet Rec. 2015;176:99. http://dx.doi.org/10.1136/vr.102743

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Chronic Wasting Disease in Deer and Elk: Scientific Facts and Findings

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REVIEW

Chronic Wasting Disease in Deer and Elk: Scientific Facts and Findings

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ABSTRACT. Chronic wasting disease (CWD) is a prion disease of cervids such as deer and elk in North America. Unlike other transmissible spongiform encephalopathy (TSE) such as scrapie, CWD occurs in both captive and wild ranging animals, but not in domestic ruminants such as sheep and cattle. In this paper, the history of the disease, pathogenesis of CWD, susceptibility of animals, its transmission mechanisms, potential origins of the disease, diagnostic methods in the field and laboratory tests, surveillance and survey systems in the USA and Canada, control strategies, economic impact of the disease, food and feed safety, and the risks in human and animals are reviewed and summarized. Although there is no evidence that CWD has been transmitted to humans, it may have the potential to infect humans.
KEY WORDS: CWD, diagnostic method, food and feed safety, pathogenesis, surveillance

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Chronic wasting disease (CWD) is a transmissible spongiform encephalopathy (TSE) that can affect specific species of native North American deer, including mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*) as well as Rocky Mountain elk (*Cervus elaphus nelsoni*). The disease is found in both captive (farmed) and free-living populations of these species. The purpose of this paper is to present the current scientific knowledge about this disease.

HISTORY OF THE DISEASES

CWD was first identified in the late 1960s in captive mule deer in a Colorado wildlife research facility. Researchers working on natural history and nutritional studies with captive mule deer observed the clinical signs and called the syndrome chronic wasting disease (CWD). It was initially thought to be associated with the stresses of captivity, nutritional deficiencies, or intoxication. Later, the disease was recognized as a spongiform encephalopathy-forming disease through histological studies [27]. The disease was also recognized in Rocky Mountain elk [26]. Its neuropathology included the “daisy plaques” which are also a unique abnormality of the new variant Creutzfeldt-Jakob disease (vCJD) in humans. The occurrence of CWD remained limited to captive mule deer until 1981, but in the 1990s the disease was found in free-ranging mule deer, white tail deer, and elk in Colorado and Wyoming. This is the only TSE known to affect free-ranging wildlife species. Little attention was paid to this disease in its early discovery, however, it received much more attention after the potential link between vCJD and Bovine Spongiform Encephalopathy (BSE) was identified, and now many researchers and regulators in public health, wildlife, and animal health have intensified their interest in this disease.

By the year 2000, CWD had been identified in both farmed and free-ranging animals in several states neighboring the first reported case, as well as in contiguous regions of Canada. Intensified recent surveillance has identified what appears to be an ever-expanding geographic range. Cases have been identified in the western portion of Colorado, in Wisconsin, Minnesota, New Mexico, and Utah and some imported cases have been reported in South Korea [17].

PATHOGENESIS

The pathogenesis of CWD in its natural setting shares several similarities with its related diseases, mainly scrapie and BSE. The pathogenesis consists of early involvement of the lympho-reticular system, including gut-associated lymphoid tissue with incubation periods ranging between 15 and 36 months, depending on the species and conditions of infection. Minor differences in the amount and distribution of abnormal protein in different body tissues have been observed in deer and elk. It has not been detected, however, in either muscle or “antler velvet” - two products consumed by humans. Spongiform changes are present in the medulla oblongata, especially the parasympathetic vagal nucleus and in the thalamus, hypothalamus and olfactory cortex and are often severe. The disease specific abnormal prion protein, PrP^{CWD}, as demonstrated by immunohistochemistry (IHC) is found in the brain, palatine tonsils, visceral and regional lymph nodes, Peyers patches and other lymphoid tissue of the small and large intestine and also in the spleen of affected deer [16]. In the brain, the disease specific PrP accumulation and spongiform change is seen initially in the dorsal motor nucleus of the vagus nerve [15, 23, 24] detected PrP^{CWD} in the brain stem, spinal cord, pituitary (*pars intermedia and pars nervosa*), vagosympathetic trunk, sympathetic trunk, nodose ganglion, myenteric plexus, adrenal medulla, pancreatic islets, brachial plexus, sciatic nerve, but not in the trigeminal (gasserian) ganglion, coeliac ganglion, cranial cervical ganglion or spinal nerve roots. These findings suggest that there is, at least in the clinical disease, extensive involvement of multiple organ systems, including central and peripheral nervous tissues, endocrine organs and the alimentary tract, the latter suggesting a possible means of agent shedding. Immunohistochemical evidence of disease specific PrP has not been found in the mucosa of the abomasum and intestines, thymus, bone marrow, skeletal muscle, liver, lungs, myocardium, walls of vessels, kidney, bladder, ovary, endometrium, testis, epididymis, sebaceous and sweat glands, and epidermis of skin of affected deer. In elk, PrP^{CWD} has been detected by IHC in the myenteric plexus, the vagosympathetic trunk, the cell column of the spinal cord and endocrine glands. PrP^{CWD} accumulates first in the dorsal motor nuclei of the vagus nerve at the level of the obex of the medulla and this accumulation precedes the development of lesions [15].

Brain lesions, associated with clinical disease in deer, have been found 16 months after experimental infection and in elk from the age of 12 months, whereas immunohistochemical demonstration of PrP^{CWD} is achieved much earlier, sometimes several months, or up to a year, in both lymphoid tissues and CNS.

There are no reported studies of tissue infectivity bioassays in CWD because there are no adequate biological models available to detect CWD infectivity and because the substantial resources necessary to conduct bioassays in deer and elk have not been allocated. This is an important omission in the research, which prevents any quantification of infection relative to tissue/organ.

SPECIES SUSCEPTIBILITY AND CROSS SPECIES

A major determinant of susceptibility to the TSE diseases is the host PrP gene. Genetic homology between species confers similarities and divergence in the spatial configuration of the respective protein, and is an important element of the structural basis of the species barrier. Only three species of cervidae are known to be naturally susceptible to CWD: mule deer, white-tailed deer and Rocky Mountain elk. One case was originally reported in black tailed deer (*Odocoileus hemionus columbianus*) [27], a subspecies of mule deer. Hybrid animals of mule deer and white-tailed deer have also been affected. Other non-domestic ruminants, including moose (*Alces alces*), pronghorn antelope (*Antilocapra americana*), Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*), mouflon (*Ovis musimon*), mountain goats (*Oreamnos americanus*), and a blackbuck (*Antilope cervicapra*), have been in contact with CWD-affected deer and elk or have resided in premises in which CWD had occurred and have not developed the disease [25]. Cattle, sheep and goats that have resided in research facilities together with CWD-affected animals for prolonged periods or under field conditions did not develop the disease. These observations of apparent cross-species resistance are supported by molecular studies of [13] and *in vivo* studies of [8].

Several experimental studies to transmit CWD have been conducted, most by intra-cerebral (IC) inoculation. While such studies provide information on susceptibility to the most efficient means of interspecies transmission, they do not inform on interspecies susceptibility by natural routes of transmission. For the latter oral or other possible natural exposure route studies are considered the most appropriate. On-going research on the species barrier is indicating that there is a substantial biological barrier to transmission of CWD from deer to cattle. Preliminary data from experiments in progress in the USA indicate that only a few calves develop disease after challenge with CWD pathogen from affected mule deer using the intra-cerebral(IC) inoculation route of transmission. Cattle have been inoculated orally with a brain tissue pool from CWD-affected mule deer at the University of Wyoming and have not developed any evidence of transmission more than five years following exposure. These studies are scheduled to run for ten years. In addition, bovine calves have been orally inoculated with CWD brain tissue pools from mule deer and from elk; these calves are being sequentially necropsied and results are not yet available (Williams, *pers comm*).

Cattle living in close contact with infected deer and elk have not developed the disease during the first five years of a ten-year study. Twenty-four cattle were housed with resident deer and elk with endemic CWD, in two wildlife research facilities in Wyoming and Colorado. These studies started in 1997 and to date there is no evidence of transmission of CWD to cattle through contact. Control deer have all succumbed to CWD. Brains from cattle over five years of age and from different ranches within an enzootic area of CWD were examined with H&E and IHC stains and all were found to be negative (Gould, *pers. comm*).

Kaluz *et al.* [4] and O'Rourke *et al.* [10], indicated that the sequences of the prion protein gene are very similar between certain cervidae. Thus, it is possible to derive a conclusion from a specific study on one of these species.

Polymorphisms of the normal PrP gene influence susceptibility to infection and disease phenotype. In Rocky Mountain elk, sequence analysis of the PrP gene showed only a single polymorphism; one amino acid change (Met to Leu) at codon 132. It was found among 43 genotyped free-ranging and farmed Rocky Mountain elk that were positive for CWD, homozygous for PrP codon 132-Met (M/M) were over-represented when compared to unaffected control groups. In the same group, several heterozygous M/L were positive. Positive elk with the homozygous codon 132 L/L were not found [10]. Research is continuing into the influence of genetics on susceptibility; there may be an association between PrP genotype and resistance in elk but this has not been recognised [10]. A phylogenetic analysis suggested that cattle and mule deer have converged with great apes including humans in key areas of their prion protein [6]. It is, therefore, difficult to draw specific inferences from these data but such studies provide indications as to species in which the PrP gene should be examined in more detail.

A recent report described CJD in "unusually young patients who consumed venison", and although epidemiological and molecular biological investigation failed to show a convincing link between exposure and disease, the conclusion that these patients were most likely cases of sporadic CJD must be weighed against the fact that we do not know what CWD in humans would look like - it might look like sporadic CJD, or vCJD, or might have distinguishing characteristics unlike either form of disease.

There is epidemiological and biological strain typing evidence that the occurrence of spongiform encephalopathies in closely related wild ungulate species held in British zoological collections contemporaneously with the epidemic of BSE were due to food borne exposure to the BSE agent via contaminated proprietary ruminant feedstuffs. Such cases occurred only in species within the family Bovidae (subfamilies *bovinae* and *hippotraginae*) [5] and a considerably greater range of species, not only within the order Artiodactyla, but across several other orders, was exposed to feeds containing animal proteins. Within the Artiodactyla, an estimated 62 species were held in British zoos in 1989 [5] and undoubtedly this included members of the family *Cervidae*. The extent to which such species were exposed to commercial feedstuffs or supplements at the time is not known, but the practice was commonplace.

DISEASE TRANSMISSION

There is considerable evidence that CWD is both infectious and contagious but specific details of its transmission remain as yet to be determined. However, historically the epidemiology of CWD does not support its being a feed-borne disease like BSE, associated with rendered ruminant meat and bone meal (MBM). Evidence for this includes (1) the observations that captive cervidae without records of being fed with animal-protein also succumbed to the disease and (2) free-ranging animals are unlikely to have access to compound feed stuffs.

Lateral transmission, compounded by animal movements, is the most important factor in spread of CWD. Indirect transmission via environmental contamination may play a role in natural dynamics and persistence of the disease and thus exacerbate the spread of the disease, and may present an obstacle to eradicating CWD from infected premises.

Observational studies suggested that lateral transmission, similar to that experienced in scrapie epidemics, occur in CWD and is the most important factor impacting the spread of the disease [9, 25]. The presence of the CWD agent in lymphoid tissues of the alimentary tract suggests that the agent may be shed through the alimentary tract (feces and saliva). Contaminated pastures used by captive cervidae appear to have served as sources of infection in some CWD outbreaks. The potential role of invertebrate and/or vertebrate reservoirs in the spread of CWD warrants further study, as does the influence of weather conditions on disease persistence, especially in free-ranging populations. Rapid increases in prevalence within captive herds suggest transmission may be quite efficient, at least at a local level. Recently four Saskatchewan elk farmers were advised not to grow grain or raise livestock on certain parts of their land since it may harbor CWD. Restocking pastures after leaving them clear for more than ten years was no guarantee for complete removal of possible contamination and sentinel programs were initiated to test these pastures.

There is less evidence for the existence of maternal transmission but because this cannot be distinguished from the high component of lateral transmission, it is not possible to exclude it. Placentomes, ovaries and fetal tissues from two mule deer in term pregnancy were examined with IHC and PrP^{CWD} was not detected [17], in contrast to the finding of PrP^{Sc} in pregnant domestic sheep with scrapie [19]. Tuo *et al.* [19] demonstrated that accumulation of PrP^{Sc} in uterine-placental epithelial cells in the placentome was determined by the pregnancy status of scrapie-infected ewes. The distribution of PrP^{Sc} plaques in placentomes showed a tendency toward increased size and number of placentomal PrP^{Sc} plaques from the endometrial stalk (maternal side) to chorionic plate (fetal side). In any case, maternal transmission alone is unlikely to sustain epidemics of CWD [7].

Both sexes and a wide range of age classes of animals can be affected, underscoring the likely importance of animal-to-animal (lateral) transmission in sustaining epidemics. Both intra- and inter-specific transmission (e.g., mule deer/white-tailed deer, elk/white-tailed deer) probably occurs. The infectious period is unknown but it appears likely that PrP^{CWD} shedding is progressive through the disease course. The presence of PrP^{CWD} at the beginning of the incubation time in alimentary tract associated lymphoid tissues suggests that shedding may take place early on [16].

THE ORIGIN OF CWD

There is no epidemiological evidence that would suggest the origin of CWD. As indicated above, there is no evidence to support a feed-borne common source origin of CWD. Hypotheses as to the origin of the disease might include:

1) Infection of deer by a strain of scrapie that has adapted to cervidae [23].
2) A genetic form of TSE arising in deer, with subsequent natural transmission.
3) Exposure to a currently unknown TSE, expressing the possibility, borne particularly out of the infancy of the study of diseases of wildlife, that there could be undetected TSE or prion diseases in other species.
4) A spontaneous conformational change of the prion protein occurring in mule deer, with subsequent transmission to other deer and to elk.

None of these hypotheses provide a particularly plausible explanation but further consideration of the evidence against a sheep scrapie origin is necessary. Given the endemic occurrence of scrapie in North America, a scrapie origin might be considered the commonly accepted theory, but even this has substantial counter arguments. Scrapie in sheep has an almost world-wide distribution and is present in many countries that harbor free-ranging deer but CWD has not been reported in deer populations of countries outside of North America. Although CWD transmits to goats [25] and to sheep [3] by IC inoculation, the incubation period (more than six years in goats) produced suggests a large species barrier and this is not what might be expected if the agent were originally a sheep scrapie agent strain. In addition, biological strain-typing in inbred mouse strains has shown that the CWD agent differs from the BSE agent and from strains of scrapie tested thus far)[2]. Lastly, comparisons of abnormal PrP glycoform patterns from CWD-affected deer and elk, and scrapie-affected sheep and cattle did not provide reliable indications of TSE infections of common origin among the species studied [12].

DIAGNOSIS

Clinical signs of CWD are not specific. A consistent clinical sign of CWD in deer and elk is progressive weight loss. Behavioral changes also occur in the majority of cases, including decreased interactions with other animals, listlessness, lowering of the head, drooping ears, blank facial expression and repetitive walking in set patterns. In elk, behavioral changes may also include hyper-excitability, nervousness, ataxia and head pressing. Free-ranging, CWD-affected elk may lose the fear of humans. Affected animals continue to eat grain but may show decreased interest in hay. In deer and elk polydipsia and polyuria also commonly occur. Excessive salivation and grinding of the teeth are also observed. The clinical disease is progressive and always fatal.

In captive herds experiencing a new outbreak of CWD, there is frequently a history that includes sporadic cases of prime-aged animals losing condition, being unresponsive to symptomatic treatment and dying from aspiration pneumonia. This pneumonia, presumably caused by difficulty in swallowing and by ptyalism, may lead to misdiagnosis of the condition if there is not histological and/or immunohistochemical examination of nervous or/and lymphoid tissues. "Sudden deaths" following handling also have been reported as the index cases in some situations as have unusual traumatic losses.

Most cases of CWD occur in adult animals. The majority of CWD-affected animals are 3–5 years of age. The oldest elk with CWD was >15 years old. The clinical course of CWD varies from a few days to approximately a year, with most of animals surviving from a few weeks to three or four months. Caretakers familiar with individual animals often recognize subtle changes in behavior well before serious weight loss occurs.

Differential diagnoses include mineral deficiencies that lead to neurological symptoms in deer and elk (e.g. fading elk syndrome, listeriosis, and copper deficiency).

Evidence of non-clinical CWD infection has been seen in deer fawns and elk calves by about six months of age (Spraker, Pers comm). The youngest naturally-infected mule deer diagnosed with clinical disease was 17 months of age. CWD has been diagnosed in a 24-month-old Rocky Mountain elk [1].

Gross lesions seen at necropsy reflect the clinical signs, primarily emaciation. Aspiration pneumonia, which may be the actual cause of death, is also a common post-mortem finding in animals affected with CWD.

LABORATORY TESTING

On microscopic examination, spongiform lesions of CWD in the central nervous system resemble those of other TSE's. Lesions are usually found in several nuclei in the medulla oblongata, pons, mesencephalon and telencephalon in clinically-affected animals [24, 18]. The parasympathetic vagal nucleus in the dorsal portion of the medulla oblongata at the obex is the most important site to be examined for diagnosis of CWD, especially in apparently clinically normal animals [11, 17].

Immunostaining of tissues using PrP antibodies can demonstrate disease specific prion protein in the brain, palatine tonsils, visceral and regional lymph nodes, Peyers patches of the small intestine, lymphoid tissue of the large intestine, and the spleen of affected deer. Immunohistochemistry (IHC) currently used as the 'gold standard' in testing for different TSEs, is also used to test brain tissue for the presence and accumulation of PrP^{CWD}, the protein marker used to diagnose CWD. The area of the brain used for testing (parasympathetic vagal nucleus of the medulla at the obex) is critical and if the correct area of the brain is not tested, this must be considered. Testing of both brain and lymphoid tissue is preferred.

The current rapid tests used for BSE in Europe are being evaluated for their usefulness as screening tests for CWD [14]. The Bio-Rad CWD ELISA test used on lymph node tissue has recently been licensed in the US for mule deer, elk and white-tailed deer. The IHC and Bio-Rad ELISA both provide reliable results in testing for CWD. The latter test was used in some veterinary diagnostic laboratories on samples from Colorado and Wyoming. To date, slightly over 27,000 tests in 25,000 animals with approximately 200 positive animals (mule deer, elk and white-tailed deer) have been run using the Bio Rad ELISA for free-ranging cervidae surveillance.

Tonsillar biopsies have been assessed for the diagnosis of CWD in live animals [20, 28]. This technique is useful for the pre-clinical diagnosis of CWD in farmed live mule deer and white-tailed deer. PrP^{CWD} accumulates in tonsillar and lympoid tissues in an early stage of the infection and can be detected with IHC 2 to 20 months before a CWD-related death and up to 14 months before the onset of clinical signs of CWD. These studies suggest that tonsillar biopsy is a valid method for detecting CWD in live deer during incubation stage, and may be used as an ante-mortem and pre-clinical diagnosis and as an adjunct management tool. This technique is currently being evaluated as a practical management tool under field conditions (i.e. involving the capture, anaesthetic and biopsy of wild deer) [28].

A third eyelid test used in sheep for the diagnosis of scrapie was examined for the pre-clinical identification of infected animals [10]. This approach, however, does not seem feasible in deer and elk due to the very limited amount of lymphoid tissue associated with the third eyelid in these species (Miller and Spraker, unpublished data).

SURVEILLANCE AND SURVEY SYSTEMS

During the last 10–15 years, several wildlife and animal health agencies have initiated a series of surveys that include hunter-killed and -targeted sampling areas as well as deer and elk farms for the purpose of determining the extent of the infection in free-ranging and farmed cervidae. These surveys were mainly focused in the states of Colorado and Wyoming and to some extent on selected elk and deer farms across the USA and Canada. Most of these surveys, however, were initiated as a reaction to a reported case with the focus on determining the prevalence instead of a being part of a planned surveillance system.

These surveys have identified CWD cases in free-ranging mule deer in Wyoming, Colorado, Nebraska, South Dakota, and New Mexico. The disease has also been found in free-ranging elk in Wyoming, Colorado, and South Dakota. Similarly it has been found in free-ranging white-tailed deer in Wyoming, Colorado, South Dakota, Nebraska, Wisconsin, Illinois, and Utah. With continuing and planned levels of these surveys the distribution and level of prevalence may change over a period of only a few months.

In addition, CWD has been diagnosed in farmed elk herds in a number of states in the United States and in two Canadian provinces. The current US national surveillance plan for farmed cervidae herds includes:

1) Mandatory death reporting.
2) CWD testing of all animals, except calves, which are slaughtered or die on the affected premises.
3) Individual animal identification and annual census.

Surveillance for CWD in US farmed elk began in 1996 and has been a cooperative effort involving state agriculture and wildlife agencies, the U.S. Department of Agriculture's (USDA), and Animal and Plant Health Inspection Service (APHIS). Farmed cervidae surveillance has been increasing each year since 1997 and will become an integral part of the USDA program to eliminate CWD from farmed elk. The farmed cervidae surveillance program and the surveillance program for wildlife are interdependent. Particular aspects of surveillance programs depend upon conditions in each state. For areas with known CWD infections, estimates of disease prevalence can be used to judge the effectiveness of management actions and to evaluate disease dynamics in the context of ecological research questions. Surveillance activities are also needed to satisfy public and management information needs. The CWD-positive elk herds in the United States include South Dakota, Nebraska, Colorado, Oklahoma, Kansas, Montana, and Minnesota. CWD has been also diagnosed in farmed white-tailed deer in Wisconsin.

In late 2002, the Colorado Division of Wildlife in cooperation with the Colorado Department of Agriculture and Colorado State University initiated a planned surveillance as a model for hunted cervidae in Colorado for CWD. The rapid screening test (BioRad ELISA) was applied on a volunteer basis to screen more than 25,000 samples from Colorado elk and deer. The IHC was used as a confirmatory test for those samples testing positive by screening. Findings from this survey will be available soon.

In Canada, CWD has been diagnosed in deer or elk on at least 40 game ranches in Saskatchewan and in farmed white-tailed deer on one ranch in Alberta (since 1996). Of these, 95% of infected elk herds had only a few (1-3) infected animals as diagnosed by IHC on the brain. Most (91%) elk diagnosed with CWD were at a pre-clinical stage. Approximately 65% of infected herds in Saskatchewan had a prevalence of infection less than 5%. While animals under 12 months of age have been diagnosed with pre-clinical infection by IHC, the youngest elk diagnosed with clinical CWD was 17 months old. Canadian veterinary services consider that the incubation period for CWD is 16-36 months, with a mean of 22 months. With elk, as with deer, animals of all ages and both sexes have been found infected with CWD and no bias has been evident.

Until 2000, there was no active surveillance for CWD in Canada. The government is in the process of conducting retrospective inspections of all farms that have imported animals from the United States, with emphasis on those farms where imported animals died within three years of importation. Provincial Government surveillance has provided valuable information on CWD. A voluntary national CWD certification program was recently introduced to provide access to herd replacements of known ('certified') CWD status and to meet the requirements of trading partners. Subject to conditions, herds that have been enrolled in voluntary CWD certification programs can enter the federal program at higher entry level status.

There is no published information on the possible occurrence of, or surveillance for, TSEs in cervidae species on the European continent. Throughout the world (particularly in Europe, North America and Australia), pathological examinations will have been carried out on numerous species of deer that have died in, or have been culled from zoological collections. In many cases, this will have included histopathological examination of the brain. None of the cases from Europe, Australia, and New Zealand have indicated such disease.

Several zoological gardens and wildlife research institutes were contacted for further information on surveillance of cervidae. From data received, it is concluded that currently minor surveillance activity is on-going or planned for CWD in cervidae.

CONTROL STRATEGIES

Control measures in general include prevention of introduction, notification of the disease, control or ban on movements, quarantine, eradication of affected herds, and compensation, and measures to prevent/stop the spread from free-range to farmed animals (and vice versa). Because of the commercial aspect of game ranching, animals were commonly moved across the US and Canada. Recently, laws have been passed to prevent the movement of these captive animals across state lines. Some states will not allow any parts of animals into their state, if the origin of the meat/tissue is from an area in which CWD is known to occur.

There is also some natural movement of deer and elk across state lines. Knowledge of herd management, prevalence of CWD, and susceptibility factors may provide additional support for efficient controls. For example, it can be predicted that a hierarchy of prevalence is likely among the species (white-tailed deer>mule deer>elk) given that white-tailed deer are more social and found at higher densities.

Several states in the USA have recently banned or restricted the importation of deer species, including North Carolina, Michigan, Vermont, Tennessee, Texas (March 2002), Nebraska, Wisconsin, New York, Colorado, and Arizona. In New Mexico, upon recognition of the disease in free-ranging mule deer, the state immediately stopped any importation of deer or elk. Following the screening of herds, herd certification may be an option. However, given the limited knowledge on the incubation of the disease and its variation in clinical presentation, it is likely to take as long as five years of surveillance of all juvenile and adult mortality before a farmed herd may be certified as being free from CWD. The United States FDA Center for Veterinary Medicine announced in November 2002 a proposed policy on rendering tissues from cervidae from CWD-positive areas or herds.

Key elements of the Canadian eradication for farmed and captive cervidae are as follows:

1) CWD is reportable under the Federal Health of Animals Act (since 2001).
2) The finding of an infected animal (confirmed by IHC in the government laboratory) triggers a series of events :
   a) Imposition of quarantine on all animals and animal products at the affected farm.
   b) Slaughter of all cervidae.
   c) Testing of all adult cervidae in a government laboratory.

Since the eradication program commenced in February 2000, the Canadian government has slaughtered approximately 8,300 farmed elk on the affected farms (40 in Saskatchewan and 1 in Alberta) and tested 7,153 adult animals (99 % elk) and has detected a total of 230 elk infected with CWD to date. It has cost the federal government 33 million (Canadian) to compensate the farmers (Peart, pers comm).

ECONOMIC IMPACT

It is obvious that there has been a significant impact on the North American farmed cervidae industry from CWD but the total effect is difficult to quantify. There has been some influence, bearing, consequence, and repercussions on the sale of hunting licenses in different US states (e.g. Wisconsin). Public awareness has been raised by multiple forms of outreach by many agencies. A huge cost is involved in the compensation of Canadian farmers where animals were eradicated on CWD-positive farms. The cost of quarantine of farm and grassland in an attempt to reduce the environmental contamination following CWD in a farmed herd is difficult to quantify. CWD has also had a major impact on the deer and elk farming industry. Elk are raised for the production of antler velvet and meat and for trophy hunting. About 70% of velvet antler was formerly exported to South Korea. In the course of Canadian eradication activities and the detection of an increasing number of cases in 2000-2001, some trading partners closed their markets to Canadian cervids and cervid products, including semen, embryos and velvet. It is difficult to determine the total economic impact of this market closure.

FOOD AND FEED SAFETY AND HUMAN AND ANIMAL RISKS

There is no evidence that CWD can be transmitted to humans consuming meat or handling infected cervids or their products, however this possibility cannot be ruled out. The World Health Organization recommends that people not consume animal products from any animal infected with a TSE disease and public health policies in Canada and the US are consistent with this directive. In North America, some health officials advise hunters not to consume meat from animals known to be infected with the disease. In addition, they suggest hunters take simple precautions when field dressing deer or elk taken in areas where the disease is found. In the USA, the consumption of meat from CWD-affected animals is discouraged; however, there is no ban. So, affected meat probably has been consumed for decades in Colorado and Wyoming. In Canada, all adult cervidae slaughtered under commercial arrangements in the provinces of Saskatchewan, Manitoba, and Alberta are tested for CWD and carcasses are only released upon receipt of a negative result. Offal may be disposed off by incineration or deep burial before test results are known. Once a farmed cervidae is diagnosed with CWD, the infected animal and all cervidae exposed to positive animals are destroyed and the carcasses disposed of by incineration or deep burial. Antler velvet from test negative animals in the herd is released from official control.

Recently, the United States' Center for Disease Control (CDC) issued a new statement concerning CWD and possible human infection: “Although it is generally prudent to avoid consuming food derived from any animal with evidence of a TSE, to date, there is no evidence that CWD has been transmitted or can be transmitted to humans under natural conditions”. However, the CDC has renewed surveillance efforts in order to rule out a link between CWD and vCJD. While to date there has been one case of vCJD reported in US (contracted in the UK), the CDC is working with ongoing investigations in Wyoming and Colorado to track cases of CJD or suspected CJD.

CONCLUSION

CWD is spreading and may have the potential to infect humans. It is not known whether CWD exists undetected outside North America. Its unique and troubling feature is that unlike scrapie and BSE, it occurs in both captive and wild ranging animals, which poses enigmas both for understanding the means by which it is transmitted from animal to animal, and for devising strategies to prevent its spread. When diagnosed in captive animals, herds can be culled or entirely destroyed, but this strategy cannot be used for animals in the wild.

Although CWD presents more of a problem to individuals (hunters, for example) than to general public health, individual infections could have public health consequences similar to those of vCJD: clinically healthy individuals harboring the infection during its incubation period could possibly transmit disease via cross-contamination of surgical instruments or blood donations, and after death from unsuspected disease, their bodies could be harvested for organ donations. Without the ability to establish a diagnosis of human CWD infection, or knowledge of the presence or absence of infectivity in peripheral body tissues and blood, the potential for human risk will continue to depend solely on epidemiological inference.

Another potentially dangerous situation would arise if CWD were to find its way into non-cervid animal species. In particular, if CWD were to be introduced and become endemic in livestock species such as sheep and cattle, the animal and human food chains could be put at the same kind of risk as what occurred with BSE. We know that sheep and cattle can be experimentally infected with CWD by intracerebral inoculation, and tests are ongoing to determine if oral dosing with CWD brain tissue, or close contact with CWD-infected deer, can transmit disease to cattle.

Although food chain infections would require a series of breakdowns in the system of precautionary measures already taken to prevent a BSE outbreak, including the banning of most mammalian protein for use in ruminant feed, the potential for human error is a real and unpredictable factor.

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REFERENCES

1. Ball, K. 2002. Chronic wasting disease in a Rocky Mountain Elk. *Can. Vet. J.* **11**: 880–882.
2. Bruce, M., Chree, A., Williams, E.S., Williams, E.S. and Fraser, H. 2000. Perivascular PrP amyloid in the brains of mice infected with chronic wasting disease. *Brain Pathol.* **10**: 662–663.
3. Hamir, A. N., Miller, J. M., Cutlip, R. C., Stack, M. J., Chaplin M. J. and Jenny, A.L. 2003. Preliminary Observations on the Experimental Transmission of Scrapie to Elk (*Cervus elaphus nelsoni*) by intracerebral inoculation. *Vet. Pathol.* **40**: 81–85.
4. Kaluz, S., Kaluzova, M., Flint, A.P. 1997. Sequencing analysis of prion genes from red deer and camel. *Gene* **199**: 283–286.
5. Kirkwood, J.K. and Cunningham, A.A. 1994. Spongiform encephalopathy in captive wild animals in Britain: epidemiological observations. pp. 29–47. *In*: Transmissible Spongiform Encephalopathies (Bradley, R.and Marchanteds, B. eds.), European Commission, Agriculture, Brussels.
6. Krakauer, D.C., Pagel, M., Southwood, T.R. and Zanotto, P.M. 1996. Phlogenesis of prion protein. *Nature (Lond.)* **380**: 6576–6675.
7. Miller, M.W. 2002. Temporal and spatial dynamics of Chronic Wasting Disease Epidemics. pp.10–12. Proc. Chronic Wasting Disease Symp.
8. Miller, M.W., Williams, E.S., McCarty, C.W., Spraker, T.R., Kreeger, T.J., Larsen, C.T. and Thorne, E.T. 2000. Epizootiology of chronic wasting disease in free-ranging cervids in Colorado and Wyoming. *J. Wildl. Dis.* **36**: 676–690.
9. Miller, M.W., Wild, M.A. and Williams, E.S. 1998. Epidemiology of chronic wasting disease in captive Rocky Mountain elk. *J. Wildl. Dis.* **34**: 532–538.
10. O'Rourke, K.I., Besser, T.E. and Miller, M.W. 2002. PrP genotypes of captive and free-ranging Rocky Mountain elk (Cervus elaphus nelsoni) with chronic wasting disease. *J. Gen. Virol.* **80**: 2765–2769.
11. Peters, J., Miller, J.M., Jenny, A.L., Peterson, T.L. and Carmichael, K.P. 2000. Immunohistochemical diagnosis of chronic wasting disease in preclinically affected elk from a captive herd. *J. Vet. Diagn. Invest.* **12**: 579–582.
12. Race, R.E., Raines, A., Baron, T.G., Miller, M.W., Jenny, A. and Williams, E.S. 2002. Comparison of abnormal prion protein glycoform patterns from transmissible spongiform encephalopathy agent-infected deer, elk, sheep, and cattle. *J. Virol.* **76**: 12365–12368.
13. Raymond, G.J., Bossers, A., Raymond, L.D., O'Rourke, K.I., McHolland, L.E., Bryant, P.K. 3rd, Miller, M.W., Williams, E.S., Smits, M. and Caughey, B. 2000. Evidence of a molecular barrier limiting susceptibility of humans, cattle and sheep to chronic wasting disease. *EMBO J. A* **19**: 4425–4430.
14. Salman, M.D., Spraker, T.R., Powers, B., Phillips, J., Dailey, D., Walling, M. and Triantis, J. 2002. Validation of TSE commercially available Bovine Spongioform Encephalopathy (BSE) Rapid Screening Tests from screening of Chronic Wasting Disease (CWD) in brain and lymphoid tissues. pp.7–10. Proc. Chronic Wasting Disease Symp.
15. Sigurdson, C.J., Spraker, T.R., Miller, M.W., Oesch, B. and Hoover, E.A. 2001. PrP(CWD) in the myenteric plexus, vagosympathetic trunk and endocrine glands of deer with chronic wasting disease. *J. Gen. Virol.* **82**: 2327–2334.
16. Sigurdson, C.J., Williams, E.S., Miller, M.W., Spraker, T.R., O'Rourke, K.I. and Hoover, E.A. 1999. Oral transmission and early lymphoid tropism of chronic wasting disease PrPres in mule deer fawns (*Odocoileus hemionus*). *J. Gen. Virol.* **80**: 2757–2764.
17. Spraker, T.R., Zink, R.R., Cummings, B.A., Wild, M.A., Miller, M.W. and O'Rourke, K.I. 2002. Comparison of histological lesions and immunohistochemical staining of proteinase-resistant prion protein in a naturally occurring spongiform encephalopathy of free-ranging mule deer (odocoileus hemionus) with those of chronic wasting disease of captive mule deer. *Vet. Pathol.* **39**: 110–119.
18. Spraker, T.R., Miller, M.W., Williams, E.S., Getzy D.M.,

Adrian, W.J., Schoonveld, G.G., Spowart, R.A., O'Rourke, K.I., Miller, J.M. and Merz, P.A. 1997. Spongiform encephalopathy in free-ranging mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*) and Rocky Mountain elk (*Cervus elaphus nelsoni*) in northcentral Colorado. *J. Wildl. Dis.* **33**: 1–6.

19. Tuo, W., O'Rourke, K.I., Zhuang, D., Cheeves, W., Spraker, T.R. and Knowles, D.P. 2002. Pregnancy status and fetal prion genetics determine PrP^{Sc} accumulation in placentomes of scrapie-infected sheep. *Proc. Natl. Acad. Sci. U.S.A.* **99**: 6310–6315.
20. Wild, M.A., Spraker, T.R., Sigurdson, C.J., O'Rourke, K. and Miller, M.W. 2002. Preclinical diagnosis of chronic wasting disease in captive mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*) using tonsillar biopsy. *J. Gen. Virol.* **83**: 2617–2628.
21. Williams, E.S., Yuill, T., Artois, M., Fischer, J. and Haigh, S.A. 2002. Emerging infectious diseases in wildlife. *Rev. Sci. Tech.* **21**: 139–157.
22. Williams, E.S., Kirkwood, J.K. and Miller, M.W. 2001. Transmissible spongiform encephalopathies. pp.292–301. *In*: Infectious Diseases of Wild Mammals, 3rd ed. (Williams, E.S. and Barker, I.K. eds.), Iowa State University Press, Ames, Iowa.
23. Williams, E.S., Miller, M.W., Kreeger, T.J., Kahn, R.H. and Thorne, E.T. 2002. Chronic wasting disease of deer and elk: a review with recommendations for management. *J. Wildl. Manage.* **66**: 28–30.
24. Williams, E.S. and Young, S. 1993. Neuropathology of chronic wasting disease of mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus nelsoni*). *Vet. Pathol.* **30**: 36–45.
25. Williams, E.S. and Young, S. 1992. Spongiform encephalopathies in Cervidae. *Rev. Sci. Tech.* **11**: 551–567.
26. Williams, E.S., Young, S. and Marsh, R.F. 1982. Preliminary evidence of transmissibility of chronic wasting disease of mule deer. Proc. Wildl. Dis. Asso. Ann. Conf.
27. Williams, E.S. and Young, S. 1980. Chronic wasting disease of captive mule deer: a spongiform encephalopathy. *J. Wildl. Dis.* **16**: 89–98.
28. Wolfe, L.L., Conner, M.M., Baker, T.H., Dreitz, V.S., Burnham, K.P., Williams, E.S., Hobbs, N.T. and Miller, M.W. 2002. Evaluation of antemortem sampling to estimate chronic wasting disease prevalence in free-ranging mule deer. *J. Wildl. Manage.* **66**: 564–572.

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Modifying Elk (*Cervus elaphus*) Behavior With Electric Fencing at Established Fence-Lines to Reduce Disease Transmission Potential

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Original Article

Modifying Elk (*Cervus elaphus*) Behavior With Electric Fencing at Established Fence-Lines to Reduce Disease Transmission Potential

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ABSTRACT Direct and indirect contact through fences at cervid farms with only a single perimeter fence may play a role in transmission of diseases such as chronic wasting disease or bovine tuberculosis (*Mycobacterium bovis*). We report a case study examining effectiveness of a baited electric fence, as an addition to an existing single woven-wire fence (2.4 m high), for altering behavior and reducing fence-line contact between elk (*Cervus elaphus*). We used a video-surveillance system to monitor one 20-m-long test fence at an elk ranch in north-central Colorado, USA from 2006 to 2007. We conducted 26 trials (11 without electric fence during 48.2 total cumulative days and 15 with electric fence during 63.7 days) with different levels of motivation for contact between groups of elk separated by the test fence. We documented 426 contacts between elk (direct transmission risk) or the woven-wire fence (indirect transmission risk) during trials without the electric fence. We documented 0 contacts between adult elk or the woven-wire fence during trials when the electric fence was in place. During our case study, 24 of 25 elk exposed to the electric fence were completely deterred. We emphasize that our approach targets behavior modification of farmed elk routinely exposed to the electric fence, not wild elk that may occasionally approach from the outside. Our results suggest that adding a baited electric fence inside an existing woven-wire–fenced enclosure has potential to provide a cost-effective means to minimize contacts between farmed and wild elk.

KEY WORDS *Cervus elaphus*, chronic wasting disease (CWD), disease transmission, electric fence, elk, fence-line contact.

Chronic wasting disease (CWD; Williams 2005) and bovine tuberculosis (TB [*Mycobacterium bovis*]; Clifton-Hadley et al. 2001) are global threats to farmed and wild cervids. Chronic wasting disease is a fatal, transmissible spongiform encephalopathy (Williams and Young 1992, Miller and Williams 2004, Williams 2005) that appears to be transmitted directly from animal to animal (Miller et al. 1998, Miller and Williams 2003, Miller and Wild 2004) and indirectly through environmental routes (Williams et al. 2002, Miller et al. 2004). Bovine tuberculosis is a bacterial disease that can be transmitted directly either by oral and respiratory routes, or indirectly through environmental routes (Clifton-Hadley et al. 2001; Mackintosh et al. 2002; Palmer et al. 2003, 2004). Social interactions by cervids through fences and contact with fences, involving transfer of saliva, could facilitate transmission of CWD (Williams et al. 2002, Williams and Miller 2003) and TB (Rhyan et al. 1995) between farmed and wild populations.

The farmed-deer breeding industry has been reported as the "fastest growing industry in rural America," (Anderson et al. 2007:4). There are an estimated 7,828 cervid farms in the United States, which generate US$652 million of economic activity for the Texas, USA economy alone (Anderson et al. 2007). However, farmed cervid facilities and transport of animals between facilities have been implicated in transmission of diseases including CWD and TB (Rhyan et al. 1995, Williams et al. 2002, Argue et al. 2007). Of course the risk of disease transmission exists not only from farmed to wild cervids, but also from wild to farmed cervids (Buck 2002, Demarais et al. 2002, Diez et al. 2002). Managing against transmission of diseases between farmed and wild cervids through biosecurity measures (i.e., fencing, vaccination, population management, etc.) should be of utmost importance to cervid farm owners and natural resource managers.

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Fencing is the most logical measure to prevent contact between farmed and wild animals (Ward et al. 2009) and there is an implicit assumption that reducing contact rates will reduce risk of disease transmission. Single woven-wire fences (WWFs; 2.4–3.0 m in ht) are the standard fence type at farmed cervid facilities (Demarais et al. 2002). A single WWF allows direct contact between farmed and wild cervid populations through the fence; thus, potential for disease transmission exists (VerCauteren et al. 2007). However, VerCauteren et al. (2007) documented no contacts by elk or deer through double WWFs (separated $\geq$1 m) or a single WWF paralleled by a 3-strand electric fence (0.6 m inside WWF). VerCauteren et al. (2007) was not designed to evaluate fence type, but results suggested that an offset electric fence used in conjunction with a single WWF may reduce or potentially eliminate contact between farmed elk and wild cervids.

Although research has shown use of electric fencing can effectively control movements of cervids (Hygnstrom and Craven 1988, Karhu and Anderson 2006, VerCauteren et al. 2006, Webb et al. 2009), effectiveness of coupling an electric fence with an existing WWF to reduce fence-line contact has not been explored. Our goal was to assess potential for a simple baited electric fence, offset from an existing 2.4-m-tall WWF, to alter elk behavior and reduce the number of contacts with fences and between elk on opposite sides of fences. Our specific objectives were to assess whether presence of the electric fence reduced elk–elk and elk–WWF contact rates during scenarios where individuals and groups of elk were separated from herd-mates and to measure elk behavior toward the electric fence.

STUDY AREA

Our study took place on a privately owned elk ranch in Larimer County, Colorado, USA between August 2006 and October 2007. Elevation and annual precipitation averaged 1,800 m and 38.43 cm, respectively. Total fenced area was 7 ha, with multiple interior pens. Mature ponderosa pines (*Pinus ponderosa*) were scattered in the enclosure, with little other natural vegetation.

METHODS

Interior Pen Design

We chose 2 interior pens that shared a common WWF (2.4-m high and 85-m long) for our evaluation (Fig. 1). We installed a second 2.4-m-high WWF parallel to and 1.2 m from the existing WWF along 65 m of the WWF. The remaining section (20 m long) was not double-fenced and was evaluated either alone during control trials or with our experimental electric fence (EF; ElectroBraid™ Fence Limited, Yarmouth, Canada) during EF treatment trials. Elk on the EF side (pen A; Fig. 1) constituted our test group and elk in pen B served as attractants. We outfitted adult females (>24 months old) with alphanumeric collars (ID) for identification in video. We did not collar elk calves (<12 months old) or adult males (>24 months old); adult males were individually identifiable by unique antler characteristics. We positioned the EF, which consisted of 2 energized strands of polyester-fiber rope with intertwined copper wires, 1 m from the WWF and 0.74 m and 1.48 m above ground. The EF was powered by a 110-V energizer (Power Wizard® model 18000; Power Wizard, Inc., Streetsboro, OH) that was checked weekly and produced a pulsed energy output (18 J) between 8 kV and 9 kV. Wooden and fiberglass posts (end and in-line, respectively), spaced 6.6 m, supported the EF with plastic insulators. Elk in both pens had ad libitum access to feed and water throughout the study. Care and use of all elk associated with our fence-line experiments were approved by the National Wildlife Research Center (NWRC) Animal Care and Use Committee (NWRC study protocol QA-1360).

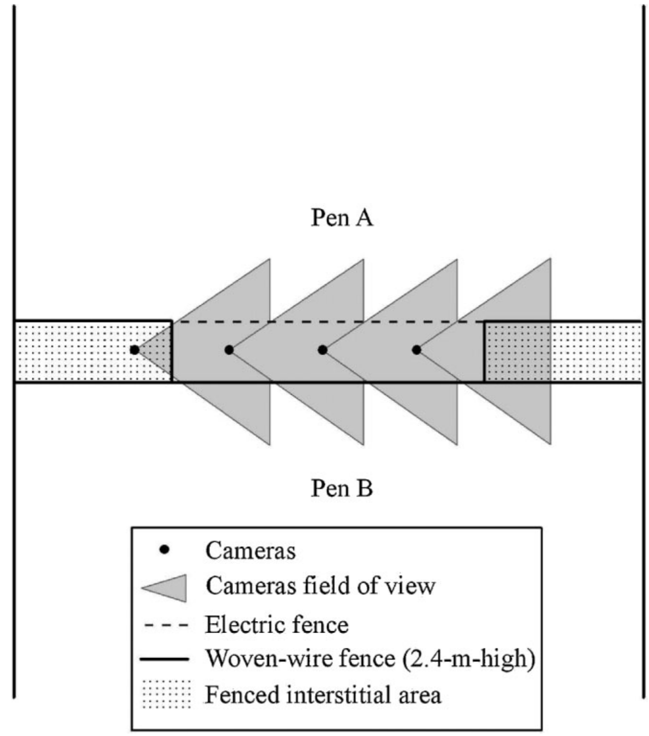

Figure 1. Layout (not drawn to scale) of test-fence area and video surveillance system examining efficacy of an electric fence to reduce contact along fence-lines by farmed elk in north-central Colorado, USA. Cameras were orientated in the same direction to yield continuous coverage of the test-fence area. We monitored the test-fence area between August 2006 and October 2007.

Video-Surveillance System

We monitored the test section of fence with 4 infrared-video cameras (Sony® model PRO120HL; Sony Corporation, Tokyo, Japan) linked to a digital-video recorder (DVR; V-MAX Series, Kevis®, Inc., Dongan-gu, Korea). The cameras operated continuously on a 110-V power supply and the DVR recorded data when motion was detected within the cameras' field-of-view. We mounted cameras 3 m above ground and 5 m apart on wooden posts. We aimed cameras downward and oriented them in the same direction to monitor both sides of the EF and WWF test section (Fig. 1).

Study Design

To evaluate effectiveness of the EF under different situations or motivation levels, we conducted trials in 8 scenarios: rutting adult males separated from adult females (scenarios 1 and 2), mixed age–sex groups (excluding ad M) separated from other group members (scenarios 3–6), and mixed age–sex groups (excluding ad M) separated from other group members with supplemental grain (Honor™ Elk All Pro Concentrate Techni-Breeder; Land O'Lakes Purina Feed LLC, Shoreview, MN) distributed along the WWF in both pens along the test section to encourage elk to aggregate near the test section (scenarios 7 and 8; Table 1). Within each scenario we explored multiple elk–pen combinations and within most scenarios we conducted similarly configured trials with and without the EF. The exceptions were scenarios 3–6, where logistical problems prevented similarly configured trials with and without EF. However, scenario 3 provides a general indication of contact rate without EF for comparison with scenarios 4–6. Each trial was a control (EF absent) or treatment (EF present). Chronologically, control trials of scenario 1 and then 3 preceded EF-treatment trials of scenario 1. Thereafter scenarios 4–6 occurred in order and we sequentially inter-mixed control and treatment trials in scenarios 7 and 8. Scenario 2 occurred last.

We began EF treatment trials by coating both strands of the EF with molasses (prior to introducing elk to pen A), hypothesizing that elk would investigate this novel substance, receive a shock to their oral–nasal region, and be effectively deterred (Porter 1983, Hygnstrom and Craven 1988, Jordan and Richmond 1992). Duration of individual trials was approximately 4 days (range = 3–7 calendar days). We defined direct contacts as when elk in pen A touched elk in pen B through the WWF; elk behavior defined as direct contact included everything from nose-to-nose contacts to sparring. We defined indirect contacts as when elk in pen A touched the WWF. Elk mouth and lick wire fencing, depositing saliva and potentially disease agents; thus, indirect contacts could contribute to risk of transmitting disease between elk on opposite sides of a fence. For each contact (EF, WWF, or direct) we documented date and time; if only contact with WWF or the EF, then elk ID; if direct contact through WWF, then elk IDs of individuals involved.

Study Analysis

We calculated a mean daily contact rate and a mean daily per-capita (elk in pen A) contact rate for each trial and for each extant scenario $\times$ treatment combination based on direct and indirect contacts, combined. Mean daily contact rate = (total contacts/trial) $\times$ (24 hr/day)/(total hr/trial) and per-capita mean daily contact rate = (mean daily contact rate)/(no. of elk in pen A). We also calculated mean time to EF contact to document how elk behavior toward the EF changed over time. Mean time to EF contact = [$\sum$ (EF contact date and time $-$ start of EF trial date and time)]/ total EF contacts. Trials were not strictly independent because individual elk were used in multiple trials; therefore, we report only descriptive and graphical results of individual trials.

RESULTS

No Electric Fence

We observed 133 direct and 293 indirect contacts between elk in pen A and elk in pen B or the WWF, respectively, during trials without the EF. We observed an average of 7.8 contacts/day (12.0 total days for 3 trials during autumn 2006) between a rutting adult male in pen A and either elk in pen B or the WWF (scenario 1; no EF; Fig. 2). All 11 direct contacts with the rutting adult male during these trials involved adult females, never calves. We observed, on average, 4.7 contacts/day (9.7 total days for 2 trials during autumn 2007) when we placed a rutting adult male in pen A and a rutting adult male in pen B along with adult females and calves (scenario 2; no EF; Fig. 2). The adult male in pen A made 4 direct contacts with elk in pen B during these trials; 3 with adult females and 1 with a calf.

We observed an average of 4.8 contacts/day (8.7 total days for 2 trials) when we randomly split adult females and calves into 2 groups and allocated them to pens A and B (scenario 3; 10 or 13 elk/trial to pen A; no EF; Fig. 2). Mean contact rate on a per-capita basis was 0.4 contacts/day. Seventeen direct contacts occurred; 14 between adult females and calves and 3 between adult females. We observed 18.8 contacts/day (7.9 total days for 1 trial) when there were 12 elk in pen A plus sweet feed (scenario 7; no EF; Fig. 2), which was

Table 1. Descriptions of scenarios used to evaluate a baited electric fence (EF), adjacent to a woven-wire fence (WWF; 1.2 m apart) in Pen A, to prevent direct contact between elk in pens A and B, and indirect contact consisting of elk in pen A contacting the WWF. All scenarios occurred between August 2006 and October 2007 in north-central Colorado, USA.

	Description of elk groups and motivation to breach EF		No. of trials	
Scenario	Pen A	Pen B	EF absent	EF present
1	1 rutting ad M	11–12 ad F, 10 calves, 2 yearling M	3	4
2	1 rutting ad M	7 ad F, 10 yearling, 1 rutting ad M	2	4
3	5–6 ad F, 4–6 calves, 2 yearling M	5–6 ad F, 4–6 calves, 2 yearling M	2	0
4	10 calves	11 ad F	0	1
5	5 ad F	2 ad F, 10 calves	0	1
6	2 ad F, 10 calves	5 ad F	0	1
7	2 ad F, 10 yearlings, grain along WWF[a]	5 ad F, grain along WWF[a]	1	1
8	5 ad F, grain along WWF[a]	2 ad F, 10 yearlings, grain along WWF[a]	1	1

[a] Highly palatable supplemental grain provided close to each side of WWF at test section to attract elk. When EF was present in Pen A, grain was between EF and WWF.

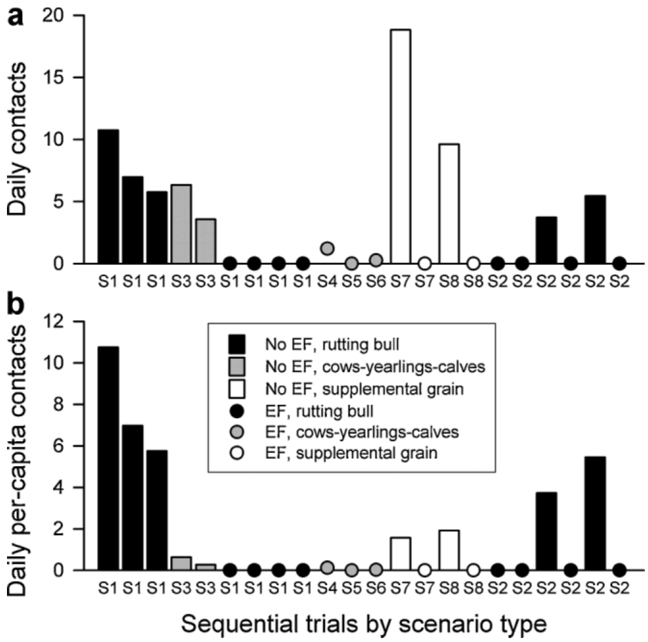

Figure 2. Mean daily contact rate (a) and mean daily per-capita contact rate (b) for trials where 2 groups of penned elk were separated by either a single woven wire fence (WWF) or WWF plus a parallel 2-strand electric fence (EF) on one side of the WWF in north-central Colorado, USA. Mean daily contact rates were based on total counts/trial of direct elk-to-elk bodily contact through the WWF plus elk-to-WWF contact for elk in the EF pen (pen A), weighted by total hours of camera monitoring/trial and to a per-capita basis for number of elk in the EF pen. Control (EF absent, bars) and treatment (EF present, circles) trials are shown chronologically with the first scenario (S1) occurring August 2006 and the last scenario (S2) occurring October 2007.

equivalent to 1.6 per-capita contacts/day. When we placed 5 adult females plus sweet feed in pen A and adult females and calves in pen B (scenario 8; no EF), we observed 9.6 contacts/day (9.9 total days for 1 trial; Fig. 2) or 1.9 per-capita contacts/day.

Electric Fence in Place

We exposed 25 elk to our EF, including 6 rutting adult males, 7 adult females, and 12 calves–yearlings. Twenty-four of these elk, including all adults, were completely deterred from contacting elk in pen B or the WWF during EF trials (63.7 total days).

Rutting adult male and adult female elk attempted to approach pen B on 14 and 3 occasions, respectively, when they touched the EF and were successfully deterred. Of the 4 EF-naive adult males in pen A during scenario 1, we recorded no contacts with the EF for one adult male, a single contact with the EF by an antler of another adult male, and 3 and 4 oral–nasal contacts with the EF for the other 2 adult males. During scenario-2 EF trials, each of these previously exposed adult males contacted the EF 1 or 2 times per trial. Only 3 of 7 adult females involved in EF trials contacted the EF: 1 of 2 adult females grouped with calves and 2 of 5 adult females segregated from calves.

Scenario 4 was first exposure of 10 calves to the EF, where all calves were in pen A and 11 adult females were in pen B. Under scenario 4, calves made 46 attempts at crossing the EF where they made contact with the EF, of which 30 attempts were deterred. A single late-born calf walked under the EF on 16 occasions. All but 2 of these EF contacts occurred within the first 30 hr of the trial. This calf contacted the WWF 4 times and an adult female in pen B 2 times (1.2 contacts/day; 5.0 total days; 10 elk in pen A; 0.12 per-capita contacts/day; Fig. 2). Under scenario 6, these calves were again exposed to the EF and the same calf walked under the EF one time and contacted the WWF one time (0.25 contacts/day; 4.0 total days; 12 elk in pen A; 0.021 per-capita contacts/day; Fig. 2). We observed only 2 EF contacts under scenario 6: one by the same late-born calf and one by an adult female. None of these calves (yearlings by then) breached the EF under scenario 7.

The majority (58%) of EF contacts by elk occurred in the first 12 hr of 96-hr trials; 19% of EF contacts occurred in the first 30 min. Mean time to EF contact, including all elk age and sex classes, was approximately 18 min. Of the 69 EF contacts observed, 52 involved calves, 14 rutting adult males, and 3 adult females. The maximum number of individual EF contacts was by an adult male elk ($n = 4$).

DISCUSSION

We documented direct and indirect contacts by elk during all trials without the EF. Daily contact rates were similar for trials separating rutting adult males from adult females and calves from their dams without supplemental feed. Daily contact rates were dramatically greater in 3 of 4 trials when supplemental feed was used. When viewed on a per-capita basis, contact rates for rutting adult males were generally greater than for adult females and calves. Scenarios 1 and 2 occurred during the autumn or when male elk were demonstrating rutting behavior, which could have led to increased rates of contact in those trials. Male elk exhibit multiple rutting behaviors in the autumn (i.e., perineum licking, muzzling, mutual grooming, sparring; Struhsaker 1967, Geist 2002), which may increase potential of disease transmission at fence-lines.

Our experimental EF, baited with molasses, modified elk behavior and eliminated fence-line contact between adult elk in adjacent pens during our case study. Elk clearly responded to the presence of the EF by avoiding it, and readily returned to the WWF test section after removal of the EF. In most instances, elk approached the EF shortly after we baited and energized it. Elk investigated the EF with their nose or tongue, presumably to taste the molasses, and always received a shock, which elicited a rapid response and often quick retreat. Electric fencing psychologically deters animals from crossing because of the negative stimuli (shock) the animal receives (Porter 1983, Poole et al. 2004, VerCauteren et al. 2006). Although only 3 of 7 (all individually identifiable) adult females exposed to the EF actually contacted it, all 7 were deterred. The 4 adult females that did not contact the EF may have learned to avoid it by observing negative behavioral reactions of other elk. A similar socially learned behavioral response (McKillop and Sibly 1988) was documented with Eurasian badgers (*Meles meles*) exposed to electric fences (Tolhurst et al. 2008). Even the highly motivated calf that repeatedly and successfully breached the EF apparently learned to avoid it within 2 days of first exposure, although negative reinforcement to the EF (i.e., repeated contact with the EF) was required during second exposure before this calf was reliably deterred.

Fences are a common tool natural resource managers use to exclude animals from high-value resources, thereby reducing disease transmission potential, damage to crops and orchards, automobile and aviation collisions, and destruction of ornamental plantings (VerCauteren et al. 2006). The use of double fencing has been suggested to reduce risk of disease transmission between farmed animals and wildlife (DelGiudice 2002, Wobeser 2002, Bollinger et al. 2004) and some regulatory agencies require double WWFs for containing ungulates under certain circumstances (Demarais et al. 2002). The Wisconsin Department of Natural Resources (WI-DNR 2008) requires 1 of 3 alternatives, depending on enclosure size, for raising white-tailed deer (*Odocoileus virginianus*): double fencing of deer farms, enrollment in the CWD herd status program (single WWF), or lethal sampling (single WWF). Double fencing often implies 2 parallel WWFs ≥2.4 m high situated 2–5 m apart (Demarais et al. 2002). The WI-DNR allows an alternative to 2 parallel WWFs, which is a single solid high fence (lower 2.1 m of the fence covered with solid material that prevents animals on opposite sides of fence from making visual or physical contact) in conjunction with a single-strand EF, either inside or outside the enclosure (WI-DNR 2008). VerCauteren et al. (2007) reported an on-farm example of an EF used inside a WWF, where farmed elk were continuously exposed to the EF and, thereby, appeared trained to avoid it. Similar results were obtained with cattle confined to small "training yards" that had an offset electric fence attached inside a conventional 8-wire fence (McDonald et al. 1981). It was assumed that the undersized training yards increased investigation and frequency of contacts with the EF, which led to a controlled learning period and also increased likelihood of cattle observing shock events of neighbors (McDonald et al. 1981, McKillop and Sibly 1988). We believe placing the EF inside a WWF enclosure and conditioning resident, farmed elk will be more effective than trying to condition transient, wild elk to an EF installed on the outside of a WWF enclosure.

Potential limitations of the EF we evaluated may include susceptibility to damage by hard-antlered adult males and vulnerability to breaching by calves. We believe negative conditioning of adult males by baiting the EF was essential for reducing potential for hard-antlered males to become entangled in the EF. Despite this, we observed a few events where adult males contacted the EF with only their antlers and were not shocked, and other events when adult males had antlers hooked on the EF when they made skin contact and were shocked. Although these incidents did not result in damage to the EF, similar events could result in EF entanglement in antlers as shocked animals retreat. We believe that lowering the bottom EF strand 10–15 cm, or adding a third strand, could reduce opportunity for calves to walk under the EF. Electric-fence design modifications to more effectively deter calves could be considered, though for chronic diseases like CWD and TB, young animals are least likely to be infected and shedding infectious agents. Although it was never a problem during our study, vegetation should not be allowed to contact the EF, to ensure that adequate voltage can be sustained. Our study only evaluated short-term efficacy of the EF; long-term efficacy and durability of the EF should be assessed in future studies, along with necessity of prebaiting or periodic rebaiting. An additional EF treatment only including elk not initially trained to the EF might also prove informative.

MANAGEMENT IMPLICATIONS

There is little doubt that a well-maintained double WWF would dramatically reduce direct contact between farmed and wild cervids, as well as potential for indirect contact via contaminated WWF, compared to a single WWF. However, typical woven-wire high fence costs approximately US$10–15/m (VerCauteren et al. 2006), whereas our EF cost US$3.53/m (excluding labor and cost of the EF energizer). During our case study, no adult elk penetrated our EF during nearly 64 days of trials where EF was present. Breaches by a single calf were likely preventable by design modification, but calf–adult-female pairs could also be temporarily contained inside double WWF until calves are too big to go under the EF. We have demonstrated potential for a well-maintained, prebaited EF adjacent to an existing WWF for reducing contacts between farmed and wild elk. As with all electric fences, an adequate power supply to the fencer and voltage to the fence is required. If either of these 2 items are lacking, risk of contact with implications such as pathogen transmission increases. We also feel that baiting and training cervids to the negative effects of the EF is vital to the efficacy of the fence at reducing contact. Further testing of this concept is warranted before recommending it for application on cervid farms.

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LITERATURE CITED

Anderson, D. P., B. J. Frosch, and J. L. Outlaw. 2007. Economic impact of the Texas deer breeding industry. Texas A&M University, Agricultural and Food Policy Center, APFC Research Report 07-3, College Station, Texas, USA.

Argue, C. K., C. Ribble, V. W. Lees, J. McLane, and A. Balachandran. 2007. Epidemiology of an outbreak of chronic wasting disease on elk farms in Saskatchewan. The Canadian Veterinary Journal 48:1241–1248.

Bollinger, T., P. Caley, E. Merrill, F. Messier, M. W. Miller, M. D. Samuel, and E. Vanopdenbosch. 2004. Chronic wasting disease in Canadian wildlife: an expert opinion on the epidemiology and risks to wild deer. Canadian Cooperative Wildlife Health Center, Saskatoon, Saskatchewan, Canada, <http://wildlife.wisc.edu/coop/CWD/Canada-Review.pdf>. Accessed 1 Aug 2010.

Buck, J. M. 2002. Status and management implications of captive cervid farming in the Northeast. Transactions of the North American Wildlife and Natural Resources Conference 67:297–307.

Clifton-Hadley, R. S., C. M. Sauter-Louis, I. W. Lugton, R. Jackson, A. Durr, and J. W. Wilesmith. 2001. *Mycobacterium bovis* infections. Pages 340–360 *in* E. S. Williams and I. K. Barker, editors. Infectious diseases of wild mammals. Third edition. Iowa State University Press, Ames, USA.

DelGiudice, G. D. 2002. Understanding chronic wasting disease (CWD) and CWD management planning background. Division of Wildlife, Minnesota Department of Natural Resources, St. Paul, USA. <http://files.dnr.state.mn.us/natural_resources/animals/mammals/deer/cwd/cwdplan2002.PDF>. Accessed 1 Aug 2010.

Demarais, S., R. W. DeYoung, L. J. Lyon, E. S. Williams, S. J. Williamson, and G. J. Wolf. 2002. Biological and social issues related to confinement of wild ungulates. The Wildlife Society Technical Review 02-3, Bethesda, Maryland, USA.

Diez, J. R., M. Gilsdorf, and R. Werge. 2002. The federal role in regulating alternative livestock operations. Transactions of the North American Wildlife and Natural Resources Conference 67:289–296.

Geist, V. 2002. Adaptive behavioral strategies. Pages 389–433 *in* D. E. Toweill and J. W. Thomas, editors. North American elk: ecology and management. Smithsonian Institution Press, Washington, D.C., USA.

Hygnstrom, S. E., and S. R. Craven. 1988. Electric fences and commercial repellents for reducing deer damage in cornfields. Wildlife Society Bulletin 16:291–296.

Jordan, D. M., and M. E. Richmond. 1992. Effectiveness of a vertical 3-wire electric fence modified with attractants or repellents as a deer exclosure. Proceedings of the Eastern Wildlife Damage Control Conference 5:44–47.

Karhu, R. R., and S. H. Anderson. 2006. The effect of high-tensile electric fence designs on big-game and livestock movements. Wildlife Society Bulletin 34:293–299.

Mackintosh, C., J. C. Haigh, and F. Griffin. 2002. Bacterial diseases of farmed deer and bison. Revue Scientifique et Technique, Office International des Epizooties 21:249–263.

McDonald, C. L., R. G. Beilharz, and J. C. McCutchan. 1981. Training cattle to control by electric fences. Applied Animal Ethology 7:113–121.

McKillop, I. G., and R. M. Sibly. 1988. Animal behavior at electric fences and the implications for management. Mammal Review 18:91–103.

Miller, M. W., and M. A. Wild. 2004. Epidemiology of chronic wasting disease in captive white-tailed and mule deer. Journal of Wildlife Diseases 40:320–327.

Miller, M. W., and E. S. Williams. 2003. Horizontal prion transmission in mule deer. Nature 425:35–36.

Miller, M. W., and E. S. Williams. 2004. Chronic wasting disease of cervids. Current Topics in Microbiology and Immunology 284:193–214.

Miller, M. W., M. A. Wild, and E. S. Williams. 1998. Epidemiology of chronic wasting disease in captive Rocky Mountain elk. Journal of Wildlife Diseases 34:532–538.

Miller, M. W., E. S. Williams, N. T. Hobbs, and L. L. Wolfe. 2004. Environmental sources of prion transmission in mule deer. Emerging Infectious Diseases 10:1003–1006.

Palmer, M. V., W. R. Waters, and D. L. Whipple. 2003. Aerosol exposure of white-tailed deer (*Odocoileus virginianus*) to *Mycobacterium bovis*. Journal of Wildlife Diseases 39:817–823.

Palmer, M. V., W. R. Waters, and D. L. Whipple. 2004. Investigation of the transmission of *Mycobacterium bovis* from deer to cattle through indirect contact. American Journal of Veterinary Research 65:1483–1489.

Poole, D. W., G. Western, and I. G. McKillop. 2004. The effects of fence voltage and the type of conducting wire on the efficacy of an electric fence to exclude badgers (*Meles meles*). Crop Protection 23:27–33.

Porter, W. F. 1983. A baited electric fence for controlling deer damage to orchard seedlings. Wildlife Society Bulletin 11:325–329.

Rhyan, J., K. Aune, B. Hood, R. Clarke, J. Payeur, J. Jarnagin, and L. Stackhouse. 1995. Bovine tuberculosis in a free-ranging mule deer (*Odocoileus hemionus*) from Montana. Journal of Wildlife Diseases 31:432–435.

Struhsaker, T. T. 1967. Behavior of elk (*Cervus canadensis*) during the rut. Zeitschrift für Tierpsychologie 24:80–114.

Tolhurst, B. A., A. I. Ward, R. J. Delahay, A. MacMaster, and T. J. Roper. 2008. The behavioral responses of badgers (*Meles meles*) to exclusion from farm buildings using an electric fence. Applied Animal Behavior Science 113:224–235.

VerCauteren, K. C., M. J. Lavelle, and S. E. Hygnstrom. 2006. Fences and deer-damage management: a review of designs and efficacy. Wildlife Society Bulletin 34:191–200.

VerCauteren, K. C., M. J. Lavelle, N. W. Seward, J. W. Fischer, and G. E. Phillips. 2007. Fence-line contact between wild and farmed cervids in Colorado: potential for disease transmission. Journal of Wildlife Management 71:1594–1602.

Ward, A. I., K. C. VerCauteren, W. D. Walter, E. Gilot-Fromont, S. Rossi, G. Edwards-Jones, M. Lambert, M. R. Hutchings, and R. J. Delahay. 2009. Options for the control of disease 3: targeting the environment. Pages 147–168 *in* R. J. Delahay, G. C. Smith, and M. R. Hutchings, editors. Management of disease in wild mammals. Springer, Tokyo, Japan.

Webb, S. L., K. L. Gee, S. Demarais, B. K. Strickland, and R. W. DeYoung. 2009. Efficacy of a 15-strand high-tensile electric fence to control white-tailed deer movements. Wildlife Biology in Practice 5:45–57.

Wisconsin Department of Natural Resources [WI-DNR]. 2008. Wisconsin Administrative Code NR 16.45: farm-raised deer; white-tailed deer, specifications. <http://www.legis.state.wi.us/rsb/code/nr/nr016.PDF>. Accessed 1 Aug 2010.

Williams, E. S. 2005. Chronic wasting disease. Veterinary Pathology 42:530–549.

Williams, E. S., and M. W. Miller. 2003. Transmissible spongiform encephalopathies in non-domestic animals: origin, transmission and risk factors. Revue Scientifique et Technique, Office International des Epizooties 22:145–156.

Williams, E. S., and S. Young. 1992. Spongiform encephalopathies in Cervidae. Revue Scientifique et Technique, Office International des Epizooties 11:551–567.

Williams, E. S., M. W. Miller, T. J. Kreeger, R. H. Kahn, and E. T. Thorne. 2002. Chronic wasting disease of deer and elk: a review with recommendations for management. Journal of Wildlife Management 66:551–563.

Wobeser, G. 2002. Disease management strategies for wildlife. Revue Scientifique et Technique, Office International des Epizooties 21:159–178.

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Challenges in managing the risks of chronic wasting disease

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Challenges in managing the risks of chronic wasting disease

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Abstract: This article summarises efforts at disease surveillance and risk management of chronic wasting disease (CWD). CWD is a fatal neurodegenerative disease of cervids and is considered to be one of the most contagious of the transmissible spongiform encephalopathies (TSEs). Evidence has demonstrated a strong species barrier to CWD for both human and farm animals other than cervids. CWD is now endemic in many US states and two Canadian provinces. Past management strategies of selective culling, herd reduction, and hunter surveillance have shown limited effectiveness. The initial strategy of disease eradication has been abandoned in favour of disease control. CWD continues to spread geographically in North American and risk management is complicated by the presence of the disease in both wild (free-ranging) and captive (farmed) cervid populations. The article concludes that further evaluation by risk managers is required for optimal, cost-effective strategies for aggressive disease control.

Keywords: chronic wasting disease; CWD; surveillance; cervids; transmissible spongiform encephalopathy; TSE; risk management strategies; culling; free ranging; captive.

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1 Introduction

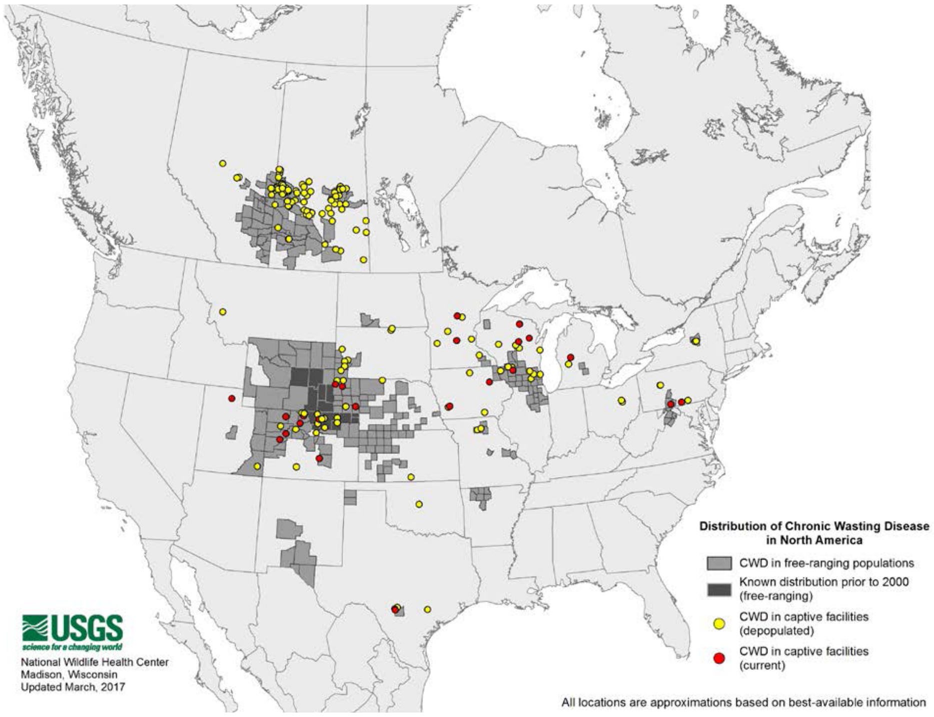
> "We feel that the current program that we have had in place for chronic wasting disease ... is not effective in achieving its goals", said Penny Greenwood, national manager of domestic disease control for the Canadian Food Inspection Agency. "This is a disease that is now established in wildlife, and when you have a disease that is established in a wildlife reservoir, it is always extremely difficult to eliminate it. We have to realize that we may not be able to eradicate this disease currently from Canada, given that we don't have any effective tools, so we may be looking at switching from eradication to control", said Ms. Greenwood. (Canadian Press, 2013)

This statement appears in a news report from mid-June 2013, and it reflects well the severe challenges faced by risk managers, in both Canada and the USA, in their effort to find an effective risk management response to chronic wasting disease (CWD). CWD is a fatal neurodegenerative disease of various species of animals in the cervid family, which includes deer, elk, reindeer, caribou and moose. The disease is most prevalent among deer species, affecting in particular mule deer, but also black-tailed deer and white-tailed deer. CWD belongs to a group of related neurodegenerative diseases called transmissible spongiform encephalopathies (TSEs), a group which also includes bovine spongiform encephalopathy (BSE), scrapie and variant Creutzfeldt-Jakob disease (for recent review see Haley and Hoover, 2015). CWD is prevalent in both farmed and wild cervids and is considered to be one of the most contagious forms of TSE known (Miller and Williams, 2002).

1.1 CWD monitoring

Disease surveillance in North America has provided some qualitative assessments of the overall risk of CWD in Canada and the USA. A combined map of disease distribution for both wild and captive cervids in North America has been reproduced in Figure 1 (USGS, 2016). As of April 2016, CWD has been detected in many US states (23 states as of September 2016) and two Canadian provinces (CWDA, 2016a). The first case of CWD detected outside of North America was in a seven-year-old male elk exported from a Saskatchewan farm to South Korea in 1997 (Sohn et al., 2002). The European Commission has also established surveillance, sampling and testing protocol for CWD in cervids (Andreoletti et al., 2010). The first case of CWD diagnosed in Europe was in a female reindeer in March 2016 (*Rangifer tarandus tarandus*) by the Norwegian Institute for Nature Research (CWDA, 2016b).

Figure 1 Geographical distribution of CWD in North America (see online version for colours)



Source: USGS (2016) (courtesy of the US Geological Survey), http://www.nwhc.usgs.gov/images/cwd/cwd_map.jpg

1.1.1 The USA

The first identification of CWD as a clinical disease anywhere in the world occurred in the USA at a state research facility in Fort Collins, Colorado in 1967, and the first case in a wild cervid (an elk) was found in 1981, also in Colorado. The US Centers for Disease Control and Prevention have prepared a detailed county-by-county list showing the distribution of CWD in wild deer and elk cervids in that country. As of January 2016, 21 US states have positive CWD cases in the wild and the disease is expected to continue to spread (CDC, 2016). The US Federal Government has concentrated on the development of increasingly precise surveillance methods for CWD (USGS, 2012), and states have sought to develop 'CWD management response plans' (examples are Wisconsin Department of Natural Resources, 2010; Michigan Department of Natural Resources, 2012; Illinois Department of Natural Resources, 2014; Texas Parks and Wildlife, 2016).

As of 30 September 2015, CWD has been confirmed in 16 States among farmed cervids; a total of 70 herds have been affected (USAHA, 2015). The US Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) has focused on the National CWD Herd Certification Program (HCP) as a national approach to minimise CWD spread in domestic cervid herd populations by implementing national herd certification standards, such as fencing, regular inventories, individual animal IDs, and CWD testing of all cervids that die and are over 12 months. When herds are CWD disease free for five years, the herds can then be certified and considered to be low risk for CWD. All animal movement must be within herds that are participating in the certification program. The first edition of the CWD program standards was published in 2012, with the final version published in 2014 after extensive review and stakeholder input. As of January 2015, 29 states are participating as approved states in the national CWD HCP (APHIS, 2015).

1.1.2 Canada

In 1996, CWD was diagnosed on a Saskatchewan elk farm. Farmed elk exported from the USA in the late 1980s were believed to be responsible for the entry of CWD into Saskatchewan (Kahn et al., 2004). The actual first case of a captive cervid displaying CWD in Canada occurred in 1978 in a mule deer at a Toronto zoo, but the case remained undiagnosed until 2006 (Dubé et al., 2006). Since 2002, CWD has been a reportable disease in Canada under the Health of Animals Act, which is under the jurisdiction of the Canadian Food Inspection Agency (CFIA). Federal regulations on CWD focus on this disease only among farmed animals, including potential transmission through deer and elk antler velvet (Angers et al., 2009), a commercial product from cervid farms. When CWD is reported on a farm it is placed under quarantine and the remaining animals are destroyed and sampled for the disease. Surveillance and tracing of all animals that came into the farm and left the farm in the 36–60 months prior to infection is important for disease containment (Kahn et al., 2004). Under this policy, the CFIA depopulated over 7,500 farmed elk and deer in Canada, at which time compensation was paid to the owners of CWD-affected farms (CFIA, 2016).

Most of the cases of CWD among farmed cervids (deer and elk) in Canada have occurred in the province of Saskatchewan. The Canadian Food Inspection Agency website (CFIA, 2016) lists a total of 77 herds of captive or farmed cervids where CWD has been detected for the period 1996 to 2015, including three herds in year 2016. Only two of those farmed cases occurred in Alberta, and the rest in Saskatchewan.

Federal authorities in Canada have also formulated a herd certification program to identify disease-free operations, which farm owners may choose to enter voluntarily. The provinces of British Columbia (B.C.), Alberta, Saskatchewan, Manitoba, and Ontario also require animal tracing and documentation and follow quarantine, depopulation and decontamination management policies for farmed cervids. So far B.C., Manitoba and Ontario have not reported any indigenous cases of CWD in either farmed or wild animals.

The first case of CWD found in the wild cervid population in Saskatchewan was reported in a mule deer in 2000; the first wild elk was detected in 2008, and the first moose was detected in Alberta in 2013. Saskatchewan's 'Cervid Chronic Wasting Disease (CWD) Surveillance Program' became mandatory in 2001. Surveillance of wild cervid populations in Saskatchewan from 1997 to Fall 2012 yielded a prevalence rate of under 1%. The hunter surveillance program was discontinued in 2012. After 2012, only diagnostic samples were examined by the province and yielded a prevalence of ~11% (CWHC, 2015).

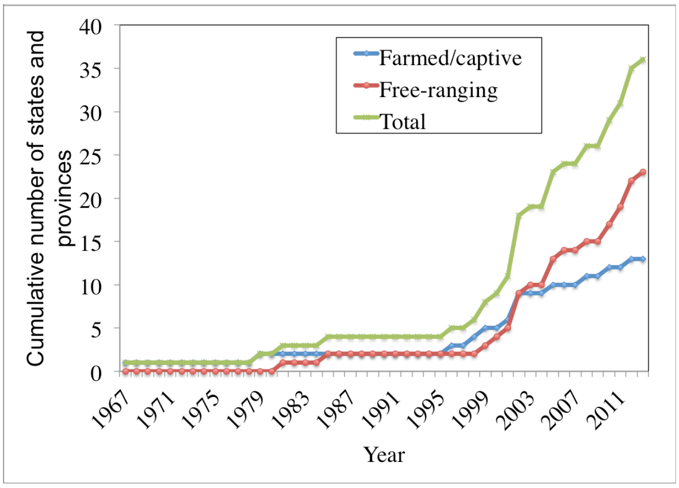
In the Province of Alberta, the species at greatest risk are mule deer and white-tailed deer (only one case of CWD in a moose). The province undertakes disease surveillance and testing, based on samples submitted by hunters, and also collects farmed animal movement information. Most of the cases detected so far in the province have been concentrated in a region of southeastern Alberta on the Saskatchewan border, but as of 2014 the disease range was spreading to the northeast. There has been an increase in disease prevalence from 2.1% to 2.4% in mule deer in fall of 2015 (Alberta Environment and Parks, 2016). The impacts on hunters in the province have been varied, with some negatively affected by CWD (to the extent that they may no longer participate in the activity) and others not affected at all (Zimmer et al., 2011, 2012).

The B.C. Ministry of the Environment released its 'British Columbia Chronic Wasting Disease Risk Assessment' in May 2008 (British Columbia Ministry of the Environment, 2008). B.C. has been carrying out CWD surveillance of wild cervids since 2002; testing is focused on samples from the Peace and Kootenay Management Regions that border Alberta, since these areas were estimated to be the most likely routes of CWD introduction into the province. The assessment considered direct and indirect consequences of CWD including changes to cervid population numbers and sustainability, associated environmental changes, economic consequences (hunting and other nature-related activities), and impacts to cultural and traditional practices.

To date, Manitoba has not reported any cases of CWD. There is ongoing surveillance and the province has examined 'more than 2,300 deer and 1,400 elk carcasses, all of which have tested negative' (Government of Manitoba, 2016). The Province of Ontario released its comprehensive 'Chronic Wasting Disease Surveillance and Response Plan' in November 2005, and a similar program for farmed cervids in the following year; as of May 2016 no case of CWD in free-ranging or commercially-farmed cervids had been reported in Ontario (OMNR, 2016). (The only cases in Ontario have occurred in captive mule deer at the Toronto Zoo.) However, since the disease has been found in a number of adjacent or nearby US states, Ontario has established an annual rigorous surveillance and testing program to monitor CWD, together with a risk model that identifies high-risk areas of the province for enhanced surveillance (Rosatte et al., 2014).

In summary, taking North America as a whole, CWD distribution has occurred in two phases (see the detailed timeline at CWDA, 2016a): During Phase I, for the first 29 years following the index case (1967–1995), the disease was found only in the two Western US states of Colorado and Wyoming; during Phase II, the next 19 years (1996–2014), the disease range expanded dramatically, reaching an additional 21 US states – extending to the northeastern and southwestern borders of the nation – and two Western Canadian provinces. The long-term trends in the geographical distribution of the disease in North America are shown in Figure 2.

Figure 2 The long-term trends in the geographical distribution of CWD in North America (see online version for colours)



Notes: The primary source for Figure 2 is the complete timeline of CWD cases in North America found in CWDA (2016a), including both wild and captive species. In Canada, the two provinces of Saskatchewan and Alberta have cases in both wild and captive cervids. In the USA, a total of ten states also have both types: Colorado, Iowa, Minnesota, Missouri, Nebraska, New York, Pennsylvania, South Dakota, Wisconsin and Wyoming. Another ten states have reported wild cases only: Illinois, Kansas, Maryland, Ohio, New Mexico, North Dakota, Utah, Virginia, West Virginia and Texas. The final three have reported cases in captive herds only: Michigan, Montana, and Oklahoma. The total number of separate 'instances' of CWD in North America, combining wild and captive types of cervids, is therefore 37.

Source: CWDA (2016a)

2 Hazard characteristics of CWD in North America

Many considerations are involved in the spread of CWD, such as (for review see Haley and Hoover, 2015):

- horizontal transmission
- vertical transmission
- environmental transmission

- genetic influence on CWD disease pathogenesis
- intra-species susceptibility.

Epidemiological, animal, and mutagenic studies have demonstrated a strong species barrier to CWD in humans (Kong et al., 2005; Race et al., 2009; Wilson et al., 2012); thus the probability of risk for human zoonotic infection is low (Kong et al., 2005). Research studies have also demonstrated that cattle, sheep, and goats remain uninfected after close contact with infected cervids (Belay et al., 2004). Direct intra-cerebral inoculation with mule deer CWD leads to a 38% infection rate among cattle, suggesting a natural, strong species barrier to CWD. On the other hand, intracerebral inoculation with white tailed deer CWD results in an 85% infection rate in cattle, suggesting that some cervid prion strains have more potential to cross the species barrier than others (Sigurdson, 2008).

Another cervid that is likely to acquire CWD in future is the northern caribou (Tyshenko et al., 2016), since oral exposure has resulted in disease transmission in reindeer, a close relative to the caribou (Mitchell et al., 2012). Genotype analysis has found that caribou PRNP alleles (alleles that are strongly associated with disease prevalence) are nearly identical to those of elk, moose, white-tailed deer and mule deer. In addition, caribou migratory and herd ranges over-lap with mule deer, white-tailed deer, elk and moose ranges in both Alberta and Saskatchewan (Happ et al., 2007; Li et al., 2007).

Ante-mortem CWD detection and surveillance detection methods (Haley et al., 2012; Haley and Hoover, 2015; Henderson et al., 2013; John et al., 2013) are under development. In the past, the main methods for CWD diagnosis have been immunohistochemistry or ELISA on post-mortem brain samples of deceased animals. Hunter surveillance uses these methods and results can take many weeks to obtain (Gilch et al., 2011). Ante-mortem methods such as tonsil and rectal biopsies have been used for large-scale surveillance of CWD in free range and captive cervids but with limited success (Sigurdson, 2008; Wild et al., 2002; Wolfe et al., 2007). Sampling with these tests is difficult and cumbersome in the wild (Gilch et al., 2011). The protein misfolding cyclic amplification (PMCA) assay can detect low levels of misfolded prions in tissues and body fluids (Sigurdson and Aguzzi, 2007; Johnson et al., 2012) and detects animals in the early stages of CWD pathogenesis (Daus et al., 2011; Haley et al., 2012). A high-throughput version of PMCA known as the real-time quaking induced conversion (RT-QuIC) can detect CWD prions in saliva (Henderson et al., 2013), urine (John et al., 2013) and blood (Elder et al., 2013) in asymptomatic animals. However this is still a lengthy and labour intensive assay to use.

3 Risks and risk factors associated with CWD

Based on the evolving science that characterises the nature of the hazard represented by CWD exposure and the exposure pathway analyses, as well as on the disease management challenges since the disease was first discovered, a number of risks and risk factors related to CWD have been identified [see WDNR (2010, pp.8–10) for the best short summary]:

1 risks to wild, free-ranging cervid species, both those already bearing the disease (deer, elk and moose) as well as the other cervid species, notably caribou and reindeer, that may be susceptible to it

2 risks to farmed cervids, including potential disease interactions between farmed and wild cervids

3 the associated risks of an ongoing, broad geographical spreading of the disease across all of North America

4 risks to human health and to other domestic farmed animals, especially cattle, pigs and sheep

5 risks to the traditional lifestyle and culture of aboriginal peoples in North America

6 ecosystem risks, both direct and indirect, such as a spreading of the disease to other mammals (such as meadow voles and other rodents) and high prion persistence in the soil.

Risks to wildlife often translate to risks and impacts on different groups of people as well. Non-aboriginal hunters may be affected by CWD in wildlife from a health risk perspective, and are affected by an impairment of the enjoyment of hunting as a recreational experience. Aboriginal peoples in North America may be affected through similar impacts on their traditional use of land and wildlife. Should the disease eventually spread to reindeer and woodland caribou, impacts on aboriginal peoples and the general public will greatly increase (Mitchell et al., 2012).

Although no formal quantitative risk assessment of CWD has been performed to date, the level of at least some of these identified risks can be estimated qualitatively with a high degree of confidence, on the basis of the extensive, accumulated scientific studies of hazard and exposure. With respect to the first-mentioned risk on this list, the disease is by now well established in North America in five species of cervids, over a large geographical range in the USA and a quite restricted range in Canada (concentrated on the Saskatchewan-Alberta border). In addition, there are smaller numbers of cases in elk and very few in moose so far (for the latter, only for moose living in close proximity to diseased deer). However, there are basically no grounds for believing at this time that the disease can be eradicated, and thus it must be regarded as being endemic, with prospects for spreading gradually to new geographical areas and perhaps to other cervid species, and for increasing in prevalence in areas where it is already well established.

It is advisable to consider separately the disease dynamics in farmed cervids, taking into account the fact that it was in farmed cervids that the disease was first detected in the USA (deer and elk in the states of Colorado and Wyoming), and that it was 14 years later before the first case in a wild cervid was discovered (deer and elk, both in Colorado). The same pattern was repeated in Canada, which had its first indigenous farmed CWD case in 1996 and its first wild cervid case in 2000, both in Saskatchewan. In ten of the 16 US states and in both Canadian provinces where CWD has appeared in farmed cervids, it has also been found in wild cervids. Farming of cervids is still increasing, especially in the USA (Miller, 2012), and so this potential disease reservoir is likewise expanding. On the other hand, another ten US states have reported cases only in wild cervids and three others only in farmed cervids.

A deficiency in the risk assessment of CWD in North America to date is the failure to address adequately – through a formal quantitative assessment – the risks entailed by the interactions of farmed cervids with wild infected cervids, including the role of prion persistence and loading in the environment over time. For example, prions shed in to the environment could act as a source of infection from wild cervids to farmed cervids across fenced areas. On-farm CWD transmission seems to occur more often where elk or deer are at higher densities or where they congregate at man-made feed and water stations [Michigan Department of Natural Resources and Agriculture, (2007), Section 5]. The frequent escapes of farmed animals from their enclosures, the introgression of wild animals onto farms by breaching the fencing, as well as fence-line interactions between wild and farmed cervids are other potential avenues for CWD movement between animals (Fischer et al., 2011; Miller, 2012; VerCauteren et al., 2005, 2007a, 2007b, 2010).

Both the human health risk and the risk of a spreading of CWD to any domestic farm animals, including cattle, pigs and sheep, appear to range from low to very low. The human health risk, related to consumption of or exposure to infected cervid materials, may even be regarded as negligible, although there are some uncertainties in these areas noted in the scientific literature (Belay et al., 2004).

As already observed, the potential for a spreading of CWD to other cervid species, especially caribou and reindeer, and thus the associated potential for a further extensive geographical spreading of the disease, appears to range from high to very high, and perhaps up to the level of near-certainty, at least in the estimation of some experts (Oraby et al., 2016). This prospect has significant potential impacts beyond the animal species risks themselves, specifically with respect to aboriginal peoples in North America.

Given the historical dependence of northern aboriginal peoples in Canada on the threatened species, especially caribou, the consequent risks to the lifestyles and traditional cultures of these peoples is similarly high. And as mentioned above, the impacts go beyond impacts on aboriginal people. The fact that boreal caribou are listed as threatened under Canada's Species at Risk Act (SARA), as well as under provincial wildlife legislation, shows the public concern for this species. CWD impacts would be significant in terms of attempting to achieve the SARA recovery plan objectives or in terms of the cost of attempting to achieve recovered status. An assessment of public preferences for CWD control illustrates that the public is supportive of general outcomes associated with reduced CWD levels, largely arising from concerns over health of wildlife populations. Measures of support for government investments in such actions have also been estimated – a lower bound estimate is approximately $16 per household in Alberta or $20M per year for a 10-year program period (Forbes, 2011).

Finally, there are large uncertainties associated with the ecosystem risks, both with respect to direct effects, especially the potential for spread to other mammalian species beyond the cervids, and to indirect or secondary effects, such as those which might follow increased disease prevalence among the cervids. In addition, the long persistence of prions in the environment and thus their accumulation over time may turn out to be a major factor in disease persistence:

> High prion persistence is expected to lead to an increasing environmental pool of prions during the early phases (i.e., approximately during the first 50 years) of the epidemic. As a consequence, over this period of time, disease dynamics will become more heavily influenced by indirect transmission [via environmental contamination], which may explain some of the observed regional differences in age and sex-specific disease patterns. This suggests

> management interventions, such as culling or vaccination, will become increasingly less effective as CWD epidemics progress. (Almberg et al., 2011)

The level of long-term risk represented by these factors is difficult to estimate at the moment, and they will need to be monitored on an ongoing basis.

4 Risk management of CWD

In general, the development of potentially effective strategies for responding to CWD is complicated greatly by the presence of the disease in both captive (farmed) and wild (free-ranging) populations and by the modes of interaction between the two populations. For example, a well-established mode of control for infectious diseases in farmed animals is the culling and destruction of the diseased animals and their herd-mates, accompanied by various types of plans to compensate farmers for their losses. But this strategy has been developed largely for infectious diseases such as BSE in animals that do not exist in close proximity to wild populations of the same species which are also susceptible to the same disease. Where the contrary is the case, as with CWD, the disease reservoir in wild animals threatens to regularly infect and re-infect herds of farmed animals of the same species, and vice-versa, and this interaction presents a serious dilemma for the prospects of success for disease control strategies.

There is little experience to date in attempts to control or eradicate infectious diseases in wild animal populations (except for rabies), and species such as cervids that range over immense, continent-wide territories present significant challenges in this regard. At the same time, farming of captive cervids appears to be steadily growing in scale and geographical range, certainly in the USA (Miller, 2012); indeed, the "farmed deer breeding industry has been called the 'fastest growing industry in rural America' (Anderson et al., 2007)" (Fischer et al., 2011). In this context, a systematic quantitative risk assessment of the CWD disease interactions between farmed and wild cervids, which does not seem to have been carried out anywhere in North America to date, is urgently required, including more of the benefit-cost analyses relevant to the management of these interactions risks of the kind undertaken by Arnot et al. (2009).

4.1 Studies of behavioural and attitudinal factors

Many of the CWD risk control strategies available to public authorities depend heavily on the adequacy of awareness and voluntary participation among hunters and the public. Research on these factors is, therefore, an important dimension in understanding the challenges and options for managing the risks of CWD. For the situation in the USA, Vaske (2010) summarised much of the existing human-oriented research on CWD published to date, which was dominated by a focus on hunters and their potential behaviours. This research on hunter behaviour was undertaken at a time when CWD was a relatively unfamiliar disease within the state or region where the studies were focused. Some key characteristics of the studies were the fact that hunters did seem to understand the existence of CWD and have concerns about its continuing spread; however, at the initial low levels of prevalence of the disease few hunters felt the need to change hunting behaviour, although non-resident hunters in particular states did show greater willingness to change hunting location or stop hunting altogether. Many studies (such as Vaske and

Lyon, 2011; Needham et al., 2006, 2007; Vaske et al., 2004) showed the importance of CWD prevalence, potential human death, perceived human health risk, presence of CWD in the state, and residency of hunters in predicting changes in hunter behaviour, which would mostly occur at high hypothetical prevalence of the disease.

Of more concern in the actual management of CWD appeared to be tension among hunters and government agencies involved in the management of the disease. Needham and Vaske (2008) showed that if hunters shared the same views on CWD with government agencies managing the disease, then there was higher trust in those agencies and this higher trust led to lower perceived personal risk from CWD. Heberlein (2004) found that the Wisconsin strategy of treating CWD 'like a fire' had reduced the effectiveness of the management strategy of significant herd reduction in Wisconsin. Cooney and Holsman (2010) found that a government strategy of controlling the disease and reducing its spread might have had more support from hunters than the attempt to eradicate the disease. Holsman et al. (2010) noted that although the majority of hunters saw CWD as something important to manage, few hunters actually increased their harvest of animals in spite of various government incentives, suggesting that hunter behaviour is unlikely to be an effective deer herd reduction management tool: "our findings call into question the efficacy of recreational hunting as a disease management tool when managers are seeking severe reductions in wildlife densities" (Other studies on hunter attitudes and behaviour involving the risks of CWD include: Gigliotti, 2004; Heberlein and Stedman, 2009; Holsman and Petchenik, 2006; Lyon and Vaske, 2010; Miller, 2003, 2004; Miller and Shelby, 2009; Needham and Vaske, 2006; Needham and Vaske, 2008; Vaske et al., 2006a, 2006b).

Relatively few studies have looked at the views of the non-hunting public on the management of CWD or the potential health risks associated with the disease. Needham and Vaske (2006) included a small sample of non-hunters in Wisconsin in their study, finding that although many respondents in both categories believed that CWD may cause disease in humans and were concerned about eating deer and elk due to CWD, hunters were more likely than non-hunters to believe that the risks of CWD had been exaggerated. Brown et al. (2006) discovered that the majority of hunters and non-hunters in New York State had heard of CWD but did not exhibit high levels of concern about the disease, potentially due to higher than average levels of trust in the agencies managing the disease. In comparative studies Goddard et al. (2010, 2011) conducted online surveys of Canadian (2009) and US (2010) members of the public. These surveys were conducted with the aid of market research companies using their standard national panels in each country, with the added restriction that at least 50% of the sample in each country must have consumed venison in their lifetime. The data showed that in neither country was there significant awareness of the CWD prior to the time of the surveys; moreover, even for those who had heard of CWD prior to the survey, only 41% realised that CWD affected both deer and elk. In these studies public awareness was lower in the USA than in Canada.

Survey respondents were also asked about their level of agreement with different strategies for CWD control (Myae and Goddard, 2011). Among the surveyed respondents as a whole the distribution of materials about CWD, holding public meetings, mailings, and facilitation of collection of heads for testing were all preferred strategies. Approval of culling as an acceptable strategy was much lower in the people with no experience of eating venison than among the people who had such experience, many of whom were also hunters. This study also found that older respondents, people who ate venison from hunted animals more frequently, and people who believe that eating venison will cause a CWD-type infection in humans were more positive about culling of animals in both Canada and the USA. In Canada, males and people with higher education were more supportive of culling while people living in rural areas were less supportive of culling. It is worth noting that Lischka et al. (2010) found high levels of support by hunters and the non-hunting public in Illinois for significant herd reduction as a management strategy in CWD-infected areas. The targeting of a geographic area where CWD had been found and thereafter had higher local media coverage suggests that public support for herd reduction or culling is higher the nearer the disease to the surveyed members of the public. However, Lischka et al. (2010) also found very high levels of support for more passive forms of management, such as educating hunters and the public, funding research about CWD, and increasing the regulation of deer and elk farms.

5 Risk control strategies for CWD

Thus there are a number of factors that represent major intrinsic obstacles to risk control of CWD, which provide at least a partial explanation for the failure to arrest the spread of the disease so far. The suite of disease control strategies for CWD that have been implemented will be discussed in the following pages. For some time now the situation in Canada has been described as described by the Canadian Wildlife Health Cooperative (CWHC, 2011a): "the ultimate objective of Canada's National CWD Control Strategy 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". This is a word-for-word repetition of the objective that was first announced by the same organisation in 2005. The wording is interesting, of course, for its clear recognition, even then, that eradication of CWD was unlikely to be a feasible objective, and that the alternative of control, as defined – preventing a spread to new areas or new species – was the best outcome that could be hoped for.

As we have seen, this theme was reaffirmed by the CFIA, the federal agency with national regulatory responsibility for the disease, in the statement made by an agency official in mid-2013: "we have to realize that we may not be able to eradicate this disease currently from Canada, given that we don't have any effective tools, so we may be looking at switching from eradication to control" (Canadian Press, 2013). This is the same conclusion that the State of Wisconsin arrived at in 2010, in the course of preparing what is almost certainly the best overall document on CWD risk management strategies that currently exists (WDNR, 2010):

> "We are therefore establishing the following goal for the management of CWD over the next 15 years: Minimize the area of Wisconsin where CWD occurs and the number of infected deer in the state. The currently identified geographic distribution of CWD is substantially larger than was known in 2002 and is likely increasing. Eliminating CWD from Wisconsin using the tools currently available is unlikely given the difficulty in managing CWD in free-ranging deer, magnitude of deer reductions required to significantly affect the disease, and declining legislative support. However, there is still a need to take steps to effectively manage CWD regardless of the continued challenges. Therefore, minimizing the area of the state where the disease occurs is the responsible goal to pursue. This goal does indicate a shift in our original

> management approach by currently accepting an area of CWD infection in southern Wisconsin, and at the same time, focusing CWD control efforts on limiting CWD to that area of the state while simultaneously controlling its intensity and distribution."

The truth of the matter is, unfortunately, that the intrinsic difficulties in disease control mentioned above raise the distinct possibility that achieving the objective of control too appears to exceed the capacity of the tools that are currently available. 'Control', as opposed to the earlier focus on 'eradication', is usually defined as seeking to prevent an increase in both disease prevalence and regional disease distribution over existing levels, as defined by response plans formulated at particular points in time. But the steady increases in both CWD prevalence and distribution in recent years, considering North America as a whole, suggests that 'control' was already known to be not working particularly well at the time when it was promulgated as a 'new' risk management objective (replacing eradication). And it is not at all clear what other strategy might be devised to succeed that of control.

These considerations leave open the key question of what are the realistic objectives for the risk mitigation of CWD that are actually possible or feasible in the coming years. We may be better able to comment on this key question after reviewing the suite of disease control strategies that have been attempted to date. In this context, readers may wish to consult the complete set of 'Chronic Wasting Disease and Cervidae Regulations in North America', arranged by US state and Canadian province, that is available at CWDA, 2016c (see also CWHC, 2011b). Only a short summary of widely used measures for wild and farmed cervids is provided here, which will be compared with the results of an expert elicitation exercise in each case.

5.1 Wild (free-ranging) cervids

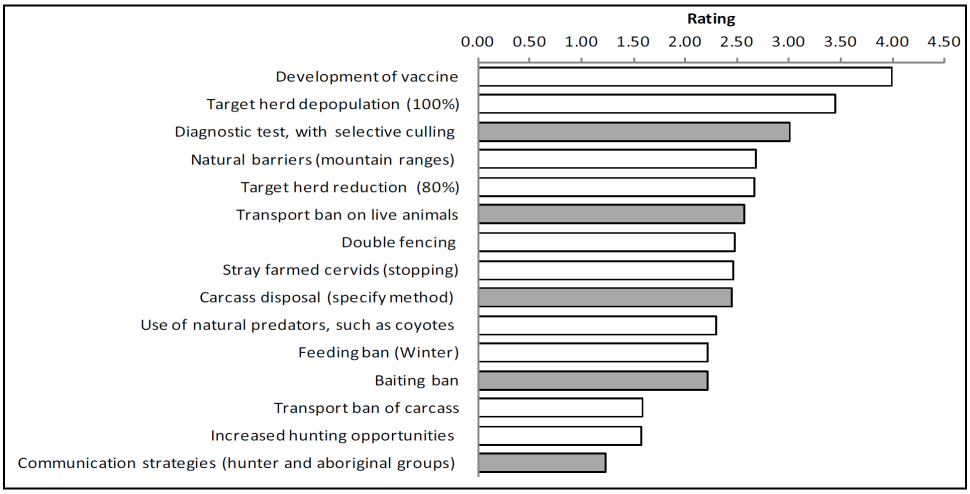
Various selections of the following strategies have been implemented for wild (free-ranging) cervids in different US states and in the provinces of Alberta and Saskatchewan:

- Notification (mostly voluntary, mandatory in specified high-risk areas): hunters are encouraged to report sick animals and to submit heads of animals for testing.
- State and provincial authorities provide public freezers at designated locations for hunters to deposit cervid animal heads for testing (in Canada, B.C., Saskatchewan, and Ontario, e.g., OMNR, 2016).
- Surveillance, monitoring and testing: states and provinces compile statistics on numbers of animals reported and tested and the numbers of positive results. Evidence of increases over time in regional disease prevalence can be used to implement enhanced surveillance and special monitoring programs in particular areas which represent possible new foci for the disease.
- Herd reduction: extending hunting seasons in areas with high concentrations of animals (which facilitates disease transmission), and developing special culling programs, such as culling of deer in localised areas of high disease prevalence or along the leading edge of a known new outbreak of the disease, and culling of sick animals by sharpshooters outside of the regular hunting seasons (e.g., IDNR, 2014).

- Hunter control: for example, prohibitions against moving high-risk parts of carcasses out of areas where CWD is established, and regulations on disposal of carcass parts.
- Recommendations for hunter precautions to follow when field-dressing an animal, e.g., wear rubber gloves, minimise handling of brain, eye, or spinal tissues, and avoid cutting through the spine (Government of Manitoba, 2016).
- Feeding and baiting ban: prohibiting the dispersal of feed to attract wild animals, because it encourages close proximity and thus raises the potential for disease transmission.
- Transport ban: banning the movement of hunter-harvested carcasses across jurisdictional lines, and requiring a permit for the movement of live Cervidae across jurisdictional boundaries.
- Opinion survey and outreach and communication programs: used to increase citizen familiarity with CWD and awareness of the importance of controlling the disease.
- Applied Research Programs: For example, modelling to assess changes in spatial distribution and prevalence of disease (for assessing the effectiveness of management actions), and improved disinfection and decontamination protocols (Nobert et al., 2016; Potapov et al., 2016; Uehlinger et al., 2016).

An expert elicitation exercise resulted in set of risk control measures for wild cervids, ranked in order of importance (see Figure 3).

Figure 3 Weighted averages of the ratings for the 15 control measures of CWD in the wild cervids



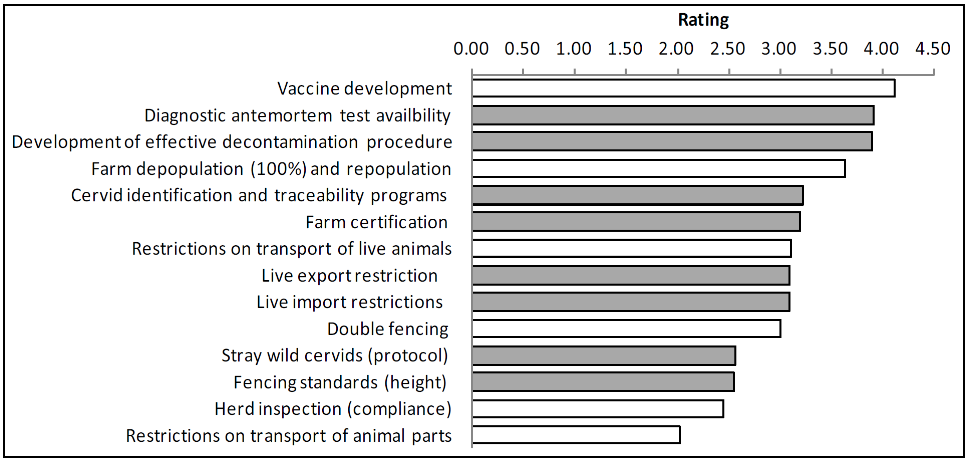
Source: Oraby et al. (2016, Figure 5)

5.2 *Farmed cervids*

The following strategies have been implemented for farmed cervids in different US states and in the provinces of Alberta and Saskatchewan:

- in general, many jurisdictions have extensive sets of rules and specifications for farmed cervids – see, e.g., the combined federal and state rules for deer farmers in Wisconsin, especially Subchapter VII of the relevant statute (WDNR, 2015a)
- registration and voluntary certification of cervid farms (e.g., APHIS, 2015)
- notification of diseased animals (mandatory for operators of cervid farms)
- protocols for the reporting and recovery or destruction of escaped animals and best management practices, including provision for recovery paddocks
- surveillance/testing: testing programs and protocols designed to detect, monitor, and control diseases, with participation and reporting mandatory for operators of cervid farms
- cervid identification (ear tags) and traceability requirements for tracking of movements
- regulation of movement between farms, including mandatory permits
- import regulation: government permit required for movement between countries
- transport regulation: regulating or banning the movement of captive live animals across intra-country jurisdictional lines
- herd depopulation: destruction of entire herds in which diseased animals are found, followed by securing of the affected area (maintenance of fencing to prevent ingress of wild animals) and application of decontamination protocols
- facility management: regulating fencing for captive herds, including double-fencing and electric fencing (Fischer et al., 2011).

Figure 4 Weighted averages of the ratings for the 14 control measures of CWD in the farmed cervids



Source: Oraby et al. (2016, Figure 6)

The ongoing surveillance and random testing protocols, together with herd depopulation and facility decontamination protocols, are the most common strategies in all jurisdictions for the attempt to control CWD in farmed cervids.

An expert elicitation exercise resulted in set of risk control measures for farmed cervids, ranked in order of importance (see Figure 4).

6 Conclusions

As noted above, taking North America as a whole, CWD distribution has occurred in two phases (see the overall timeline at CWDA, 2016b). During phase 1, for the first 29 years following the index case (1967–1995), the disease was found only in the two Western US states of Colorado and Wyoming; during phase 2, the next 18 years (1996–2013), the disease range expanded dramatically, reaching an additional 20 US states – extending to the northeastern and southwestern borders of the nation – and two western Canadian provinces.

The extensive document (MDNRA, 2007) prepared for the State of Michigan, for example, shows the great effort that some jurisdictions have made in terms of advance planning and preemptive measures for CWD disease control (the surveillance measures in place resulted recently in the detection of the first case of CWD in a farmed cervid in that state). Some planning of this type has been under way in the USA for about three decades, and yet the seemingly inexorable spread of the disease among free-ranging cervids in geographical terms, and in terms of new cervid species, proceeds apace. In view of this simple fact, there are strong efforts under way to improve surveillance methodologies for free-ranging cervids (USGS, 2012).

There does not seem to be a comprehensive database of disease prevalence across all affected regions of the two countries. (Prevalence is estimated as a percentage of infected cases in the population sampled. So far as can be determined, there are no overall estimates of prevalence in farmed cervid populations). Examination of reported prevalence in some specific localities appears to indicate that on the whole prevalence is still relatively low; nevertheless, in general prevalence does seem to be increasing steadily in areas where the disease is well established. Various estimates of prevalence range from as low as <1% (for example, among some species in the two affected Canadian provinces), to others in the 1%–5% range, and to some others at much higher levels. In regions of Wyoming, prevalence in mule deer "has grown from ~11% to ~36% from 1997–2007, with local annual prevalence growth rates in excess of 1.15%" (Almberg et al., 2011). In the state of Wisconsin, the current figures in certain areas are quite high and the rate of increase is disturbing (Bergquist, 2014; WDNR, 2015b):

> "Since 2002, chronic wasting disease (CWD) prevalence within our western monitoring area has shown an overall increasing trend in all sex and age classes. During the past 13 years, the trend in prevalence in adult males has risen from 8–10 percent to over 25 percent, and in adult females from about 3–4 percent to more than 10 percent. During that same time, the prevalence trend in yearling males has increased from about 2 percent to about 8 percent and in yearling females from roughly 2 percent to about 7 percent."

In late 2011, this state also reported this result from the depopulation of a captive herd (WDNR, 2011): "the 80% prevalence rate discovered on Buckhorn Flats is the highest prevalence recorded in any captive cervid operation in North America". Heberlein and

Stedman (2009), Cooney and Holsman (2010) and Holsman et al. (2010) argue that initial attempts to control CWD in Wisconsin were less successful in reducing prevalence of the disease than they might have been with better engagement with hunters and non-hunting public in their planning and implementation. Wisconsin has a very large and densely concentrated deer population, which is known to be a factor in efficient disease transmission, and which could account for these relatively high numbers. The high prevalence (25%) noted recently for Wisconsin includes the two counties (Dane and Iowa) where CWD was first detected among wild cervids in that state (Bergquist, 2014).

In conclusion, there are a number of trends in the evolving pattern of CWD in North America that would appear to justify some new initiatives in risk management decision making for this issue. There is a pervasive sense among some risk managers at the state and provincial levels that the major disease control strategies selected to date are either not working, or are proving only minimally effective in controlling the disease in specific areas. But if new initiatives are to be considered, robust methods must be used in order to set priorities among risk control options, through risk-ranking and benefit-cost analyses, and to concentrate resources on the preferred strategies which emerge from such exercises.

The possibility that there may soon be an effective vaccine for CWD is very significant in this regard. Researchers have mimicked a common mode of prion infection using CWD prion inserted into an attenuated *Salmonella* bacterium to produce anti-prion antibodies. This vaccine is has shown some success and is under further development (Goñi et al., 2015). Another group in Canada has also developed a vaccine that is currently under clinical trials with elk (PREVENT, 2015).

Expert opinion already obtained has provided some other candidate strategies for consideration:

> "Policies aimed at reducing the presence of the infectious CWD agent in the environment (including carcass disposal and CWD positive farm depopulation), reducing deer densities (targeted culling), and reduced movement of cervids in critical areas (through the use of fencing, double fencing, or natural barriers) were considered to be effective control measures, and were ranked highly by experts for both wild and farmed cervids." (Oraby et al., 2016)

In addition, further research and innovation in prion disinfection and decontamination technologies would appear to be a high priority. Finally, using genetic information as a way to improve risk management is another possible initiative: Geospatial maps with genetic data taken from ongoing CWD surveillance could show geographical areas of susceptibility or resistance to CWD for various cervid species, thus allowing risk managers to allocate management resources better on the basis of disease distribution.

At the broadest level, risk managers may wish to assign high priority to carrying out systematic reviews or expert elicitation exercises in two areas:

1. What risk mitigation strategies are available, now that the objective of disease eradication has been abandoned, if the objective of disease control should similarly fail?
2. What cost-effective strategies, if any, are available for further isolating populations of farmed and wild cervids if the disease interactions between these two populations should appear to be more problematic than it is considered to be at present?

Such exercises might begin with consultations among government and academic scientific and wildlife management specialists, using established techniques for consensus building. At those sessions some consideration should be given to the advisability of preparing quantitative risk estimates for the top-ranked CWD risks, especially, and urgently, as noted earlier on the crucial issue of potential disease interactions between farmed and wild cervids. Then the results from these initial consultations should be taken out to important external stakeholders – aboriginal peoples, hunters and cervid farm operators, public-interest groups, and others – across a broad range of regional locations, reflecting the scope of the disease outbreak to date. Prior to these outreach campaigns, some effort should be put into using effective risk communication on the scientific and technical aspects of the risk management of CWD.

References

Alberta Environment and Parks (2016) *Chronic Wasting Disease (CWD) Surveillance Update* [online] http://aep.alberta.ca/fish-wildlife/wildlife-diseases/chronic-wasting-disease/default.aspx (accessed 15 August 2016).

Almberg, E.S., Cross, P.C., Johnson, C.J., Heisey, D.M. and Richards, B.J. (2011) 'Modeling routes of chronic wasting disease transmission: environmental prion persistence promotes deer population decline and extinction', *PLoS One*, Vol. 6, No. 5, p.e19896.

Anderson, D.P., Frosch, B.J. and Outlaw, J.L. (2007) *Economic Impact of the Texas Deer Breeding Industry*, APFC Research Report 07-3, Texas A&M University, Agricultural and Food Policy Center, College Station, Texas, USA.

Andreoletti, O., Berkvens, D., Ducrot, C., Gavier-Widen, D., Griffin, J., Hope, J. and Vanopdenbosch, E. (2010) 'Scientific opinion on the results of the EU survey for chronic wasting disease (CWD) in cervids', *EFSA Journal*, Vol. 8, No. 10, pp.1–29.

Angers, R., Seward, T.S., Napier, D., Green, M., Hoover, E., Spraker, T., O'Rourke, K., Balachandran, A. and Telling, G.C. (2009) 'Chronic wasting disease in elk antler velvet', *Emerging Infectious Diseases*, Vol. 15, No. 5, pp.696–703.

Animal and Plant Health Inspection Service, United States Department of Agriculture (APHIS) (2015) *Voluntary National CWD Herd Certification Program* [online] https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-diseaseinformation/sa_alternate_livestock/sa_cervid_health/sa_cwd/ct_farmed (accessed 15 July 2016).

Arnot, C., Latte, E., Unterschultz, J. and Adamowicz, V. (2009) 'Chronic wasting disease (CWD) potential economic impact on cervid farming in Alberta', *Journal of Toxicology and Environmental Health, Part A*, Vol. 72, Nos. 17–18, pp.1014–1017.

Belay, E.D., Maddox, R.A., Williams, E.S., Miller, M.W., Gambetti, P. and Schonberger, L.B. (2004) 'Chronic wasting disease and potential transmission to humans', *Emerging Infectious Diseases*, Vol. 10, No. 6, pp.977–984.

Bergquist, L. (2014) '1 in 4 deer in Iowa, Western Dane Counties [Wisconsin] has chronic wasting disease', *Milwaukee Wisconsin Journal Sentinel* [online] http://www.jsonline.com/news/wisconsin/1-in-4-deer-in-dane-iowa-counties-has-chronic-wasting-disease-b99213273z1-247165301.html#ixzz2uQeiljKe (accessed 15 August 2016).

British Columbia Ministry of the Environment (2008) *British Columbia Chronic Wasting Disease Risk Assessment*, by J. Parmley, C. Himsworth and L. Nogueira-Borden [online] http://www2.gov.bc.ca/assets/gov/environment/plants-animals-andecosystems/wildlife-wildlife-habitat/wildlife-health/wildlife-healthdocuments/bc_cwd_riskassess061008.pdf (accessed 15 August 2016).

Brown, T.L., Decker, D.J., Major, J.T., Curtis, P.D., Shanahan, J.E., and Siemer, W.F. (2006) 'Hunters' and other citizens' reactions to discovery of CWD in central New York', *Human Dimensions of Wildlife*, Vol. 11, No. 3, pp.203–214.

Canadian Food Inspection Agency (CFIA) (2016) *Chronic Wasting Disease (CWD) of Deer and Elk* [online] http://www.inspection.gc.ca/animals/terrestrialanimals/diseases/reportable/cwd/eng/1330143462380/1330143991594 (accessed 15 August 2016).

Canadian Press (2013) *Ottawa Revises Strategy for Chronic Wasting Disease*, by J. Cotter [online] http://www.theglobeandmail.com/news/national/ottawa-revises-strategy-for-chronic-wastingdisease/article12593366/ (accessed 15 August 2016).

Canadian Wildlife Health Cooperative (CWHC) (2011a) *A Proposal for Canada's National Chronic Wasting Disease Control Strategy* [online] http://www.cwhcrcsf.ca/docs/technical_reports/A_Proposal_for_a_National_CWD_Control_Strategy_2011_final.pdf (accessed 15 August 2016).

Canadian Wildlife Health Cooperative (CWHC) (2011b) *Management of CWD in Canada: Workshop Summary* [online] http://www.cwhcrcsf.ca/docs/technical_reports/CWD_Workshop_Summary_February_910_2011_Edmonton_revised_20110516.pdf (accessed 15 August 2016).

Canadian Wildlife Health Cooperative (CWHC) (2015) *CWHC Reports: Chronic Wasting Disease Testing in Saskatchewan* [online] http://www.cwhc-rcsf.ca/surveillance_data_cwd.php (accessed 15 August 2016).

Centers for Disease Control and Prevention (CDC) (2016) *Chronic Wasting Disease (CWD): Occurrence* [online] http://www.cdc.gov/prions/cwd/occurrence.html (accessed 15 August 2016).

Chronic Wasting Disease Alliance (CWDA) (2016a) *Chronic Wasting Disease Timeline* [online] http://cwd-info.org/timeline/ (accessed 15 May 2016).

Chronic Wasting Disease Alliance (CWDA) (2016b) *The First Detection of Chronic Wasting Disease (CWD) in Europe* [online] http://cwd-info.org/the-first-detection-of-chronic-wasting-disease-cwdin-europe/ (accessed 15 August 2016).

Chronic Wasting Disease Alliance (CWDA) (2016c) *State News and Information* [online] http://www.cwd-info.org/index.php/fuseaction/policy.regulationsMap (accessed 15 August 2016).

Cooney, E.E. and Holsman, R.H. (2010) 'Influences on hunter support for deer herd reduction as a chronic wasting disease (CWD) management strategy', *Human Dimensions of Wildlife*, Vol. 15, No. 3, pp.194–207.

Daus, M.L., Breyer, J., Wagenfuehr, K., Wemheuer, W.M., Thomzig, A., Schulz-Schaeffer, W.J. and Beekes, M. (2011) 'Presence and seeding activity of pathological prion protein (PrP(TSE)) in skeletal muscles of white-tailed deer infected with chronic wasting disease', *PLoS One*, Vol. 6, No. 4, p.e18345.

Dubé, C., Mehren, K.G., Barker, I.K., Peart, B.L. and Balachandran, A. (2006) 'Retrospective investigation of chronic wasting disease of cervids at the Toronto Zoo, 1973–2003', *The Canadian Veterinary Journal*, Vol. 47, No. 12, pp.1185–1193.

Elder, A.M., Henderson, D.M., Nalls, A.V., Wilham, J.M., Caughey, B.W., Hoover, E.A., Kincaid, A.E., Bartz, J.C. and Mathiason, C.K. (2013) 'In vitro detection of prionemia in TSE-infected cervids and hamsters', *PLoS One*, Vol. 8, No. 11, p.e80203.

Fischer, J.W., Phillips, G.E., Baasch, D.M., Lavelle, M.J. and VerCauteren, K.C. (2011) 'Modifying elk (*Cervus elaphus*) behavior with electric fencing at established fence-lines to reduce disease transmission potential', *Wildlife Society Bulletin*, Vol. 35, No. 1, pp.9–14.

Forbes, K. (2011) *What Economic Value do Albertans Place on Containing Chronic Wasting Disease?*, MSc thesis, Agricultural and Resource Economics, University of Alberta.

Gigliotti, L.M. (2004) 'Hunters' concerns about chronic wasting disease in South Dakota', *Human Dimensions of Wildlife*, Vol. 9, No. 3, pp.233–235.

Gilch, S., Chitoor, N., Taguchi, Y., Stuart, M., Jewell, J.E. and Schatzl, H.M. (2011) 'Chronic wasting disease', *Top. Curr. Chem.*, Vol. 305, No. 1, pp.51–78.

Goddard, E., Aubeeluck, A., Muringai, V. and Adamowicz, W. (2010) 'Canadian public awareness of and concerns about chronic wasting disease', *PrioNet Annual Meeting*, 9 March, Ottawa.

Goddard, E., Myae, A.C., Muringai, V. and Adamowicz, W. (2011) 'Canadian and American public awareness of and concerns about chronic wasting disease', *APRI/PrioNet Workshop on Management of CWD in Canada*, 9–10 February, Edmonton.

Goñi, F., Mathiason, C.K., Yim, L., Wong, K., Hayes-Klug, J., Nalls, A., Peyser, D., Estevez, V., Denkers, N., Xu, J. and Osborn, D.A. (2015) 'Mucosal immunization with an attenuated Salmonella vaccine partially protects white-tailed deer from chronic wasting disease', *Vaccine*, Vol. 33, No. 5, pp.726–733.

Government of Manitoba, Ministry of Conservation (2016) *Chronic Wasting Disease* [online] http://www.gov.mb.ca/conservation/wildlife/disease/cwd.html (accessed 15 August 2016).

Haley, N.J. and Hoover, E.A. (2015) 'Chronic wasting disease of cervids: current knowledge and future perspectives', *Annual Review of Animal Biosciences*, Vol. 3, No. 1, pp.305–325.

Haley, N.J., Mathiason, C.K., Carver, S., Telling, G.C., Zabel, M.D. and Hoover, E.A. (2012) 'Sensitivity of protein misfolding cyclic amplification versus immunohistochemistry in ante-mortem detection of chronic wasting disease', *Journal of General Virology*, Vol. 93, No. 5, pp.1141–1150.

Happ, G.M., Huson, H.J., Beckmen, K.B. and Kennedy, L.J. (2007) 'Prion protein genes in caribou from Alaska', *Journal of Wildlife Diseases*, Vol. 43, No. 2, pp.224–228.

Heberlein, T.A. (2004) 'Fire in the Sistine Chapel: how Wisconsin responded to chronic wasting disease', *Human Dimensions of Wildlife: An International Journal*, Vol. 9, No. 3, pp.165–179.

Heberlein, T.A. and Stedman, R.C. (2009) 'Socially amplified risk: attitude and behavior change in response to CWD in Wisconsin deer', *Human Dimensions of Wildlife*, Vol. 14, No. 5, pp.326–340.

Henderson, D.M., Manca, M., Haley, N.J., Denkers, N.D., Nalls, A.V., Mathiason, C.K., Caughey, B. and Hoover, E.A. (2013) 'Rapid antemortem detection of CWD prions in deer saliva', *PLoS One*, Vol. 8, No. 9, p.e74377.

Holsman, R.H. and Petchenik, J. (2006) 'Predicting deer hunter harvest behavior in Wisconsin's chronic wasting disease eradication zone', *Human Dimensions of Wildlife*, Vol. 11, No. 3, pp.177–189.

Holsman, R.H., Petchenik, J. and Cooney, E.E. (2010) 'CWD after 'the fire': six reasons why hunters resisted Wisconsin's eradication effort', *Human Dimensions of Wildlife*, Vol. 15, No. 3, pp.180–193.

Illinois Department of Natural Resources (2014) *Illinois 2013–2014 Chronic Wasting Disease Surveillance and Management Report* [online] http://www.dnr.illinois.gov/programs/CWD/Documents/CWDAnnualReport20132014.pdf (accessed 15 August 2016).

John, T.R., Schatzl, H.M. and Gilch, S. (2013) 'Early detection of chronic wasting disease prions in urine of pre-symptomatic deer by real-time quaking-induced conversion assay', *Prion*, Vol. 7, No. 3, pp.253–258.

Johnson, C.J., Aiken, J.M., McKenzie, D., Samuel, M.D. and Pedersen, J.A. (2012) 'Highly efficient amplification of chronic wasting disease agent by protein misfolding cyclic amplification with beads (PMCAb)', *PLoS One*, Vol. 7, No. 4, p.e35383.

Kahn, S., Dubé, C., Bates, L. and Balachandran, A. (2004) 'Chronic wasting disease in Canada: Part 1', *Canadian Veterinary Journal*, Vol. 45, No. 5, pp.397–404.

Kong, Q., Huang, S., Zou, W., Vanegas, D., Wang, M., Wu, D., Yuan, J., Zheng, M., Bai, H., Deng, H., Chen, K., Jenny, A.L., O'Rourke, K., Belay, E.D., Schonberger, L.B., Petersen, R.B., Sy, M.S., Chen, S.G. and Gambetti, P. (2005) 'Chronic wasting disease of elk: transmissibility to humans examined by transgenic mouse models', *Journal of Neuroscience*, Vol. 25, No. 35, pp.7944–7949.

Li, L., Coulthart, M.B., Balachandran, A., Chakrabartty, A. and Cashman, N.R. (2007) 'Species barriers for chronic wasting disease by in vitro conversion of prion protein', *Biochemical and Biophysical Research Communications*, Vol. 364, No. 4, pp.796–800.

Lischka, S.A., Shelton, P. and Buhnerkempe, J. (2010) 'Support for chronic wasting disease management among residents of the infected area in Illinois', *Human Dimensions of Wildlife*, Vol. 15, No. 1, pp.229–232.

Lyon, K.M. and Vaske, J. (2010) 'Predicting hunting participation in response to chronic wasting disease in four states', *Human Dimensions of Wildlife*, Vol. 15, No. 3, pp.208–220.

Michigan Department of Natural Resources (2012) *Michigan Surveillance and Response Plan for Chronic Wasting Disease (CWD) of Free-Ranging and Privately-Owned Cervids* [online] http://igan.gov/documents/emergingdiseases/CWDContingencyPlan_2012Update_FinalDraft_391020_7.pdf (accessed 15 August 2016).

Michigan Department of Natural Resources and Agriculture (2007) *A Systematic Review of Michigan's Policy for CWD Prevention, Detection and Control*, Prepared by J. Ducrocq et al., Centre for Coastal Health, August, 172pp.

Miller, C.A. (2003) 'Hunter perceptions and behaviors related to chronic wasting disease in Northern Illinois', *Human Dimensions of Wildlife*, Vol. 8, No. 3, pp.229–230.

Miller, C.A. (2004) 'Deer hunter participation and chronic wasting disease in Illinois: an assessment at time zero', *Human Dimensions of Wildlife*, Vol. 9, No. 3, pp.237–239.

Miller, C.A. and Shelby, L.B. (2009) 'Hunters' general disease risk sensitivity and behaviors associated with chronic wasting disease', *Human Dimensions of Wildlife*, Vol. 14, No. 2, pp.33–141.

Miller, J.E. (2012) A Growing Threat: How deer breeding could put public trust wildlife at risk. *U.S. Fish and Wildlife Service: The Wildlife Professional*, Winter, pp.22–27 [online] http://chronicwasting-disease.blogspot.ca/2012/12/a-growing-threat-how-deer-breeding.html (accessed 5 September 2016).

Miller, M.W. and Williams, E.S. (2002) 'Detection of PrP (CWD) in mule deer by immunohistochemistry of lymphoid tissues', *Veterinary Record*, Vol. 151, No. 20, pp.610–612.

Mitchell, G.B., Sigurdson, C.J., O'Rourke, K.I., Algire, J., Harrington, N.P., Walther, I., Spraker, T.R. and Balachandran, A. (2012) 'Experimental oral transmission of chronic wasting disease to reindeer (Rangifer tarandus tarandus)', *PLoS One*, Vol. 7, No. 6, p.e39055.

Myae, A.C. and Goddard, E. (2011) 'Explaining preferences for CWD management strategies', Poster presented at the *PRION 2011 Congress*, 16–19 May, Montreal, Quebec.

Needham, M.D. and Vaske, J.J. (2006) 'Beliefs about chronic wasting disease risks across multiple states, years, and interest groups', *Human Dimensions of Wildlife*, Vol. 11, No. 3, pp.215–220.

Needham, M.D. and Vaske, J.J. (2008) 'Hunter perceptions of similarity and trust in wildlife agencies and personal risk associated with chronic wasting disease', *Society & Natural Resources*, Vol. 21, No. 3, pp.197–214.

Needham, M.D., Vaske, J.J. and Manfredo, M.J. (2006) 'State and residency differences in hunters' responses to chronic wasting disease', *Human Dimensions of Wildlife*, Vol. 11, No. 3, pp.159–176.

Needham, M.D., Vaske, J.J., Donnelly, M.P. and Manfredo, M.J. (2007) 'Hunting specialization and its relationship to participation in response to chronic wasting disease', *Journal of Leisure Research*, Vol. 39, No. 3, pp.413–437.

Nobert, B.R., Merrill, E.H., Pybus, M.J., Bollinger, T.K. and Hwang, Y.T. (2016) 'Landscape connectivity predicts chronic wasting disease risk in Canada', *Journal of Applied Ecology*, Vol. 53, No. 1, pp.1450–1459, doi:10.1111/1365-2664.12677.

Ontario Ministry of Natural Resources (2016) *Chronic Wasting Disease* [online] http://www.ontario.ca/environment-and-energy/chronic-wasting-disease (accessed 16 August, 2016).

Oraby, T., Tyshenko, M.G., Westphal, M., Darshan, S., Crouteau, M.C., Aspinell, W., ElSaadany, S., Cashman, N.R. and Krewski, D. (2016) 'Using expert judgments to improve chronic wasting disease management in Canada', *Journal of Toxicology and Environmental Health, Part A*, Vol. 79, Nos. 16–17, pp.713–728.

Potapov, A., Merrill, E., Pybus, M. and Lewis, M.A. (2016) 'Chronic wasting disease: transmission mechanisms and the possibility of harvest management', *PloS One*, Vol. 11, No. 3, p.e0151039.

PREVENT (2015) *CWD Vaccine* [online] http://prevent-cecr.ca/our-work/project-portfolio/ (accessed 15 August 2016).

Race, B., Meade-White, K.D., Miller, M.W., Barbian, K.D., Rubenstein, R., LaFauci, G., Cervenakova, L., Favara, C., Gardner, D., Long, D., Parnell, M., Striebel, J., Priola, S.A., Ward, A., Williams, E.S., Race, R. and Chesebro, B. (2009) 'Susceptibilities of nonhuman primates to chronic wasting disease', *Emerging Infectious Diseases*, Vol. 15, No. 9, pp.1366–1376.

Rosatte, R., Buchanan, T., Davies, C., Middel, K., Patterson, B., Bruce, L., Gibson, M., Bennett, K., Silver, A., Taylor, S., Stevenson, B., Donovan, B., Heydon, C., Ojkic, D. and Tapscott, B. (2014) 'Chronic wasting disease surveillance program and proactive response plan for Ontario, Canada', *Canadian Wildlife Biology and Management*, Vol. 3, No. 2, pp.52–68 [online] http://cwbm.ca/Issues/Vol3No2.pdf (accessed 15 August 2016).

Sigurdson, C.J. (2008) 'A prion disease of cervids: chronic wasting disease', *Veterinary Research*, Vol. 39, No. 4, pp.1–12.

Sigurdson, C.J. and Aguzzi, A. (2007) 'Chronic wasting disease', *Biochimica et Biophysica Acta-Molecular Basis of Disease*, Vol. 1772, No. 6, pp.610–618.

Sohn, H-J., Kim, J-H., Choi, K-S., Nah, J-J., Joo, Y-S., Jean, W-H., Ahn, S-W., Kim, O-K., Kim, D-Y. and Balachandran, A. (2002) 'A case of chronic wasting disease in an elk imported to Korea from Canada', *Journal of Veterinary Medical Science*, Vol. 64, No. 9, pp.855–858.

Texas Parks and Wildlife (2016*) Chronic Wasting Disease (CWD)* [online] http://www.tpwd.state.tx.us/huntwild/wild/diseases/cwd/ (accessed 15 August 2016).

Tyshenko, M.G., Oraby, T., Westphal, M., Darshan, S., Croteau, M., Aspinall, W., Elsaadany, S., Cashman, N.R. and Krewski, D. (2016) 'Expert elicitation on uncertainties associated with chronic wasting disease', *Journal of Toxicology and Environmental Health, Part A*, Vol. 79, Nos. 16–17, pp.729–745.

Uehlinger, F.D., Johnston, A.C., Bollinger, T.K. and Waldner, C.L. (2016) 'Systematic review of management strategies to control chronic wasting disease in wild deer populations in North America', *BMC Veterinary Research*, Vol. 12, No. 1, pp.173–189.

US Animal Health Association, Committee on Wildlife Diseases (USAHA) (2015) *Cervid Health Program Updates* [online] http://portals5.gomembers.com/Portals/6/Reports/2015/report-wd2015.pdf (accessed 15 August 2016).

US Department of the Interior, US Geological Survey (USGS) (2012) *Enhanced Surveillance Strategies for Detecting and Monitoring Chronic Wasting Disease in Free-Ranging Cervids* [online] http://pubs.usgs.gov/of/2012/1036/pdf/ofr2012_1036.pdf (accessed 15 August 2016).

US Department of the Interior, US Geological Survey, National Wildlife Health Centre (USGS) (2016) *Chronic Wasting Disease (CWD)* [online] http://www.nwhc.usgs.gov/disease_information/chronic_wasting_disease/ (Accessed 15 August 2016).

Vaske, J.J. (2010) 'Lessons learned from human dimensions of chronic wasting disease research', *Human Dimensions of Wildlife*, Vol. 15, No. 3, pp.165–179.

Vaske, J.J. and Lyon, K.M. (2011) 'CWD prevalence, perceived human health risks, and state influences on deer hunting participation', *Risk Analysis*, Vol. 31, No. 3, pp.488–496.

Vaske, J.J., Needham, M.D., Newman, P., Manfredo, M.J. and Petchenik, J. (2006b) 'Potential for conflict index: hunters' responses to chronic wasting disease', *Wildlife Society Bulletin*, Vol. 34, No. 1, pp.44–50.

Vaske, J.J., Needham, M.D., Stafford, N.T., Green, K. and Petchenik, J. (2006a) 'Information sources and knowledge about chronic wasting disease in Colorado and Wisconsin', *Human Dimensions of Wildlife*, Vol. 11, No. 3, pp.191–202.

Vaske, J.J., Timmons, N.R., Beaman, J. and Petchenik, J. (2004) 'Chronic wasting disease in wisconsin: hunter behavior, perceived risk, and agency trust', *Human Dimensions of Wildlife*, Vol. 9, No. 3, pp.193–209.

VerCauteren, K., Fischer, J., Pooler, R., Lavelle, M., and Phillips, G. (2005) 'Fence-line interactions among farmed and free-ranging cervids: preliminary results', *Wildlife Damage Management Conferences – Proceedings*, Paper 94 [online] http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1087&context=icwdm_wdmconfproc (accessed 15 August 2016).

VerCauteren, K.C., Lavelle, M.J., Seward, N.W., Fischer, J.W. and Phillips, G.E. (2007a) 'Fence-line contact between wild and farmed white-tailed deer in Colorado: potential for disease transmission', *Journal of Wildlife Management*, Vol. 71, No. 5, pp.1594–1602 [online] http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1717&context=icwdm_usdanwrc (accessed 15 August 2016).

VerCauteren, K.C., Lavelle, M.J., Seward, N.W., Fischer, J.W. and Phillips, G.E. (2007b) 'Fence-line contact between wild and farmed white-tailed deer in Michigan: potential for disease transmission', *Journal of Wildlife Management*, Vol. 71, No. 5, pp.1603–1606 [online] http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1716&context=icwdm_usdanwrc (accessed 15 August 2016).

VerCauteren, K.C., Vandeelen, T.R., Lavelle, M.J. and Hall, W.H. (2010) 'Assessment of abilities of white-tailed deer to jump fences', *Journal of Wildlife Management*, Vol. 74, No. 6, pp.1378–1381 [online] http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2340&context=icwdm_usdanwrc (accessed 15 August 2016).

Wild, M.A., Spraker, T.R., Sigurdson, C.J., O'Rourke, K.I. and Miller, M.W. (2002) 'Preclinical diagnosis of chronic wasting disease in captive mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*) using tonsillar biopsy', *J. Gen. Virol.*, Vol. 83, No. 10, pp.2629–2634.

Wilson, R., Plinston, C., Hunter, N., Casalone, C., Corona, C., Tagliavini, F., Suardi, S., Ruggerone, M., Moda, F., Graziano, S., Sbriccoli, M., Cardone, F., Pocchiari, M., Ingrosso, L., Baron, T., Richt, J., Andreoletti, O., Simmons, M., Lockey, R., Manson, J.C. and Barron, R.M. (2012) 'Chronic wasting disease and atypical forms of bovine spongiform encephalopathy and scrapie are not transmissible to mice expressing wild-type levels of human prion protein', *J. Gen. Virol.*, Vol. 93, No. 7, pp.1624–1629.

Wisconsin Department of Natural Resources (2010) *Wisconsin's Chronic Wasting Disease Response Plan, 2010–2025* [online] http://dnr.wi.gov/topic/wildlifehabitat/documents/CWD_15plan.pdf (accessed 22 August 2016).

Wisconsin Department of Natural Resources (2011) *Almond Deer Farm Update*, 22 November [online] http://dnr.wi.gov/about/nrb/2011/december/12-11-2b2.pdf (accessed 22 August 2016).

Wisconsin Department of Natural Resources (2015a) *Trade and Consumer Protection. Farm-Raised Deer* [online] http://datcp.wi.gov/Farms/Deer_Farming/index.aspx and *Statute ACTP 10 (Subchapter VII)* [online] http://docs.legis.wisconsin.gov/code/admin_code/atcp/010/10.pdf (accessed 22 August 2016).

Wisconsin Department of Natural Resources (2015b) *CWD Prevalence and Surveillance* [online] http://dnr.wi.gov/topic/wildlifehabitat/prevalence.html (accessed 22 August 2016).

Wolfe, L.L., Spraker, T.R., Gonzalez, L., Dagleish, M.P., Sirochman, T.M., Brown, J.C., Jeffrey, M. and Miller, M.W. (2007) 'PrPCWD in rectal lymphoid tissue of deer (*Odocoileus spp.*)', *Journal of General Virology*, Vol. 88, No. 7, pp.2078–2082.

Zimmer, N., Boxall, P.C. and Adamowicz, W.L. (2011) 'The impact of chronic wasting disease and its management on hunter perceptions, opinions, and behaviors in Alberta, Canada', *Journal of Toxicology and Environmental Health, Part A: Current Issues*, Vol. 74, Nos. 22–24, pp.1621–1635.

Zimmer, N., Boxall, P.C. and Adamowicz, W.L. (2012) 'The impacts of chronic wasting disease and its management on recreational hunters', *Canadian Journal of Agricultural Economics*, Vol. 60, No. 1, pp.71–92.

Note added in proof

The first case of CWD in a free-ranging Norwegian reindeer was discovered in the central region of Norway in March of 2016 (Benestad et al., 2016); subsequently, two additional cases in wild deer were discovered in the same area. Norway has decided to use hunters and sharpshooter to eradicate the entire herd of 2,000 animals in this area. Then, also in 2016, two cases of CWD in moose were discovered near Trondheim in northern Norway (Stokstad, 2017). The European Commission has asked the European Food Safety Authority (EFSA) to introduce surveillance and sampling activities in the entire northern sector of the European Union (Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Poland and Sweden) with respect to the threat of CWD to seven wild, semi-domesticated and farmed cervid species: Eurasian tundra reindeer, Finnish (Eurasian) forest reindeer, moose, roe deer, white-tailed deer, red deer and fallow deer (Ricci et al., 2016). In addition, recent research on CWD in North America (Edmunds et al., 2016; Meyerett-Reid et al., 2017) includes a major review (Zabel and Ortega, 2017) of environmental factors in the spread and persistence of the cervid prion protein. Finally, a new risk control strategy has been proposed for CWD in North America, namely, using controlled burns of fires in forest areas where vegetation and soil is found to be heavily contaminated with prions.

Additional references

Benestad, S.L., Mitchell, G., Simmons, M., Ytrehus, B. and Vikøren, T. (2016) 'First case of chronic wasting disease in Europe in a Norwegian free-ranging reindeer', *Veterinary Research*, Vol. 47, p.88.

Edmunds, D.R., Kauffman, M.J., Schumaker, B.A., Lindzey, F.G., Cook, W.E., Kreeger, T.J. et al. (2016) 'Chronic wasting disease drives population decline of white-tailed deer', *PLoS ONE*, Vol. 11, No. 8, p.e0161127.

Meyerett-Reid, C., Wyckoff, A.C., Spraker, T., Pulford, B., Bender, H. and Zabel, M.D. (2017) 'De novo generation of a unique cervid prion strain using protein misfolding cyclic amplification', *mSphere*, Vol. 2, p.e00372-16.

Ricci, A. et al. (2016) 'Chronic wasting disease in cervids', *EFSA Journal*, Vol. 15, No. 1, p.4667.

Stokstad, E. (2017) 'Norway plans to exterminate a large reindeer herd to stop a fatal infectious brain disease', *Science*, 3 April, Vol. 356, No. 6344.

Zabel, M. and Ortega, A. (2017) 'The ecology of prions', *Microbiology and Molecular Biology Reviews*, Vol. 81, p.e00001-17.

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Lloyd Knight
Rules Review Officer
Idaho State Department of Agriculture
PO Box 7249
Boise, Idaho 83707

May 5, 2021

Dear Mr. Knight:

I am writing on behalf of the Idaho Conservation League to provide comments and suggestions regarding the domestic cervidae rules administered by the Idaho Department of Agriculture. ICL has been Idaho's leading voice for conservation since 1973. As Idaho's largest state-based conservation organization, we represent over 30,000 supporters, many of whom have a deep personal interest in protecting human health and the environment. The Idaho Conservation League works to protect these values through public education, outreach, advocacy and policy development.

I would like to thank ISDA for the opportunity to be involved in and comment on the domestic cervidae rulemaking process. As you know, chronic wasting disease (CWD) is knocking on Idaho's door with confirmed captive and wild cases in three of our neighboring states. It is therefore imperative that Idaho take all possible steps to prevent or limit the spread of CWD within our borders.

The most obvious need is to test all domestic cervidae greater than twelve months of age for CWD regardless of the cause of death. This suggestion is consistent with numerous available scientific studies and recommendations that urge full testing as a means to detect and stomp out any "sparks" of CWD as early as possible.

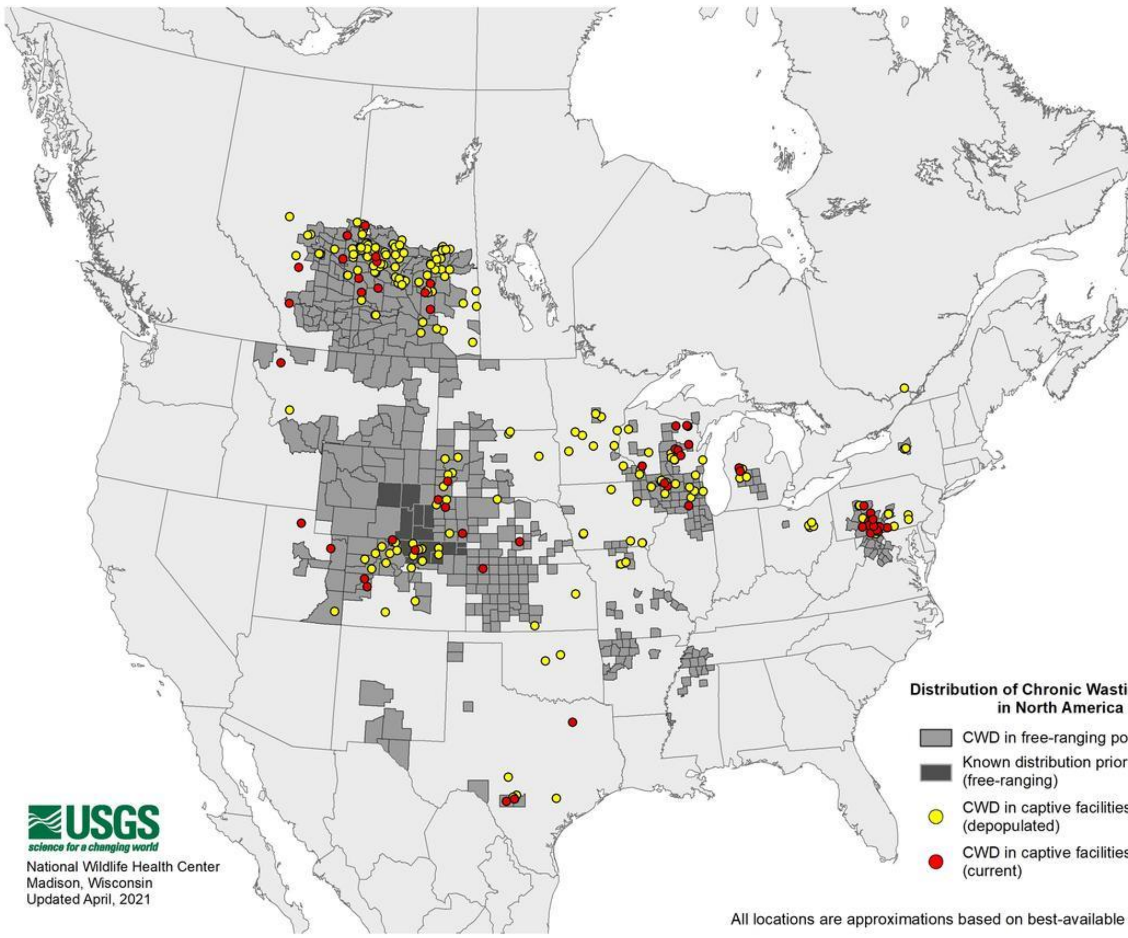
Additional comments and suggestions may be found in the attached comments. I'm also submitting the enclosed scientific publications for consideration and to be included in the administrative record. Please do not hesitate to reach out if you have any questions or comments.

Sincerely,

Brad Smith
North Idaho Director

Domestic cervidae rulemaking

The Idaho Conservation League (ICL) would like to thank the Idaho State Department of Agriculture (ISDA) for opening a public negotiated rulemaking process regarding domestic cervidae. As illustrated in the map below, chronic wasting disease (CWD) has been confirmed in both domestic and wild cervids in three of Idaho's neighboring states. ISDA must revise its rules governing domestic cervidae in order to limit the potential spread of CWD into the state where it will affect both domestic and wild populations of cervids. Proposed changes are described below.



Distribution of Chronic Wasting Disease in North America, updated December 17, 2020. (Credit: Bryan Richards, USGS National Wildlife Health Center). Available online at: https://www.usgs.gov/news/chronic-wasting-disease-can-science-save-our-dear-deer?qt-news_science_products=1#qt-news_science_products

Sec. 102. Perimeter Fence Requirements.

The current rules regarding perimeter fencing found at IDAPA 02.04.19, Section 102 provide that fencing at domestic elk and fallow deer farms must be at least 8 feet high. In contrast, the minimum fence height for domestic reindeer farms is 6 feet. Fence height requirements for ALL domestic cervidae farms should be brought into alignment, with a minimum height of at least 8 feet. A uniform requirement of at least eight feet is necessary to prevent the ingress and egress of any wild or domestic cervid, regardless of species or origin. A minimum height greater than 8 feet might be necessary in locations where a fence is installed perpendicular to a slope, thereby reducing the effective height of the fence on the uphill side.

Domestic reindeer farms were not allowed in Idaho north of the Salmon River until recently. The restriction north of the Salmon River was to prevent the spread of CWD to wild caribou. The last wild caribou was captured from the Selkirk Recovery Zone in 2019 and relocated to a captive breeding facility in Revelstoke, British Columbia.

The ultimate goal is to reintroduce caribou to the Selkirk Recovery Area. As such, a secondary perimeter fence should be required at ALL domestic cervidae farms in Boundary and Bonner Counties where the Selkirk Caribou Recovery Area is located. Citing Demarais et al. (2002), Fischer et al. (2011) note that secondary fencing requirements range from a minimum separation of 6.5 to 16 feet. ISDA should choose a minimum separation of the inner and outer perimeter fences at domestic cervidae farms in Boundary and Bonner Counties that is within this range.

Sec. 500. Domestic Cervidae Ranch Surveillance.

The current rules at IDAPA 02.04.19, Section 500 provide that:

> *Brain tissue from no less than ten percent (10%) of all domestic cervidae sixteen (16) months of age or older that are harvested on domestic cervidae ranches must be submitted for CWD testing annually. If ten (10) or less cervids on a domestic cervidae ranch are harvested in a calendar year, at least one (1) testable brain sample must be submitted to meet the annual CWD surveillance requirement. In addition to the tissue samples from the harvested domestic cervidae, brain tissue from one hundred percent (100%) of all domestic cervidae sixteen (16) months of age or older that die for any reason other than being harvested must also be submitted for CWD testing annually.*

The basis for the 10 percent testing standard for harvested cervidae is unclear. In proposing any rule or portions of any rule, the director shall utilize the "best available peer reviewed science and supporting studies conducted in accordance with sound and objective scientific practices." Idaho Code 22-101A(2)(a). The 10 percent standard is not supported by the available scientific literature. In fact, all of the studies that we reviewed encouraged testing ALL domestic cervidae for CWD regardless of the cause of death (e.g. Leiss et al. 2017, Bollinger at al. 2004, Salman 2003). Complete testing is recommended in order to ensure early detection and eradication of CWD "sparks" (Bollinger et al. 2004). We understand that a 100 percent testing requirement is burdensome to domestic cervidae farmers. However, 100 percent testing is consistent with available scientific publications and expert recommendations. Rigorous testing is necessary to not only protect wild cervidae but also the domestic cervidae industry from devastating outbreaks of CWD.

ISDA may also wish to modify the rule to provide domestic cervidae ranchers with the option of providing brain tissue or lymphoid tissue for CWD testing. In fact, Bollinger et al. (2004) notes that CWD prions accumulate early in lymph nodes, and therefore, lymphoid sampling allows for earlier detection of CWD.

We also recommend testing all dead cervids over 12 months of age, regardless of the cause of death. As pointed out by Leiss et al. (2017) this is consistent with the U.S. Department of Agriculture's Herd Certification Program.

Domestic reindeer are exempt from CWD testing under current rules. ISDA proposes to remove this exemption. ICL supports testing ALL domestic cervidae for CWD, regardless of species and cause of death. Moore et al. (2016) found that reindeer are susceptible to CWD, and Leiss et al. (2017) suggests that the potential for the spread of CWD to wild caribou is high. Therefore, removing this exemption is prudent.

Stricter enforcement of testing and tracking of animals are also issues. In some cases, domestic cervidae carcasses are left lying around on farms for far too long before an effort is made to locate, remove and test the carcass for CWD. Domestic cervidae ranchers may not be able to reliably test carcasses that are in an advanced state of decomposition. Therefore, rigorous tracking and testing of domestic cervidae both on site and in an ISDA database are critical to effective CWD surveillance and containment.

Proposed Sec. 606. (Currently Sec. 607.). From Certified CWD Free Herd.

The current rules require that all elk imported into Idaho shall originate from a herd that has been enrolled in a CWD monitoring program for at least 60 months and which has been determined to have certified CWD free cervid herd status by the animal health official of the state or province of origin. Additionally, there is an administrative order in effect that prohibits the import of elk from any domestic elk farm that is within 25 miles of a confirmed case of CWD in wild cervidae.

At the April 21st negotiated rulemaking hearing, ISDA indicated that there are no available scientific publications regarding this topic. However, the Michigan Department of Natural Resources (2017) drafted a useful summary of the regulations governing importation of domestic cervidae in both the United States and Canada. The summary illustrates that the regulations regarding the importation of domestic cervidae from CWD endemic areas are literally and figuratively all over the map. On one end of the spectrum, some states and provinces do not allow ANY cervids to be imported, and on the other end of the spectrum, there are no limits whatsoever. In between, some states and provinces prohibit the importation of cervids from any county, region and/or state that is endemic for CWD; some have regulations that prohibit importation from endemic areas; some require that the state exporting the cervid be enrolled in an official CWD monitoring and certification program; some require that there has been no diagnosis of CWD in the originating herd nor any confirmed cases of CWD in wild cervids within a certain radius of the originating herd; and/or some require only that there has been no diagnosis of CWD in the originating herd or imported cervid.

Fortunately, Idaho has thus far been spared from a CWD outbreak. However, CWD is right on our doorstep. It is therefore imperative that the state and ISDA take every precaution to prevent the spread of CWD into Idaho. ISDA's current administrative order may not be ideal for the domestic cervidae industry, but it is better than having an outbreak of CWD that devastates both wild and domestic herds in Idaho. As such, we recommend that ISDA enter the existing administrative order as a proposed rule.

References

Bollinger, T., P. Caley, E. Merrill, F. Messier, and M. W. Miller. 2004. Expert scientific panel on chronic wasting disease. Canadian Cooperative Wildlife Health Centre: Newsletters & Publications. 19. https://digitalcommons.unl.edu/icwdmccwhcnews/19

Fischer, J. W., G. E. Phillips, D. M. Baasch, M. J. Lavelle, and K. C. Vercauteren. 2011. Modifyingelk (*Cervus elaphus*) behavior with electric fencing at established fence-lines to reduce disease transmission potential. *Wildlife Society Bulletin*. 35(1):9–14.

Leiss, W., M. Westphal, M. G. Tyshenko and M. C. Croteau. 2017. Challenges in managing the risks of chronic wasting disease. *International Journal of Global Environmental Issues*. 16(4): 277-302.

S. J. Moore, R. Kunkle, M. H. W. Greenlee, E. Nicholson, J. Richt, A. Hamir, W. R. Waters, and J. Greenlee. 2016. Horizontal transmission of chronic wasting disease in reindeer. *Emerging Infectious Diseases*. 22(12): 2142–2145

Salman, M.D. 2003. Chronic wasting disease in deer and elk: Scientific facts and findings. *Journal of Veterinary Medical Science*. 65(7): 761-768.

From: Brad Smith
To: Rulesinfo; Lloyd Knight
Subject: {External}Domestic Cervidae Rulemaking
Date: Wednesday, May 5, 2021 3:59:50 PM
Attachments: 2003 Salman - Chronic Wasting Disease in Deer and Elk - Scientific Facts and Findings.pdf
Fischer et al 2011 - Modifyingelk (Cervus elaphus) behavior with electric fencing at established fence-lines to reduce disease transmission potential.pdf
2004 Bollinger et al - Expert Scientifific Panel on Chronic Wasting Disease.pdf
Leiss et al 2017 - Challenges in managing the risks of chronic wasting disease.pdf
2019 CWD-Free Herd Certification Standards.pdf
Moore et al 2016 - Horizontal Transmission of CWD in reindeer.pdf
Domestic cervidae rulemaking comments.pdf

Mr. Knight:

Attached, please find my comments and recommendations on behalf of the Idaho Conservation League regarding the domestic cervidae rules. I have also attached the associated publications that I referenced in my comments for inclusion in the administrative record. Let me know if you have any questions.

Thanks!

Please make a gift to ICL during Idaho Gives, April 29-May 6!
All gifts will be matched up to $30,000!

Brad Smith, North Idaho Director
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Red Deer versus Elk Genetics

Mitochondrial DNA testing has supported that red deer and elk are in fact two distinct species for almost 20 years.

Elk and red deer can have fertile offspring, often a strong indicator that two animals belong to the same species. There are also many differences between the two. Pregnant elk cows carry their calves for 20 days longer than red deer hinds, while bull elk carry their antlers for 35 days longer than red deer stags. An average bull elk weighs 720 pounds, while a red deer stag averages just 400. And of course, the bugle of an elk is a very different experience from the roar of a red deer.

The ability of the two species to produce fertile offspring has helped spawn controversy about red deer game farms. Along with the ethical issues involving the commercialization of wildlife, and concerns over disease, game farms can also compromise the genetic integrity of wild elk herds. If animals egress or ingress into a captive facility, as is sometimes the case, they can mate with wild elk creating a hybrid offspring that can threaten the purity of wild elk herds.

There are two types of DNA testing; mitochondrial speciation and Single Tandem repeat or Single Nucleotide Polymorphisms (STR/SNP).

Mitochondrial DNA speciation would need to have a 96% or higher similarity or sequence homology to Rocky Mtn. Elk (*Cervus Canadensis)* to be considered pure.

STR/SNP speciation would have to have defined alleles that we only see with that species. You would need to have no presence of the Red Deer specific alleles present to call an animal pure or not a hybrid red deer/elk.

Both tests need to be designed based on standard “pure” individuals. The STR/SNP analyses need to encompass a large enough populations to ensure that the loci or alleles being assessed are truly species specific.

Comparative Study

Mol Phylogenet Evol. 2002 Mar;22(3):342-56.
doi: 10.1006/mpev.2001.1065.

A phylogenetic comparison of red deer and wapiti using mitochondrial DNA

Renee O Polziehn[1], Curtis Strobeck
Affiliations expand

- PMID: 11884159
- DOI: 10.1006/mpev.2001.1065

Abstract

A phylogeny was constructed for red deer/wapiti (Cervus elaphus) subspecies using sequence data from the control region of mitochondrial DNA (mtDNA). The tree was rooted using Cervus nippon (sika deer), Cervus albirostris (Thorold's white-lipped deer), and several Odocoileinae species. A division between the mtDNA haplotypes of red deer (European) and wapiti (Asian/North American) corresponds to subspecies found on opposite sides of the Himalayan Mountains and Gobi, which suggests wapiti should be reconsidered for the status of C. canadensis. Using parsimony and distance analysis, red deer and wapiti are derived from a single recent common ancestor, which is consistent with current taxonomy that recognizes the subspecies of Cervus elaphus as monophyletic group. However, maximum-likelihood analysis using weighted transitional substitutions caused red deer to form a sister group to sika deer (Cervus nippon) and wapiti. A phenetic comparison revealed wapiti also share more nucleotide similarities with sika deer, although approximately 5% sequence divergence separates wapiti, sika, and red deer. Phylogenetic evidence from the cytochrome b sequences corroborated observations from the control region. Observations from this study suggest that the species status of wapiti should be reinstated.

CONSIDERING WEATHER-ENHANCED TRANSMISSION OF MENINGEAL WORM, PARELAPHOSTRONGYLUS TENUIS, AND MOOSE DECLINES

CONSIDERING WEATHER-ENHANCED TRANSMISSION OF MENINGEAL WORM, *PARELAPHOSTRONGYLUS TENUIS,* AND MOOSE DECLINES

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ABSTRACT: The risk of meningeal worm (*Parelaphostrongylus tenuis*) infection in white-tailed deer (*Odocoileus virginianus*) and neurologic disease in moose (*Alces alces*) in eastern North America is influenced largely by the effects of weather on deer density and gastropod intermediate hosts. Frequent, easy winters result in high survival and density of deer with a large proportion of young animals that shed up to 3 x more *P. tenuis* larvae; both greatly increase the production of first-stage larvae. An early spring increases survival of shed larvae by reducing the timing mismatch between the parasite's "spring rise" and snow melt; larvae deposited into snow experience high mortality. A wetter and longer growing season with moderate temperatures increases the survival of first-stage larvae dispersed in soil, and the density, mobility, and frequency of infected gastropods, including the abundance of infective larvae in them. This weather-enhanced transmission further increases larval output by reducing the proportion of unproductive unisexual infections in deer. High production of larvae and optimal conditions for gastropods increase rates of transmission to co-habiting moose and the occurrence of neurologic disease which is dose-dependent. The density of infected deer at the northern limit of their range is typically limited by winter severity allowing coexistence of deer, moose, and parasite. However, as in Nova Scotia and northwestern Minnesota and adjoining regions, pronounced and prolonged moose declines associated with sustained high deer densities and meningeal worm infection have occurred twice in the past 95 years. These two regions may be prone to extended periods of mild winters and longer, wetter growing seasons that ultimately enhance abundance and transmission of the meningeal worm implicated in moose population declines.

ALCES VOL. 54: 1–13 (2018)

Key words: weather, *Parelaphostrongylus tenuis,* meningeal worm, transmission, white-tailed deer, *Alces*, moose population declines, moose sickness.

Parelaphostrongylus tenuis is a common, but innocuous parasite of white-tailed deer (*Odocoileus virginianus*) throughout the eastern half of North America. It is important because it causes neurologic disease in moose (*Alces alces*) in northern forest habitat where the ranges of deer and moose overlap. Transmission involves a complex life cycle in which first-stage larvae are released to the external environment on deer faeces, and infect and develop in terrestrial gastropods which are subsequently ingested by cervids. The potential for weather to influence transmission rates of *P. tenuis* among deer and its importance to the health of moose have been increasingly documented (Peterson et al. 1996, Wasel et al. 2003, Lankester 2010, Maskey et al. 2015).

Deer, moose, and the parasite can coexist for extended periods (Whitlaw and Lankester 1994b, Dumont and Crete 1996) which partially explains why the hypothesis that *P. tenuis* may be a primary cause of pronounced and prolonged moose declines remains controversial (Lankester 2010). Such declines occurred in northern Minnesota in the late 1920s and 1930s, in Nova Scotia in the 1940s and 1950s, and again in these jurisdictions in the late 1980s – early 1990s (Benson 1958, Karns 1967, Anderson 1972, Whitlaw and Lankester 1994a, Lankester 2001, Parker 2003, Beazley et al. 2006, Murray et al. 2006, Lankester 2010). During the latter period, moose were also declining in upper Michigan (Dodge et al. 2004) and in areas adjacent to northwestern Minnesota including northeastern North Dakota, northwestern Ontario, and southeastern Manitoba (Thompson 2000, Murray et al. 2006, Maskey 2008, Ranta and Lankester 2017, V. Crichton, Manitoba Conservation [retired], pers. comm.). In all instances, moose faced increasing densities of deer with meningeal worm and cases of moose sickness were routinely documented (Lankester et al. 2007, Wünschmann et al. 2015, Ranta and Lankester 2017).

This paper examines how weather likely influences the parasite's rate of transmission and increases its importance as a disease agent for moose. The overall hypothesis is that geographical regions experiencing reoccurring, pronounced, and prolonged moose declines may be prone to lengthy periods of weather-enhanced *P. tenuis* transmission that greatly increase the parasite's role in moose morbidity and mortality.

WEATHER AND FIRST-STAGE WORM LARVAE

First-stage larvae passed by deer are located in a thin film of mucus that covers the surface of each faecal pellet (Lankester 2001). If pellets are deposited in an open area, larvae may be exposed to rapid drying and potentially harmful solar radiation; however, rain washes larvae off pellets into the underlying litter and soil. Laboratory experiments indicate that larvae on pellets or in water can withstand constant sub-zero temperatures for several months, but repeated freezing and thawing greatly reduces survival, as does repeated wetting and drying at room temperature (Shostak and Samuel 1984). Further, 70% of larvae frozen for up to 182 days survived, but only 16% were still alive after 306 days with only one undergoing some development in a snail (Lankester and Anderson 1968).

Infected deer pass up to 3 × more larvae during spring than at other times of the year (Peterson and Lankester 1991, Slomke et al. 1995). Larval production is believed lower in late-starting springs as larvae on pellets deposited in snow survive poorly despite moderated temperatures beneath snow cover; presumably, actions by subnivean invertebrates and molds reduce survival (Forrester and Lankester 1998). In northeastern Minnesota, the mean number of larvae produced by deer of all ages increased from a low of 289/gdf (grams dried faeces) in December to a peak of 1127/gdf in early March. Although larval production peaked in early March while snow remained on the ground, ~75% of larvae deposited from January until snowmelt in mid-April died (Forrester and Lankester 1998). This "spring rise" may be an adaptation maximizing progeny output at a time best suited for their survival and transmission. The meningeal worm likely evolved in southern climes with its normal white-tailed deer host and may remain ill-adapted to long northern winters. Earlier springs, however, will presumably increase larval survival during the peak production period.

WEATHER AND TERRESTRIAL GASTROPODS

First-stage larvae must penetrate and develop to the third infective stage in the terrestrial gastropod intermediate host in which the rate of larval development is determined by ambient temperatures. Cool, moist woodland habitats are preferred by gastropods (Lankester and Anderson 1968, Hawkins et al. 1997, Maskey et al. 2015), whereas the litter of predominantly coniferous forests is believed less favourable for snails (Gleich and Gilbert 1976, Boag and Wishart 1982). Mobility varies among species, with slugs more mobile than snails, particularly in wet conditions. The greater mobility of slugs allows avoidance of dry conditions, whereas snails withdraw into their shell and aestivate.

Several gastropod species are capable intermediate hosts of *P. tenuis* (Lankester 2001, Nankervis et al. 2000, Maskey et al. 2015), but 3 species are most numerous and frequently infected: the marsh slug (*Deroceras laeve*) and 2 woodland snails (*Zonitoides* spp. and *Discus cronkhitei*) (Lankester 2001, Cyr et al. 2014). The marsh slug thrives in wet conditions but is adaptive to resist dehydration (Luchtel and Deyrup-Olsen 2001); the snails tolerate slightly drier sites.

Deroceras leave provides an example of how changes in weather may influence the role of intermediate hosts. This ubiquitous Nearctic slug has spread throughout the world attesting to its versatility (Pilsbry 1946, Faberi et al. 2004), and is the only land gastropod known that deliberately enters water, surviving for days while submerged in inundated areas. It has a clear watery slime that might be easier for *P. tenuis* larvae to penetrate compared to the viscous slime of some other species. It is mobile, gliding quickly over vegetation and covering relatively large distances. In rainy or foggy weather, *D. laeve* climbs low vegetation where it is better positioned to be consumed by cervids. This slug is also adapted to a wide range of temperature, surviving to at least -8 °C (Getz 1959, Faberi et al. 2004). Live specimens were found under cardboard sheets during over-night temperatures close to freezing (Lankester and Peterson 1996). It is one of the first gastropods active in spring and the last active in autumn.

Deroceras laeve lives for only one year in the temperate regions of North America (Lankester and Anderson 1968, Boag and Wishart 1982, Lankester and Peterson 1996). The prevalence of *P. tenuis* peaks in adult *D. laeve* before their death in midsummer and again in maturing slugs in autumn; infective larvae survive in this slug over winter (Lankester and Anderson 1968). In northeastern Minnesota, large *D. laeve* were moderately numerous in June and absent in July and August, with maturing slugs most numerous in September and October and remaining active until mid-November. In contrast, the availability of the longer-lived snails *Zonitoides arboreus* and *Discus cronkhitei* was less bimodal during the growing season (Lankester and Peterson 1996).

Gastropod abundance correlates with precipitation (Burch 1962, Whitlaw et al. 1996, Hawkins et al. 1997). Gastropods are most active on forest floor litter and low vegetation during the wet seasons of spring and autumn, and less active in summer (Lankester and Peterson 1996). Many more gastropods are found in the upper layer of soil than are active on the surface. Cardboard sheets placed on the forest floor had ~2% of the number of gastropods estimated in soil cores from the upper 10 cm of soil beneath the sheets (Hawkins et al. 1998). As well, collections dominated by *D. laeve* peaked when temperature beneath the boards was ~15 °C; abundance declined at lower and higher temperatures.

The frequency of *P. tenuis* infection is generally low (i.e., < 0.1%) in gastropods in boreal areas, as is the mean number of larvae recovered from each gastropod (2-3). This low recovery suggests that gastropods become infected by crawling over dried faeces or litter and soil, rather than fresh faeces (Lankester and Peterson 1996). Gastropods are more readily infected by larvae on moist than dry soil, and can be infected repeatedly (Lankester and Anderson 1968). Although some gastropods show a degree of attraction to fresh deer faeces (Garvon and Bird 2005), this behaviour or interaction may be uncommon. Whether infective larvae of *P. tenuis* leave gastropods and survive on vegetation is unknown.

Annual infection rates in gastropods vary relative to temperature, moisture, and the duration of conditions suitable for activity. Terrestrial gastropods survive over winter in the boreal region as do developing *P. tenuis* larvae in them (Lankester and Anderson 1968, Lankester and Peterson 1996). Larval development is arrested at low temperatures and during dry periods, but resumes with the return of suitable conditions.

There is a direct linear relationship between ambient temperature selected by the gastropod host and the rate of larval development (Jenkins et al. 2006). This relationship has not been well studied for *P. tenuis*, but closely related *P. odocoilei* shows little or no development below 8.5 ºC and requires a minimum of 163 accumulated degree-days of heat to reach the infective stage in *D. laeve* (Jenkins et al. 2006). Accurate field estimates of developmental rates in *P. tenuis* will require conducting experiments of the type described by Kutz et al. (2002) who held infected slugs in enclosures over summer while monitoring weather parameters. The rate of larval development also varies among host species. For example, in laboratory studies, 95% of *P. tenuis* larvae in the snail *Mesodon thyroidus* reached the infective stage after 35 days at 21 ºC; only 34% completed development in the slug *Deroceras reticulatum* (Lankester and Anderson 1968).

The hypothesis that the prevalence of *P. tenuis* infection in gastropods is positively correlated with increased deer density has not been adequately tested. However, in northeastern Minnesota, the frequency of infection (0.16%) was 4 x higher in gastropods where deer wintered at density of 50 animals/km^2 compared to summer habitat with 4 animals/km^2 (Lankester and Peterson 1996). Prevalence in gastropods can also be much higher (4-9%) on more southerly range where deer usually exist at higher densities year-round (Lankester 2001); however, data from these regions also reflect the differences and effects of climate, weather, and growing seasons.

INFLUENCE OF WEATHER ON DEER AND LARVAL OUTPUT

Severe winters typically limit the density of deer on northern range often shared with moose (Karns 1980, Nelson and Mech 1986, Mech et al. 1987, Dumont et al. 2000, DelGiudice et al. 2002, Patterson and Power 2002, Nelson and Mech 2005). A series of successive easy winters can markedly increase deer density, particularly the proportion of fawns and yearlings. The overall output of first-stage *P. tenuis* larvae increases proportionately with increased deer density and is also influenced by herd demographics (Fig. 1). Young, newly infected deer pass 2-3 x more larvae than older deer, and because output diminishes with age, fawn and yearling deer are disproportionately influential in a growing deer population (Slomke et al. 1995, Peterson et al. 1996). Higher deer density also increases habitat overlap between deer and moose, thereby increasing the risk of infection to moose.

Favourable weather increases larval output by deer not only by increasing deer density and altering demographics, but also by

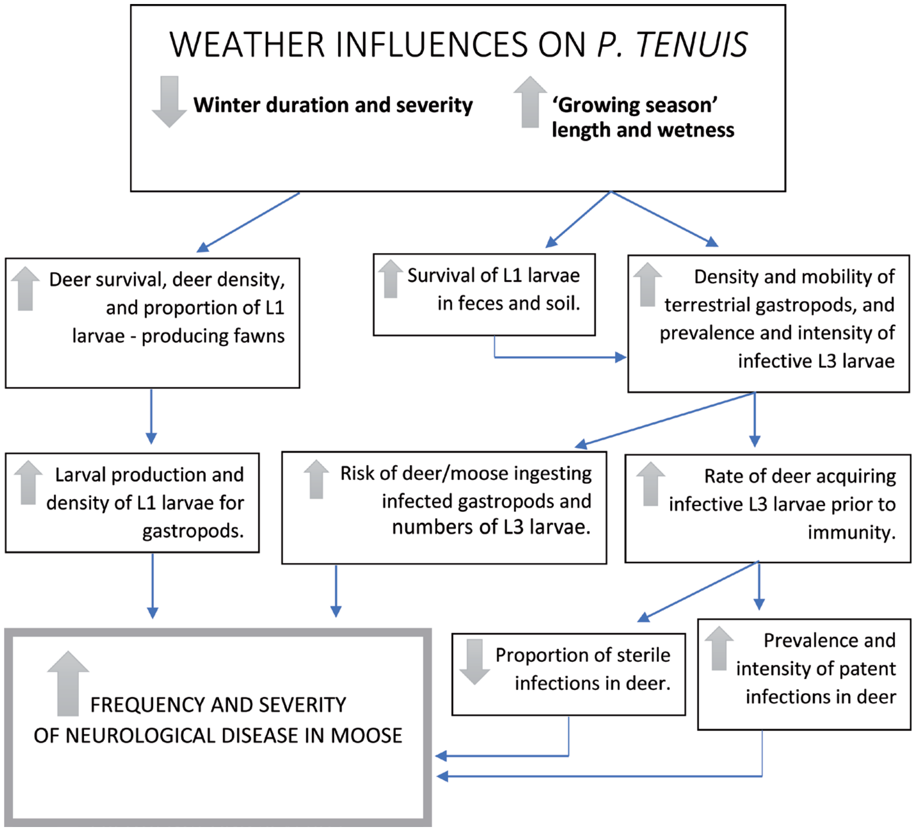

Fig. 1. Schematic illustrating the hypothesized influences of weather on deer and gastropod abundance that lead to increased transmission of meningeal worm to deer and moose.

increasing the rate at which naïve deer acquire their first infective larvae. This rate of transmission determines whether a deer develops a patent infection and produces first-stage larvae in its faeces, or instead has a sterile infection. If conditions for transmission are sub-optimal, only 1-2 infective larvae may become established before a fawn's first winter. This parasite is bisexual and infection with only a single worm, or of 2 or more worms of the same gender, will produce no first-stage larvae. Within about 6 months of ingesting infective larvae, the fawn develops an immune response that prevents further infection. Established worms are thought to be long-lived and to maintain this protection against supra-infection for the life of the deer.

These biological characteristics of *P. tenuis* have been confirmed in both field and laboratory studies (Slomke et al. 1995, Duffy et al. 2002, 2004). Up to one-third of infected deer examined in northeastern Minnesota had unisexual, sterile infections (Slomke et al. 1995), and 58% of deer examined in northern Michigan had single worm infections (Nankervis et al. 2000). Favourable weather will, by increasing the rate at which infective larvae initially are acquired, reduce the proportion of unisexual, sterile infections and thereby increase larval output by the fawn cohort. At the parasite's western limits, high proportions of sterile infections and low prevalence of infection are thought to reflect rates of transmission that are limited by low precipitation and marginal conditions for gastropods (Wasel et al. 2003, Jacques et al. 2015, Maskey et al. 2015).

Some temperate northeastern forests provide conditions favorable for the meningeal worm to reach its final host. For example, despite low levels of *P. tenuis* infection in gastropods, almost all deer become infected by 2 years of age. Lankester and Peterson (1996) argued that this can be explained by the large volume of vegetation eaten close to the ground, particularly in spring and autumn. In a Minnesota study area with a stable deer population estimated at 2 animals/km^2, 79% of fawns became infected within their first year of life despite only a 0.08% rate of gastropod infection; eventually, 96% of deer became infected (Slomke et al. 1995).

MEASURING TRANSMISSION RATES

It would be advantageous to monitor changes in transmission rates of *P. tenuis* in deer, but peculiarities of the parasite's biology make this difficult. Metrics such as the prevalence and intensity of adult worms in deer heads are not particularly useful because almost all deer in the northeastern forests of Minnesota have at least one worm (sustained prevalence ~100%, Slomke et al. 1995). Likewise, the mean intensity of worms in the head varies little other than minor changes in the fawn cohort. Deer acquire only a small number of worms during their first year or two of life, and none thereafter. Higher deer densities that increase the number of larvae dispersed in the environment might be expected to increase the abundance of adult worms in the heads of deer, but field evidence is unsupportive. Slomke et al. (1995) measured similar abundance (3.5 ± 1.8 worms) in the heads of deer confined at a year-round density of 30 deer/km^2, as in a nearby, free-ranging population (3.0 ± 2.0 worms) at 2 deer/km^2.

Changes in transmission rates are potentially reflected in the frequency of infection in gastropods, but measuring the frequency of infection is challenging. Because the prevalence of infection in snails and slugs in northeastern forests is typically very low, extensive, labor-intensive sampling is required to detect significant changes. As well, considerable skill is required to distinguish the larvae of *P. tenuis* from those of several other species of nematodes found in these hosts. Nonetheless, higher frequency of infection in gastropods has been identified in more southerly deer range where infection opportunity is presumably increased by higher deer density, longer growing seasons, or more favourable gastropod habitat (Lankester 2001).

Annual changes in transmission rates can only be monitored by examining deer faeces for first-stage larvae (Peterson et al. 1996, Maskey et al. 2015). Ideally, faecal samples should be collected off snow during late winter after newly acquired worms have matured and produced larvae. Changes in prevalence and intensity of larvae in an opportunistically collected sample of faeces should reflect changes in the proportion of fawns in the population, as well as weather-related transmission rates determining the frequency of sterile unisexual infections. Examining only fawn faeces, Peterson et al. (1996) found that both prevalence and intensity varied annually and correlated best with changing deer density and the duration of the previous autumn transmission period.

Transmission likely occurs exclusively during the snow- and frost-free periods referred to here as the growing season. The annual length of the growing season varies considerably (Murray et al. 2006) which alters the time period in which transmission is possible any given year (Fig.1). Larval output by deer is maximum in spring, the wettest season, yet autumn presents unique opportunities for *P. tenuis* transmission. The entire fawn cohort is susceptible to infection in late summer and autumn, whereas by snow melt the following spring, almost 80% could be resistant to further infection. Also, gastropod abundance peaks by autumn prior to any over-winter mortality. Any delay in the onset of winter lengthens the period for possible infection (i.e., ingestion by deer and moose) of the new cohort of *D. laeve*. Visibly sick moose are frequently seen in spring, suggesting that infection occurred the previous autumn (Lankester 2001). Autumn is similarly considered the most important season for transmission of related protostrongylid nematodes in sheep (*Ovis* spp.) and mule deer (*Odocoileus heminous*) (Samuel et al. 1985, Jenkins et al. 2006).

WEATHER-ENHANCED TRANSMISSION AND MOOSE

Weather-enhanced transmission of *P. tenuis* will increase the number of infective larvae available in gastropods, and the rate at which deer and moose ingest them over their lifetime. Deer will be unaffected and the prevalence and mean intensity of worms in their heads will change little. Many ingested larvae may be unable to migrate beyond the intestines. Others may die in tissues *en route* to the spinal cord but, nonetheless, be important in boosting immunity to reinfection. Moose, on the other hand, are more susceptible and the rate at which they ingest infective larvae during the growing season may determine the severity of neurological disease (Lankester 2001). Moose given relatively high numbers of *P. tenuis* larvae (15-25) showed severe and unmistakable signs of moose sickness including circling, hind-quarter weakness, and eventually an inability to stand. However, 4 moose given doses of 3-5 larvae, more closely resembling those acquired from a single naturally-infected gastropod, developed only mild neurological signs for periods of 1 to 3 months; one had no detectable signs at termination. Further, other results suggest that a degree of protection against future infection may result from a low-dose exposure (Lankester 2002).

Young moose may be the most susceptible to neurological disease. Disease occurs in animals of all ages, but many sick animals are < 2 years old (Lankester et al. 2007, Carstensen et al. 2015, Wünschmann et al. 2015). Young males that consume more food in early life might be expected to ingest more larvae than young females. Interestingly, in the current long-term decline in Minnesota, Murray et al. (2006) found lower survival of male than female calves. It is reasonable to predict that the infection rate of wild moose will be most influenced by the rate of acquiring infective larvae; however, even low-dose exposure and sub-clinical infection can be important. Rempel (2011) suggested that indirect effects of parasites like *P. tenuis* might reduce recruitment through increased predation, and possibly have greater impact on moose populations than direct mortality.

Intuitively, the exposure rate of moose to meningeal worm is directly related to deer density; however, two problems make it difficult to clearly demonstrate this relationship. It is difficult to 1) correctly census clinically ill and minimally compromised moose, and 2) estimate deer density that varies seasonally and annually. Nonetheless, field data (Whitlaw and Lankester 1994a, Maskey 2008) and several anecdotal studies in northeastern forests suggest that when infected deer density increases, moose numbers decline (Karns 1967, Saunders 1973, Gilbert 1974, Dumont and Crete 1996, Gogan et al. 1997, Lankester 2001, Lankester and Samuel 2007). Yet, if deer density remains < ~5 animals/km^2, moose density remains relatively stable for extended periods (Karns 1967, Whitlaw and Lankester 1994b), albeit at densities lower than where deer are absent (e.g., on the island of Newfoundland and on Isle Royale, Michigan) (Timmermann et al. 2002, Lankester 2010).

Pronounced and prolonged moose declines have occurred repeatedly in particular regions of shared moose and deer habitat (Lankester 2010). These include much of Nova Scotia, northwestern Minnesota, and areas to the west of Lake Superior including northeastern North Dakota, southeastern Manitoba, and northwestern Ontario. The most recent decline in northwestern Minnesota began during a period of milder, shorter winters and has lasted 25 years. In 15 years moose numbers declined to ~100 animals from an estimated 4,000 in the late 1980s (Murray et al. 2006, Lenarz et al. 2009).

Recent pronounced declines have had certain shared characteristics. All were associated with conditions likely to have enhanced transmission of meningeal worm; i.e., extended series of warmer winters, frequent or sustained high deer densities, and wetter and longer than usual growing seasons (Beazley et al. 2006, Maskey 2008, Lenarz et al. 2009, Ranta and Lankester 2017). The annual growing season during the moose decline in northwestern Minnesota was on average 12 days longer, and up to a maximum of 39 days longer than during pre-decline years (Murray et al. 2006). Although precipitation records for northwestern Minnesota revealed no change during the decline, a long-term, wet climate cycle beginning in 1993 was reported in adjacent northeastern North Dakota (Todhunter and Rundquist 2004 in Maskey et al. 2015). Ranta and Lankester (2017) found that the growing season during a pronounced moose decline in northwestern Ontario was only marginally longer than in pre-decline years, but decidedly wetter than average. In northeastern Minnesota, Lenarz et al. (2009) found that warming January temperatures were inversely correlated with subsequent annual survival of moose. And in northwestern Minnesota, disease has played a measurable role in the moose decline; the majority (87%) of the 24% annual mortality rate was attributed to pathology associated with parasitic disease and related malnutrition (Murray et al. 2006).

CONCLUSIONS

It is argued here that transmission rates of *P. tenuis* and the risk of debilitating meningeal worm infection in moose are driven primarily by weather, specifically by winter severity and the length, precipitation, and temperature during the 'growing season'. Warmer, shorter winters permit higher densities of infected deer which increase the density of first-stage larvae on range. Longer, wetter growing seasons increase the density of infected gastropod intermediate hosts and parasite transmission rates. Over much of their shared range in the mixed coniferous-deciduous forests of eastern North America, moose can persist with infected deer where typical winter severity effectively limits or stabilizes deer density. But sustained high deer density and weather-enhanced transmission of *P. tenuis* can potentially cause local moose abundance to decline markedly over time and remain low. Further, these declines do not occur without warning as they are seemingly preceded by a number of successive winters (e.g., >10) favourable to deer survival. In northwestern Ontario, both deer and moose abundance rose in response to habitat rejuvenation and easier winters. Only after 15 years of slow, but steady increases in deer numbers did moose begin to decline (Ranta and Lankester 2017).

After discovering that *P. tenuis* causes moose sickness, Anderson (1972) suggested that this parasite might be capable of seriously impacting moose populations. His assertion was based in large part on historical reports of moose sickness in Nova Scotia and northern Minnesota, and in this restricted sense, it increasingly appears that his conclusion was correct. These two regions have experienced repeated, pronounced and prolonged declines in moose abundance suggesting that they are prone to extended periods of weather that favour winter survival of deer and enhanced transmission of meningeal worm implicated in such declines.

In regions where weather-enhanced transmission of meningeal worm appears to have occurred in the past or is likely in the future, management options to minimize this disease in moose should focus on maintaining deer density at < 5 animals/km^2 as per Karns (1967) and Whitlaw and Lankester (1994a). Strategies might include higher harvests of antlerless deer, possibly less-focused habitat management that prioritizes deer wintering areas, and certainly regulating/prohibiting winter feeding of deer to enhance their populations. Given that long-term climate change will be favourable to deer, maintenance of more southerly moose populations will require concerted management efforts and may prove difficult. Learning to manage the ebb and flow of co-existing deer and moose populations may be a better approach than attempting to maintain each species in a steady state.

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REFERENCES

Anderson, R. C. 1972. The ecological relationships of meningeal worm and native cervids in North America. Journal of Wildlife Diseases 8: 304–310.

Beazley, K., M. Ball, L. Isaacman. S. Mcburney, P. Wilson, and T. Nette. 2006. Complexity and information gaps in recovery planning for moose (*Alces alces americana*) in Nova Scotia, Canada. Alces 42: 89–109.

Benson, D. A. 1958. "Moose sickness" in Nova Scotia I. Canadian Journal of Comparative Medicine. 22: 244–248.

Boag, D. A., and W. D. Wishart. 1982. Distribution and abundance of terrestrial gastropods on a winter range of bighorn sheep in southwestern Alberta. Canadian Journal of Zoology 60: 2633–2640. Journal of Parasitology 92: 298–305.

Burch, J. B. 1962. How to Know the Eastern Land Snails. W. C. Brown, Dubuque, Iowa, USA.

Carstensen, M., E. C. Hildebrand, D. Plattner, M. H. Dexter, C. Jennelle, and R. G. Wright. 2015. Determining cause-specific mortality of adult moose in northeast Minnesota. Pages 161–171 *in* L. Cornicelli, M. Carstensen, M. Grund, M. Larsen, J. Lawrence, editors. Summaries of Wildlife Research Findings. Minnesota Department of Natural Resources, St. Paul, Minnesota, USA.

Cyr, T., S. K. Windels, R. Moen, and J. W. Warmbold. 2014. Diversity and abundance of terrestrial gastropods in Voyageurs National Park, Minnesota: implications for the risk of moose becoming infected with *Parelaphostrongylus tenuis*. Alces 50: 121–132.

DelGiudice, G. D., M. R. Riggs, P. Joly, and W. Pan. 2002. Winter severity, survival, and cause specific mortality of female white-tailed deer in north-central Minnesota. Journal of Wildlife Management 66: 698–717.

Dodge, W. B. Jr., S. R. Winterstein, D. E. Beyer, Jr., and H. Campa III. 2004.

Survival, reproduction, and movements of moose in the western upper peninsula of Michigan. Alces 40: 71–85.

Duffy, M. S., T. A. Greaves, and M. D. B. Burt. 2004. Establishment of adult *Parelaphostrongylus tenuis*, patent infections, and acquired immunity after experimental infection of white-tailed deer (*Odocoileus virginianus*) and red deer (*Cervus elaphus elaphus*). Journal of Parasitology 90: 245–254.

_____, N. J. Keppie, and M. D. B. Burt. 2002. Meningeal worm is a long-lived parasitic nematode in white-tailed deer. Journal of Wildlife Diseases 38: 448–452.

Dumont, A., and M. Crete. 1996. The meningeal worm, *Parelaphostrongylus tenuis*, a marginal limiting factor for moose, *Alces alces* in southern Quebec. Canadian Field Naturalist 11: 413–418.

_____, M. Crete, J.-P. Ouellet, J. Huot, and J. Lamoureux. 2000. Population dynamics of northern white-tailed deer during mild winters. Evidence of regulation by food competition. Canadian Journal of Zoology 78: 764–776.

Faberi, A. J., A. N. Lopez, P. L. Manetti, N. L. Clemente, and H. A. Alverez Castillo. 2004. Growth and reproduction of the slug *Deroceras laeve* (Muller) (Pulmonata: Stylommatophora) under controlled conditions. Spanish Journal of Agricultural Research 4: 345–350.

Forrester, S. G., and M. W. Lankester. 1998. Over-winter survival of first-stage larvae of *Parelaphostrongylus tenuis* (Nematoda: Protostrongylidae). Canadian Journal of Zoology 76: 704–710.

Garvon, J. M., and J. Bird. 2005. Attraction of the land snail *Anguispira alternate* to fresh faeces of white-tailed deer: implications in the transmission of *Parelaphostrongylus tenuis.* Canadian Journal of Zoology 83: 358–362.

Getz, L. L. 1959. Notes on the ecology of slugs: *Arion circumscriptus, Deroceras reticulatum,* and *D. laeve.* American Midland Naturalist 61: 485–498.

Gilbert, F. F. 1974. *Parelaphostrongylus tenuis* in Maine II – prevalence in moose. Journal of Wildlife Management 38: 42–46.

Gleich, J. G., and F. F. Gilbert. 1976. A survey of terrestrial gastropods from central Maine. Canadian Journal of Zoology 54: 620–627.

Gogan, P. J. P., K. D. Kozie, and E. M. Olexa. 1997. Ecological status of moose and white-tailed deer at Voyageurs National Park, Minnesota. Alces 33: 187–201.

Hawkins, J. W., M. W. Lankester, R. A. Lautenschlauger, and F. W. Bell. 1997. Effects of alternative conifer release treatments on terrestrial gastropods in northwestern Ontario. The Forestry Chronicle 73: 91–98.

______, _____, and R. A. Nelson. 1998. Sampling terrestrial gastropods using cardboard sheets. Malacologia 39: 1–9.

Jacques, C. N., J. A. Jenks, T. W. Grovenburg, R. W. Klaver, and S. A. Dubay. 2015. Influence of ecological factors on prevalence of meningeal worm (*Parelaphostrongylus tenuis*) infection in South Dakota, USA. Journal of Wildlife Diseases 51: 332–340.

Jenkins, E. J., S. J. Kutz, E. P. Holberg, and L. Polley. 2006. Bionomics of larvae of *Parelaphostrongylus odocoilei* (Nematoda: Protostrongylidae) in experimentally infected gastropod intermediate hosts. Journal of Parasitology 92: 298–305.

Karns, P. D. 1967. *Pneumostrongylus tenuis* in deer in Minnesota and implications for moose. Journal of Wildlife Management 32: 299–303.

_____. 1980. Winter – the grim reaper. Pages 47–53 *in* R. L. Hines and S. Nehls, editors. White-tailed Deer Population Management in the North-Central States. Proceedings of the 1979 Symposium of the North Central Wildlife Society, The Wildlife Society, Urbana, Illinois, USA.

Kutz, S. J., E. P. Hoberg, J. Nishi, and L. Polley. 2002. Development of the muskox lungworm, *Umingmakstrongylus pallikuukensis* (Protostrongylidae) in gastropods in the arctic. Canadian Journal of Zoology 80: 1877–1985.

Lankester, M. W. 2001. Extrapulmonary lungworms of cervids. Pages 228–278 *in* W. M. Samuel, M. J. Pybus, and A. A. Kocan, editors. Parasitic Diseases of Wild Mammals, 2nd edition. Iowa State University Press, Ames, Iowa, USA.

______. 2002. Low-dose meningeal worm (*Parelaphostrongylus tenuis*) infections in moose (*Alces alces*). Journal of Wildlife Diseases 38: 789–795.

______. 2010. Understanding the impact of meningeal worm, *Parelaphostrongylus tenuis,* on moose populations. Alces 53: 53–70.

______, and R. C. Anderson. 1968. Gastropods as intermediate hosts of meningeal worm, *Parelaphostrongylus tenuis*, Dougherty. Canadian Journal of Zoology 46: 373–383.

______, and W. J. Peterson. 1996. The possible importance of deer wintering yards in the transmission of *Parelaphostrongylus tenuis* to white-tailed deer and moose. Journal of Wildlife Diseases 32: 31–38.

______, _____, and O. Ogunremi. 2007. Diagnosis *Parelaphostrongylus tenuis* in moose (*Alces alces*). Alces 43: 49–59.

______, and W. M. Samuel. 2007. Pests, parasites and diseases. Pages 479–517 *in* A. W. Franzmann and C. C. Schwartz, editors. Ecology and Management of the North American Moose, 2nd edition. University Press of Colorado, Boulder, Colorado, USA.

Lenarz, M. S., M. E. Nelson, M. W. Schrage, and A. J. Edwards. 2009. Temperature mediated moose survival in northeastern Minnesota. Journal of Wildlife Management 73: 503–510.

Luchtel, D. L., and I. Deyrup-Olsen. 2001. Body wall: form and function. Pages 147–178 *in* G. M. Barker, editor. The Biology of Terrestrial Molluscs. CABI Publishing, London, United Kingdom.

Maskey, J. J. 2008. Movements, resource selection, and risk analyses for parasitic disease in an expanding moose population in the northern Great Plains. Ph. D. Thesis, University of North Dakota, Grand Forks, North Dakota, USA.

______, R. A. Sweitzer, and B. J. Goodwin. 2015. Climate and habitat influence prevalence of meningeal worm infection in North Dakota, USA. Journal of Wildlife Diseases 51: 670–679.

Mech, L. D, R. E. McRoberts, and R. O. Peterson. 1987. Relationship of deer and moose populations to previous winters' snow. Journal of Animal Ecology 56: 615–627.

Murray, D. L., E. W. Cox, W. B. Ballard, H. A. Whitlaw, M. S. Lenarz, T. W. Custer, T. Barnett, and T. D. Fuller. 2006. Pathogens, nutritional deficiency, and climate influences on a declining moose population. Wildlife Monographs 166: 1–30.

Nankervis, P. J., W. M. Samuel, S. M. Schmitt, and J. G. Sikarskie. 2000. Ecology of meningeal worm, *Parelaphostrongylus tenuis* (nematode), in white-tailed deer and terrestrial gastropods of Michigan's Upper Peninsula with implications for moose. Alces 36: 163–181.

Nelson, M. E., and L. D. Mech. 1986. Relationship between snow depth and gray wolf predation on white-tailed deer. Journal of Wildlife Management 50: 471–474.

_____, and _____. 2005. A 3-decade dearth of deer *(Odocoileus virginianus)* in a wolf (*Canis lupis*) – dominated ecosystem. American Midland Naturalist 155: 373–382.

Parker, G. 2003. Status Report on The Eastern Moose (*Alces alces Americana* Clinton) in Mainland Nova Scotia. Nova Scotia Department of Natural Resources, Halifax, Nova Scotia, Canada.

PATTERSON, B. R., and V. A. POWER. 2002. Contributions of forage competition, harvest, and climate fluctuation to changes in population growth of northern white-tailed deer. Oecologia 130: 62–71.

PETERSON, W. J., and M. W. LANKESTER. 1991. Aspects of the epizootiology of *Parelaphostrongylus tenuis* in a white-tailed deer population. Alces 27: 183–192.

_____, _____, and M. RIGGS. 1996. Seasonal and annual changes in shedding of *Parelaphostrongylus tenuis* larvae by white-tailed deer in northeastern Minnesota. Alces 32: 61–73.

PILSBRY, H. A. 1946. Land Mollusca of North America (North of Mexico). Academy of Natural Sciences Philadelphia, Monograph 3, Vol. II, Part 1. George W. Carpenter Fund for the Encouragement of Original Scientific Research, Philadelphia, Pennsylvania, USA.

RANTA, B., and M. W. LANKESTER. 2017. Moose and deer population trends in northwestern Ontario: a case history. Alces 53: 159–179.

REMPEL, R. S. 2011. Effect of climate change on moose populations: exploring the response horizon through biometric and systems models. Ecological Modelling 222: 3355–3365.

SAUNDERS, B. 1973. Meningeal worm in white-tailed deer in northwestern Ontario and moose population densities. Journal of Wildlife Management 37: 327–330.

SAMUEL, W. M., T. R. PLATT, and S. M. KNIPSEL-KRAUSE. 1985. Gastropod intermediate hosts and transmission of *Parelaphostrongylus odocoilei*, a muscle-inhabiting nematode of mule deer, *Odocoileus h. hemionus,* in Jasper National Park, Alberta. Canadian Journal of Zoology 63: 928–932.

SCHOSTAK, A. W., and W. M. SAMUEL. 1984. Moisture and temperature effects of survival and infectivity of first-stage larvae of *Parelaphostrongylus odocoilei* and *P. tenuis* (Nematoda: Metastrongyloidea). Journal of Parasitology 70: 261–269.

SLOMKE, A. M., M. W. LANKESTER, and W. J. PETERSON. 1995. Infrastructure dynamics of *Parelaphostrongylus tenuis* in white-tailed deer. Journal of Wildlife Diseases 31: 125–135.

THOMPSON, I. D. 2000. Forest vertebrates in Ontario: patterns of distribution. Pages 54–73 *in* A. H. PERERA, D. L. EULER, and I. D. THOMPSON, editors. Ecology of a Managed Terrestrial Landscape. University of British Columbia Press, Vancouver, British Columbia, Canada.

TIMMERMAN, H. R., R. GOLLAT, and H. A. WHITLAW. 2002. Reviewing Ontario's moose management policy – 1980–2000 – targets achieved, lessons learned. Alces 38: 11–45.

TODHUNTER, P. E., and B. R. RUNDQUIST. 2004. Terminal lake flooding and wetland expansion in Nelson County, North Dakota. Physical Geography 25: 68–85.

WASEL, S. M., W. M. SAMUEL, and V. CRICHTON. 2003. Distribution and ecology of meningeal worm, *Parelaphostrongylus tenuis* (Nematoda), in northcentral North America. Journal of Wildlife Diseases 39: 338–346.

WHITLAW, H. A., and M. W. LANKESTER. 1994a. A retrospective evaluation of the effects of parelaphostrongylosis on moose populations. Canadian Journal of Zoology 72: 1–7.

______, and ______. 1994b. The co-occurrence of moose, white-tailed deer and *Parelaphostrongylus tenuis* in Ontario. Canadian Journal of Zoology 72: 819–825.

_____, _____, and W. B. BALLARD. 1996. *Parelaphostrongylus tenuis* in terrestrial gastropods from white-tailed deer winter and summer range in northern New Brunswick. Alces 32: 75–83.

Wunschmann, A., A. G. Armien, E. Butler, M. Schrage, B. Stromberg, J. B. Bender, A. M. Firshman, and M. Carstensen. 2015. Necropsy findings in 62 opportunistically collected free-ranging moose (*Alces alces*) from Minnesota, USA (2003–2013). Journal of Wildlife Diseases 51: 157–65.

From: Dr. Scott Leibsle
To: Lloyd Knight; Chanel Tewalt
Subject: FW: {External}Cervid Negotiated Rule-making information
Date: Wednesday, May 12, 2021 11:48:42 AM
Attachments: image002.png
LankesterAlces2018 (1).pdf
Red Deer versus Elk Genetics.docx
image003.png

Comments for the cervidae portion of the import rule....although, I would probably post these on both the cervidae and import rulemaking pages.

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Sent: Wednesday, April 21, 2021 2:06 PM
To: Dr. Scott Leibsle <Scott.Leibsle@ISDA.IDAHO.GOV>
Subject: {External}Cervid Negotiated Rule-making information

Scott,

There is not a great deal of literature on P. tenuis except in small ruminants (Parelaphostrongylus tenuis - an overview | ScienceDirect Topics), White-tailed deer, and Moose. Below are the cattle withdrawal times for Ivomectin and IDFG uses the longest withdrawal times for all off-label use in wildlife.

Ivermectin Pour-On *(Generic)* **Note:** A withdrawal period has not been established for this product in pre-ruminating calves. Do not use in calves to be processed for veal.	Cattle	Topical	48 d
ivomec® 1% Injection for Cattle and Swine *(Merial)* **Note:** A withdrawal period has not been established for this product in pre-ruminating calves. Do not use in calves to be processed for veal.	Cattle Swine	SubQ SubQ	35 d 18 d
ivomec® Plus Injection for Cattle *(Merial)* **Note:** Do not use in calves to be processed for veal.	Cattle	SubQ	49 d
ivomec® Pour-On for Cattle *(Merial)* **Note:** Do not use in calves to be processed for veal.	Cattle	Topical	48 d

I am also attaching some thoughts on Red Deer/Elk Genetic issues for your read. I do know a great deal about the genetics test, I do believe our Director offered for our lab or our Fisheries genetics lab to develop an STR/SNP based assay to support this issue.

Please let me know if you have any other comments or questions.

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CWD import proximity requirements

Alabama	No cervid imports.
Alaska	No cervids within 10 miles of CWD positive
Arizona	No cervid imports.
Arkansas	No cervid imports.
California	No imports allowed from CWD positive states.
Colorado	CWD HCP compliance only
Idaho	No cervids from CWD endemic areas or within 25 miles
Illinois	Cannot originate from a CWD endemic area (any county and surrounding counties where CWD has been diagnosed w/in last 5 years)
Iowa	No cervids located within a 30 mile radius of endemic area for CWD allowed
Kansas	CWD HCP compliance only
Kentucky	No cervids from CWD positive states.
Michigan	No cervids from herds within 25 miles of CWD positive in domestic herds within last 5 years; No cervids from herds within 75 miles of CWD positive wild animal if the exporting facility has *single perimeter* fence in previous ten years; No cervids from facility wihin 50 miles of CWD positive wild animal in previous 10 years if exporting facility has *double perimeter* fence. Banned states include Wisconsin, Colorado and Wyoming.
Minnesota	No cervids from CWD endemic area, defined as counties where CWD infected wild cervids are found)
Missouri	No cervids from CWD endemic areas.
Oklahoma	No cervids from counties or provinces where CWD has been identified in free-ranging cervid populations.
Pennsylvania	No movement permitted from endemic areas and states.
Rhode Island	No cervids from CWD endemic areas.

South Dakota	No cervids from herds that were part of a traceback or trace forward herd within past 5 years.
Tennessee	No cervids from an area where CWD has been diagnosed in wildlife.
Texas	No cervids within 20 miles of CWD positive
Utah	No animals from CWD endemic portions of Alberta, Saskatchewan, Colorado, Nebraska, South Dakota, Wyoming or within 20 miles of a CWD positive.
West Virginia	No animals from facilities that are located within 15 mile radius of a confirmed CWD positive in last 60 months.
Wisconsin	Cervids must be adequately separated from any wild animals known to be infected with CWD.

Chronic Wasting Disease Transmission to Minnesota and Wisconsin Cervid Farms

1. Characterizing Risk of Chronic Wasting Disease Transmission Exposures

University of Minnesota researchers conducted a study funded by the Minnesota Board of Animal Health (BAH) to evaluate means by which cervid (deer, elk, and other deer family species) farms are exposed to Chronic Wasting Disease (CWD) and identify ways to reduce transmission risks. CWD, the transmissible spongiform encephalopathy of cervids, is thought to be caused by a malformed prion protein that causes brain cells to die. The disease threatens the health of both wild and farmed cervids. There is no treatment or vaccine for CWD; all animals on farms found to be infected are either destroyed or placed in long-term quarantine with on-going surveillance, resulting in severe economic losses to herd owners. More CWD information can be found at:

- USDA Animal and Plant Health Inspection Service (APHIS): https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information
- Minnesota BAH: https://www.bah.state.mn.us/deer-elk/
- Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP): https://datcp.wi.gov/Pages/Programs_Services/AnimalDiseases.aspx

The researchers first identified potential exposures of CWD to farmed cervids, based on review of published scientific literature. These included **direct contact with infected live animals**, including farmed or wild cervids, and **indirect contact with infected animals** through cervid parts (brought to farms from hunting or taxidermy practices), shared equipment, feed and water, or contaminated feces from animal scavengers. The next step was to classify potential exposures for CWD transmission into categories of higher known risk, lower (or unknown) risk, or negligible risk (Table 1), based on current state of understanding of these risks.

Table 1. Risk of CWD transmission exposures to cervid farms

Potential exposures	Higher Known Risk	Lower (or Unknown) Risk	Negligible Risk
1. Direct contacts with infected cervids			
• Introduction of farmed cervids	*From farm later found to be CWD-positive*	*From farms with no CWD-positive animals in the 5 years before detection*	*No introductions in the 5 years before detection*
• Contact with wild cervids from farm location <50 miles from CWD-positive wild cervid	*Farm cervid escapes/re-entry or wild cervid entry*	*Single perimeter fencing*	*Double perimeter fencing or not <50 miles from positive cervid*
2. Indirect contacts with infected cervids			
• Introduction of cervid parts (hunting, taxidermy)	*From <50 miles from CWD-pos wild cervids*	*From other areas*	*No introductions*
• Sharing equipment, contaminated feed or water, scavengers	*With CWD-positive farms*	*From location <50 miles from CWD-positive wild cervids*	*No indirect contacts*

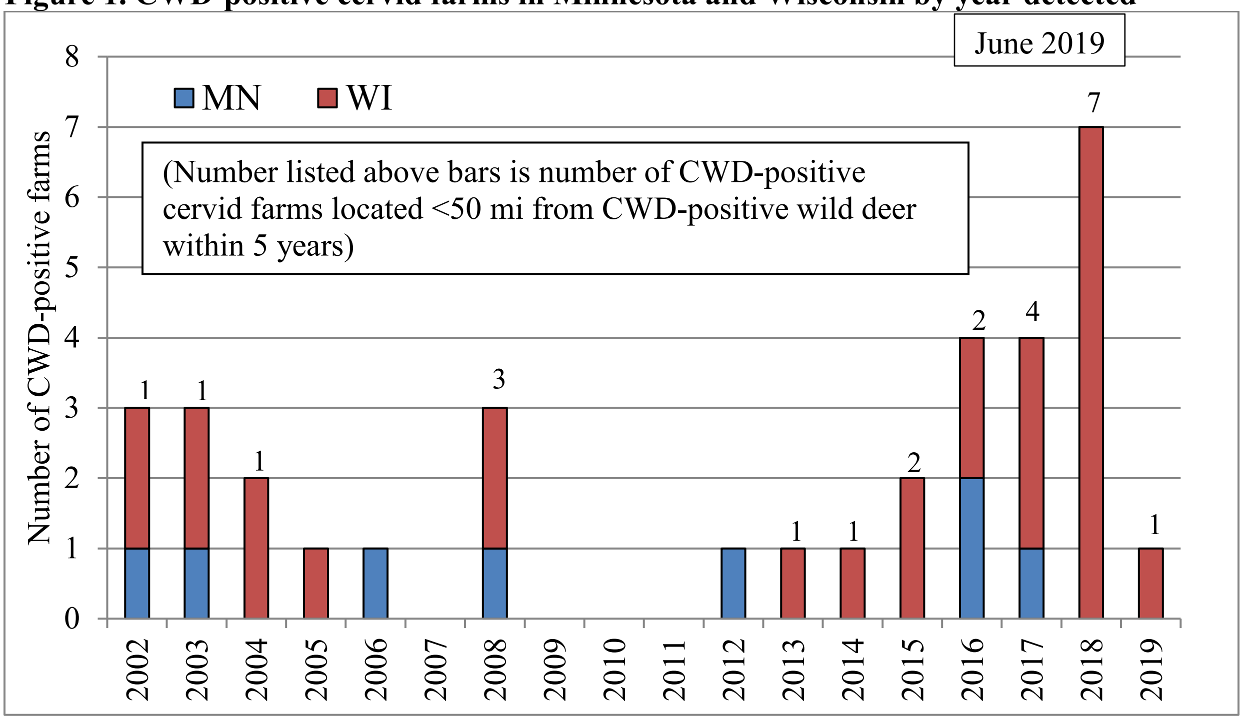
2. CWD in Minnesota and Wisconsin Cervid Farms

Through collaboration with the Minnesota BAH and the Wisconsin DATCP, the research team next reviewed records from the 34 CWD-positive cervid farms in Minnesota and Wisconsin detected from 2002 to January 2019 evaluate their potential exposures to CWD. While the total number of cervid farms in each state is similar, there are several differences between the states, including a larger region in Wisconsin with detected CWD-positive wild cervids as well as differences in CWD regulatory programs between the states.

Key findings from the review of the CWD-positive farms in Minnesota and Wisconsin:

- Of the 34 CWD-positive farms, 26 farms were located in Wisconsin, compared to 8 in Minnesota.
- 21 (62%) of the 34 CWD-positive farms tested positive since 2012, representing an increase in the rate of detection of new positive farms from previous years.

Figure 1. CWD-positive cervid farms in Minnesota and Wisconsin by year detected



- Most of the recently detected farms (since 2012) were located in Wisconsin (17 farms). 15 of these recently detected farms had exclusively white-tailed deer, 2 had exclusively elk (both in Wisconsin), and 4 had mixed inventories or other species.
- **Most CWD-positive cervid farms since 2012 were located within 50 miles of known CWD-positive wild deer**. CWD has been detected in wild deer in or within 10 miles of 42 of 72 Wisconsin counties (https://dnr.wi.gov/topic/wildlifehabitat/documents/cwdaffectedcountiesdifferences.pdf), compared to only a few counties in Minnesota to date (https://www.bah.state.mn.us/deer-elk).

3. Risk of CWD Transmission Exposures to Minnesota and Wisconsin Cervid Farms

Key findings from the review of the CWD-positive farms in Minnesota and Wisconsin:

Results from the record review are summarized below (Figure 2) based on the categorization in Table 1. These data show:

- **56% of CWD-positive farms (n=19) experienced one or more known higher risk CWD exposures** (described in Table 1). Of these 19 farms, 63% (12) introduced cervids from another farm later detected with CWD, 42% (8) reported wild deer entered farm pens or farmed cervids escaped and re-entered in areas with CWD in wild deer, and 11% (2) reported exposure of the farm to cervid parts from areas with CWD in wild deer through hunting or taxidermy practices. Some farms reported multiple exposure pathways.
- **Notably, 44% of CWD-positive farms (n=15) did <u>not</u> have known higher-risk CWD exposures**. Sixty-two percent of the CWD positive herds detected since 2012 fell into this category, compared to only 15% of those detected prior, indicating potential changing farm exposures to CWD. Most of these 15 herds had added animals from herds without test-positive animals in the previous 5 years (80%), though some had no new additions (20%). Since current tests detect CWD only in dead animals, the potential exists for animals purchased from tested herds to have been unknowingly infected.
- **Most CWD-positive farms (85%) without known higher risk exposures were located within 50 miles of CWD-infected wild deer.** Of these 11 herds, 73% had single and 27% had double perimeter fencing to prevent direct contact with wildlife. CWD detection in herds despite fencing barriers and with no animal movements from other positive farms indicates the potential significance of indirect contact exposures in locations with infected wildlife, and the critical need for research to identify practices to minimize these risks.

Figure 2. Highest Risk Exposures for CWD-infected Cervid Farms by Year in MN and WI

Number of CWD-positive farms

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
7																	W	
6																	F	
5																	F	
4															F	O	F/W	
3	F*	F*					W*								F/W	F/W	F/W/P	
2	F	W	F				W							F/W	F*	P*	W	
1	F/W	F	F/W	F	P*		W				O*	F/W	F/W	F/W	F*	F	F	F
Farms located <50 miles from CWD-positive wild deer																		
	1	1	1				3					1	1	2	2	4	7	1

Within each year, each row represents a separate CWD-positive farm categorized by:

- Highest risk exposures: Farmed cervid (F) Wild deer (W) Cervid parts (P) Other (O)
- Known risk level: **Higher** **Lower (or unknown)** **Negligible**
- State: * Minnesota

Domestic Cervidae Rulemaking Meeting April 21, 2021

Attendees:

Scott Barnes (ISDA)
Dallas Burkhalter (ISDA)
Katy DeVries (ISDA)
Tricia Hebdon (IDFG)
Chase Jones
Rulon Jones
Miranda Juker (ISDA)
Pamm Juker (ISDA)
Paul Kline (IDFG)
Lloyd Knight (ISDA)
Debra Lawrence, DVM (ISDA)
Scott Leibsle, DVM (ISDA)
Jeff Lerwill
Kami Marriott
David Miller
Mike Miller
Jonathan Oppenheimer (ICL)
Billy Rasmussen
Jeff Siddoway
Brad Smith (ICL)
Chanel Tewalt (ISDA)
Joshua Uriarte (OSC)
Garret Visser
Kyle Wilmot (ISDA)

Everyone was welcomed and the meeting was introduced by Lloyd Knight. He explained that the goal of the rulemaking in general was to remove unnecessary and redundant language, as opposed in to being in response to a petition for changes. He encouraged everyone to comment as they needed. He then turned the meeting over to Dr. Scott Leibsle as the main presenter.

After welcoming all the attendees, Dr. Leibsle explained the areas of review – IDAPA 02.04.19 "Rules Governing Domestic Cervidae" and Sections 600-699 of IDAPA 02.04.21 "Rules Governing the Importation of Animals". He began by reviewing the Rulemaking Summary sheet and sharing a current budget summary for the Cervidae Program at ISDA. While discussing the budget, he explained they were hoping to begin work on a Cervidae program database in 2021, which would be an extra expense for the FY 2022 budget.

For section 004 – Incorporation by Reference, it's standard operating procedure to update these references to the current versions. The changes, including one to 9 CFR Part 55 - Chronic Wasting Disease (CWD) should not affect Idaho producers, unless they are participating in the USDA CWD Certification Program – then they must meet the requirements set forth by USDA.

For section 010 – Definitions and section 011 – Redundant abbreviations were removed such as those included in the documents incorporated by reference. A definition for "Endemic Area" was added and updated the definition of "Source Herd" was updated to reflect actual usage. The abbreviation "CWDP" was removed and "HCP" was added to accurately reflect the programs actually in place. No questions/comments were noted.

Section 013 was removed as AZA facilities are not governed by the rule. This change would primarily affect zoos. Section 014 was removed as redundant language. The removal in the beginning of section 020 was for the same reason in Section 13 – AZA facilities do not fall under this rule. Section 020.02 was removed to reflect the 2021 statutory amendment. Section 020.05 was added to regulate temporary exhibition of reindeer, which is currently not allowed. At this point, Brad Smith (ICL) had a question regarding the removal of 020.02, specifically in relation to the Endangered Species Act applying to Mountain Caribou in the Selkirks. He stated there was the potential for reindeer to be reintroduced into the wild as part of the recovery plan and wanted to know what measures would be taken to limit wild reindeer from having contact with domestic reindeer. Dr. Leibsle explained that the fencing and facility requirements that apply to domestic Cervidae facilities would continue to be in effect. That, however, is the limit of requirements in place to prevent fence line contact. He added they had no choice but to remove this section, due to the statutory change, but they could negotiate some aspects. He asked for suggestions to be sent by email to Rules Info, Lloyd Knight, Miranda Juker and/or himself. No questions/comments were noted.

Sections 021, 022 regarding official identification. Dr. Leibsle explained that most of these sections are mandated in statute and cannot be changed. The removal of 022.07 and 022.08 was because these types of identification are not currently believed to be in use and are not considered official by USDA. David Miller explained that he still uses Ranch-Specific Lamb tags, in addition to the metal USDA clips. Dr. Leibsle asked if that meant he would like them left in as an option. Mr. Miller was willing to re-tag if necessary, but felt that having that ranch-specific tag makes tracing an animal's point of origin easier and would prefer that to be left in as an identification option. Dr. Leibsle made note of this request.

Section 023 was removed for redundancy. Section 031 and its subsections, language was simplified. Section 031.01 was deleted as not feasible because producers usually handle re-identification themselves. Section 031.04 was removed because not many producers use tattoos anymore. No questions/comments were noted.

Section 050 – Genetics. This section had been previously designated as a topic of interest by Jeff Siddoway. Dr. Leibsle explained that there is not currently in-state testing for Red Deer Genetic Factor (RDGF), and the few testing options available have been problematic in the past. David Miller asked if there is no way to enforce this rule, is it was even necessary to have in the rule. Dr. Leibsle said it was also in the import rule, through which it would be easier to regulate. David Miller suggested removing this section as it is unenforceable and unneeded. After making a note, Dr. Leibsle asked if there were more comments. Brad Smith pointed out it would be nice to have the option if a test were to become available. Dr. Leibsle then explained some of the testing problems they experience including: the tests are hard to validate, there's no guidance as to an acceptable level of purity and the tests are not governed by any organization to determine accuracy.

Jeff Siddoway stated that he sent some samples to GenomNZ (New Zealand), which cost approximately $100 and took 4 months each, but was concerned about the lack of a control sample from local captive and wild populations. Jeff Siddoway stated GenomNZ does not disclose where they get their baseline, and he felt that there should be statewide sample testing of approximately 1000 animals. He said that until there was a local baseline established, which would require testing of a thousand head of deer from every Fish and Game region, he had no interest in having this rule in the state. He added the RDGF was not as much of an issue as it was made to seem because producers want "typical" animals. He explained that there is a difference in the spread of antlers in elk and red deer – "U" shape versus "V" shape – and very few producers and/or hunters would want that gene expressed in their Cervidae. He felt it was best to get rid of the whole RDGF issue in the rules until there was an adequate baseline, reliable lab and/or a need within an industry where producers largely trust each other. Dr. Leibsle clarified a "baseline" as something to compare samples to for genetic purity. He said he didn't think New Zealand would be using a North American sample; that would have to be supplied by us. He asked if there were further comments, and no one had any.

Section 060.05 was removed as redundant language and Section 080 was removed because dead animal disposal is already governed by IDAPA 02.04.17 “Rules Governing Dead Animal Movement and Disposal”. Section 090 – Dr. Leibsle explained that the fees for elk are currently at the maximum of $10/head. To simply the rule, all due dates for all fees applied to the domestic cervidae program will be changed to December 31st. Section 100.02 and 100.03 were removed as necessary language. Section 101 – language was clarified that all facility requirements must be met before any Cervidae may be introduced into a facility. Brad Smith asked about quarantine facilities, and how it was determined if one was required. Dr. Leibsle explained that producers importing from areas with an endemic disease area would be the most likely to need quarantine facilities, and this would usually be to existing facilities as opposed to new ones. He added that he doesn’t think many producers really want that type of import. No questions/comments were noted.

Section 102 - no proposed changes, but it was asked if there any feedback as to whether there should be additional fencing requirements when a facility has had ingress of wild animals in the past. No comments were noted. Section 104 – this is more of an animal care issue and addressed in Idaho Code 25-3500. As he came to section 201, Dr. Leibsle said he was hopeful that they would be able to solve most inventory problems with a database in the future. In the meantime, it can be difficult reconciling with the various types of documents they receive. ISDA is requiring the summary report to be completed in addition to the standard annual inventory documents to assist in this process. He added that the time/labor spent reconciling inventories accounts for a lot of the program expenses.

Jeff Siddoway said that he was contacted by a southeastern Idaho rancher who requested that they stop requiring fees after an animal reaches a certain age, such as 12 years old. This would cap the animal’s life registration cost at $120. He asked if there was any support for this and added that there could be a financial impact, depending on the age structure of the industry, but he didn’t know how much. Dr. Leibsle said that it would be time consuming to have inventory work done by the agency for age validation. He said that would increase the complexity of inventories, as well as confusion and conversations to clear things up. He said he was willing to put the idea out there, but the current system makes this logistically difficult. He asked if anyone else had comments on this and none were noted.

Section 204.04 was being removed because other agencies may be notified as a courtesy, but cervids are not a brand animal. Section 205 was a clarification, not a change. Miranda Juker explained when ISDA receives death certificates, they could be for animals that were too young to be included on an inventory. This can make it difficult to determine an animal’s identity, especially when the age is not recorded on the certificate. Dr. Leibsle added that if the animal has not been included on an inventory due to a young age, they do not need to report the death. However, if the animal has been included on the annual inventory – no matter how young – the death must be reported. In line with that, they want to develop an electronic/web-based form to make death reporting easier. Section 205.01 extends the timeline for reporting. The removal of section 207 was for redundancy; it’s already in statute and unnecessary in this rule.

Section 208 was amended to an extended timeframe as it’s difficult to enforce a 10-day timeframe. This also brings it in line with other reporting requirements as part of the annual inventory. The removal of 209.01 is because the voluntary ranch management plan has not been used since the CWD requirement was changed in 2015. He said the mandatory ranch management plans should remain in place in Section 209.03, but asked if there were there any thoughts on revising the risk assessment criteria used in this section. No questions/comments were noted.

In Section 250 - Dr. Leibsle pointed out there is a difference between the federal interstate requirements and the intrastate requirements for Idaho, David Miller asked if the Tuberculosis (TB) program was federal, like the CWD program. Dr. Leibsle explained that is the case for *inter*state movement, however the rule here is discussing *intra*state movement. Mr. Miller asked about the current state status regarding TB, which Dr. Leibsle said Idaho is accredited TB-free. Mr. Miller then explained he was concerned because he had to test his whole herd twice last year for movement within the state. He asked why Cervidae producers were required to have this testing when other livestock producers aren't. He proposed that they shouldn't have to maintain the federal accreditation status for movement within the state. Dr. Leibsle explained that producers are not required to be TB Accredited herds, but if they choose to do so they do have to meet the federal testing requirements for that accreditation. Mr. Miller stated that if they are a TB free state and only importing TB tested animals, they shouldn't need to test again when they are moving the animals within the state. Dr. Leibsle said the concern is not only the domestic Cervidae which are tested but there are, for example, wild cervids in Michigan that pose a disease risk to the domestic population. He asked Mr. Miller if he was proposing they remove the TB test requirement for movement of cervids within the state. Mr. Miller stated yes. Dr. Leibsle asked if there were further comments on this issue. Chase Jones said that he seconded that proposal – they should be able to move within the state without additional testing. Jeff Siddoway likewise concurred with the proposal. He added that a lot of in-state movements happen close to harvest and it can be dangerous, time consuming and the shaving for testing messes up the cape. Dr. Leibsle thanked them for their comments and asked if there were any more. No additional questions/comments were noted. Dr. Leibsle added that if TB were to become an issue, ISDA would still have the authority to require testing at that time.

Section 250.02 proposed a changed timeframe to match all other forms; while section 250.03 was redundant and unnecessary. Section 300 was removed because ISDA already has this authority in statute (25-218, Idaho Code) and there is no need to itemize the potential diseases. Sections 303 through 305 and 400 were identified as all redundant and in statute. No questions/comments were noted. Billy Rasmussen referred back to Mr. Siddoway previously talking about the $10/head fee for annual inventory. He suggested that they could increase the fee for first-time additions but lower it later in life for older animals. For example, he has a 20-year-old cow that he doesn't feel he needs to pay a fee for every year. He acknowledged it would be extra work for the agency, and pointed out that the average age for bulls is 2-5 years. He said that increasing the initial fee could lower the overall costs and ease the burden on producers. Dr. Leibsle explained that the $10 maximum for the fee is in statute and would require a legislative change to adjust that. He added that ISDA would need to do a fiscal analysis to determine how a change in fees would impact revenue. He requested that Mr. Rasmussen submit that specific request in writing. Mr. Rasmussen said it was just a thought and Dr. Leibsle could continue with the meeting.

Dr. Leibsle continued with section 450 regarding TB testing being required for change of ownership versus movement as discussed earlier. David Miller said he would like the see the test requirement removed here, as well. No additional questions/comments were noted. Section 500, proposed to clarify which species are identified as susceptible to CWD. The proposed change would make it so the requirement falls on elk and reindeer, not fallow deer - the only other species farmed in the state. He asked for comments regarding CWD. Jonathan Oppenheimer said he was just joining the meeting. He said that the level of testing for CWD should be a key consideration and he was looking for a way to increase testing of animals dying for reasons for other than slaughter or harvest. Dr. Leibsle said that the testing requirement is already 100% for deaths outside of slaughter and harvest. Mr. Oppenheimer pointed out that there are issues that could prevent testing – they need to determine how many animals die from natural causes without being tested because, for example, they are found too late for sample collection. To his understanding there are some animals that are not tracked or tested because they decompose and wanted to know if there was a way to track the untested animals. He also asked about slaughter being only 10%. Dr. Leibsle said this issue will come up later and they could circle back to the issue at that point. No additional questions/comments were noted.

Section 501.01 through 501.04. These sections were being stricken due to lack of state and/or federal personnel and redundancy. He explained that ISDA will continue to educate on the proper way to collect CWD samples. For valid tests, samples must be submitted to the lab in whichever format required by the lab. Miranda Juker confirmed Idaho's elk producers have a pretty good success rate with CWD sample submission. David Miller then asked about live-animal testing and how soon that would be available. Dr. Leibsle said that there is a live-animal test for white-tailed deer only, but it is not approved by USDA. A rectal biopsy is currently only allowed if the white-tailed deer are already quarantined for CWD exposure, then multiple rectal biopsy tests can be performed to enable the animals to be released from quarantine. There has been some testing of mule deer through an ear punch, but they were getting a lot of false positives. Dr. Leibsle explained that CWD moves differently through elk and deer; the disease takes longer to migrate from the brain to lymph tissue in the rectum of an elk. The reason for this is unknown, as is the actual duration in which CWD migrates to rectal tissue in an elk. Dr. Leibsle said that all the regulatory agencies are waiting for a live CWD test to be made available, but they won't approve a test until after USDA has confirmed the test to be accurate and validated.

Section 502.01a – clarifies current available CWD tests. The most common tests used are the ELISA and the Immunohistochemistry. Section 503 discusses the CWD Herd Certification program, which any Idaho producer can participate in, if they choose. This is a federal program with standards set by USDA and does not need to be included in this rule. Currently, no Idaho producers participate in this program. Section 506 was removed due to redundancy, as this authority exists elsewhere.

Having reached the end of the rule, Dr. Leibsle opened the floor to questions and comments. Billy Rasmussen began by asking about CWD. He wanted to know if there were any numbers showing what the state tested last year from hunter samples, as he never saw samples being dropped off. Tricia Hebdon of the Idaho Department of Fish and Game (IDFG) said they had about 1100 samples tested so far this year. They have mandatory annual testing required in the Idaho panhandle near Libby, Montana and eastern Idaho. They rotate through other areas of the state and this year included the Salmon, Idaho area. Mr. Rasmussen asked what percentage of animals this would be testing. Ms. Hebdon indicated she would look into that. Dr. Leibsle said if that information were sent to him, he would make sure it got posted online.

After a 10-minute break, Dr. Leibsle said he had received a question from Tricia Hebdon regarding sampling for CWD testing including the brain and the medial lymph nodes. Ms. Hebdon elaborated that this was a question for discussion – it could be easier to get lymph nodes for testing as opposed to the traditional obex sample. Dr. Leibsle said that Idaho only requires the obex for testing and it could be difficult asking for both, although it could help when the obex is missed during collection. He said this would require additional training on how to collect samples. David Miller offered that he has taken elk to slaughter in Nampa, Idaho and they have told him that even the lymph nodes can be difficult. Dr. Leibsle clarified they were just talking about a secondary testing option as insurance if the obex sample was improperly collected and rendered untestable. David Miller said that ISDA used to provide a certificate after training on sample collection. He added that once you have been trained and know what to do the collection isn't that hard. Dr. Leibsle asked for further comments. Jeff Siddoway asked if they could make it an option – either obex or lymph nodes – so they wouldn't have to also submit the lymph nodes if they were confident in their ability to remove the obex. Dr. Leibsle said he would have to talk to the lab, and whether it was possible a lymph node sample would be viable for a longer period of time than the obex– especially in animals that have been dead longer. He added that the lymph node provides the most reliable test in white-tailed deer, but that is not the case in elk.

Dr. Leibsle asked if there were any further comments on the Cervidae rules. David Miller asked about the proposed added definition for "Endemic Area" and what would set the boundaries for this. Dr. Leibsle said this would be covered in the import rules and moved the discussion on the IDAPA 02.04.21 "Rules Governing the Importation of Animals" sections 600-649, adding that the official negotiated rulemaking meeting for this rule would be conducted in full on April 22, 2021, however given the relevance of Section 600 of this rule to the cervidae industry, the comments from the current meeting would be included in the rulemaking record as well. In section 600.1 the language was simplified, and 600.2 was removed since testing is discussed in section 601. ISDA had received comments from Jeff Siddoway, submitted prior to this meeting, regarding 600.4 "Deworming Requirement". Mr. Siddoway said that in the past, to be allowed to get animals east of the 100th meridian, they had to agree to this requirement. He pointed out that any facility with good husbandry practices wouldn't have a problem. He said that it could be difficult to get a veterinarian to his facility at times and asked if it would be sufficient to allow owners to handle the deworming treatment and add an affidavit to the CVI. Dr. Leibsle explained that this requirement was on the veterinarian issuing the CVI in the state of origin. Mr. Siddoway said he understood, but still felt the requirement was cumbersome. Dr. Leibsle asked him what exactly his proposed change would be. Mr. Siddoway said they should accept a producer-signed affidavit regarding liver fluke treatment as opposed to requiring veterinary certification.

Dr. Leibsle explained that this section was specifically addressing meningeal worm and it doesn't specifically state that a veterinarian must be the one to treat. The attending veterinarian is only required to record a statement on the CVI that the animals have been treated with a dewormer. ISDA has never required the veterinarian be the person to apply the treatment (Ivermectin). He asked Mr. Siddoway to clarify what he was asking, as it appeared his request was permitted by the rule. Mr. Siddoway said that section in the copy of the rules he had, 600.02 said "treated with a parasite that's efficacious against giant liver flukes by an accredited veterinarian no less than 30 days or no more than 60 days prior to importation…" and he assumed the language was the same for meningeal worm. Dr. Leibsle said he was looking at an outdated version of the rules, since the current rule did not have that. Mr. Siddoway asked to clarify that a veterinarian does not have to administer the deworming treatment. Dr. Leibsle said that was correct, there just needed to be a statement that treatment had occurred. Mr. Siddoway acknowledged the clarification. Billy Rasmussen asked about the safety of meat being given for public consumption when they have had recently been treated with Ivermectin. Dr. Leibsle explained that Ivermectin is the accepted treatment for meningeal worms, although it is off-label use when being administered to Cervidae. Dr. Leibsle stated the estimated meat withdrawal time for elk being treated with Ivermectin was approximately 30 days. He clarified, asking if Mr. Rasmussen was concerned about residual product in the meat when it was harvested. Mr. Rasmussen affirmed. Dr. Leibsle asked for his specific request. Mr. Rasmussen said that he didn't have an exact wording yet but, for example, a producer in Canada wouldn't test animals within 60 days before shipping because it could damage the horns. He said that unless they push the Ivermectin treatment out to 6 months or so, he didn't see how they could avoid the drug reside entering into the food chain. David Miller asked if they could change the de-worming requirement so it applies only to animals from an endemic area, as opposed to all animals. Dr. Leibsle said they could suggest an amendment for the rule to say something like "east of the 100th meridian." Mr. Miller pointed out that most animals would be dying within 60 days of import anyway. Dr. Leibsle said he was open to suggestions and this was best done in writing. Mr. Miller asked the group what their thoughts were.

Tricia Hebdon said the meat withdrawal period was actually 60 days and pushing the requirement to 60 days would mean the animals still had protection in place against the meningeal worm. Billy Rasmussen didn't feel that treating 60 days before would be an option due to the bulls being in velvet. Dr. Leibsle said that it would allow for more time to complete the requirement – including if the producer still wanted to keep within 30 days. Mr. Rasmussen asked how dangerous meat with Ivermectin was. Dr. Leibsle referred him to FSIS for information on the health impact of drug residues. Jeff Lerwill suggested changing the requirement to 6 months to allow more leeway and time for the ivermectin to wear off. Dr. Leibsle said all suggestions were on the table. He added that he understands certain times are preferred for working animals. To recap he said there were currently 2 proposals to amend this requirement - 60 days advance treatment and 6 months advance treatment. David Miller reiterated that he would like to see it amended to apply only to animals entering from east of the 100th meridian. After noting the suggestions, Dr. Leibsle asked if there were any other comments. He added that this part of the rule was originally negotiated to prevent introduction of *P. tenuis* into the wild population. Jeff Siddoway asked if anyone knew how long treatment lasted until there was a chance of re-infection. Dr. Leibsle referred to Ms. Hebdon who said that from what she's read re-infection becomes a concern after 3 months. She indicated she would send the literature she had on the subject.

After Dr. Leibsle asked about further questions, Brad Smith requested help to understand the difference in risk east of the 100th meridian. Dr. Leibsle explained that USDA has conducted surveillance that indicated *P. tenuis* occurs primarily east of the 100th meridian; they have not discovered it to a significant degree to the west. He said he would look for literature on this topic. No additional questions/comments were noted. Section 600.05 - it was suggested to remove the import statement since a veterinarian is already responsible for making sure animals on a CVI are not showing symptoms of *any* disease. In discussing section 601, Dr. Leibsle pointed out that 601.01 was just amended in 2020. He said that only animals from a designated surveillance area or high-risk area require brucellosis testing and the only surveillance area in the country was the area around Yellowstone Park in Idaho, Montana and Wyoming. He asked Miranda Juker if there were any farmed cervids within the Montana Designated Surveillance Area (DSA). Ms. Juker did not believe so and said if they are there, they aren't being sent into Idaho.

Section 601.02 - Jeff Siddoway elaborated on his previous comments regarding Red Deer Genetic Factor (RDGF). Mr. Siddoway said that it had kind of been covered previously but, because there is no lab and no base sample, he felt this requirement should be removed. He added that he didn't think he could find an elk producer in the state who would want to use red deer. No additional questions/comments were noted. Mr. Siddoway also had a comment regarding TB and asked if that had been covered enough previously. Mr. Siddoway said that it was covered earlier – he didn't think there was a need for intrastate testing as it was just burdensome. Dr. Leibsle clarified that the TB issue discussed in the previous rule applied to intrastate movement only and the import rule currently being discussed was for movement from other states into Idaho. Movements across state lines are required to perform TB testing unless coming from an accredited TB free herd. Mr. Siddoway understood, and David Miller asked if they could use a blood test to meet the requirement for import testing. Miranda Juker confirmed that either the tuberculin or the blood test was acceptable for movement. Mr. Miller said he had received elk as imports last year and they thought they still had to shave and re-check for TB testing, which meant more handling of animals and greater risk of injury. Dr. Leibsle explained that, in the past, the Bovigam test gave a lot of false positive test results. Since then, he believes the issue had been fixed, but he didn't know if a Bovigam test was permitted to maintain a TB accredited free status. Mr. Miller said that so far, is has been accepted. No additional questions/comments were noted.

Sections 605 through 607 were removed as unnecessary language because it is responsibility of the accredited veterinarian issuing a CVI is to ensure the animals are healthy. 606 was removed due to relevancy and redundancy. Section 607 was identified by both Jeff Siddoway and David Miller for additional discussion on CWD import requirements. Dr. Leibsle stated that the August 2020 administrative order is still in effect, which limits importation of cervidae from within a CWD endemic area or within 25 miles of CWD-positive wild cervidae. Dr. Leibsle stated that CWD was an ongoing problem that was continuing to spread across many regions of North America, specifically Canada. The reason for the administrative order was that ISDA did not feel the level of CWD surveillance in wild cervidae and the method in which Canadian animal health officials were using to identify and expand their CWD endemic areas were providing sufficient protection to prevent importing CWD into Idaho.

Jeff Siddoway said that in 2020 quite a few outfits with harvest/hunting facilities had deals to purchase Canadian elk including down payments paid and hunts pre-sold. Without warning they received the administrative order which slammed the door on these deals. While he recognizes the authority given to the administrator and director, he felt that an allowance for herds with 5-year CWD-free status should have still been able to import. He said that the radius of 25 miles, as opposed to 20 miles, made all the difference in this situation, adding that it cost him $100,000 in net income. He felt the CWD-free herd was at odds with the administrator. He asked if the radius could be reduced from 25 miles, since 25 of the 50 states in the US, including Wyoming, are known to have CWD. He added that he was 99% sure CWD is present in wild elk in Idaho. While he didn't have a solution, he did know that the order at that time hurt Idaho Cervidae producers.

David Miller said he wanted to know how they chose 25 miles as their radius because Utah put theirs at 20 miles and wondered what was consistent with other states. Dr. Leibsle displayed a table showing the CWD import requirements from other cervid farming states. The table indicated different states have taken entirely different approaches - some far more restrictive than Idaho, some far less restrictive. In making the decision back in August 2020, Dr. Leibsle indicated a scientific study developed by the University of Minnesota was also taken into consideration. The study investigated the risk factors that could predispose a domestic cervidae facility to become infected with CWD. The study identified that any domestic cervidae facility located within a 50-mile radius of a CWD positive in a wild cervidae was one of the primary risk factors for domestic cervidae ranches becoming infected with

CWD.   Dr. Leibsle explained they tried to take a balanced approach by requiring a large enough distance to establish safeguards against inadvertently importing a CWD positive animal, without being so restrictive that the requirement would completely eliminate all cervid markets. Idaho is not the most restrictive in this regard and they are not the least restrictive; the regulation falls in the middle of what most farmed cervid states require. He added that a lot is still unknown about CWD, which is spreading rapidly – especially in Alberta, Canada.

Dr. Leibsle said that, while the administrative order is still in effect, the preferred location for this requirement is the import rule, and if stakeholders could come to a reasonable agreement on the CWD safe distance issue, if would be best to incorporate that into the Import Rule. Dr. Leibsle clarified that the states that do not have any kind of CWD proximity requirement, such as Colorado, already have CWD. Chanel Tewalt reiterated that the administrative order stands regardless of rulemaking decisions, adding that they want to have additional discussions with producers and stakeholders about adding it to the rule. Jeff Lerwill said that he has spoken with Canadian producers who feel they are personally being attacked. He said there is no proof of where a harvested animal actually came from – it could have been shot further away. He did admit that some have had CWD-positive animals within that 25-mile radius, but they can still ship to Colorado. He felt there is ambiguity because no one is verifying where animals are actually originating. Mr. Lerwill said there could be issues where someone doesn't like a neighbor, so they say animals are from somewhere closer to damage them. Mr. Lerwill then asked what IDFG felt the difference in health was between Idaho and Montana, and when CWD test results for samples pulled by butchers and taxidermists would be released. Dr. Leibsle said if there are problems with accurately locating where a CWD animal is harvested in another state or province, there isn't anything that can be done about that. Dr. Leibsle displayed a map showing the 2020 CWD cases identified in Alberta. He explained that ISDA is greatly concerned because while many of the CWD positive cases identified on the map (stars on the map) are in Alberta's endemic area (shaded on the map) – many are also located outside of their endemic area.

Tricia Hebdon said Idaho does not currently have CWD in the wild and IDFG is doing everything they can to get exact harvest locations to help define a CWD area in the state if/when they have a positive. She said that taxidermists and wild game processors are not required to submit samples, but some do anyway. Rulon Jones said that the number of confirmed cases in Alberta were a result of the number of hunters and tests submitted. He said that CWD wasn't necessarily spreading, there is just an increase in testing which appears to lead to an increase in the number of cases as existing cases are exposed. Rulon Jones then asked why ISDA doesn't continue to rely on the rule in place regarding CWD-free herds, which can't control the animals outside their facility. He said that if a producer could show they don't have CWD inside their fence, that should be sufficient. Dr. Leibsle explained that their intent wasn't to claim elk producers aren't doing their job, but rather to address the potential for exposure from wild elk which is out of their control. Billy Rasmussen pointed out that the testing rate in Alberta, Canada is over 50%, while Idaho only tested 1100 wild elk, primarily in areas without any Cervidae facilities. Mr. Rasmussen asked what would be done if CWD was found near a captive herd in Idaho – would it be shut down? Mr. Rasmussen said the state should be responsible for testing more wild elk instead of over-regulating domestic producers. Dr. Leibsle said that if CWD was found in wild cervidae in Idaho, ISDA would not shut down a domestic elk facility because of its proximity to that wild case – that would only happen if CWD was found inside their fence. Dr. Leibsle pulled up another map of CWD testing in Alberta to compare 2019 and 2020. He said the 2020 map indicates an apparent decrease in

CWD cases from 2019, however that is because Alberta chose to limit the areas in which they were conducting CWD surveillance in 2020. He added that this is a complicated issue and asked for further comments.

Kami Marriott said that she agrees with that has been said about CWD so far, and she was glad Rulon Jones spoke up. She added that she knows this is a big issue and hopes there can be a remedy. She then said that RDGF feels redundant to worry about when animals are ultimately going to be harvested and they aren't breeding animals. She also agreed that the intrastate TB testing requirement should be removed. Brad Smith said that he understood the 25-mile radius was a hardship, but they need to do what they can to protect both wild and domestic herds. He said he appreciated all that ISDA was doing with the limited information available. David Miller asked for clarification on the executive order staying in place and adding it to the import rules. Dr. Leibsle reiterated ISDA's desire is to discuss the issue further. The administrative order is not being rescinded at this time; they want to see where producers are on the issue. Mr. Miller asked if they were wanting a proposal for the rule instead of the administrative order, which would nullify the order. Dr. Leibsle confirmed that ISDA is requesting alternate proposals from stakeholders. Jeff Lerwill asked about a CWD blood test. Dr. Leibsle said they are willing to accept any validated test for any disease, but currently there is no blood test available or validated to detect CWD. He added that there are several experimental tests currently in development, but nothing is approved. Jeff Siddoway asked for a recap of the brucellosis testing requirements - the two tests and the timeframe, as 30 days is sometimes hard to meet. Dr. Leibsle explained that brucellosis testing is only required for animals from a high-risk or surveillance area, which currently would be the Montana or Wyoming DSA. He added that USDA requires brucellosis testing when crossing international borders. Mr. Siddoway asked if the two tests was a USDA requirement. Dr. Leibsle clarified that one blood sample may be split up for two tests, one of which must be Fluorescence Polarization Assay (FPA) and the other can be Buffered Acidified Plate Assay (BAPA) or Buffered Antigen Plate-Agglutination Test (BPAT). Mr. Siddoway said that the second test had hung them up in the past and asked if the testing timeframe could be extended from 30 to 45 days. Dr. Leibsle pointed out the current rule has a 60-day test requirement. He then clarified import requirements.

Imported cervidae need a 5-year CWD herd history, which can be an issue with Canada. Because of the way they operate, it can be difficult to get source herd information, as required in section 607.01 of the import rule. He said they could call the provinces to see if it's something Canada can even provide, adding that he would try to get more information. Section 607.02 was to be removed because the Administrator does not want to be put in a position to grant exceptions to some and not others. He said that if there are other ideas for how to prevent the introduction of CWD into Idaho, if they could grant more flexibility while maintaining the health status of the state, he was open to them and encouraged stakeholders to submit their ideas and proposals. Dr. Leibsle concluded the presentation and stated that comments may be submitted to the rulemaking records for the next 2 months.

Lloyd Knight said that if anyone wanted to join the meeting the next day looking at the entire import rule, they could email a request to him for a link. Mike Miller then spoke up asking if he should submit his question regarding reindeer in north Idaho in writing. Dr. Leibsle said that it was addressed at the beginning of the meeting. He said that IDAPA 02.04.19 section 20.02 was removing the limitation on ownership, but they were proposing notification when there was a request to exhibit, which would be otherwise prohibited. He said the only other change regarding reindeer was the CWD testing requirement from the addition of "susceptible to CWD" in sections 500.01 and 500.02. Mr. Miller said he understood, and the current comments were ok with him. Dr. Leibsle asked one final time for comments, before Lloyd Knight closed out the meeting. Mr. Knight said everyone should have the link for the next meeting already, and they would try to get amended rules, meeting minutes and other documents onto the ISDA website in a couple weeks. He said he would try to send an email once everything was posted. Lloyd Knight then adjourned the meeting.

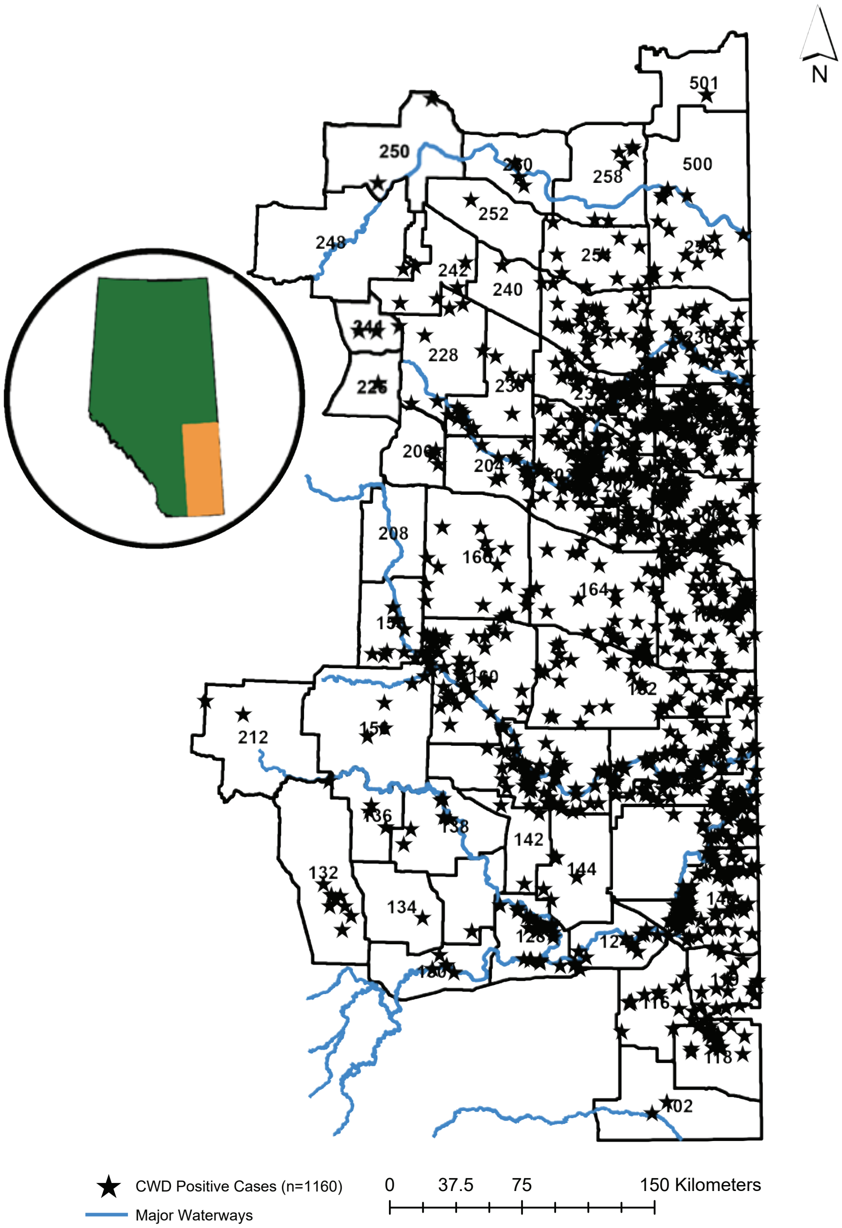
CWD import proximity requirements

Alabama	No cervid imports.
Alaska	No cervids within 10 miles of CWD positive
Arizona	No cervid imports.
Arkansas	No cervid imports.
California	No imports allowed from CWD positive states.
Colorado	CWD HCP compliance only
Idaho	No cervids from CWD endemic areas or within 25 miles
Illinois	Cannot originate from a CWD endemic area (any county and surrounding counties where CWD has been diagnosed w/in last 5 years)
Iowa	No cervids located within a 30 mile radius of endemic area for CWD allowed
Kansas	CWD HCP compliance only
Kentucky	No cervids from CWD positive states.
Michigan	No cervids from herds within 25 miles of CWD positive in domestic herds within last 5 years; No cervids from herds within 75 miles of CWD positive wild animal if the exporting facility has *single perimeter* fence in previous ten years; No cervids from facility wihin 50 miles of CWD positive wild animal in previous 10 years if exporting facility has *double perimeter* fence. Banned states include Wisconsin, Colorado and Wyoming.
Minnesota	No cervids from CWD endemic area, defined as counties where CWD infected wild cervids are found)
Missouri	No cervids from CWD endemic areas.
Oklahoma	No cervids from counties or provinces where CWD has been identified in free-ranging cervid populations.
Pennsylvania	No movement permitted from endemic areas and states.
Rhode Island	No cervids from CWD endemic areas.

South Dakota	No cervids from herds that were part of a traceback or trace forward herd within past 5 years.
Tennessee	No cervids from an area where CWD has been diagnosed in wildlife.
Texas	No cervids within 20 miles of CWD positive
Utah	No animals from CWD endemic portions of Alberta, Saskatchewan, Colorado, Nebraska, South Dakota, Wyoming or within 20 miles of a CWD positive.
West Virginia	No animals from facilities that are located within 15 mile radius of a confirmed CWD positive in last 60 months.
Wisconsin	Cervids must be adequately separated from any wild animals known to be infected with CWD.

Chronic Wasting Disease in Wild Cervids – Alberta

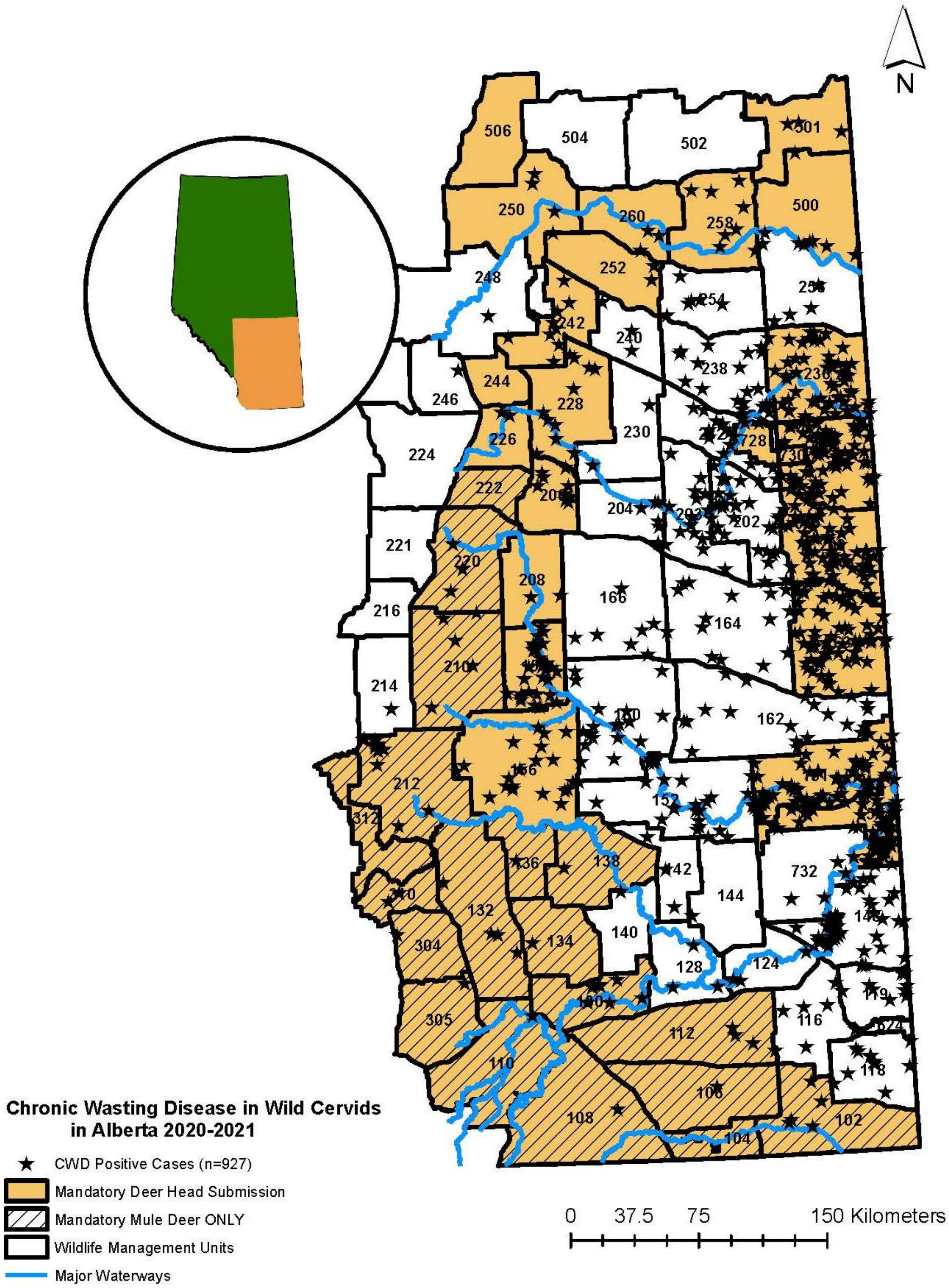
2019 Surveillance Season (FINAL)



alberta.ca/chronic-wasting-disease-updates.aspx

Chronic Wasting Disease in Wild Cervids - Alberta

2020 Surveillance Season (FINAL)



Animal Industries
Domestic Cervidae
PCA - 22503, 22104
Fund 0332-06

	2017	2018	2019	2020	Through Mar. 2021
Revenues					
License Plate Transfer	21,400.50	22,355.25	23,164.94	24,087.00	24,594.00
Fines	2,800.00	5,680.00	5,100.00	-	-
Licenses	58,348.00	61,989.00	66,506.00	68,761.00	55,481.00
Total Revenues	82,548.50	90,024.25	94,770.94	92,848.00	80,075.00
Personnel	59,015.00	62,882.92	40,881.70	39,993.57	35,286.68
Operating Expense					
Lab testing	-	-	990.00	-	-
Training	-	-			
Travel	402.17	2,757.90	1,785.00	1,113.54	151.54
Other	3,022.14	1,014.57	274.76	2,743.09	3,889.14
Total Operating	3,424.31	3,772.47	3,049.76	3,856.63	4,040.68
Total Expenses	62,439.31	66,655.39	43,931.46	43,850.20	39,327.36
Net Cash Position	20,109.19	23,368.86	50,839.48	48,997.80	40,747.64
Accumulated	(58,701.86)	(35,333.00)	15,506.48	64,504.28	105,251.92

<u>Rulemaking Summary</u>

IDAPA 02.04.19 – Rules Governing Domestic Cervidae

Where is the rulemaking authority?

Authority for this rulemaking resides in the Title 25 Chapter 3704 Idaho Code – Domestic Cervidae Farms

What does this rule do?

These rules govern procedures for the detection, prevention, control and eradication of diseases among domestic cervidae, and facilities, record keeping, and reporting requirements of domestic cervidae ranches.

What is the agency proposing to change?

The agency has performed Zero Based Regulation to simplify, clarify or remove outdated, unnecessary or irrelevant language in sections highlighted blue in the attached strawman. The amended language in these sections does not change the regulatory impact, scope, intent or authority in the current rule.

The agency has conducted an internal audit of this rule and identified multiple sections that may require amendments due to inaccurate or confusing language, recommendations to improve the efficiency of the program or changes that must be made to coincide with recent statutory amendments. The changes listed below, and highlighted in yellow in the attached strawman, do result in a change to the regulatory impact, scope, intent or authority in the current rule.

- Updating incorporations by reference to current version (Section 004)
- Create a definition of “endemic area” (section 010)
- Correct and clarify definition of “source herd” (section 010)
- Remove prohibition on reindeer farming north of the Salmon River; define what requirements are necessary to transport a reindeer off property for temporary exhibition (Section 020)
- Remove the fee for domestic cervidae that die during the same calendar year (Section 090)

- All facility requirements must be approved prior to population with cervids (Section 101)
- Require a summary report form be submitted with the annual inventory (Section 201)
- Change the due date for intrastate movement fees (Section 208)
- Require reindeer be included in CWD testing requirements (Section 500)

Recent discussions with industry and stakeholders have identified the topics listed below, and highlighted in green in the attached strawman, for review and potential amendment:

- Modification to the Red Deer Gene Factor testing and management requirements (Section 050)

02.04.19 – RULES GOVERNING DOMESTIC CERVIDAE

000. LEGAL AUTHORITY.
This chapter is adopted under the legal authority of Sections 25-203, 25-305, 25-601, and 25-3704, Idaho Code. ( )

001. TITLE AND SCOPE.

01. Title. The title of this chapter is "Rules Governing Domestic Cervidae." ( )

02. Scope. These rules govern procedures for the detection, prevention, control and eradication of diseases among domestic cervidae, and facilities, record keeping, and reporting requirements of domestic cervidae ranches. ( )

002. – 003. (RESERVED)

004. INCORPORATION BY REFERENCE.
The following documents are incorporated by reference. ( )

01. Bovine Tuberculosis Eradication, Uniform Methods and Rules, Effective January 1, 2005. This document can be viewed online at https://www.aphis.usda.gov/animal_health/animal_diseases/tuberculosis/downloads/tb-umr.pdf. ( )

02. Code of Federal Regulations, Title 9, Part 161, January 1, ~~2016~~2021. This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

03. Code of Federal Regulations, Title 9, Part 55, January 1, ~~2016~~2021.This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

04. Code of Federal Regulations, Title 9, Subchapter A, Part 1 and 2, January 1, ~~2016~~2021.This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

005. -- 009. (RESERVED)

010. DEFINITIONS.

~~**01. Accredited Veterinarian**. A veterinarian approved by the Administrator and USDA/APHIS/VS, in accordance with Title 9, Part 161, CFR, January 1, 2004, to perform functions required by cooperative state-federal animal disease control and eradication programs. ( )~~

02. Approved Laboratory. NVSL, an AAVLD accredited laboratory that is qualified to perform CWD diagnostic procedures, or a laboratory designated by the Administrator to perform CWD diagnostic procedures. ( )

03. Approved Slaughter Establishment. A USDA inspected slaughter establishment at which ante-mortem and post-mortem inspection is conducted by USDA inspectors. ( )

04. Area Veterinarian in Charge. The USDA/APHIS/VS veterinary official who is assigned to supervise and perform official animal health activities in Idaho. ( )

Commented [DSL1]: Update to 2021 version. Accredited veterinarian standards.

Commented [DSL2]: Update to 2021 version. CWD regulations

Commented [DSL3]: Update to 2021 version. Animal welfare regulations.

Commented [DSL4]: Redundant…defined in 9 CFR 55 & 9 CFR 161

05. **Breed Associations and Registries**. Organizations maintaining permanent records of ancestry or pedigrees of animals, individual animal identification records and records of ownership. ( )

06. ~~**Certificate**. An official document issued by a state or federal animal health official or an accredited veterinarian at the point of origin of a shipment of cervidae that contains information documenting the age, sex, species, individual identification of the animals, the number of animals, the purpose of the movement, the points of origin and destination, the consignor, the consignee, the status of the animals relative to official diseases, test results and any other information required by the state animal health official for importation or translocation.~~ ( )

Commented [DSL5]: Definition unnecessary…CVI already a state and federal requirement

07. **Cervid Herd**. One (1) or more domestic cervidae or groups of domestic cervidae maintained on common ground or under common ownership or supervision that may be geographically separated but can have interchange or movement. ( )

08. **Cervidae**. Deer, elk, moose, caribou, reindeer, and related species and hybrids including all members of the cervidae family and hybrids. ( )

09. **Chronic Wasting Disease**. A transmissible spongiform encephalopathy of cervids that is a nonfebrile, transmissible, insidious, and degenerative disease affecting the central nervous system of cervidae. ( )

10. **Commingling**. Within the last five (5) years, the animals have had direct contact with each other, had less than thirty (30) feet of physical separation, or shared management equipment, pasture, or surface water sources, except for periods of less than forty-eight (48) hours at sales or auctions when a state or federal animal health official has determined such contact presents minimal risk of CWD transmission. ( )

11. **Custom Exempt Slaughter Establishment**. A slaughter establishment that is subject to facility inspection by USDA-FSIS, but that does not have ante-mortem and post-mortem inspection of animals by USDA inspectors. ( )

Commented [DSL6]: clarification

12. **CWD-Adjacent Herd**. A herd of domestic cervidae occupying premises that border a premises occupied by a CWD positive herd, including herds separated by roads or streams. ( )

13. **CWD-Exposed Animal**. A cervid animal that is not exhibiting any signs of CWD, but has had contact within the last five (5) years with cervids from a CWD-positive herd or the animal is a member of a CWD-exposed herd. ( )

14. **CWD-Exposed Herd**. A herd of cervidae in which no animals are exhibiting signs of CWD, but: ( )

a. An epidemiological investigation indicates that contact with CWD positive animals or contact with animals from a CWD positive herd has occurred in the previous five (5) years; or ( )

b. A herd of cervidae occupying premises that were previously occupied by a CWD positive herd within the past five (5) years as determined by the designated epidemiologist; or ( )

c. Two (2) herds that are maintained on a single premises even if they are managed separately, have no commingling, and have separate herd records. ( )

15. **CWD-Positive Cervid**. A domestic cervid on which a diagnosis of CWD has been confirmed through positive test results on any official cervid CWD test by an approved laboratory. ( )

16. **CWD-Positive Herd**. A domestic cervidae herd in which any animal(s) has been diagnosed with CWD, based on positive laboratory results, from an approved laboratory. ( )

17. **CWD-Suspect Cervid**. A domestic cervid for which laboratory evidence or clinical signs suggests

a diagnosis of CWD. ( )

18. CWD-Suspect Herd. A domestic cervidae herd in which any animal(s) has been determined to be a CWD-suspect. ( )

19. Death Certificate. A form, approved by the administrator, provided by the Division for the reporting of cervidae deaths and for reporting sample submission for CWD testing. ( )

20. Designated Epidemiologist. A state or federal veterinarian who has demonstrated the knowledge and ability to perform the functions required under these rules and who has been selected by the Administrator to fulfill the epidemiology duties relative to the state domestic cervidae disease control program. ( )

21. Disposal. Final disposition of dead cervidae. ( )

22. Domestic Cervidae. Fallow deer (*Dama dama*), elk (*Cervus elaphus*) or reindeer (*Rangifer tarandus*) owned by a person. ( )

23. Domestic Cervidae Ranch. A premises where domestic cervidae are held or kept, including multiple premises under common ownership. ( )

24. Electronic Identification. A form of unique, permanent individual animal identification such as radio frequency identification tag, radio frequency identification implant, or other forms approved by the Administrator. ( )

Endemic Area. A geographical area designated by a state animal health official in the state of origin where animals located within that area are subject to an increased risk of acquiring a contagious disease. Most commonly in reference to Tuberculosis or Chronic Wasting Disease.

25. Escape. Any domestic cervidae located outside the perimeter fence of a domestic cervidae ranch and not under the immediate control of the owner or operator of the domestic cervidae ranch. ( )

26. Federal Animal Health Official. An employee of USDA/APHIS/VS who is authorized to perform animal health activities. ( )

27. Harvest. Any healthy domestic cervid that is intentionally and lethally removed from a domestic cervidae facility, by an owner, designated employee or customer of the facility, strictly for the purposes of either shooting or meat production. ( )

28. Herd of Origin. A cervid herd, on any domestic cervidae ranch or other premise, where the animals were born, or where they were kept for at least one (1) year prior to date of shipment. ( )

29. Herd Status. Classification of a cervidae herd with regard to CWD. ( )

30. Intrastate Movement Certificate. A form approved by the Administrator, and available from the Division, to document the movement of domestic cervidae between premises within Idaho. ( )

31. Individual CWD Herd Plan. A written herd management agreement and testing plan developed by the herd owner and approved by the Administrator to identify and eradicate CWD from a positive, source, suspect, exposed, or adjacent herd. ( )

32. Limited Contact. Incidental contact between animals of different herds in separate pens off of the herd's premises at fairs, shows, exhibitions and sales. ( )

33. National CWD Herd Certification Program. A federal-state-industry cooperative program administered by APHIS and implemented by participating states that establishes CWD surveillance and testing standards that owners must achieve before interstate transport of cervids will be permitted. ( )

Commented [DSL7]: New definition

34. **Official CWD Test**. A test approved by the Administrator and conducted at an approved laboratory to diagnose CWD. ( )

35. **Official Identification**. Identification, approved by the Administrator, that individually, uniquely, and permanently identifies each cervid. ( )

36. **Operator**. A person who has authority to manage or direct a domestic cervidae ranch. ( )

37. **Premises**. The ground, area, buildings, and equipment utilized to raise, propagate, control, or harvest domestic cervidae. ( )

38. **Quarantine**. An order issued on authority of the Administrator, by a state or federal animal health official or accredited veterinarian, prohibiting movement of cervids from any location without a written restricted movement permit. ( )

39. **Quarantine Facility**. A confined area where selected domestic cervidae can be secured and isolated from all other cervidae and livestock. ( )

40. **Ranch Management Plan**. A written plan for a domestic cervidae ranch that sets forth best management practices that mitigates the introduction or dissemination of disease among domestic cervidae. ( )

41. **Reidentification**. The identification of a domestic cervid which had been officially identified, as provided by this chapter, but which has lost the official identification device, or the tattoo or official identification device has become illegible. ( )

42. **Restrain**. The immobilization of domestic cervidae in a chute, other device, or by other means for the purpose of efficiently, effectively, and safely inspecting, treating, vaccinating, or testing. ( )

43. **Restricted Movement Permit**. An official document that is issued by the Administrator, AVIC, or an accredited veterinarian for movement of animals from positive, suspect, or exposed herds. ( )

44. **Source Herd**. The herd or herds from where a producer acquired their existing livestock. ~~A herd from which at least one (1) cervid has originated within the previous five (5) years and that cervid has been diagnosed CWD positive. ( )~~

Commented [DSL8]: Clarify & standardize the definition

45. **State Animal Health Official**. The Administrator, or Administrator's designee. ( )

46. **Status Date**. The date on which the Administrator approves in writing a herd status change with regard to CWD. ( )

47. **Trace Back Herd**. An exposed herd in which at least one (1) CWD positive animal resided within any of the previous sixty (60) months prior to diagnosis with CWD. ( )

48. **Trace Forward Herd**. A herd that has received exposed animals from a positive herd within sixty (60) months prior to the diagnosis of CWD in the positive herd or from the identified point of entry of CWD into the positive herd. ( )

49. **Traceback**. The process of identifying the movements and the herd of origin of CWD positive, or exposed animals, including herds that were sold for slaughter. ( )

50. **Wild Cervidae**. Any cervid animal not owned by a person. ( )

51. **Wild Ungulate**. Any four (4) legged, hoofed herbivore, including cervids and other ruminants, not owned by a person. ( )

52. **Wild Ungulate Cooperative Herd Plan**. A plan, developed cooperatively by the owner of the domestic cervidae ranch, the ISDA, and the Idaho Department of Fish and Game to determine the disposition of any wild ungulates that are found to be located on a domestic cervidae ranch. ( )

011. ABBREVIATIONS.

01. **AAVLD**. American Association of Veterinary Laboratory Diagnosticians. ( )

02. **APHIS**. Animal and Plant Health Inspection Service. ( )

03. **AVIC**. Area Veterinarian in Charge. ( )

04. **AZA**. Association of Zoos and Aquariums. ( )

05. **CFR**. Code of Federal Regulations. ( )

06. **CWD**. Chronic Wasting Disease. ( )

07. ~~**CWDP**. Chronic Wasting Disease Program.~~ ( )
HCP. Herd Certification Program.

Commented [DSL9]: Updated abbreviation.

08. **ISDA**. Idaho State Department of Agriculture. ( )

09. **NAEBA**. North American Elk Breeders Association. ( )

10. **NVSL**. National Veterinary Services Laboratory. ( )

11. **TB**. Tuberculosis. ( )

12. **UM&R**. Uniform Methods and Rules. ( )

13. **USDA**. United States Department of Agriculture. ( )

14. **VS**. Veterinary Services. ( )

012. APPLICABILITY.
These rules apply to all domestic cervidae located in, imported into, exported from, or transported through the state of Idaho. ( )

~~013. **AZA ACCREDITED FACILITIES AND USDA LICENSED FACILITIES.**~~
~~AZA accredited facilities and facilities licensed by USDA under 9CFR Subchapter A Parts 1 and 2 as licensees, dealers, exhibitors, research facilities and zoos are exempt from the provisions of this chapter provided that: ( )~~

~~**01.** **Movement Between AZA and USDA Facilities**. AZA accredited and USDA licensed facilities may not sell, give, or in any way transfer cervidae to persons or domestic cervidae ranches within Idaho, except other to AZA accredited or USDA licensed facilities. ( )~~

~~**02.** **Transfer of Cervidae**. Any AZA accredited or USDA licensed facility that in any way transfers cervidae, or title to cervidae, to any person in Idaho, except to other AZA accredited or USDA licensed facilities, must comply with all of the provisions of this chapter. ( )~~

~~014. Importation Of Domestic Cervidae.~~
~~All domestic cervidae imported into the state of Idaho must comply with the requirements of the APHIS National CWD Herd Certification Program and IDAPA 02.04.21 "Rules Governing the Importation of Animals," which apply to domestic cervidae.~~ ( )

015. -- 019. (RESERVED)

020. LOCATION OF DOMESTIC CERVIDAE.
Any person who owns or has control of domestic cervidae in Idaho that are not located on a domestic cervidae ranch that is in compliance with the applicable provisions of this chapter, ~~or on an AZA accredited or USDA licensed facility in compliance with this chapter~~, is in violation of these rules. ( )

01. Department Action. In addition to any other administrative or civil action, the department may seize, require removal from the state, require removal to a domestic cervidae ranch that is in compliance with the provisions of this chapter, or require disposal of any domestic cervidae that are not located on a domestic cervidae ranch, an AZA accredited facility, or a USDA licensed facility which is in compliance with the provisions of this chapter. ( )

02. Reindeer. Reindeer may not be owned, possessed, propagated or held in Idaho north of the Salmon River in order to protect the wild caribou herd in northern Idaho. ( )

03. Exceptions. The Administrator may grant exceptions from the provisions of Section 020 on a case specific basis. ( )

04. Natural Disasters. Damage caused to domestic cervidae ranch facilities by natural disasters does not constitute a violation of this chapter, provided that the owner or operator begins any necessary repairs immediately upon discovering the damage, acts expeditiously, as determined by the Administrator, to complete any necessary repairs and reports the extent and cause of any damage to the Division within twenty-four (24) hours of the discovery of the damage. ( )

05. Notification of Temporary Exhibition. Producers conducting temporary exhibitions must notify ISDA, in advance, of any event where a reindeer will be exhibited outside of an approved cervidae facility. ISDA must be provided with the date and location of the event as well as a description of the temporary facility and an escape plan protocol.

021. OFFICIAL IDENTIFICATION.
All domestic cervidae must be individually, permanently, and uniquely identified, with two (2) types of official identification approved by the Administrator. ( )

01. Reporting of Identification. The unique individual identification number, type of identification, and the name, address, and telephone number of the owner of each animal identified must be reported to the Administrator, in writing, by the owner or operator. ( )

02. Identification Assigned. Official identification, once assigned to an individual animal, may not be changed or transferred to another animal. Animals that lose identification devices must be re-identified in accordance with Section 031. ( )

03. Progeny. All progeny of domestic cervidae must be officially identified by December thirty-first of the year of birth, upon sale or transfer of ownership, or upon leaving the domestic cervidae ranch, whichever is earlier. ( )

04. Visible Identification. At least one (1) of the official types of identification used must be visible from one hundred and fifty (150) feet. ( )

022. TYPES OF OFFICIAL IDENTIFICATION.

Commented [DSL10]: 2021 Statutory Amendment

Commented [DSL11]: Mandated in statute. 25-3703A

Commented [DSL12]: Mandated in statute. 35-3703A

All domestic cervidae must be individually identified by two (2) of the following types of official identification, at least one (1) of the types of official identification must be a bangle or lamb tag that is visible from one hundred fifty (150) feet. ( )

01. Official USDA Ear Tag. ( )

02. Tattoo. Legible skin tattoo using an alphanumeric tattoo sequence that has been recorded with the Division of Animal Industries and applied to either the ear or escutcheon. ( )

03. Electronic Identification. A form of electronic identification, approved by the Administrator. ( )

04. Official NAEBA Eartag. ( )

05. Official ISDA Cervidae Program Ear Tag. A tamper resistant, unique number sequenced, individual identification tag approved by the Administrator. ( )

06. Official HASCO Brass Lamb Tag. A brass lamb tag engraved with farm name and individual animal identification number. ( )

~~**07. Freeze Brands**. Legible, freeze brands that uniquely identify the individual domestic cervid.~~ ( )

~~**08. Ranch Specific Unique Bangle or Lamb Tags**. The Administrator may grant written approval for the use of bangle or lamb tags that are: ranch specific; tamper resistant; uniquely numbered; and correlated with another type of official identification on the annual inventory report. ( )~~

09. Other Identification. Other forms of unique individual identification approved by the Administrator. ( )

~~023. National CWD Herd Certification Program Official Identification.~~

~~All domestic cervidae enrolled in the National CWD Herd Certification Program are required to be identified with two (2) forms of identification for each animal. One (1) form of identification must be a nationally unique official animal identification that uses an APHIS-approved numbering system that is linked to the CWD National Database or equivalent ISDA database. The second form of identification must be unique to the individual animal within the herd and also be linked to the CWD National Database or equivalent ISDA database. ( )~~

~~**01. APHIS-Approved Identification Devices**. ( )~~

~~**a.** Electronic Identification; ( )~~

~~**b.** Official USDA Tamper-Resistant Ear Tag; ( )~~

~~**c.** Legible Ear or Flank Tattoo; and ( )~~

~~**d.** Other forms of Identification as approved by APHIS Administrator. ( )~~

024. -- 029. (RESERVED)

030. OFFICIAL VISIBLE IDENTIFICATION.

01. Ear Tags. All domestic cervidae must be identified with a bangle or lamb tag that is visible from one hundred fifty (150) feet. ( )

02. Size. The large portion of the bangle or lamb tag must be at least two (2) square inches. ( )

Commented [DSL13]: Federal program requirements. Redundant language.

Commented [DSL14]: Mandated in statute. 25-3703A

03. **Color**. No visible identification may have a primary color of brown, black, pink, tan, or silver. ( )

04. **Camouflage Patterns**. No visible identification may utilize camouflage patterns. ( )

031. REIDENTIFICATION OF DOMESTIC CERVIDAE.

~~No domestic~~ Permanent official identification in domestic ~~cervidae~~cervidae that has been lost or is no longer legible may be replaced only for the purpose to reestablish their original identity. ~~were marked with official identification may be re-tattooed for the purpose of reestablishing their identification nor re-ear-tagged with an official identification ear tag at any time subsequent to the original identification, except that re-tattooing or re-ear-tagging for the purpose of reestablishing the official identification is allowed only under the following conditions:~~ ( )

~~**01.** **Supervision**. Reidentification is accomplished under the supervision of an accredited veterinarian, or state or federal animal health officials.~~ ( )

~~**02.** **Permanent Identification**. Animals that are presented for reidentification have some permanent identification that identifies the animals as those originally officially identified such as an individual animal registration tattoo, or other approved permanent identification, provided that such identification was submitted on the annual inventory report or other official record.~~ ( )

03. **Inventory Evaluation**. In absence of permanent identification, the Administrator may conduct an investigation or inventory evaluation to determine identity of the animal that is being presented for reidentification. ( )

Commented [DSL15]: Mandated in statute 25-3705

~~**04.** **Reproduction of Original Tattoo**. Re-tattooing must reproduce the original tattoo that was placed in the animal's ear at the time of official identification.~~ ( )

05. **Records**. All animals that have been re-identified must be reconciled to their original identification on the annual ISDA inventory form, due on Dec. 31st of each year.~~The accredited veterinarian or state or federal animal health official who supervises the reidentification must correlate the new identification with previous identification and record the ear tag or other identification numbers, the tattoo symbols and the owner's name and address and submit the reidentification record to the Division within ten (10) days of the date of reidentification~~. ( )

032. -- 039. (RESERVED)

040. INSPECTIONS.

Commented [DSL16]: Mandated in statute (25-3704)

Commented [DSL17]: Mandated in statute 25-3705

To prevent the introduction and dissemination, or to control and eradicate diseases, state and federal animal health officials are authorized to inspect cervidae records, premises, facilities, and domestic cervidae to ensure compliance with the provisions of this chapter and other state or federal laws or rules applicable to domestic cervidae. State and federal animal health officials must comply with the operation's biosecurity protocol so long as the protocol does not inhibit reasonable access to:~~(~~)

01. **Entry**. Enter and inspect, at reasonable times, the premises of domestic cervidae ranches and inspect domestic cervidae. ( )

02. **Access to Records**. Review or copy, at reasonable times, any records that must be kept in accordance with these rules. ( )

041. -- 049. (RESERVED)

050. GENETICS.

Domestic cervidae that have red deer genetic influence may not be imported into Idaho. Additionally, any domestic cervidae located in Idaho that are identified as having red deer genetic influence will be destroyed, removed from the state, or neutered.( )

051. -- 059. (RESERVED)

060. WILD CERVIDAE.
Wild cervidae may not be confined, kept or held on a domestic cervidae ranch. ( )

01. Duty of Ranch Owner. It is the duty of owners of all domestic cervidae ranches to take precautions, and to conduct periodic inspections, to ensure that wild cervidae are not located within the perimeter fence of any domestic cervidae ranch. ( )

02. Notification of Administrator. All owners or operators of domestic cervidae ranches must notify the Administrator within twenty-four (24) hours of gaining knowledge of the presence of wild cervidae inside the perimeter fence of the domestic cervidae ranch. ( )

03. Failure to Notify the Administrator. The failure of any owner or operator of a domestic cervidae ranch to notify the Administrator of the presence of wild cervidae within the perimeter fence of a domestic cervidae ranch is a violation of this chapter. ( )

04. Idaho Department of Fish and Game. Upon receiving notification that wild cervidae are on a domestic cervidae ranch, the Administrator will notify the Idaho Department of Fish and Game. ( )

05. ~~**Wild Ungulate Cooperative Herd Plan**. The Idaho Department of Fish and Game will cooperate with ISDA and the owners or operators of domestic cervidae ranches where any wild cervidae or wild ungulates are present within the external perimeter fence of the domestic cervidae ranch to develop and implement a site specific written herd plan to address the disposition of the wild cervidae or wild ungulates. ( )~~

Commented [DSL18]: Mandated in statute. 25-3705B

061. -- 069. (RESERVED)

070. SUPERVISION OF DOMESTIC CERVIDAE PROGRAM.
A department veterinary medical officer will provide routine supervision of the domestic cervidae program. ( )

071. -- 079. (RESERVED)

~~080. Disposal Of Domestic Cervidae.~~
~~All domestic cervidae carcasses and parts of carcasses not utilized for human consumption, except parts of carcasses utilized for taxidermy purposes, must be disposed of in compliance with IDAPA 02.04.17, "Rules Governing Dead Animal Movement And Disposal."~~ ( )

Commented [DSL19]: Redundant language

081. -- 089. (RESERVED)

090. FEES.

01. Annual Assessment Fee. A fee, not to exceed ten dollars ($10) per head per year on elk or three dollars ($3) per head per year on fallow deer and reindeer, is hereby assessed on all domestic cervidae in the state to cover the cost of administering the program covered in these rules. The fee includes all domestic cervidae present at the ranch as of December 31 ~~and all domestic cervidae that die during the same calendar year.~~ This fee is due January first of each year. The annual assessment fee may be reduced if program revenue accumulates to a balance of at least one hundred thousand dollars ($100,000) in excess of the projected annual cost of operating the program, as determined by the Department on July 1 of each year. ( )

Commented [DSL20]: Mandated in statute. 25-3708

Commented [DSL21]: 2020 statutory amendment

02. Import, Export, and Movement Fees. The fees imposed in Section 25-3708(2) through (4), Idaho Code, are due no later than December 31 of each year, but the ~~Department requests all movement fees be submitted within five (5) business days of the movement of the domestic cervids.~~ ( )

091. -- 099. (RESERVED)

100. DOMESTIC CERVIDAE RANCHES.
In order to prevent the introduction or dissemination of diseases, and to control or eradicate diseases, all domestic cervidae ranches must comply with the disease control, facility, and record keeping requirements and all other provisions of this chapter. ( )

01. Each Premises. Each separate premises where domestic cervidae are kept or held must comply with all of the provisions of this chapter. ( )

~~**02. Vehicle Access**. Domestic cervidae ranches must have motorized vehicle access to the restraining system on each premises, during the portion of the year that cervidae are held or kept on the premises, adequate to facilitate disease prevention and control as determined by the Administrator. ( )~~

~~**03. Premises Registration**. Each premises where domestic cervidae are kept or held must be registered with the Division and assigned a unique, individual number approved by the Administrator. ( )~~

101. DOMESTIC CERVIDAE RANCH FACILITY REQUIREMENTS.
Prior to populating the facility with domestic cervids, ~~A~~all domestic cervidae ranches are required to have facilities that include, but are not limited to, perimeter fence, restraining system, gathering system, water system, and if required, a quarantine facility. ( )

01. Maintenance. All facilities must be maintained, at all times that domestic cervidae are present, to prevent the escape of domestic cervidae or ingress of wild cervidae. ( )

02. Inspections. To ensure compliance with this chapter, state or federal animal health officials will inspect all premises where domestic cervidae are, or will be, possessed, controlled, harvested, propagated, held, or kept. ( )

~~**a.** Each domestic cervidae ranch will be inspected no less than once every five (5) years. Domestic cervidae ranches may be inspected more frequently if requested by the owner or if specified in a ranch management plan. The Administrator may require additional facility inspections as necessary to aid in the prevention, control, or eradication of disease or to ensure compliance with the provisions of this chapter or other state or federal rules applicable to domestic cervidae. ( )~~

~~**b.** All facilities relating to the handling or raising of domestic cervidae will be inspected. ( )~~

102. PERIMETER FENCE REQUIREMENTS.
A perimeter fence, completely enclosing the domestic cervidae ranch to be constructed of high-tensile, non-slip woven wire or other fencing material approved by the Administrator. ( )

01. Elk and Fallow Deer. For elk and fallow deer, the fence must be a minimum of eight (8) feet in height for its entire length at all times. ( )

02. Reindeer. For reindeer, the fence must be at least six (6) feet in height for its entire length at all times. ( )

03. Wire. The top two (2) feet of each fence may be smooth, barbed or woven wire (at least twelve and one-half (12-1/2) gauge) with horizontal strands spaced not more than six (6) inches apart. ( )

a. Wire must be placed on the animal side of the fence to prevent pushing the wire away from the posts. ( )

b. Wire must be attached to all posts at the top, bottom, and not more than eighteen (18) inches apart between the top and bottom of the wire. ( )

04. Posts. Wooden posts used in the perimeter fence must be at least butt-end treated with a

Commented [DSL22]: Mandated in statute. 25-3705A

Commented [DSL23]: Mandated in statute. 25-3705

Commented [DSL24]: Different requirements for facility documenting ingresses?

commercially available preservative and have a minimum of four (4) inch top for line posts and a minimum of five (5) inch top for corner posts. Metal pipe posts must be a minimum of two and one-eighth (2-1/8) inches outside diameter with a three-sixteenths (3/16) inch wall thickness for line posts and two and seven-eighths (2-7/8) inches outside diameter with a seven thirty-seconds (7/32) inch wall thickness for corner posts. Posts must be spaced no more than twenty-four (24) feet apart, with stays, supports or braces as needed, and be placed in the ground a minimum of three (3) feet. ( )

05. Gates. Each domestic cervidae ranch must have gates that prohibit the escape of domestic cervidae or the ingress of wild cervidae. ( )

06. Fence Maintenance. Fences must be maintained, at all times that domestic cervidae are present, to prevent domestic cervidae from escaping or native wild cervidae from entering the enclosure. ( )

07. Exceptions. The Administrator may grant exceptions to the specifications in Section 102 on a case specific basis. ( )

103. GATHERING AND RESTRAINING SYSTEM.

Each domestic cervidae ranch must have a system for humanely and effectively gathering and restraining domestic cervidae for the purpose of inspecting, identifying, treating, or testing of animals by state or federal animal health officials. ( )

01. Gathering System. Each domestic cervidae ranch must have a system that facilitates the gathering of domestic cervidae so as to be able to move the domestic cervidae through the restraining system, at any time of the year that domestic cervidae are present. ( )

02. Restraining System. A system approved by the Administrator, to immobilize domestic cervidae for the purpose of efficient, effective, and safe handling for inspecting, treating, vaccinating, or testing. ( )

03. Exceptions. The Administrator may grant exceptions to the provisions of this section on a case specific basis. ( )

~~104. Water System.~~

~~Each domestic cervidae ranch must have a water system adequate to supply the need of the cervidae herd.~~ ( )

105. QUARANTINE FACILITY.

If animals are to be imported onto the domestic cervidae ranch, a quarantine facility, approved by the Administrator, must be provided for holding animals until any disease retesting is accomplished or other requirements are met. ( )

106. -- 199. (RESERVED)

200. RECORDS AND REPORTING.

01. Reports. Owners of domestic cervidae ranches must submit complete and accurate reports to the Administrator. Failure to submit complete and accurate reports within the designated time frames is a violation of this chapter. ( )

02. Records. All owners of domestic cervidae ranches, during normal business hours, must present to state or federal animal health officials, for inspection, review, or copying, any cervidae records deemed necessary to ensure compliance with the provisions of this chapter. ( )

03. Notification. State or federal animal health officials will attempt to notify the owners or operators of domestic cervidae ranches, and premises where records are kept prior to any inspections. ( )

04. Emergencies. In the event of an emergency, as determined by the Administrator, the notification requirements of Section 200 may be waived. ( )

201. ANNUAL INVENTORY REPORT.

01. Inventory Report. All owners of domestic cervidae ranches must submit annually, to the Administrator, a complete and accurate inventory and summary report form of all animals held no later than December 31st of each year containing the following minimum information: ( )

a. Name and address of the domestic cervidae ranch. ( )

b. Name and address of the owner of the domestic cervidae ranch. ( )

c. Date the inventory was completed. ( )

02. Individual Domestic Cervidae. For each individual domestic cervidae that was located on the domestic cervidae ranch during the year for which the report is being made, the following information must be provided: ( )

a. All types of official and unofficial identification; ( )

b. Species; ( )

c. Sex; and ( )

d. Age or year born. ( )

202. INVENTORY VERIFICATION.

~~State or federal animal health officials will verify all domestic cervidae ranch inventories of animals held and individual animal identification annually.~~ ( )

01. Visible Identification. Individual animal identification verification may be accomplished by visually noting the unique official visible identification number or visually noting an unofficial visible identification number if the number is correlated with two (2) forms of official identification on the inventory submitted by the cervidae producer. The Administrator may, on a case by case basis, grant written permission for ranch specific unique bangle tags to be used for official identification. ( )

02. Duty to Gather and Restrain. It is the duty of the owner of each domestic cervidae ranch to gather and restrain any domestic cervidae that state or federal animal health officials determine are not readily identifiable for inventory verification purposes. The Administrator determines the suitability of the restraint system. ( )

~~203. Change Of Address.~~

~~Owners of domestic cervidae ranches must notify the Division in writing within thirty (30) days of any change in the address of the owners of domestic cervidae, the owner of the domestic cervidae ranch, or the domestic cervidae ranch.~~ ( )

204. ESCAPE OF DOMESTIC CERVIDAE.

It is the duty of each owner or operator of a domestic cervidae ranch to take all reasonable actions to prevent the escape of domestic cervidae from a domestic cervidae ranch. ( )

01. Notification of Escape. When any domestic cervidae escape from a domestic cervidae ranch, the owner or operator of the domestic cervidae ranch must notify the Administrator by phone, facsimile, or other means approved by the administrator within twenty-four (24) hours of the discovery of the escape. ( )

02. Duty to Retrieve Escaped Cervidae. It is the duty of each owner or operator of a domestic cervidae ranch to retrieve or otherwise bring under control all domestic cervidae that escape from a domestic cervidae ranch. ( )

Commented [DSL25]: Mandated in statute. 25-3703

Commented [DSL26]: Mandated in statute. 25-3705A

03. Fish and Game. The Administrator will notify the Idaho Department of Fish and Game of each escape. ( )

~~**04. Sheriff and State Brand Inspector**. When domestic cervidae escape from a domestic cervidae ranch and the owner or operator is unable to retrieve the animals within twenty-four (24) hours, the Administrator may notify the county sheriff or the state brand inspector of the escape pursuant to Title 25, Chapter 23, Idaho Code.~~ ( )

05. Capture. In the event that the owner or operator of a domestic cervidae ranch is unable to retrieve escaped domestic cervidae in a timely manner, as determined by the Administrator, the Administrator may effectuate the capture of the escaped domestic cervidae to ensure the health of Idaho's livestock and wild cervidae populations. ( )

06. Failure to Notify. Failure of any owner or operator of a domestic cervidae ranch to notify the Administrator within twenty-four (24) hours of the discovery of an escape of domestic cervidae is a violation of this chapter. ( )

07. Taking of Escaped Domestic Cervidae. A licensed hunter may legally take domestic cervidae that have escaped from a domestic cervidae ranch only under the following conditions: ( )

a. The domestic cervidae has escaped and has not been in the control of the owner or operator of the domestic cervidae ranch for more than seven (7) days; and ( )

b. The hunter is licensed and in compliance with all the provisions of the Idaho Department of Fish and Game rules and code. ( )

205. NOTICE OF DEATH ~~OF DOMESTIC CERVIDAE~~.

~~Notice of death of domestic cervidae twelve (12) months or older and all domestic cervidae officially identified and inventoried that died on a ranch or at an approved slaughter or custom exempt slaughter establishment must be submitted by the owner or operator to the division on a report approved by the Administrator:( )~~All domestic cervidae that die on a ranch or are sent to slaughter must be reported to the Department except for calves that died prior to being reported on an annual inventory.

01. Submission of Death Certificates. A complete and accurate copy of all CWD sample submission forms/death certificates must be submitted to the division on a form approved by the Administrator ~~by regular mail, facsimile, electronic mail, or by other means as approved by the Administrator within ten (10) business days of when the owner or operator knew or reasonably should have known of the death.~~ no later than Dec. 31st in the year the animal died. ~~The CWD sample submission form/death certificate must contain the following minimum information:( )~~

~~**a.** Name and address of the domestic cervidae ranch; and ( )~~

~~**b.** Name and address of the owner of the domestic cervidae ranch. ( )~~

~~**02. Individual Domestic Cervidae**. For each individual domestic cervidae death, the following minimum information must be provided: ( )~~

~~**a.** All individual identification numbers; ( )~~

~~**b.** Sex; ( )~~

~~**c.** Age or year born; ( )~~

~~**d.** Date and time of death; ( )~~

~~e. Cause of death; ( )~~

~~f. Specify animals submitted for CWD testing; and ( )~~

~~g. Dated signature. ( )~~

206. (RESERVED)

~~207. Notification Of Exposure To Disease.~~
~~Any owner, operator, veterinarian practicing in Idaho, laboratory conducting cervidae testing, or any other person who has reason to believe that domestic cervidae are exposed to or infected with a dangerous or reportable disease or parasite must notify the Division immediately. ( )~~

208. INTRASTATE MOVEMENT CERTIFICATE.
All owners of domestic cervidae ranches who move cervidae, from one premises to another, including movement from one (1) premises to another premises owned, operated, leased, or controlled by the owner, within the state of Idaho must submit, to the Administrator, a complete and accurate intrastate movement certificate signed by the owner, within ~~ten (10) business days of the movement~~no later than Dec 31st in the year the movement occurred. The Administrator will provide blank intrastate movement certificates to the owners of domestic cervidae ranches upon request. ( )

209. RANCH MANAGEMENT PLAN.

~~**01. Voluntary Ranch Management Plan**. A domestic cervidae ranch may apply, on a form prescribed by the Administrator, to enter into a voluntary ranch management plan. The ranch management plan will be developed cooperatively by the owner or authorized agent and the Administrator. For the ranch management plan, the Administrator will conduct a risk assessment considering the factors in Subsection 209.03. A voluntary ranch management plan may, notwithstanding other rule requirements to the contrary, establish inventory verification requirements and CWD sampling requirements specific for a domestic cervidae ranch. Failure to adhere to an approved voluntary ranch management plan is a violation of these rules. ( )~~

02. Mandatory Ranch Management Plan. Domestic cervidae ranches are required to develop and implement an approved ranch management plan if the ranch is found in violation of Sections 060, 204 or 500 of these rules. The ranch management plan must be completed and implemented within six (6) months of the disposition of the violation. For the ranch management plan, the Administrator will conduct a risk assessment considering the factors in Subsection 209.03. Failure to comply with the mandatory ranch management plan is a violation of these rules. ( )

03. Risk Assessment for Ranch Management Plans. The Administrator will conduct a risk assessment for each ranch management plan. A ranch management plan will not include a double fencing requirement but may require that double gates be installed. The Administrator will consider the following factors when conducting a risk assessment at a domestic cervidae ranch: ( )

Commented [DSL27]: Update risk assessment factors

a. Risk of egress. The risk of egress may be evaluated based on, but not limited to, history of domestic cervidae escape during the previous five (5) years, recovery rate of escaped domestic cervidae, length of time domestic cervidae were outside of the perimeter fence, annual average precipitation, topography, altitude and tree density. ( )

b. Risk of ingress. The risk of ingress may be evaluated on, but not limited to, history of ingress during the previous five (5) years, annual average precipitation, topography, altitude, tree density and proximity to wildlife migration corridors. ( )

c. Compliance with CWD sample submission. The Administrator may, based on a risk assessment of the facility, adjust the number of tissue sample submissions required under this rule. The adjustment will be based on, but not limited to, the following: ( )

i. Whether the domestic cervidae on the ranch have commingled with any domestic cervids of unknown CWD status. ( )

ii. Whether the domestic cervidae ranch has been in compliance with all requirements of Title 25, Chapter 35, Idaho Code, and these rules. ( )

iii. Whether the domestic cervidae ranch has had documented cases of ingress of wild cervids or egress of domestic cervidae within the eighteen (18) months prior to the risk assessment. ( )

210. -- 249. (RESERVED)

250. INTRASTATE MOVEMENT OF DOMESTIC CERVIDAE.
All live domestic cervidae moving from one premises to another premises within the state of Idaho must be officially identified, except calves during the year of birth accompanying their dam, and accompanied by: ( )

01. TB Test. An official negative test for tuberculosis of all cervidae over twelve (12) months of age, conducted within the last ninety (90) days, or written permission from the Administrator, except: ( )

Commented [DSL28]: Federal law is 60 days prior to entry

a. Animals originating from an accredited, qualified or monitored herd, as described in "Bovine Tuberculosis Eradication, Uniform Methods and Rules," effective January 1, 2005, if they are accompanied by a certificate signed by an accredited veterinarian or the Administrator stating such domestic cervidae have originated directly from such herd; or ( )

b. Those domestic cervidae consigned directly to an approved slaughter establishment or ~~domestic cervidae approved feedlot~~; or ( )

c. Those domestic cervidae moving from one premises to another premises owned, operated, leased, or controlled by the same person. ( )

02. Intrastate Movement Certificate. All intrastate movements of live domestic cervidae, including movement from one premises to another premises owned, operated, leased, or controlled by the same person, must be reported to ISDA on the annual inventory form, due Dec. 31st in the year the movement occurred. ~~accompanied by a complete and accurate intrastate movement certificate, which has been signed by the owner or operator of the domestic cervidae ranch where the movement originates and includes a statement of the CWD and TB status of the cervidae. ( )~~

~~**03. Movement of Cervidae Between Accredited AZA or USDA Licensed Facilities**. Movement of cervidae between accredited AZA and USDA licensed facilities is exempt from the requirements of this chapter. All other movement from AZA accredited or USDA licensed facilities must comply fully with all of the provisions of this chapter. ( )~~

251. -- 299. (RESERVED)

300. DISEASE CONTROL.
~~The Administrator may require domestic cervidae in the state to be tested for brucellosis (Brucella abortus or Brucella suis), tuberculosis (Mycobacterium bovis), meningeal worm (Parelaphostrongylus tenuis), muscle worm (Elaphostrongylus cervus), CWD or for other diseases or parasites determined to pose a risk to other domestic cervidae, livestock, or wildlife.~~ ( )

Commented [DSL29]: Redundant 25-218 & 02.04.03.522

301. DUTY TO RESTRAIN.
It is the duty of the owner of each domestic cervidae ranch to gather and restrain domestic cervidae for testing when directed to do so in writing by the Administrator. The Administrator determines the suitability of the restraint system. ( )

302. TESTING METHODS.
The Administrator determines appropriate testing procedures and methods. ( )

303. TESTING, TREATMENT, QUARANTINE, OR DISPOSAL REQUIRED.

~~The Administrator determines when testing, treatment, quarantine, or disposal of domestic cervidae is required at any domestic cervidae ranch pursuant to Title 25, Chapters 2, 3, 4, 6, and 37, Idaho Code. If the Administrator determines that testing, treatment, quarantine, disposal of domestic cervidae, or cleaning or disinfection of premises is required, a written order will be issued to the owner describing the procedure to be followed and the time period for carrying out such actions. ( )~~

Commented [DSL30]: Idaho Code 25-218

304. QUARANTINES.

~~All domestic cervidae animals or herds that are determined to be exposed to, or infected with, any disease that constitutes an emergency, as provided in Title 25, Chapter 2, Idaho Code, will be quarantined. ( )~~

Commented [DSL31]: 25-2 Idaho Code

~~**01. Infected Herds**. Infected herds or animals must remain under quarantine until such time that the herd has been completely depopulated and the premises has been cleaned and disinfected as provided by the Administrator, or the provisions for release of a quarantine established in these rules have been met. ( )~~

~~**02. Exposed Herds**. The quarantine for exposed herds or animals may take the form of a hold order which remains in effect until the exposed animals have been tested and the provisions for release of a quarantine as established in these rules have been met. ( )~~

~~**03. Validity of Quarantine**. The quarantine is valid whether or not acknowledged by signature of the owner. ( )~~

305. DECLARATION OF ANIMAL HEALTH EMERGENCY.

~~The Director is authorized to declare an animal health emergency. ( )~~

Commented [DSL32]: 25-212 Idaho Code

~~**01. Condemnation of Animals**. In the event that the Director determines that an emergency exists, animals that are found to be infected, or affected with, or exposed to an animal health emergency disease may be condemned and destroyed. ( )~~

~~**02. Indemnity**. Any indemnity is paid in accordance with Sections 25-212 and 25-213, Idaho Code. ( )~~

~~**03. Notification to Administrator**. Every owner of cervidae, every breeder or dealer in cervidae, every veterinarian, and anyone bringing cervidae into this state who observes the appearance of, or signs of any disease or diseases, or who has knowledge of exposure of the cervidae to diseases that constitute an emergency must give immediate notice to the Administrator by telephone, facsimile, or other means as approved by the Administrator.~~ ( )

04. ~~**Failure to Notify**. Any owner of cervidae who fails to report as herein provided forfeits all claims for indemnity for animals condemned and slaughtered or destroyed on account of the animal health emergency.~~ ( )

Commented [DSL33]: 25-212 Idaho Code

306. -- 399. (RESERVED)

~~400. Brucellosis.~~

~~Owners of domestic cervidae ranches must comply with the provisions of IDAPA 02.04.20, "Rules Governing Brucellosis," that apply to domestic cervidae.~~ ( )

401. -- 449. (RESERVED)

450. TUBERCULOSIS.

01. Change of Ownership. All domestic cervidae that are sold, or are in any way transferred from one person to another person in Idaho are required to be tested negative for TB within ninety (90) days prior to the change of ownership or transfer, except: ( )

Commented [DSL34]: Federal requirement is 60 days

a. Animals originating from an accredited, qualified or monitored herd, as described in "Bovine Tuberculosis Eradication, Uniform Methods and Rules," effective January 1, 2005, if they are accompanied by a certificate signed by an accredited veterinarian or the Administrator stating such domestic cervidae have originated directly from such herd; or ( )

b. Those domestic cervidae consigned directly to an approved slaughter establishment or domestic cervidae approved feedlot. ( )

c. The Administrator, following an evaluation, may grant exceptions to the provisions of this Section on a case-by-case basis. ( )

~~**02. Rules and UM&R**. Owners of domestic cervidae ranches must comply with the provisions of IDAPA 02.04.03, "Rules Governing Animal Industry," that apply to domestic cervidae, and the Bovine Tuberculosis Eradication, UM&R, Effective January 1, 2005.~~ ( )

451. -- 499. (RESERVED)

500. SURVEILLANCE FOR CWD.

Commented [DSL35]: USDA now identifies reindeer as a susceptible species

01. Slaughter Surveillance. Brain tissue from no less than ten percent (10%) of all domestic cervidae sixteen (16) months of age or older that are slaughtered at approved slaughter establishments or custom exempt slaughter establishments must be submitted annually by the owner of the slaughtered cervidae to official laboratories to be tested or examined for CWD as provided for in these rules. If ten (10) or less cervids on a domestic cervidae ranch are slaughtered in a calendar year, at least one (1) testable brain sample must be submitted to meet the annual CWD surveillance requirement. Tissues samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement. ( )

02. Domestic Cervidae Ranch Surveillance. Brain tissue from no less than ten percent (10%) of all domestic cervidae sixteen (16) months of age or older that are harvested on domestic cervidae ranches must be submitted for CWD testing annually. If ten (10) or less cervids on a domestic cervidae ranch are harvested in a calendar year, at least one (1) testable brain sample must be submitted to meet the annual CWD surveillance requirement. In addition to the tissue samples from the harvested domestic cervidae, brain tissue from one hundred percent (100%) of all domestic cervidae sixteen (16) months of age or older that die for any reason other than being harvested must also be submitted for CWD testing annually~~.~~ R~~eindeer and~~ fallow deer are exempt from CWD testing unless the ~~reindeer and~~ fallow deer are part of a CWD positive, exposed, trace, source, or suspect herd or part of an elk herd. The owner or operator of the domestic cervidae ranch must submit all tissue samples to an official laboratory to be tested for CWD, as provided for in these rules. Tissues samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement~~. In the event a domestic cervidae ranch cannot submit a testable brain sample, the domestic cervidae ranch must submit a CWD Sample Submission Waiver Request within ten (10) business days of determining that a testable brain sample cannot be submitted. ( )~~

Commented [DSL36]: Change to "USDA-identified susceptible species"

501. COLLECTION OF SAMPLES FOR CWD TESTING.

Only accredited veterinarians, state and federal animal health officials, and other persons, approved by the Administrator, may collect brain or other tissue samples for CWD testing. Samples must be collected immediately upon discovery of the death of a domestic cervid. ( )

~~**01. Brain Samples**. Only persons trained by state or federal animal health officials, and approved by the Administrator, may remove the obex portion of the brainstem for submission as the sample for CWD testing. ( )~~

~~**02. Submission of Head**. Only persons trained by state or federal animal health officials, and approved by the Administrator, may submit a head with the official identification attached to the head as the sample for CWD testing. ( )~~

~~**03.** **Handling of Samples**. All CWD samples must be handled in a manner that prevents degradation of the sample. ( )~~

~~**04.** **Sample Submission Time**. Fresh samples for CWD testing must be submitted, to an approved laboratory, within seventy-two (72) hours of the date of collection. Formalin preserved samples must be submitted, to an approved laboratory, within ten (10) business days of the date of collection.~~ ( )

05. **Non-Testable or Samples That Do not Contain Appropriate Tissues**. The Administrator may conduct an investigation to determine if a domestic cervidae ranch is complying with the provisions of Section 500 if: ( )

~~**a.** The owner or operator of a domestic cervidae ranch submits samples for CWD testing which are non-testable; or ( )~~

~~**b.** The owner or operator of a domestic cervidae ranch submits samples for CWD testing that do not contain the obex portion of the brainstem or other appropriate tissues, if available, for CWD testing. ( )~~

c. The owner or operator of a domestic cervidae ranch submits samples for CWD testing which cannot be identified to the animal of origin. ( )

06. **Failure to Meet Annual CWD Tissue Submission Requirement**. An owner or operator of a domestic cervidae ranch who fails to submit samples for CWD testing or who fails to meet the annual tissue submission requirements of this chapter, or both, is in violation of these rules, except the Administrator may approve, in writing, a variance from sample submission requirements on a case specific basis. ( )

502. OFFICIAL CWD TESTS.

01. **Official Tests**. Official tests for CWD, approved by the Administrator, include: ( )

a. ~~Histopathology~~Enzyme Linked Immunosorbent Assay (ELISA); ( )

b. Immunohistochemistry; ( )

c. ~~Western Blot;~~ ( )

d. Negative Stain Electron Microscopy; ( )

e. ~~Bioassay;~~ and ( )

02. **Other Scientifically Validated Test**. The Administrator may approve other scientifically validated laboratory or diagnostic tests to confirm a diagnosis of CWD. ( )

503. CWD STATUS.

CWD status is validated pursuant to the Federal CWD Herd Certification program standards.~~based on the number of years that a herd of domestic cervidae has been determined to be in compliance with the provisions of this chapter, during which there is no evidence of CWD in the herd.~~ ( )

~~**01.** **Status Review**. The Administrator will review the CWD status of each domestic cervidae herd located in Idaho on at least an annual basis. ( )~~

~~**02.** **Status Date**. The status date is the date that the Administrator approves a change in the CWD status of a domestic cervidae herd in Idaho. ( )~~

~~**03.** **Cervidae of Lesser Status**. If a herd of domestic cervidae has contact with cervidae of a lesser status, the status of the herd with the higher status will be lowered to the status of the cervidae with the lesser status.~~

~~( )~~

~~**04. Change of Ownership**. A herd's status may remain with the herd when a change of ownership, management or premises occurs, if there is no contact with cervidae of lesser status, and no previous history of CWD on the premises. ( )~~

~~**05. Contact with CWD Positive Animals**. Any herd of domestic cervidae that has contact with CWD positive or exposed animals may have its status reduced or removed. ( )~~

504. INVESTIGATION OF CWD.
An epidemiological investigation will be conducted on all CWD positive, suspect, and exposed animals and herds, herds of origin, source herds, all adjacent herds, and all trace herds as determined by the Administrator. ( )

01. Quarantine. All positive, suspect, and exposed herds or animals, herds of origin, adjacent herds, and herds having contact with positive or exposed animals must be quarantined; and ( )

02. Identification. CWD suspect and exposed animals must be identified and remain on the premises where they are found until they have met the provisions for release of quarantine established in this chapter, are destroyed and disposed of as directed by the Administrator, or are moved at the Administrator's direction on a restricted movement permit. ( )

505. DURATION OF CWD QUARANTINE.
Quarantines imposed because of CWD in accordance with this chapter remain in effect until one (1) of the following criteria are met: ( )

01. CWD Positive Herds. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after five (5) years of compliance with an individual herd CWD plan and all provisions of these rules, during which there was no evidence of CWD. ( )

02. CWD Suspect Herds. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd as determined by the Administrator. ( )

03. Source Herds and Herds of Origin. The quarantine may be released after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd and that the herd is not the source of infection as determined by the Administrator. ( )

04. Exposed Herds. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd as determined by the Administrator. ( )

05. Adjacent Herds. The quarantine may be released when directed by the Administrator based upon an epidemiological investigation and in consultation with the designated epidemiologist. ( )

06. Fencing Requirements. Any owner of a domestic cervidae ranch who chooses to remain under quarantine for five (5) years must construct a second perimeter fence that meets the requirements for perimeter fence, as provided in Section 102, such that no domestic cervidae on the domestic cervidae ranch can get within ten (10) feet of the original exterior perimeter fence or as approved by the Administrator. ( )

07. Complete Depopulation. The quarantine may be released after: ( )

a. Complete depopulation of all cervidae on the premises as directed by the Administrator; and ( )

b. The premises have been free of all livestock as specified in an individual CWD herd plan approved by the Administrator; and ( )

c. The soil and facilities have been cleaned, treated, decontaminated, or disinfected as directed by the Administrator. ( )

08. Disposal of Positive or Exposed Cervidae. All CWD positive or exposed domestic cervidae must be disposed of as directed by the Administrator. ( )

~~506. Cleaning, Treating, Decontaminating, Or Disinfecting.~~

~~Premises must be cleaned, treated, decontaminated, or disinfected under state or federal supervision as directed by the Administrator within fifteen (15) days after CWD positive or suspect animals have been removed. ( )~~

~~**01. Exemptions**. The Administrator may authorize, in writing, an exemption from cleaning, treating, decontaminating, or disinfection requirements on a case-by-case basis. ( )~~

~~**02. Extension of Time**. The Administrator may authorize, in writing, an extension of time for cleaning and disinfection under extenuating circumstances. ( )~~

~~**03. Requests for Extensions or Exemptions**. The owner of the contaminated facility must submit requests for extensions or exemptions to the Administrator in writing. ( )~~

507. -- 999. (RESERVED)

Commented [DSL37]: Redundant. 25-218 & 02.04.03.590-1

Domestic Cervidae Rulemaking Meeting May 19th, 2021
IDAPA 02.04.21 Discussion

Attendees:

Scott Leibsle, DVM, ISDA
Lloyd Knight, ISDA
Chase Jones
Tricia Hebdon, IDFG
Mike Miller
Brad Smith, ICL
Deb Lawrence, DVM, ISDA
Dallas Burkhalter, ISDA
Katy DeVries, ISDA
Miranda Juker, ISDA
Travis Lowe, NAEBA
Garret Visser
David Miller
Ed Benhardt
Rulon Jones
Jeff Siddoway
Kami Marriott
Scott Barnes, DVM, ISDA
Jennifer
Brian Brooks, IWF

The discussion followed the conclusion of the rulemaking meeting for the Rules Governing Domestic Cervidae and moved to IDAPA 02.04.21 "Rules Governing the Importation of Animals" section 600 through 607. Dr. Leibsle said he had summarized comments which had been submitted by ICL and IWF and worked to include them at the appropriate place in the rule. At 600.3 the deworming requirement had been discussed previously. With *p. tenuis* still being prevalent around the 100th meridian, the current requirement is for all imported cervids to be dewormed within 30 days before entry. There were previously comments regarding concerns about drug residue being in the animals longer than 30 days. Recommendations from the previous meeting ranged from 60 days to 6 months, with an additional suggestion to only require for animals east of the 100th meridian. There were no additional comments brought up at this meeting. Dr. Leibsle said that ISDA had been hearing the same concerns for years. The intent of the deworming requirement is to prevent meningeal worm, and any of the previous suggestions are viewed as reasonable from the perspective of ISDA.

Jeff Siddoway was concerned about the need for a Certificate of Veterinary Inspection (CVI) to make sure deworming requirement was needed. He said when he treats his own animals, he's not required to have a veterinarian there to watch everything he does. He had no issue with the deworming requirement itself, just didn't feel it was practical to require a veterinarian to be there. Dr. Leibsle said the veterinarian doesn't need to witness the treatment, just state on the CVI that it had been completed. David Miller said a combination of the 6-month treatment timeframe and only requiring for animals east of the 100th meridian was acceptable to the Cervidae industry. Dr. Leibsle said they get comments about drug residue all the time and that requirement would meet the animal health needs present.

Section 601.2 regarding Red Deer Genetic Factor (RDFG) was discussed next. Dr. Leibsle said that ISDA wants requirements that are fair and equitable which is not possible with the lack of a reliable, validated test. He encouraged that a proposal and testing protocols be sent in regarding this matter. There were no comments.

Section 606 – This is the area to add language from the August 2020 administrative order with additional requirements. In addition to being required to participate in the HCP, they are restricting movement from a CWD-endemic area (as set by other state/province) or within 25 miles. When implementing the order, they tried to find a midline with the requirements set by other states – not the most or least restrictive out there – but there needs to be some standard set. The previous comments regarding this issue had some recommending lowering the radius to 20 miles and others feeling it was better to keep 25 miles.

Domestic Cervidae Rulemaking Meeting May 19th, 2021
IDAPA 02.04.21 Discussion

Rulon Jones said that the federal standards had been referenced a couple times, but the federal standard doesn't include an endemic area requirement. He asked why the state standard was being set over and beyond the federal requirements. Dr. Leibsle gave a couple reasons why state requirements would be more stringent than federal requirements – if industry stakeholders want something more restrictive, or if the governing agency determines there is a risk and they need to protect the industry. He said the primary concern is Alberta because they changed how they are surveilling for CWD in the wild population. While acknowledging there are varying opinions on the issue, the goal is to protect the industry.

Mr. Jones said the requirements were more than needed and the federal standards were enough. He said that CWD will always be a challenge, but it's not fair to be restricted in doing business because of something they can't control. He said Cervidae producers manage behind their fences to maintain a CWD-free herd and it was beyond reason to go beyond that. Dr. Leibsle agreed it was beyond the control of producers and explained the requirement was therefore present to protect producers. CWD in wild elk cannot be controlled by the producers, but there is a clear risk. He added that he understood the position and the order wasn't saying that producers aren't doing a good job.

Garret Visser supported keeping the 25-mile radius from the administrative order. He asked if the department could elaborate on the scientific literature available. Dr. Leibsle said that CWD is spreading aggressively in Alberta and Canada changed their management strategy between 2019 and 2020. He said there was a study by Scott Wells from the University of Minnesota about 3 years ago which identified all the risk factors for spread of CWD to domestic herds. One big factor was proximity to CWD in wild elk populations. That study said that less than a 50-mile radius presented a risk.

Dr. Leibsle brought up information on proximity requirements for all the different states. He said the radius varies, some states have banned animals from CWD areas altogether, and some have more restrictive fencing requirements. ISDA wants to protect without being overly restrictive. Kami Marriott agreed with Rulon Jones and wanted to have discussion about how ranches could mitigate their CWD risk with Best Management Practices and a history of testing to show they were going above and beyond to keep their herds free from CWD. Dr. Leibsle asked if that meant a producer wanting to import from and area in Alberta within a 25-mile radius could do things to show they are mitigating the CWD risks. Ms. Marriott said yes. Dr. Leibsle said a risk analysis was being done to an extent as it was already required to have a 5-year herd history for anyone importing into Idaho. He suggested that if producers wanted additional considerations to allow exceptions to the 25-mile rule, they would need to provide a plan. He cited the example of the North Dakota Livestock Board which has an appeals process in place for imports that are initially denied. He said he would need to know what the additional considerations for a risk analysis would be and how a decision should be justified, since it puts the agency in place to deny some movements and permit others with the same origin.

Travis Lowe shared NAEBA's point of view. He said that different states define an endemic area/radius in different ways which greatly impacts commerce. He pointed out that the industry involves risk and producers are already doing research before deciding who to purchase animals from. He feels there is a lack of consistency when states make their own rules, although the HCP sets some standards. He mentioned a study done in Minnesota on white tailed deer, which have different susceptibility to CWD. He said there have been CWD-infected elk herds elsewhere in the country, which led to USDA depopulating thousands of animals to only found four positives. This is indicative of a low level of spread even within infected herds. He said it was making a big assumption to say wild elk 24.5 miles away provide a risk to domestic farms. He mentioned doing risk assessments would be important in the future, because all facilities vary greatly in their individual circumstances.

Dr. Leibsle asked Mr. Lowe if he had any suggested components for a risk analysis. Mr. Lowe said that he was willing to take responsibility to gather information. He mentioned that there has to be great accuracy in locations where CWD is discovered when they are dealing with a certain radius. He said they have photos from both Canada and the USA showing samples not being handled properly. He said he would like to discuss with their members before suggesting any ideas. Dr. Leibsle said the department was open to new ideas for how to minimize the risk of CWD without adversely affecting commerce and the industry. He said with the 25-mile radius being enforced it was previously discussed if the agency should validate actual locations. He said that any comments or proposals must be received by June 20th, 2021, and they would like to have a semi-final rule presented at the June meeting.

Rulon Jones said he appreciated Kami Marriott's earlier comment. He said there are some breeders who count their animals every day, which avoids the issue of sample deterioration, and they are doing everything they can to ensure their herd is clean and safe. The presence of wild CWD cases affects their livelihood. He said there should be something they can come up with to prevent ruining lives because of something beyond their control. Dr. Leibsle encouraged producers to do outreach to states with appeals processes such as North Dakota, Colorado and Texas; see what they do when reviewing and granting exemptions. He encouraged the industry to come up with a data-driven proposal and said the agency was willing to listen to suggestions.

Jeff Siddoway said that producers know the business is risky and they have a lot invested. They don't want to bring in a disease that would end their operation. He said that he didn't like the way the rule was implemented in 2020 because producers had already made down payments and it caused them to lose opportunities and thousands of dollars in net profit. He said the industry needs to look for some kind of live animal test – sheep have an accepted live animal test for scrapie. He didn't know the process for test approval, but he said if the producers were willing to take a risk and live with the test results and import from an endemic area the state should allow it. He asked how long it would take for a test to be accepted in Idaho, if producers and NAEBA paid to find one. Dr. Leibsle explained that the absence of a live animal test wasn't due to lack of desire; everyone would jump at the opportunity to have a validated live test. He said such as test was likely to happen in deer first because the movement of CWD through their system is more predictable. He said a blood or saliva test would be great but, once any validated test was available, they would like the opportunity to accept it. He then asked if there were further comments and there were none.

Domestic Cervidae Rulemaking Meeting May 19th, 2021
IDAPA 02.04.21 Discussion

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Jeff Siddoway was concerned about the need for a Certificate of Veterinary Inspection (CVI) to make sure deworming requirement was needed. He said when he treats his own animals, he's not required to have a veterinarian there to watch everything he does. He had no issue with the deworming requirement itself, just didn't feel it was practical to require a veterinarian to be there. Dr. Leibsle said the veterinarian doesn't need to witness the treatment, just state on the CVI that it had been completed. David Miller said a combination of the 6-month treatment timeframe and only requiring for animals east of the 100th meridian was acceptable to the Cervidae industry. Dr. Leibsle said they get comments about drug residue all the time and that requirement would meet the animal health needs present.

Section 601.2 regarding Red Deer Genetic Factor (RDFG) was discussed next. Dr. Leibsle said that ISDA wants requirements that are fair and equitable which is not possible with the lack of a reliable, validated test. He encouraged that a proposal and testing protocols be sent in regarding this matter. There were no comments.

Section 606 – This is the area to add language from the August 2020 administrative order with additional requirements. In addition to being required to participate in the HCP, they are restricting movement from a CWD-endemic area (as set by other state/province) or within 25 miles. When implementing the order, they tried to find a midline with the requirements set by other states – not the most or least restrictive out there – but there needs to be some standard set. The previous comments regarding this issue had some recommending lowering the radius to 20 miles and others feeling it was better to keep 25 miles.

Domestic Cervidae Rulemaking Meeting May 19th, 2021
IDAPA 02.04.21 Discussion

Rulon Jones said that the federal standards had been referenced a couple times, but the federal standard doesn't include an endemic area requirement. He asked why the state standard was being set over and beyond the federal requirements. Dr. Leibsle gave a couple reasons why state requirements would be more stringent than federal requirements – if industry stakeholders want something more restrictive, or if the governing agency determines there is a risk and they need to protect the industry. He said the primary concern is Alberta because they changed how they are surveilling for CWD in the wild population. While acknowledging there are varying opinions on the issue, the goal is to protect the industry.

Mr. Jones said the requirements were more than needed and the federal standards were enough. He said that CWD will always be a challenge, but it's not fair to be restricted in doing business because of something they can't control. He said Cervidae producers manage behind their fences to maintain a CWD-free herd and it was beyond reason to go beyond that. Dr. Leibsle agreed it was beyond the control of producers and explained the requirement was therefore present to protect producers. CWD in wild elk cannot be controlled by the producers, but there is a clear risk. He added that he understood the position and the order wasn't saying that producers aren't doing a good job.

Garret Visser supported keeping the 25-mile radius from the administrative order. He asked if the department could elaborate on the scientific literature available. Dr. Leibsle said that CWD is spreading aggressively in Alberta and Canada changed their management strategy between 2019 and 2020. He said there was a study by Scott Wells from the University of Minnesota about 3 years ago which identified all the risk factors for spread of CWD to domestic herds. One big factor was proximity to CWD in wild elk populations. That study said that less than a 50-mile radius presented a risk.

Dr. Leibsle brought up information on proximity requirements for all the different states. He said the radius varies, some states have banned animals from CWD areas altogether, and some have more restrictive fencing requirements. ISDA wants to protect without being overly restrictive. Kami Marriott agreed with Rulon Jones and wanted to have discussion about how ranches could mitigate their CWD risk with Best Management Practices and a history of testing to show they were going above and beyond to keep their herds free from CWD. Dr. Leibsle asked if that meant a producer wanting to import from and area in Alberta within a 25-mile radius could do things to show they are mitigating the CWD risks. Ms. Marriott said yes. Dr. Leibsle said a risk analysis was being done to an extent as it was already required to have a 5-year herd history for anyone importing into Idaho. He suggested that if producers wanted additional considerations to allow exceptions to the 25-mile rule, they would need to provide a plan. He cited the example of the North Dakota Livestock Board which has an appeals process in place for imports that are initially denied. He said he would need to know what the additional considerations for a risk analysis would be and how a decision should be justified, since it puts the agency in place to deny some movements and permit others with the same origin.

Travis Lowe shared NAEBA's point of view. He said that different states define an endemic area/radius in different ways which greatly impacts commerce. He pointed out that the industry involves risk and producers are already doing research before deciding who to purchase animals from. He feels there is a lack of consistency when states make their own rules, although the HCP sets some standards. He mentioned a study done in Minnesota on white tailed deer, which have different susceptibility to CWD. He said there have been CWD-infected elk herds elsewhere in the country, which led to USDA depopulating thousands of animals to only found four positives. This is indicative of a low level of spread even within infected herds. He said it was making a big assumption to say wild elk 24.5 miles away provide a risk to domestic farms. He mentioned doing risk assessments would be important in the future, because all facilities vary greatly in their individual circumstances.

Dr. Leibsle asked Mr. Lowe if he had any suggested components for a risk analysis. Mr. Lowe said that he was willing to take responsibility to gather information. He mentioned that there has to be great accuracy in locations where CWD is discovered when they are dealing with a certain radius. He said they have photos from both Canada and the USA showing samples not being handled properly. He said he would like to discuss with their members before suggesting any ideas. Dr. Leibsle said the department was open to new ideas for how to minimize the risk of CWD without adversely affecting commerce and the industry. He said with the 25-mile radius being enforced it was previously discussed if the agency should validate actual locations. He said that any comments or proposals must be received by June 20th, 2021, and they would like to have a semi-final rule presented at the June meeting.

Rulon Jones said he appreciated Kami Marriott's earlier comment. He said there are some breeders who count their animals every day, which avoids the issue of sample deterioration, and they are doing everything they can to ensure their herd is clean and safe. The presence of wild CWD cases affects their livelihood. He said there should be something they can come up with to prevent ruining lives because of something beyond their control. Dr. Leibsle encouraged producers to do outreach to states with appeals processes such as North Dakota, Colorado and Texas; see what they do when reviewing and granting exemptions. He encouraged the industry to come up with a data-driven proposal and said the agency was willing to listen to suggestions.

Jeff Siddoway said that producers know the business is risky and they have a lot invested. They don't want to bring in a disease that would end their operation. He said that he didn't like the way the rule was implemented in 2020 because producers had already made down payments and it caused them to lose opportunities and thousands of dollars in net profit. He said the industry needs to look for some kind of live animal test – sheep have an accepted live animal test for scrapie. He didn't know the process for test approval, but he said if the producers were willing to take a risk and live with the test results and import from an endemic area the state should allow it. He asked how long it would take for a test to be accepted in Idaho, if producers and NAEBA paid to find one. Dr. Leibsle explained that the absence of a live animal test wasn't due to lack of desire; everyone would jump at the opportunity to have a validated live test. He said such as test was likely to happen in deer first because the movement of CWD through their system is more predictable. He said a blood or saliva test would be great but, once any validated test was available, they would like the opportunity to accept it. He then asked if there were further comments and there were none.

Rulemaking Summary

IDAPA 02.04.19 – Rules Governing Domestic Cervidae

Where is the rulemaking authority?

Authority for this rulemaking resides in the Title 25 Chapter 3704 Idaho Code – Domestic Cervidae Farms

What does this rule do?

These rules govern procedures for the detection, prevention, control and eradication of diseases among domestic cervidae, and facilities, record keeping, and reporting requirements of domestic cervidae ranches.

What is the agency proposing to change?

The agency has performed Zero Based Regulation to simplify, clarify or remove outdated, unnecessary or irrelevant language in sections highlighted blue in the attached strawman. The amended language in these sections does not change the regulatory impact, scope, intent or authority in the current rule.

The agency has conducted an internal audit of this rule and identified multiple sections that may require amendments due to inaccurate or confusing language, recommendations to improve the efficiency of the program or changes that must be made to coincide with recent statutory amendments. The changes listed below, and highlighted in yellow in the attached strawman, do result in a change to the regulatory impact, scope, intent or authority in the current rule.

- Updating incorporations by reference to current version (Section 004)
- Create a definition of "endemic area" (section 010)
- Correct and clarify definition of "source herd" (section 010)
- Remove prohibition on reindeer farming north of the Salmon River; define what requirements are necessary to transport a reindeer off property for temporary exhibition (Section 020)
- Remove the fee for domestic cervidae that die during the same calendar year (Section 090)

- All facility requirements must be approved prior to population with cervids (Section 101)
- Require a summary report form be submitted with the annual inventory (Section 201)
- Change the due date for intrastate movement fees (Section 208)
- Require reindeer be included in CWD testing requirements (Section 500)

Recent discussions with industry and stakeholders have identified the topics listed below, and highlighted in green in the attached strawman, for review and potential amendment:

- Modification to the Red Deer Gene Factor testing and management requirements (Section 050)

02.04.19 – RULES GOVERNING DOMESTIC CERVIDAE

000. LEGAL AUTHORITY.
This chapter is adopted under the legal authority of Sections 25-203, 25-305, 25-601, and 25-3704, Idaho Code. ( )

001. TITLE AND SCOPE.

01. Title. The title of this chapter is "Rules Governing Domestic Cervidae." ( )

02. Scope. These rules govern procedures for the detection, prevention, control and eradication of diseases among domestic cervidae, and facilities, record keeping, and reporting requirements of domestic cervidae ranches. ( )

002. – 003. (RESERVED)

004. INCORPORATION BY REFERENCE.
The following documents are incorporated by reference. ( )

01. Bovine Tuberculosis Eradication, Uniform Methods and Rules, Effective January 1, 2005. This document can be viewed online at https://www.aphis.usda.gov/animal_health/animal_diseases/tuberculosis/downloads/tb-umr.pdf. ( )

02. Code of Federal Regulations, Title 9, Part 161, January 1, ~~2016~~2021. This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

03. Code of Federal Regulations, Title 9, Part 55, January 1, ~~2016~~2021.This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

04. Code of Federal Regulations, Title 9, Subchapter A, Part 1 and 2, January 1, ~~2016~~2021.This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

005. -- 009. (RESERVED)

010. DEFINITIONS.

~~**01. Accredited Veterinarian**. A veterinarian approved by the Administrator and USDA/APHIS/VS, in accordance with Title 9, Part 161, CFR, January 1, 2004, to perform functions required by cooperative state-federal animal disease control and eradication programs. ( )~~

02. Approved Laboratory. NVSL, an AAVLD accredited laboratory that is qualified to perform CWD diagnostic procedures, or a laboratory designated by the Administrator to perform CWD diagnostic procedures. ( )

03. Approved Slaughter Establishment. A USDA inspected slaughter establishment at which ante-mortem and post-mortem inspection is conducted by USDA inspectors. ( )

04. Area Veterinarian in Charge. The USDA/APHIS/VS veterinary official who is assigned to supervise and perform official animal health activities in Idaho. ( )

Commented [DSL1]: Update to 2021 version. Accredited veterinarian standards.

Commented [DSL2]: Update to 2021 version. CWD regulations

Commented [DSL3]: Update to 2021 version. Animal welfare regulations.

Commented [DSL4]: Redundant…defined in 9 CFR 55 & 9 CFR 161

05. **Breed Associations and Registries**. Organizations maintaining permanent records of ancestry or pedigrees of animals, individual animal identification records and records of ownership. ( )

06. ~~**Certificate**. An official document issued by a state or federal animal health official or an accredited veterinarian at the point of origin of a shipment of cervidae that contains information documenting the age, sex, species, individual identification of the animals, the number of animals, the purpose of the movement, the points of origin and destination, the consignor, the consignee, the status of the animals relative to official diseases, test results and any other information required by the state animal health official for importation or translocation.~~ ( )

Commented [DSL5]: Definition unnecessary…CVI already a state and federal requirement

07. **Cervid Herd**. One (1) or more domestic cervidae or groups of domestic cervidae maintained on common ground or under common ownership or supervision that may be geographically separated but can have interchange or movement. ( )

08. **Cervidae**. Deer, elk, moose, caribou, reindeer, and related species and hybrids including all members of the cervidae family and hybrids. ( )

09. **Chronic Wasting Disease**. A transmissible spongiform encephalopathy of cervids that is a nonfebrile, transmissible, insidious, and degenerative disease affecting the central nervous system of cervidae. ( )

10. **Commingling**. Within the last five (5) years, the animals have had direct contact with each other, had less than thirty (30) feet of physical separation, or shared management equipment, pasture, or surface water sources, except for periods of less than forty-eight (48) hours at sales or auctions when a state or federal animal health official has determined such contact presents minimal risk of CWD transmission. ( )

11. **Custom Exempt Slaughter Establishment**. A slaughter establishment that is subject to facility inspection by USDA-FSIS, but that does not have ante-mortem and post-mortem inspection of animals by USDA inspectors. ( )

Commented [DSL6]: clarification

12. **CWD-Adjacent Herd**. A herd of domestic cervidae occupying premises that border a premises occupied by a CWD positive herd, including herds separated by roads or streams. ( )

13. **CWD-Exposed Animal**. A cervid animal that is not exhibiting any signs of CWD, but has had contact within the last five (5) years with cervids from a CWD-positive herd or the animal is a member of a CWD-exposed herd. ( )

14. **CWD-Exposed Herd**. A herd of cervidae in which no animals are exhibiting signs of CWD, but: ( )

a. An epidemiological investigation indicates that contact with CWD positive animals or contact with animals from a CWD positive herd has occurred in the previous five (5) years; or ( )

b. A herd of cervidae occupying premises that were previously occupied by a CWD positive herd within the past five (5) years as determined by the designated epidemiologist; or ( )

c. Two (2) herds that are maintained on a single premises even if they are managed separately, have no commingling, and have separate herd records. ( )

15. **CWD-Positive Cervid**. A domestic cervid on which a diagnosis of CWD has been confirmed through positive test results on any official cervid CWD test by an approved laboratory. ( )

16. **CWD-Positive Herd**. A domestic cervidae herd in which any animal(s) has been diagnosed with CWD, based on positive laboratory results, from an approved laboratory. ( )

17. **CWD-Suspect Cervid**. A domestic cervid for which laboratory evidence or clinical signs suggests

a diagnosis of CWD. ( )

18. **CWD-Suspect Herd**. A domestic cervidae herd in which any animal(s) has been determined to be a CWD-suspect. ( )

19. **Death Certificate**. A form, approved by the administrator, provided by the Division for the reporting of cervidae deaths and for reporting sample submission for CWD testing. ( )

20. **Designated Epidemiologist**. A state or federal veterinarian who has demonstrated the knowledge and ability to perform the functions required under these rules and who has been selected by the Administrator to fulfill the epidemiology duties relative to the state domestic cervidae disease control program. ( )

21. **Disposal**. Final disposition of dead cervidae. ( )

22. **Domestic Cervidae**. Fallow deer (*Dama dama*), elk (*Cervus elaphus*) or reindeer (*Rangifer tarandus*) owned by a person. ( )

23. **Domestic Cervidae Ranch**. A premises where domestic cervidae are held or kept, including multiple premises under common ownership. ( )

24. **Electronic Identification**. A form of unique, permanent individual animal identification such as radio frequency identification tag, radio frequency identification implant, or other forms approved by the Administrator. ( )

Endemic Area. A geographical area designated by a state animal health official in the state of origin where animals located within that area are subject to an increased risk of acquiring a contagious disease. Most commonly in reference to Tuberculosis or Chronic Wasting Disease.

25. **Escape**. Any domestic cervidae located outside the perimeter fence of a domestic cervidae ranch and not under the immediate control of the owner or operator of the domestic cervidae ranch. ( )

26. **Federal Animal Health Official**. An employee of USDA/APHIS/VS who is authorized to perform animal health activities. ( )

27. **Harvest**. Any healthy domestic cervid that is intentionally and lethally removed from a domestic cervidae facility, by an owner, designated employee or customer of the facility, strictly for the purposes of either shooting or meat production. ( )

28. **Herd of Origin**. A cervid herd, on any domestic cervidae ranch or other premise, where the animals were born, or where they were kept for at least one (1) year prior to date of shipment. ( )

29. **Herd Status**. Classification of a cervidae herd with regard to CWD. ( )

30. **Intrastate Movement Certificate**. A form approved by the Administrator, and available from the Division, to document the movement of domestic cervidae between premises within Idaho. ( )

31. **Individual CWD Herd Plan**. A written herd management agreement and testing plan developed by the herd owner and approved by the Administrator to identify and eradicate CWD from a positive, source, suspect, exposed, or adjacent herd. ( )

32. **Limited Contact**. Incidental contact between animals of different herds in separate pens off of the herd's premises at fairs, shows, exhibitions and sales. ( )

33. **National CWD Herd Certification Program**. A federal-state-industry cooperative program administered by APHIS and implemented by participating states that establishes CWD surveillance and testing standards that owners must achieve before interstate transport of cervids will be permitted. ( )

Commented [DSL7]: New definition

34. **Official CWD Test**. A test approved by the Administrator and conducted at an approved laboratory to diagnose CWD. ( )

35. **Official Identification**. Identification, approved by the Administrator, that individually, uniquely, and permanently identifies each cervid. ( )

36. **Operator**. A person who has authority to manage or direct a domestic cervidae ranch. ( )

37. **Premises**. The ground, area, buildings, and equipment utilized to raise, propagate, control, or harvest domestic cervidae. ( )

38. **Quarantine**. An order issued on authority of the Administrator, by a state or federal animal health official or accredited veterinarian, prohibiting movement of cervids from any location without a written restricted movement permit. ( )

39. **Quarantine Facility**. A confined area where selected domestic cervidae can be secured and isolated from all other cervidae and livestock. ( )

40. **Ranch Management Plan**. A written plan for a domestic cervidae ranch that sets forth best management practices that mitigates the introduction or dissemination of disease among domestic cervidae. ( )

41. **Reidentification**. The identification of a domestic cervid which had been officially identified, as provided by this chapter, but which has lost the official identification device, or the tattoo or official identification device has become illegible. ( )

42. **Restrain**. The immobilization of domestic cervidae in a chute, other device, or by other means for the purpose of efficiently, effectively, and safely inspecting, treating, vaccinating, or testing. ( )

43. **Restricted Movement Permit**. An official document that is issued by the Administrator, AVIC, or an accredited veterinarian for movement of animals from positive, suspect, or exposed herds. ( )

44. **Source Herd**. The herd or herds from where a producer acquired their existing livestock. ~~A herd from which at least one (1) cervid has originated within the previous five (5) years and that cervid has been diagnosed CWD positive. ( )~~

Commented [DSL8]: Clarify & standardize the definition

45. **State Animal Health Official**. The Administrator, or Administrator's designee. ( )

46. **Status Date**. The date on which the Administrator approves in writing a herd status change with regard to CWD. ( )

47. **Trace Back Herd**. An exposed herd in which at least one (1) CWD positive animal resided within any of the previous sixty (60) months prior to diagnosis with CWD. ( )

48. **Trace Forward Herd**. A herd that has received exposed animals from a positive herd within sixty (60) months prior to the diagnosis of CWD in the positive herd or from the identified point of entry of CWD into the positive herd. ( )

49. **Traceback**. The process of identifying the movements and the herd of origin of CWD positive, or exposed animals, including herds that were sold for slaughter. ( )

50. **Wild Cervidae**. Any cervid animal not owned by a person. ( )

51. **Wild Ungulate**. Any four (4) legged, hoofed herbivore, including cervids and other ruminants, not owned by a person. ( )

52. **Wild Ungulate Cooperative Herd Plan**. A plan, developed cooperatively by the owner of the domestic cervidae ranch, the ISDA, and the Idaho Department of Fish and Game to determine the disposition of any wild ungulates that are found to be located on a domestic cervidae ranch. ( )

011. ABBREVIATIONS.

01. **AAVLD**. American Association of Veterinary Laboratory Diagnosticians. ( )

02. **APHIS**. Animal and Plant Health Inspection Service. ( )

03. **AVIC**. Area Veterinarian in Charge. ( )

04. **AZA**. Association of Zoos and Aquariums. ( )

05. **CFR**. Code of Federal Regulations. ( )

06. **CWD**. Chronic Wasting Disease. ( )

07. ~~**CWDP**. Chronic Wasting Disease Program.~~ ( )
HCP. Herd Certification Program.

Commented [DSL9]: Updated abbreviation.

08. **ISDA**. Idaho State Department of Agriculture. ( )

09. **NAEBA**. North American Elk Breeders Association. ( )

10. **NVSL**. National Veterinary Services Laboratory. ( )

11. **TB**. Tuberculosis. ( )

12. **UM&R**. Uniform Methods and Rules. ( )

13. **USDA**. United States Department of Agriculture. ( )

14. **VS**. Veterinary Services. ( )

012. APPLICABILITY.
These rules apply to all domestic cervidae located in, imported into, exported from, or transported through the state of Idaho. ( )

~~013. **AZA ACCREDITED FACILITIES AND USDA LICENSED FACILITIES.**~~
~~AZA accredited facilities and facilities licensed by USDA under 9CFR Subchapter A Parts 1 and 2 as licensees, dealers, exhibitors, research facilities and zoos are exempt from the provisions of this chapter provided that: ( )~~

~~**01.** **Movement Between AZA and USDA Facilities**. AZA accredited and USDA licensed facilities may not sell, give, or in any way transfer cervidae to persons or domestic cervidae ranches within Idaho, except other to AZA accredited or USDA licensed facilities. ( )~~

~~**02.** **Transfer of Cervidae**. Any AZA accredited or USDA licensed facility that in any way transfers cervidae, or title to cervidae, to any person in Idaho, except to other AZA accredited or USDA licensed facilities, must comply with all of the provisions of this chapter. ( )~~

~~014. Importation Of Domestic Cervidae.~~

~~All domestic cervidae imported into the state of Idaho must comply with the requirements of the APHIS National CWD Herd Certification Program and IDAPA 02.04.21 "Rules Governing the Importation of Animals," which apply to domestic cervidae.~~ ( )

015. -- 019. (RESERVED)

020. LOCATION OF DOMESTIC CERVIDAE.

Any person who owns or has control of domestic cervidae in Idaho that are not located on a domestic cervidae ranch that is in compliance with the applicable provisions of this chapter, ~~or on an AZA accredited or USDA licensed facility in compliance with this chapter~~, is in violation of these rules. ( )

01. Department Action. In addition to any other administrative or civil action, the department may seize, require removal from the state, require removal to a domestic cervidae ranch that is in compliance with the provisions of this chapter, or require disposal of any domestic cervidae that are not located on a domestic cervidae ranch, an AZA accredited facility, or a USDA licensed facility which is in compliance with the provisions of this chapter. ( )

~~**02. Reindeer**. Reindeer may not be owned, possessed, propagated or held in Idaho north of the Salmon River in order to protect the wild caribou herd in northern Idaho.~~ ( )

Commented [DSL10]: 2021 Statutory Amendment

03. Exceptions. The Administrator may grant exceptions from the provisions of Section 020 on a case specific basis. ( )

04. Natural Disasters. Damage caused to domestic cervidae ranch facilities by natural disasters does not constitute a violation of this chapter, provided that the owner or operator begins any necessary repairs immediately upon discovering the damage, acts expeditiously, as determined by the Administrator, to complete any necessary repairs and reports the extent and cause of any damage to the Division within twenty-four (24) hours of the discovery of the damage. ( )

05. Notification of Temporary Exhibition. Producers must notify ISDA, in advance, of any event where a reindeer will be exhibited outside of an approved cervidae facility. ISDA must be provided with the date and location of the event as well as a description of the temporary facility and an escape plan protocol.

021. OFFICIAL IDENTIFICATION.

All domestic cervidae must be individually, permanently, and uniquely identified, with two (2) types of official identification approved by the Administrator. ( )

Commented [DSL11]: Mandated in statute. 25-3703A

01. Reporting of Identification. The unique individual identification number, type of identification, and the name, address, and telephone number of the owner of each animal identified must be reported to the Administrator, in writing, by the owner or operator. ( )

02. Identification Assigned. Official identification, once assigned to an individual animal, may not be changed or transferred to another animal. Animals that lose identification devices must be re-identified in accordance with Section 031. ( )

03. Progeny. All progeny of domestic cervidae must be officially identified by December thirty-first of the year of birth, upon sale or transfer of ownership, or upon leaving the domestic cervidae ranch, whichever is earlier. ( )

04. Visible Identification. At least one (1) of the official types of identification used must be visible from one hundred and fifty (150) feet. ( )

022. TYPES OF OFFICIAL IDENTIFICATION.

Commented [DSL12]: Mandated in statute. 35-3703A

All domestic cervidae must be individually identified by two (2) of the following types of official identification, at least one (1) of the types of official identification must be a bangle or lamb tag that is visible from one hundred fifty

(150) feet. ( )

01. **Official USDA Ear Tag**. ( )

02. **Tattoo**. Legible skin tattoo using an alphanumeric tattoo sequence that has been recorded with the Division of Animal Industries and applied to either the ear or escutcheon. ( )

03. **Electronic Identification**. A form of electronic identification, approved by the Administrator. ( )

04. **Official NAEBA Eartag**. ( )

05. **Official ISDA Cervidae Program Ear Tag**. A tamper resistant, unique number sequenced, individual identification tag approved by the Administrator. ( )

06. **Official HASCO Brass Lamb Tag**. A brass lamb tag engraved with farm name and individual animal identification number. ( )

~~**07.** **Freeze Brands**. Legible, freeze brands that uniquely identify the individual domestic cervid.~~ ( )

08. **Ranch Specific Unique Bangle or Lamb Tags**. The Administrator may grant written approval for the use of bangle or lamb tags that are: ranch specific; tamper resistant; uniquely numbered; and correlated with another type of official identification on the annual inventory report. ( )

Commented [DSL13]: Leave language intact. David Miller

09. **Other Identification**. Other forms of unique individual identification approved by the Administrator. ( )

~~023. National CWD Herd Certification Program Official Identification.~~

~~All domestic cervidae enrolled in the National CWD Herd Certification Program are required to be identified with two (2) forms of identification for each animal. One (1) form of identification must be a nationally unique official animal identification that uses an APHIS-approved numbering system that is linked to the CWD National Database or equivalent ISDA database. The second form of identification must be unique to the individual animal within the herd and also be linked to the CWD National Database or equivalent ISDA database. ( )~~

Commented [DSL14]: Federal program requirements. Redundant language. 9 CFR 55

~~**01.** **APHIS-Approved Identification Devices**. ( )~~

~~**a.** Electronic Identification; ( )~~

~~**b.** Official USDA Tamper-Resistant Ear Tag; ( )~~

~~**c.** Legible Ear or Flank Tattoo; and ( )~~

~~**d.** Other forms of Identification as approved by APHIS Administrator. ( )~~

024. -- 029. (RESERVED)

030. OFFICIAL VISIBLE IDENTIFICATION.

Commented [DSL15]: Mandated in statute. 25-3703A

01. **Ear Tags**. All domestic cervidae must be identified with a bangle or lamb tag that is visible from one hundred fifty (150) feet. ( )

02. **Size**. The large portion of the bangle or lamb tag must be at least two (2) square inches. ( )

03. **Color**. No visible identification may have a primary color of brown, black, pink, tan, or silver.

( )

04. Camouflage Patterns. No visible identification may utilize camouflage patterns. ( )

031. REIDENTIFICATION OF DOMESTIC CERVIDAE.

~~No domestic~~ Permanent official identification in domestic ~~cervidae~~cervidae -that has been lost or is no longer legible may be replaced only for the purpose to reestablish their original identity. ~~were marked with official identification may be re-tattooed for the purpose of reestablishing their identification nor re-ear-tagged with an official identification ear tag at any time subsequent to the original identification, except that re-tattooing or re-ear-tagging for the purpose of reestablishing the official identification is allowed only under the following conditions:~~ ( )

~~**01. Supervision**. Reidentification is accomplished under the supervision of an accredited veterinarian, or state or federal animal health officials.~~ ( )

~~**02. Permanent Identification**. Animals that are presented for reidentification have some permanent identification that identifies the animals as those originally officially identified such as an individual animal registration tattoo, or other approved permanent identification, provided that such identification was submitted on the annual inventory report or other official record~~. ( )

03. Inventory Evaluation. In absence of permanent identification, the Administrator may conduct an investigation or inventory evaluation to determine identity of the animal that is being presented for reidentification. ( )

~~**04. Reproduction of Original Tattoo**. Re-tattooing must reproduce the original tattoo that was placed in the animal's ear at the time of official identification.~~ ( )

05. Records. All animals that have been re-identified must be reconciled to their original identification on the annual ISDA inventory form, due on Dec. 31st of each year.~~The accredited veterinarian or state or federal animal health official who supervises the reidentification must correlate the new identification with previous identification and record the ear tag or other identification numbers, the tattoo symbols and the owner's name and address and submit the reidentification record to the Division within ten (10) days of the date of reidentification~~. ( )

032. -- 039. (RESERVED)

040. INSPECTIONS.

To prevent the introduction and dissemination, or to control and eradicate diseases, state and federal animal health officials are authorized to inspect cervidae records, premises, facilities, and domestic cervidae to ensure compliance with the provisions of this chapter and other state or federal laws or rules applicable to domestic cervidae. State and federal animal health officials must comply with the operation's biosecurity protocol so long as the protocol does not inhibit reasonable access to:~~(~~)

01. Entry. Enter and inspect, at reasonable times, the premises of domestic cervidae ranches and inspect domestic cervidae. ( )

02. Access to Records. Review or copy, at reasonable times, any records that must be kept in accordance with these rules. ( )

041. -- 049. (RESERVED)

~~**050. GENETICS.**~~

~~Domestic cervidae that have red deer genetic influence may not be imported into Idaho. Additionally, any domestic cervidae located in Idaho that are identified as having red deer genetic influence will be destroyed, removed from the state, or neutered. ( )~~

051. -- 059. (RESERVED)

Commented [DSL16]: Mandated in statute 25-3705

Commented [DSL17]: Mandated in statute (25-3704)

Commented [DSL18]: Mandated in statute 25-3705

Commented [DSL19]: Remove instate removal requirement. David Miller, Jeff Siddoway

060. WILD CERVIDAE.
Wild cervidae may not be confined, kept or held on a domestic cervidae ranch. ( )

01. Duty of Ranch Owner. It is the duty of owners of all domestic cervidae ranches to take precautions, and to conduct periodic inspections, to ensure that wild cervidae are not located within the perimeter fence of any domestic cervidae ranch. ( )

02. Notification of Administrator. All owners or operators of domestic cervidae ranches must notify the Administrator within twenty-four (24) hours of gaining knowledge of the presence of wild cervidae inside the perimeter fence of the domestic cervidae ranch. ( )

03. Failure to Notify the Administrator. The failure of any owner or operator of a domestic cervidae ranch to notify the Administrator of the presence of wild cervidae within the perimeter fence of a domestic cervidae ranch is a violation of this chapter. ( )

04. Idaho Department of Fish and Game. Upon receiving notification that wild cervidae are on a domestic cervidae ranch, the Administrator will notify the Idaho Department of Fish and Game. ( )

05. ~~**Wild Ungulate Cooperative Herd Plan**. The Idaho Department of Fish and Game will cooperate with ISDA and the owners or operators of domestic cervidae ranches where any wild cervidae or wild ungulates are present within the external perimeter fence of the domestic cervidae ranch to develop and implement a site specific written herd plan to address the disposition of the wild cervidae or wild ungulates. ( )~~

061. -- 069. (RESERVED)

070. SUPERVISION OF DOMESTIC CERVIDAE PROGRAM.
A department veterinary medical officer will provide routine supervision of the domestic cervidae program. ( )

071. -- 079. (RESERVED)

~~080. Disposal Of Domestic Cervidae.~~
~~All domestic cervidae carcasses and parts of carcasses not utilized for human consumption, except parts of carcasses utilized for taxidermy purposes, must be disposed of in compliance with IDAPA 02.04.17, "Rules Governing Dead Animal Movement And Disposal." ( )~~

081. -- 089. (RESERVED)

090. FEES.

01. Annual Assessment Fee. A fee, not to exceed ten dollars ($10) per head per year on elk or three dollars ($3) per head per year on fallow deer and reindeer, is hereby assessed on all domestic cervidae in the state to cover the cost of administering the program covered in these rules. The fee includes all domestic cervidae present at the ranch as of December 31 ~~and all domestic cervidae that die during the same calendar year.~~ This fee is due January first of each year. The annual assessment fee may be reduced if program revenue accumulates to a balance of at least one hundred thousand dollars ($100,000) in excess of the projected annual cost of operating the program, as determined by the Department on July 1 of each year. ( )

02. Import, Export, and Movement Fees. The fees imposed in Section 25-3708(2) through (4), Idaho Code, are due no later than December 31 of each year, but the ~~Department requests all movement fees be submitted within five (5) business days of the movement of the domestic cervids.~~ ( )

091. -- 099. (RESERVED)

100. DOMESTIC CERVIDAE RANCHES.

Commented [DSL20]: Mandated in statute. 25-3705B

Commented [DSL21]: Redundant language

Commented [DSL22]: Stop assessment for cervids greater than 12 years old. Jeff Siddoway.

Billy Rasmussen.

Commented [DSL23R22]: Not feasible for ISDA to implement – having to verify age of animal if there is a discrepancy.

Commented [DSL24]: Mandated in statute. 25-3708

Commented [DSL25]: 2020 statutory amendment

In order to prevent the introduction or dissemination of diseases, and to control or eradicate diseases, all domestic cervidae ranches must comply with the disease control, facility, and record keeping requirements and all other provisions of this chapter. ( )

01. Each Premises. Each separate premises where domestic cervidae are kept or held must comply with all of the provisions of this chapter. ( )

~~**02. Vehicle Access**. Domestic cervidae ranches must have motorized vehicle access to the restraining system on each premises, during the portion of the year that cervidae are held or kept on the premises, adequate to facilitate disease prevention and control as determined by the Administrator.~~ ~~( )~~

~~**03. Premises Registration**. Each premises where domestic cervidae are kept or held must be registered with the Division and assigned a unique, individual number approved by the Administrator.~~ ( )

101. DOMESTIC CERVIDAE RANCH FACILITY REQUIREMENTS.

Prior to populating the facility with domestic cervids, ~~A~~all domestic cervidae ranches are required to have facilities that include, but are not limited to, perimeter fence, restraining system, gathering system, water system, and if required, a quarantine facility. ( )

01. Maintenance. All facilities must be maintained, at all times that domestic cervidae are present, to prevent the escape of domestic cervidae or ingress of wild cervidae. ( )

Commented [DSL26]: Mandated in statute. 25-3705A

02. Inspections. To ensure compliance with this chapter, state or federal animal health officials will inspect all premises where domestic cervidae are, or will be, possessed, controlled, harvested, propagated, held, or kept. ( )

Commented [DSL27]: Mandated in statute. 25-3705

~~**a.** Each domestic cervidae ranch will be inspected no less than once every five (5) years. Domestic cervidae ranches may be inspected more frequently if requested by the owner or if specified in a ranch management plan. The Administrator may require additional facility inspections as necessary to aid in the prevention, control, or eradication of disease or to ensure compliance with the provisions of this chapter or other state or federal rules applicable to domestic cervidae.~~ ( )

~~**b.** All facilities relating to the handling or raising of domestic cervidae will be inspected.~~ ~~( )~~

102. PERIMETER FENCE REQUIREMENTS.

A perimeter fence, completely enclosing the domestic cervidae ranch to be constructed of high-tensile, non-slip woven wire or other fencing material approved by the Administrator. ( )

01. Elk and Fallow Deer. For elk and fallow deer, the fence must be a minimum of eight (8) feet in height for its entire length at all times. ( )

02. Reindeer. For reindeer, the fence must be at least six (6) feet in height for its entire length at all times. ( )

03. Wire. The top two (2) feet of each fence may be smooth, barbed or woven wire (at least twelve and one-half (12-1/2) gauge) with horizontal strands spaced not more than six (6) inches apart. ( )

a. Wire must be placed on the animal side of the fence to prevent pushing the wire away from the posts. ( )

b. Wire must be attached to all posts at the top, bottom, and not more than eighteen (18) inches apart between the top and bottom of the wire. ( )

04. Posts. Wooden posts used in the perimeter fence must be at least butt-end treated with a commercially available preservative and have a minimum of four (4) inch top for line posts and a minimum of five (5) inch top for corner posts. Metal pipe posts must be a minimum of two and one-eighth (2-1/8) inches outside diameter with a three-sixteenths (3/16) inch wall thickness for line posts and two and seven-eighths (2-7/8) inches outside diameter with a seven thirty-seconds (7/32) inch wall thickness for corner posts. Posts must be spaced no more than twenty-four (24) feet apart, with stays, supports or braces as needed, and be placed in the ground a minimum of three (3) feet. ( )

05. **Gates**. Each domestic cervidae ranch must have gates that prohibit the escape of domestic cervidae or the ingress of wild cervidae. ( )

06. **Fence Maintenance**. Fences must be maintained, at all times that domestic cervidae are present, to prevent domestic cervidae from escaping or native wild cervidae from entering the enclosure. ( )

07. **Exceptions**. The Administrator may grant exceptions to the specifications in Section 102 on a case specific basis. ( )

103. GATHERING AND RESTRAINING SYSTEM.
Each domestic cervidae ranch must have a system for humanely and effectively gathering and restraining domestic cervidae for the purpose of inspecting, identifying, treating, or testing of animals by state or federal animal health officials. ( )

01. **Gathering System**. Each domestic cervidae ranch must have a system that facilitates the gathering of domestic cervidae so as to be able to move the domestic cervidae through the restraining system, at any time of the year that domestic cervidae are present. ( )

02. **Restraining System**. A system approved by the Administrator, to immobilize domestic cervidae for the purpose of efficient, effective, and safe handling for inspecting, treating, vaccinating, or testing. ( )

03. **Exceptions**. The Administrator may grant exceptions to the provisions of this section on a case specific basis. ( )

~~104. Water System.~~
~~Each domestic cervidae ranch must have a water system adequate to supply the need of the cervidae herd.~~ ( )

105. QUARANTINE FACILITY.
If animals are to be imported onto the domestic cervidae ranch, a quarantine facility, approved by the Administrator, must be provided for holding animals until any disease retesting is accomplished or other requirements are met. ( )

106. -- 199. (RESERVED)

200. RECORDS AND REPORTING.

01. **Reports**. Owners of domestic cervidae ranches must submit complete and accurate reports to the Administrator. Failure to submit complete and accurate reports within the designated time frames is a violation of this chapter. ( )

02. **Records**. All owners of domestic cervidae ranches, during normal business hours, must present to state or federal animal health officials, for inspection, review, or copying, any cervidae records deemed necessary to ensure compliance with the provisions of this chapter. ( )

03. **Notification**. State or federal animal health officials will attempt to notify the owners or operators of domestic cervidae ranches, and premises where records are kept prior to any inspections. ( )

04. **Emergencies**. In the event of an emergency, as determined by the Administrator, the notification requirements of Section 200 may be waived. ( )

201. ANNUAL INVENTORY REPORT.

01. Inventory Report. All owners of domestic cervidae ranches must submit annually, to the Administrator, a complete and accurate inventory and summary report form of all animals held no later than December 31st of each year containing the following minimum information: ( )

a. Name and address of the domestic cervidae ranch. ( )

b. Name and address of the owner of the domestic cervidae ranch. ( )

c. Date the inventory was completed. ( )

02. Individual Domestic Cervidae. For each individual domestic cervidae that was located on the domestic cervidae ranch during the year for which the report is being made, the following information must be provided: ( )

a. All types of official and unofficial identification; ( )

b. Species; ( )

c. Sex; and ( )

d. Age or year born. ( )

202. INVENTORY VERIFICATION.

~~State or federal animal health officials will verify all domestic cervidae ranch inventories of animals held and individual animal identification annually.~~ ( )

01. Visible Identification. Individual animal identification verification may be accomplished by visually noting the unique official visible identification number or visually noting an unofficial visible identification number if the number is correlated with two (2) forms of official identification on the inventory submitted by the cervidae producer. The Administrator may, on a case by case basis, grant written permission for ranch specific unique bangle tags to be used for official identification. ( )

02. Duty to Gather and Restrain. It is the duty of the owner of each domestic cervidae ranch to gather and restrain any domestic cervidae that state or federal animal health officials determine are not readily identifiable for inventory verification purposes. The Administrator determines the suitability of the restraint system. ( )

~~203. Change Of Address.~~

~~Owners of domestic cervidae ranches must notify the Division in writing within thirty (30) days of any change in the address of the owners of domestic cervidae, the owner of the domestic cervidae ranch, or the domestic cervidae ranch.~~ ( )

204. ESCAPE OF DOMESTIC CERVIDAE.

It is the duty of each owner or operator of a domestic cervidae ranch to take all reasonable actions to prevent the escape of domestic cervidae from a domestic cervidae ranch. ( )

01. Notification of Escape. When any domestic cervidae escape from a domestic cervidae ranch, the owner or operator of the domestic cervidae ranch must notify the Administrator by phone, facsimile, or other means approved by the administrator within twenty-four (24) hours of the discovery of the escape. ( )

02. Duty to Retrieve Escaped Cervidae. It is the duty of each owner or operator of a domestic cervidae ranch to retrieve or otherwise bring under control all domestic cervidae that escape from a domestic cervidae ranch. ( )

03. Fish and Game. The Administrator will notify the Idaho Department of Fish and Game of each

Commented [DSL28]: Mandated in statute. 25-3703

Commented [DSL29]: Mandated in statute. 25-3705A

escape. ( )

~~**04. Sheriff and State Brand Inspector**. When domestic cervidae escape from a domestic cervidae ranch and the owner or operator is unable to retrieve the animals within twenty-four (24) hours, the Administrator may notify the county sheriff or the state brand inspector of the escape pursuant to Title 25, Chapter 23, Idaho Code.~~ ( )

05. Capture. In the event that the owner or operator of a domestic cervidae ranch is unable to retrieve escaped domestic cervidae in a timely manner, as determined by the Administrator, the Administrator may effectuate the capture of the escaped domestic cervidae to ensure the health of Idaho's livestock and wild cervidae populations. ( )

06. Failure to Notify. Failure of any owner or operator of a domestic cervidae ranch to notify the Administrator within twenty-four (24) hours of the discovery of an escape of domestic cervidae is a violation of this chapter. ( )

07. Taking of Escaped Domestic Cervidae. A licensed hunter may legally take domestic cervidae that have escaped from a domestic cervidae ranch only under the following conditions: ( )

a. The domestic cervidae has escaped and has not been in the control of the owner or operator of the domestic cervidae ranch for more than seven (7) days; and ( )

b. The hunter is licensed and in compliance with all the provisions of the Idaho Department of Fish and Game rules and code. ( )

205. NOTICE OF DEATH ~~OF DOMESTIC CERVIDAE~~.

~~Notice of death of domestic cervidae twelve (12) months or older and all domestic cervidae officially identified and inventoried that died on a ranch or at an approved slaughter or custom exempt slaughter establishment must be submitted by the owner or operator to the division on a report approved by the Administrator:( )~~All domestic cervidae that die on a ranch or are sent to slaughter must be reported to the Department except for calves that died prior to being reported on an annual inventory.

01. Submission of Death Certificates. A complete and accurate copy of all CWD sample submission forms/death certificates must be submitted to the division on a form approved by the Administrator ~~by regular mail, facsimile, electronic mail, or by other means as approved by the Administrator within ten (10) business days of when the owner or operator knew or reasonably should have known of the death.~~ no later than Dec. 31st in the year the animal died. ~~The CWD sample submission form/death certificate must contain the following minimum information:( )~~

~~**a.** Name and address of the domestic cervidae ranch; and ( )~~

~~**b.** Name and address of the owner of the domestic cervidae ranch. ( )~~

~~**02. Individual Domestic Cervidae**. For each individual domestic cervidae death, the following minimum information must be provided: ( )~~

~~**a.** All individual identification numbers; ( )~~

~~**b.** Sex; ( )~~

~~**c.** Age or year born; ( )~~

~~**d.** Date and time of death; ( )~~

~~**e.** Cause of death; ( )~~

~~**f.** Specify animals submitted for CWD testing; and ( )~~

~~**g.** Dated signature. ( )~~

206. (RESERVED)

~~207. Notification Of Exposure To Disease.~~
~~Any owner, operator, veterinarian practicing in Idaho, laboratory conducting cervidae testing, or any other person who has reason to believe that domestic cervidae are exposed to or infected with a dangerous or reportable disease or parasite must notify the Division immediately. ( )~~

208. INTRASTATE MOVEMENT CERTIFICATE.
All owners of domestic cervidae ranches who move cervidae, from one premises to another, including movement from one (1) premises to another premises owned, operated, leased, or controlled by the owner, within the state of Idaho must submit, to the Administrator, a complete and accurate intrastate movement certificate signed by the owner, within ~~ten (10) business days of the movement~~no later than Dec 31st in the year the movement occurred. The Administrator will provide blank intrastate movement certificates to the owners of domestic cervidae ranches upon request. ( )

209. RANCH MANAGEMENT PLAN.

~~**01. Voluntary Ranch Management Plan**. A domestic cervidae ranch may apply, on a form prescribed by the Administrator, to enter into a voluntary ranch management plan. The ranch management plan will be developed cooperatively by the owner or authorized agent and the Administrator. For the ranch management plan, the Administrator will conduct a risk assessment considering the factors in Subsection 209.03. A voluntary ranch management plan may, notwithstanding other rule requirements to the contrary, establish inventory verification requirements and CWD sampling requirements specific for a domestic cervidae ranch. Failure to adhere to an approved voluntary ranch management plan is a violation of these rules. ( )~~

02. Mandatory Ranch Management Plan. Domestic cervidae ranches are required to develop and implement an approved ranch management plan if the ranch is found in violation of Sections 060, 204 or 500 of these rules. The ranch management plan must be completed and implemented within six (6) months of the disposition of the violation. For the ranch management plan, the Administrator will conduct a risk assessment considering the factors in Subsection 209.03. Failure to comply with the mandatory ranch management plan is a violation of these rules. ( )

03. Risk Assessment for Ranch Management Plans. The Administrator will conduct a risk assessment for each ranch management plan. A ranch management plan will not include a double fencing requirement but may require that double gates be installed. The Administrator will consider the following factors when conducting a risk assessment at a domestic cervidae ranch: ( )

a. Risk of egress. The risk of egress may be evaluated based on, but not limited to, history of domestic cervidae escape during the previous five (5) years, recovery rate of escaped domestic cervidae, length of time domestic cervidae were outside of the perimeter fence, annual average precipitation, topography, altitude and tree density. ( )

b. Risk of ingress. The risk of ingress may be evaluated on, but not limited to, history of ingress during the previous five (5) years, annual average precipitation, topography, altitude, tree density and proximity to wildlife migration corridors. ( )

c. Compliance with CWD sample submission. The Administrator may, based on a risk assessment of the facility, adjust the number of tissue sample submissions required under this rule. The adjustment will be based on, but not limited to, the following: ( )

i. Whether the domestic cervidae on the ranch have commingled with any domestic cervids of unknown CWD status. ( )

ii. Whether the domestic cervidae ranch has been in compliance with all requirements of Title 25, Chapter 35, Idaho Code, and these rules. ( )

iii. Whether the domestic cervidae ranch has had documented cases of ingress of wild cervids or egress of domestic cervidae within the eighteen (18) months prior to the risk assessment. ( )

210. -- 249. (RESERVED)

250. INTRASTATE MOVEMENT OF DOMESTIC CERVIDAE.
All live domestic cervidae moving from one premises to another premises within the state of Idaho must be officially identified, except calves during the year of birth accompanying their dam, and accompanied by: ( )

01. TB Test~~. An official negative test for tuberculosis of all cervidae over twelve (12) months of age, conducted within the last ninety (90) days, or written permission from the Administrator, except: ( )~~

~~**a.** Animals originating from an accredited, qualified or monitored herd, as described in "Bovine Tuberculosis Eradication, Uniform Methods and Rules," effective January 1, 2005, if they are accompanied by a certificate signed by an accredited veterinarian or the Administrator stating such domestic cervidae have originated directly from such herd; or ( )~~

~~**b.** Those domestic cervidae consigned directly to an approved slaughter establishment or domestic cervidae approved feedlot; or ( )~~

~~**c.** Those domestic cervidae moving from one premises to another premises owned, operated, leased, or controlled by the same person. ( )~~

02. Intrastate Movement Certificate. All intrastate movements of live domestic cervidae, including movement from one premises to another premises owned, operated, leased, or controlled by the same person, must be reported to ISDA on the annual inventory form, due Dec. 31st in the year the movement occurred. ~~accompanied by a complete and accurate intrastate movement certificate, which has been signed by the owner or operator of the domestic cervidae ranch where the movement originates and includes a statement of the CWD and TB status of the cervidae. ( )~~

03. ~~**Movement of Cervidae Between Accredited AZA or USDA Licensed Facilities**. Movement of cervidae between accredited AZA and USDA licensed facilities is exempt from the requirements of this chapter. All other movement from AZA accredited or USDA licensed facilities must comply fully with all of the provisions of this chapter. ( )~~

251. -- 299. (RESERVED)

300. DISEASE CONTROL.
~~The Administrator may require domestic cervidae in the state to be tested for brucellosis (Brucella abortus or Brucella suis), tuberculosis (Mycobacterium bovis), meningeal worm (Parelaphostrongylus tenuis), muscle worm (Elaphostrongylus cervus), CWD or for other diseases or parasites determined to pose a risk to other domestic cervidae, livestock, or wildlife.~~ ( )

301. DUTY TO RESTRAIN.
It is the duty of the owner of each domestic cervidae ranch to gather and restrain domestic cervidae for testing when directed to do so in writing by the Administrator. The Administrator determines the suitability of the restraint system. ( )

302. TESTING METHODS.
The Administrator determines appropriate testing procedures and methods. ( )

303. TESTING, TREATMENT, QUARANTINE, OR DISPOSAL REQUIRED.

Commented [DSL30]: Remove TB testing requirement for intrastate movement. David Miller. Chase Jones. Jeff Siddoway, Kami Marriot

Commented [DSL31]: Redundant 25-218 & 02.04.03.522

Commented [DSL32]: Idaho Code 25-218

~~The Administrator determines when testing, treatment, quarantine, or disposal of domestic cervidae is required at any domestic cervidae ranch pursuant to Title 25, Chapters 2, 3, 4, 6, and 37, Idaho Code. If the Administrator determines that testing, treatment, quarantine, disposal of domestic cervidae, or cleaning or disinfection of premises is required, a written order will be issued to the owner describing the procedure to be followed and the time period for carrying out such actions. ( )~~

304. QUARANTINES.

~~All domestic cervidae animals or herds that are determined to be exposed to, or infected with, any disease that constitutes an emergency, as provided in Title 25, Chapter 2, Idaho Code, will be quarantined. ( )~~

~~**01. Infected Herds**. Infected herds or animals must remain under quarantine until such time that the herd has been completely depopulated and the premises has been cleaned and disinfected as provided by the Administrator, or the provisions for release of a quarantine established in these rules have been met. ( )~~

~~**02. Exposed Herds**. The quarantine for exposed herds or animals may take the form of a hold order which remains in effect until the exposed animals have been tested and the provisions for release of a quarantine as established in these rules have been met. ( )~~

~~**03. Validity of Quarantine**. The quarantine is valid whether or not acknowledged by signature of the owner. ( )~~

305. DECLARATION OF ANIMAL HEALTH EMERGENCY.

~~The Director is authorized to declare an animal health emergency. ( )~~

~~**01. Condemnation of Animals**. In the event that the Director determines that an emergency exists, animals that are found to be infected, or affected with, or exposed to an animal health emergency disease may be condemned and destroyed. ( )~~

~~**02. Indemnity**. Any indemnity is paid in accordance with Sections 25-212 and 25-213, Idaho Code. ( )~~

~~**03. Notification to Administrator**. Every owner of cervidae, every breeder or dealer in cervidae, every veterinarian, and anyone bringing cervidae into this state who observes the appearance of, or signs of any disease or diseases, or who has knowledge of exposure of the cervidae to diseases that constitute an emergency must give immediate notice to the Administrator by telephone, facsimile, or other means as approved by the Administrator.~~ ( )

04. ~~**Failure to Notify**. Any owner of cervidae who fails to report as herein provided forfeits all claims for indemnity for animals condemned and slaughtered or destroyed on account of the animal health emergency.~~ ( )

306. -- 399. (RESERVED)

~~400. Brucellosis.~~

~~Owners of domestic cervidae ranches must comply with the provisions of IDAPA 02.04.20, "Rules Governing Brucellosis," that apply to domestic cervidae.~~ ( )

401. -- 449. (RESERVED)

450. TUBERCULOSIS.

~~**01. Change of Ownership**. All domestic cervidae that are sold, or are in any way transferred from one person to another person in Idaho are required to be tested negative for TB within ninety (90) days prior to the change of ownership or transfer, except: ( )~~

~~**a.** Animals originating from an accredited, qualified or monitored herd, as described in "Bovine~~

Commented [DSL33]: 25-2 Idaho Code

Commented [DSL34]: 25-212 Idaho Code

Commented [DSL35]: 25-212 Idaho Code

Commented [DSL36]: Remove TB testing requirement for change of ownership. David Miller.

~~Tuberculosis Eradication, Uniform Methods and Rules," effective January 1, 2005, if they are accompanied by a certificate signed by an accredited veterinarian or the Administrator stating such domestic cervidae have originated directly from such herd; or ( )~~

~~**b.** Those domestic cervidae consigned directly to an approved slaughter establishment or domestic cervidae approved feedlot. ( )~~

~~**c.** The Administrator, following an evaluation, may grant exceptions to the provisions of this Section on a case-by-case basis. ( )~~

~~**02. Rules and UM&R**. Owners of domestic cervidae ranches must comply with the provisions of IDAPA 02.04.03, "Rules Governing Animal Industry," that apply to domestic cervidae, and the Bovine Tuberculosis Eradication, UM&R, Effective January 1, 2005.~~ ( )

451. -- 499. (RESERVED)

500. SURVEILLANCE FOR CWD.

01. Slaughter Surveillance. Brain tissue from no less than ten percent (10%) of all USDA-identified domestic cervidae susceptible to CWD sixteen (16) months of age or older that are slaughtered at approved slaughter establishments or custom exempt slaughter establishments must be submitted annually by the owner of the slaughtered cervidae to official laboratories to be tested or examined for CWD as provided for in these rules. If ten (10) or less cervids on a domestic cervidae ranch are slaughtered in a calendar year, at least one (1) testable brain sample must be submitted to meet the annual CWD surveillance requirement. Tissues samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement. ( )

02. Domestic Cervidae Ranch Surveillance. Brain tissue from no less than ten percent (10%) of all USDA-identified domestic cervidae susceptible to CWD sixteen (16) months of age or older that are harvested on domestic cervidae ranches must be submitted for CWD testing annually. If ten (10) or less cervids on a domestic cervidae ranch are harvested in a calendar year, at least one (1) testable brain sample must be submitted to meet the annual CWD surveillance requirement. In addition to the tissue samples from the harvested domestic cervidae, brain tissue from one hundred percent (100%) of all domestic cervidae sixteen (16) months of age or older that die for any reason other than being harvested must also be submitted for CWD testing annually~~. Reindeer and fallow~~ Fallow deer are exempt from CWD testing unless the ~~reindeer and~~ fallow deer are part of a CWD positive, exposed, trace, source, or suspect herd or part of an elk herd. The owner or operator of the domestic cervidae ranch must submit all tissue samples to an official laboratory to be tested for CWD, as provided for in these rules. Tissues samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement. ~~In the event a domestic cervidae ranch cannot submit a testable brain sample, the domestic cervidae ranch must submit a CWD Sample Submission Waiver Request within ten (10) business days of determining that a testable brain sample cannot be submitted. ( )~~

501. COLLECTION OF SAMPLES FOR CWD TESTING.
Only accredited veterinarians, state and federal animal health officials, and other persons, approved by the Administrator, may collect brain or other tissue samples for CWD testing. Samples must be collected immediately upon discovery of the death of a domestic cervid. ( )

~~**01. Brain Samples**. Only persons trained by state or federal animal health officials, and approved by the Administrator, may remove the obex portion of the brainstem for submission as the sample for CWD testing. ( )~~

~~**02. Submission of Head**. Only persons trained by state or federal animal health officials, and approved by the Administrator, may submit a head with the official identification attached to the head as the sample for CWD testing. ( )~~

~~**03. Handling of Samples**. All CWD samples must be handled in a manner that prevents degradation of~~

Commented [DSL37]: USDA now identifies reindeer as a susceptible species

Commented [DSL38]: Change to "USDA-identified susceptible species"

Commented [DSL39]: Change to "USDA-identified susceptible species"

~~the sample. ( )~~

~~**04. Sample Submission Time**. Fresh samples for CWD testing must be submitted, to an approved laboratory, within seventy-two (72) hours of the date of collection. Formalin preserved samples must be submitted, to an approved laboratory, within ten (10) business days of the date of collection.~~ ( )

05. Non-Testable or Samples That Do not Contain Appropriate Tissues. The Administrator may conduct an investigation to determine if a domestic cervidae ranch is complying with the provisions of Section 500 if: ( )

~~**a.** The owner or operator of a domestic cervidae ranch submits samples for CWD testing which are non-testable; or ( )~~

~~**b.** The owner or operator of a domestic cervidae ranch submits samples for CWD testing that do not contain the obex portion of the brainstem or other appropriate tissues, if available, for CWD testing. ( )~~

c. The owner or operator of a domestic cervidae ranch submits samples for CWD testing which cannot be identified to the animal of origin. ( )

06. Failure to Meet Annual CWD Tissue Submission Requirement. An owner or operator of a domestic cervidae ranch who fails to submit samples for CWD testing or who fails to meet the annual tissue submission requirements of this chapter, or both, is in violation of these rules, except the Administrator may approve, in writing, a variance from sample submission requirements on a case specific basis. ( )

502. OFFICIAL CWD TESTS.

01. Official Tests. Official tests for CWD, approved by the Administrator, include: ( )

a. ~~Histopathology~~Enzyme Linked Immunosorbent Assay (ELISA); ( )

b. Immunohistochemistry; ( )

c. ~~Western Blot;~~ ( )

d. Negative Stain Electron Microscopy; ( )

e. ~~Bioassay;~~ and ( )

02. Other Scientifically Validated Test. The Administrator may approve other scientifically validated laboratory or diagnostic tests to confirm a diagnosis of CWD. ( )

503. CWD STATUS.

CWD status is validated pursuant to the Federal CWD Herd Certification program standards.~~based on the number of years that a herd of domestic cervidae has been determined to be in compliance with the provisions of this chapter, during which there is no evidence of CWD in the herd.~~ ( )

~~**01. Status Review**. The Administrator will review the CWD status of each domestic cervidae herd located in Idaho on at least an annual basis. ( )~~

~~**02. Status Date**. The status date is the date that the Administrator approves a change in the CWD status of a domestic cervidae herd in Idaho. ( )~~

~~**03. Cervidae of Lesser Status**. If a herd of domestic cervidae has contact with cervidae of a lesser status, the status of the herd with the higher status will be lowered to the status of the cervidae with the lesser status. ( )~~

~~**04.** **Change of Ownership**. A herd's status may remain with the herd when a change of ownership, management or premises occurs, if there is no contact with cervidae of lesser status, and no previous history of CWD on the premises. ( )~~

~~**05.** **Contact with CWD Positive Animals**. Any herd of domestic cervidae that has contact with CWD positive or exposed animals may have its status reduced or removed. ( )~~

504. INVESTIGATION OF CWD.

An epidemiological investigation will be conducted on all CWD positive, suspect, and exposed animals and herds, herds of origin, source herds, all adjacent herds, and all trace herds as determined by the Administrator. ( )

01. **Quarantine**. All positive, suspect, and exposed herds or animals, herds of origin, adjacent herds, and herds having contact with positive or exposed animals must be quarantined; and ( )

02. **Identification**. CWD suspect and exposed animals must be identified and remain on the premises where they are found until they have met the provisions for release of quarantine established in this chapter, are destroyed and disposed of as directed by the Administrator, or are moved at the Administrator's direction on a restricted movement permit. ( )

505. DURATION OF CWD QUARANTINE.

Quarantines imposed because of CWD in accordance with this chapter remain in effect until one (1) of the following criteria are met: ( )

01. **CWD Positive Herds**. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after five (5) years of compliance with an individual herd CWD plan and all provisions of these rules, during which there was no evidence of CWD. ( )

02. **CWD Suspect Herds**. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd as determined by the Administrator. ( )

03. **Source Herds and Herds of Origin**. The quarantine may be released after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd and that the herd is not the source of infection as determined by the Administrator. ( )

04. **Exposed Herds**. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd as determined by the Administrator. ( )

05. **Adjacent Herds**. The quarantine may be released when directed by the Administrator based upon an epidemiological investigation and in consultation with the designated epidemiologist. ( )

06. **Fencing Requirements**. Any owner of a domestic cervidae ranch who chooses to remain under quarantine for five (5) years must construct a second perimeter fence that meets the requirements for perimeter fence, as provided in Section 102, such that no domestic cervidae on the domestic cervidae ranch can get within ten (10) feet of the original exterior perimeter fence or as approved by the Administrator. ( )

07. **Complete Depopulation**. The quarantine may be released after: ( )

a. Complete depopulation of all cervidae on the premises as directed by the Administrator; and ( )

b. The premises have been free of all livestock as specified in an individual CWD herd plan approved by the Administrator; and ( )

c. The soil and facilities have been cleaned, treated, decontaminated, or disinfected as directed by the Administrator. ( )

08. Disposal of Positive or Exposed Cervidae. All CWD positive or exposed domestic cervidae must be disposed of as directed by the Administrator. ( )

~~506. Cleaning, Treating, Decontaminating, Or Disinfecting.~~

~~Premises must be cleaned, treated, decontaminated, or disinfected under state or federal supervision as directed by the Administrator within fifteen (15) days after CWD positive or suspect animals have been removed. ( )~~

~~**01. Exemptions**. The Administrator may authorize, in writing, an exemption from cleaning, treating, decontaminating, or disinfection requirements on a case-by-case basis. ( )~~

~~**02. Extension of Time**. The Administrator may authorize, in writing, an extension of time for cleaning and disinfection under extenuating circumstances. ( )~~

~~**03. Requests for Extensions or Exemptions**. The owner of the contaminated facility must submit requests for extensions or exemptions to the Administrator in writing. ( )~~

507. -- 999. (RESERVED)

Commented [DSL40]: Redundant. 25-218 & 02.04.03.590-1

IDAHO DEPARTMENT OF AGRICULTURE
2270 Old Penitentiary Road
PO Box 7249
Boise, Id 83707

02.04.19 RULES GOVERNING DOMESTIC CERVIDAE
Minutes of June 16, 2021 Meeting

HOSTS/FACILITATORS:	Lloyd Knight, ISDA Dr. Scott Leibsle, ISDA Chanel Tewalt, ISDA
STAKEHOLDERS PRESENT:	Tricia Hebdon, Idaho Fish & Game Ed Bernhardt Jennifer William David Miller Rulon Jones Brad Smith, ICL Chase Jones Garret Visser Travis Lowe Kami Marriott
DEPARTMENT STAFF:	Katy Devries, Office of Attorney General – ISDA Mitch Vermeer, ISDA Jeni Marple, ISDA Dr. Scott Barnes, ISDA Miranda Juker, ISDA Dicsie Gullick, ISDA

Lloyd Knight called the meeting to order at 8:34 AM MDT. He explained that the comment period was open until June 20th and then the rules would be posted in the July Bulletin. There would be a 21-day open comment period following the bulletin posting. He then turned the meeting over to Dr. Scott Leibsle to present the strawman.

Dr. Leibsle stated that the rules look different because there are no track changes, but the strike and score that DFM requires. He showed how to find the draft on the web and proceeded to outline the following changes:

- The documents incorporated by reference were updated to the most current edition.
- Some definitions were removed that were no longer necessary and the definition for endemic area was added.
- Rules 13 and 14 were struck because they were no longer necessary or redundant.

- Some language in rule 20 was also struck because it was no longer necessary, including the removal of the rule prohibiting reindeer north of the salmon river. Section 5 was added to rule 20 regarding the temporary exhibition of reindeer.
- Rule 22.07 was struck because freeze brands are no longer used.
- Rule 23 was struck because it is redundant to federal program requirements.
- Sections of rule 31 were simplified and clarified so that all deadlines for records and inventory are December 31st.
- Rule 50 was struck because there is not a current genetic test available.
- Rule 060.05 was struck due to legislative mandate.
- Rule 080 was struck because it was redundant
- Rule 090.01 was changed due to legislative amendment.
- Unnecessary language from removed from Rule 100.
- Rule 101 states that you cannot populate facilities until they are approved.
- The fencing requirement in rule 102 was changed to 8 feet for reindeer. There are two facilities in the state that are grandfathered in at 6 feet, but all future fencing must be 8 feet.
- Rule 104 was struck because it is redundant.
- Unnecessary language was removed from Rule 202 and 203.
- Rule 205 was simplified and all death certificates are due in December and a form will be provided on the ISDA website.
- Rules 206 and 209 were removed because they were covered in other rules.
- Rule 208 was changed so that intrastate movement certificates are due December 31st in the year the movement occurred.
- The requirement for a TB test in rule 250 for intrastate movement was removed and the movement certificate will be due December 31st in the year the movement occurred.
- Rules 300, 303, 304, 305 and 306 were struck because disease control and quarantine are covered in other rules.
- Rule 450 was struck because TB testing is no longer required for changes in ownership.
- Rule 500 regarding surveillance for CWD was changed to propose different testing requirements for different types of facilities, those that import and those that do not import. Reindeer were added to the rule so they are no longer exempt. Section 03 was added for ranches who import domestic Cervidae and require testing for 100% testing of all domestic elk and reindeer over 16 months of age that die for any reason for 60 months following the latest import.
- Rule 501 dealing with collection of samples was simplified and rule 502 was updated because there has been a change in tests available.
- Rule 503 was simplified so that CWD status in validated pursuant to the Federal CWD Herd Certification program standards. All separate requirements were struck.
- Rule 506 was struck because disposal in addressed in other rules.

Dr. Leibsle called for any questions not dealing with CWD.

Brad Smith from the Idaho Conservation League expressed support for the increase in fence height for reindeer, bringing it in line with all other fencing requirements. He also asked what would happen if there was a death in a facility and the carcass sits for too long and it becomes untestable. Specifically, what would the farmer need to do and would there be ISDA follow up?

Dr. Leibsle stated that typically when an animal goes untested it is because it died and was not discovered in time. There is nothing else that ISDA can do because it does not happen very often. There is a reporting requirement and ISDA usually has a conversation with the farmer about why it happened and works to figure out how to keep it from happening again. ISDA just wants it reported.

Brad Smith proposed that reporting happen sooner. If an animal dies in January and is not reported until December 31st, that is a long time for ISDA to be unaware. There may need to be some awareness about the death.

David Miller asked in the definition of endemic area if it should reference provincial animal health officials in addition to state health officials.

Dr. Leibsle stated that he did not think it was needed, but that it could be added for clarity.

Travis Law from the American Operators Association thanked ISDA for their common-sense approach and balance to the changes previously discussed.

Dr. Leibsle then opened the discussion to movement and CWD testing with summarizing the most recent comment from a syndicate or group of Elk Producers, which had not yet been posted to the website. The group submitting the comment was Kami Marriot, Rulon Jones, David Miller, Billy Rasmussen, Jeff Lerwell, Michelle Powell, Roy Sterns, Ken Walters and Travis Lowe. In summary, the comment was supportive of the changes regarding gene testing and fencing height, but had concerns regarding the CWD testing and import requirements. They have made several other suggestions, which is summarized here. They understood the rule was a trade and replacement for eliminating the 25-mile safe distance from a wild CWD case, however they feel that it is unreasonable and overly burdensome. They think the approach of increased testing to 100% should only be required when cervids are imported from within 25 miles or designated endemic areas and should not apply to cervids that are imported from an area that does not have a history of CWD. This would ensure that animals from these areas will have a post-mortem test result, but to require it for any animal importation would trigger enormous testing costs that would realistically discourage commerce.

The second suggestion the group had is only the imported animals should be required to be tested, not every animal on the facility if you have not imported from within the 25-mile radius they feel the existing testing requirements of 10% harvested and 100% non-harvest deaths is sufficient. Additionally, they said that after testing 100 % of those animals if there is no indication of CWD then there would no chance that those animals could contaminate the other animals on the facility.

Finally, they suggest that it would be fair to require that if importation of animals from suspected CWD area is allowed then the animal would not be allowed to be transferred to any other facility which may require the animal's death and testing if it has not been harvested or a death by December 31st of that year.

Dr. Leibsle said that there were a few more comments in the letter, but he wanted to address each of the suggestions from a feasibility standpoint and then we can open up the discussion. First, the reason the Department went away from the 25-mile radius is it was pointed out on previous calls is that the distance is somewhat arbitrary. There is no unified, agreed upon safe distance. The point is to address the issue of risk. Because there is not an accepted distance that would guarantee or provide significantly greater protection, the real issue is that we do not want to be importing animals that have CWD. When you import animals from one of those areas, regardless of where it is, those animals in the current version of the rule are not all being tested if they are being harvested, it's 1 out of 10. The problem that we run into is tracking an individual animal through the course of its life from a record keeping standpoint is extremely problematic. For the Department to be responsible for doing that would be almost unfeasible because identities of an animal, reconciling inventory is extremely complicated and time consuming. There are still producers that ISDA is waiting for additional information for their current year inventories that were due this past December 31st. This would add an additional layer of complexity to have to follow an individual animal throughout the course of its life to make sure that individual animal was tested. Rather, it would be more feasible for when you import to a facility, that entire facility is now subject to the lowest common denominator. It is more of a generalized approach to how disease surveillance is done in the livestock world. For instance, if you import an animal that may have been exposed to TB, now you have to test the whole herd to guarantee it, and that is why the particular proposed language was put forth in that manner.

Dr. Leibsle went on to add that this is important because there is so much intra-state commerce. For instance, Alberta has a lot of CWD and are having difficulty mitigating the spread of the disease. If those animals are imported from Alberta to Missouri and then we import from Missouri (and Missouri's status may be much different from Alberta), but having to trace that animal back and try to determine if that animal was the one purchased from Alberta or is a different animal is extremely complicated, time consuming and may not even be feasible. To improve surveillance picking and choosing which animals on a facility are subject to the increased testing requirement is not as feasible as requiring increased testing for the entire facility that imports animals whether it comes directly from an area that has CWD or not eliminates the need to track animals through the course of their life. The Department did consider several different variations of the suggestions made through these comments. Taking the 25-mile radius out of the equation and just improving disease surveillance across the Board was a reasonable exchange because ISDA just wants to make sure that we are not bring CWD into the state.

Dr. Leibsle opened the discussion by asking for questions or comments.

Rulon Jones asserted that the risk of importation is no different from when the legislative approval was given for lower numbers of testing. He did not know why the rule needed to be changed. For example, if we are importing from an endemic area or within the 25-mile radius, then there is an increased risk, but if someone chooses not to import from those high risk areas why is there a change?

Dr. Leibsle disagreed with the initial statement that the risk is not any different from when the statute changed. In 2015 the state of Chronic Wasting Disease in the country and in Alberta was greatly different and it has spread considerably in Alberta and many states. Some states have completely eliminated imports from some states like Colorado, Wisconsin, Wyoming and Alberta. Since Idaho has yet to identify a case of CWD, Dr. Leibsle thinks the risk to Idaho producers that have a static herd within Idaho that are not bringing animals in from outside may not be any different than before, but for those producers importing animals, they are at increased risk. CWD is continuing to spread, dramatically in some areas of the country and Alberta. The fact is we are still wanting to participate in interstate commerce and we need that to maintain a thriving industry, but the risk of CWD has grown significantly. The frequency of movement, when animals are moved from facility to facility does present a problem. There was a comment that the domestic Cervidae producers are being penalized for a lot of things that are largely out of their control. To a certain extent that is true. Wild cervids have CWD and producers and ISDA cannot do anything about that, but the surveillance of animals that come into our facilities we can do something about. The reason ISDA implemented the administrative order of the 25-mile radius and the reason we are proposing to increase our surveillance is because CWD has grown and the risk has increased in many areas.

Rulon stated that it sounded like the proposed rule had nothing to do with the 25-mile radius whether we choose to import from there or not. It sounds like ISDA is wanting to change this rule for importation no matter what. He asked if that was correct.

Dr. Leibsle said that it was not necessarily true. It has nothing to do with the 25-mile radius, but what it has to do with is confidence and disease surveillance and there are many different ways to accomplish that. The administrative order was put into place, largely due to Alberta because it is such a prominent partner in our interstate commerce. Their lapse or reduction in surveillance strategy caused great concern. ISDA wanted to put some sort of mechanism in place to have additional confidence that we are not importing CWD exposed animals. ISDA is trying to get a strategy to instill confidence. One way to do it was the 25-mile radius. Another way to do it was to make sure that every animal that comes in and those facilities that receive those animals get tested at 100%. The 25 miles was not set in stone and from comments at previous meetings, the 25-mile radius was closing off markets and damaging commerce, so the Department took a different approach.

Rulon asked that if they do not import from within the 25-mile radius would they need to test 100%.

Dr. Leibsle explained that from previous discussions the 25-mile parameter was prohibiting commerce and closing off markets. Nothing is set in stone, because that is what negotiated rulemaking is all about. However, if the rules pass as they are written, the 25-mile administrative order would come off the books because we are improving our disease surveillance.

Rulon stated that it seemed very easy to him to track. If he has a ranch and it imports from within the 25-mile radius then he would need to test 100%, but if another ranch does not import from within the 25-mile radius they also need to test 100%. That is why it doesn't make sense. If we say that nobody can import from within the 25-mile radius then we maintain the status that we have. He thinks that ranches who import from within the 25-mile radius and those that do not should be at different standards.

Dr. Leibsle pointed out that the problem comes from intra-state commerce. For example, if you were to purchase a bull from within the 25-miles from Alberta you would be subject to increased surveillance. But rather than harvesting that animal from your facility you were to sell it to a fellow producer in Idaho. They did not import an animal from within the 25 miles, but you did. Having to track where that animal moves throughout the course of its life until it dies or is harvested is a problem, which is why the approach was all or nothing. Either you are importing or transferring animals or you are not.

Rulon stated that he was not following why it had to be either or. In the past, if he imported from within the 25-mile radius then his ranch doesn't qualify. Then if anyone takes any animal from him, they would get his status.

Dr. Leibsle stated that you have two population groups, those that come from within the 25-mile radius and those that do not. Ultimately the fact that you have to track the identity of a single animal throughout the course of their life is the problem. The feasibility of doing that is why ISDA has taken this all or nothing approach.

Rulon asked about tracking ranches. For example, if he imports from the 25-mile radius then he needs to test 100%. If he sells any animal, then the ranch that bought the animal would have their status would go down, so you are not tracking individual animals. Importing the animal lowers my status, and anyone who buys any animals from me. It seems like that would be much less complicated than trying to follow an animal.

Dr. Leibsle stated that he understands the idea of a downgraded status, but ultimately, coming up with the distance is another problem. He mentioned a few other people waiting to comment and would like to see what others had to say on the issue.

Billy Rasmussen commented on imports. He felt more responsibility should be put on the producer. For example, if he brings in 10 bulls from Canada and 9 of the bulls are shot, they would go into a death certificate and would not be on the year end inventory. If something happened to the number 10 bull and he couldn't be harvested, why couldn't he let Miranda know that there is one import left at the year-end inventory. She wouldn't have to track the animal. There could be a separate page for all imports that way we can keep track of the imports and not make it more difficult. If that import goes from my place to Rulon's then there would be movement on it and at the end of the year we can make note of where that import ended up. He believes the producers can keep track of the animals. His second comment, to continue with the example, if he brings in those 10 bulls and 1 is left over at the end of the year he is now 100% testing on animals that have never been in contact with the ten bulls. They have never been close to each other but I still have to test 100% on them even though the herd has never been mixed. He understood what was trying to be accomplished and had no problem testing 100% of imports, but he does not think he should have to test 100% of animals that have never been in contact with the imported animals.

Dr. Leibsle answered that identifying single animals, is problematic for ISDA and for producers, especially those with larger facilities. It is hard to keep track of single animals. In regards to the status of your facility, this is an approach that is taken with all disease surveillance. When disease exposure happens, there is never consideration given by a state health official or effective disease management to the fact that animals are kept in separate pens. They never say, "We don't have to test those animals because they were kept in a separate pen."

Billy Rasmussen pointed out that testing is taking place. With every death they are testing 1 out of every 10 animals. If a death happens because of CWD it is going to show up rather quickly.

Dr. Leibsle commented that 1 out of 10 surveillance in a disease exposure is not an acceptable threshold when you are doing a trace out. You have to conduct it at 100%. While we are not dealing with a trace out, we are dealing with surveillance. We are trying to walk a fine line to keep imports available but have adequate surveillance.

David Miller stated that no herd can remain static for more than a year or two because if you are static, then you are out of business. As an example, if he were to import an animal from Canada that is outside an endemic zone, and that producer has done everything to maintain his export status for five years and he's done everything according to our rules, he thinks he should not have to go to 100% testing on an animal from a lower risk area. He then asked Dr. Leibsle for his thoughts.

Dr. Leibsle stated that this was covered in a previous comment. For instance, inside 25 miles is high risk and outside 25 miles is low risk. It does put record keeping and timely, accurate submission of documents at a premium. When you are having to identify a facility as Rulon suggested, if you import from a high-risk area than you have to test at 100%, but those who import from a low risk area then you test at 10%, eventually there will be intrastate movement and we are going to have to sort out which animals went where. Monitoring the movement of animals in and amongst facilities can be very complicated. I am trying to sort out how we can manage it and still offer opportunities for the industry.

David Miller stated that we have been managing it by the executive order that put in the 25-mile zone. He would like testing for 100% of the animals that come from that 25-mile zone.

Dr. Leibsle stated that the feedback he received from the last two meetings was that the 25-mile zone was problematic and was closing off markets. Rather than rely upon an arbitrary distance, that almost everyone who commented was critical of and there is not an accepted standard so ISDA proposed language was trying to come up with an alternative. But he added that if that is something that stakeholders would want to keep in place, it was still on the table.

Kami Marriot asked if this is a compromise, to take away the 25 miles but test 100%. She feels that this is going a bit beyond middle ground and is not a compromise. Once you import you have to test 100% whether or not it comes from an endemic or high-risk area. The other suggestion she had was make it so that animals from high risk areas cannot be transferred to another facility. If it is transferred to another facility then that facility should be required to test 100%. She also added that in the explanation below the rule change that came in the email it said that all facilities owned by the same ranch would require 100 % testing. She does not feel that they should have to test all facilities if there has never been any transfer of animals between the facilities.

Dr. Leibsle explained that the reason for that is because producers are not required to submit a movement transfer document if they are moving animals between different locations of which they all own. There are several producers that own multiple facilities and you can move animals back and forth across those facilities without having to notify the Department. Ultimately, there is no way to track whether an animal has been to a facility or not and what's moving back and forth. A transfer of ownership does need to be reported, if you are moving between your own facilities, the Department does not need to know. There is no way for us to know if animals are being moved back and forth between all the areas that you have. That is why it was stated that way.

Kami Marriott asked if the transfer forms that they fill out are not applicable if you are transferring between your own facilities, it's only if you are transferring with facilities owned by different producers or ranchers.

Dr. Leibsle answered that is correct.

Kami Marriott, asked if an animal is being allowed into the state from outside the 25-mile radius, why would that group of animals need to be tested. She could understand if the animals were coming from two locations and one was within the 25 miles and one was not, and that would tag the whole herd for needing to test 100%. But if an animal or group of animals are coming from an area that has never been identified as being high risk that the 10% testing rule should apply until there is another reason to assume there is possibly some contamination.

Dr. Leibsle stated that Miranda had clarified his statement and he misspoke. He pointed to Rule 208 that states that movement of Cervidae from one premises to another, even those owned, operated or controlled by the owner must submit a movement certificate. His explanation on the email he sent out would not be correct. If we were to move forward with language in this state, then his explanation on the email that he sent out would not be correct. If you are required to report movements to the Department, even if they are between your own facilities, you would not have to test all your facilities, just the ones you would be importing to.

Kami Marriott asked, if there was CWD positive in the wild if it be assumed that the positive CWD came from a domestic herd?

Dr. Leibsle answered absolutely not. He did not think that if there was a case of CWD in the wild that there would be any reason to assume that it came from a domestic herd. It would absolutely justifiable to assume it came from another wild cervid that came across our state lines.

Kami Marriott stated she feels domestic Cervidae are in a controlled environment and the wild Cervidae are not in a controlled environment. Producers are being asked to go above and beyond what the wild is doing. She understands their situation is a lot different.

Dr. Leibsle stated that she hit it right on the nose about what the problem is. We are doing all we can to keep our facilities clean and nobody wants CWD on their facility, but we do have to deal with the fact that it is also present in the wild. We do not have it in Idaho yet, but one day we will.

Travis Lowe stated that he would remiss he did not echo a couple of comments that have been made by industry and maybe make a couple more. The CWD program across the nation is by and large a voluntary program and what we have found is that the burden is on the exporting herds that engage in interstate commerce. There are a couple states out there that make it mandatory, but for the states that have a voluntary program. Producers opt in the program and go through an enormous expense testing because most states do not reimburse for that. They opt in so they can move interstate, or export. We do not have a requirement for herds to be monitored to import, but we do have that requirement for them to export. It is a requirement for the importing herds to receive animals that have that status in order to move, which leaves the burden on the exporting herd. These rules put a hefty burden on the importing herd, because now they have to go through a more rigorous program. If they opt not to import than even intrastate they can maintain their status quo, at least as I understand it.

Travis continued stating that some states do require imports from out of state be tested, but imports from within the state are not required to be tested. That way it is easy to manage those trace outs because we now have post mortem data on the interstate movement which is a lot easier because we are dealing with two different departments and APHIS as well. Whereas if it is intrastate it is the rodeo of that one state. That would probably be an easier remedy, at least for producers. I appreciate the thought, because I know it is aimed to be a middle ground to address the comments that the folks cannot import from certain areas and their markets have been cut in half, or to some degree, which makes it harder for them to engage in commerce and run their businesses. But yet, if they now have all this extra expense with this extra testing to maintain the same type of commerce, my fear is that this may disincentivize commerce and at the end of the day, these businesses thrive on commerce.

David Miller asked if he bought a bull from another Idaho producer that was not an imported bull, breeds the bull for a year and then takes him back, he is hunted and the brain stem is supplied for testing. Under the rules that are proposed he would need to test 100% for the next five years, even though the animal came, left, has been killed and tested.

Dr. Leibsle acknowledged that David Miller had a good point, but the problem that he has is an accounting one. According to David's example, if you import an animal, it dies and tests negative the risk is minimal. However, there is a larger scope and with larger numbers of animals trying to keep track of individual animals becomes a paper chase.

David suggested writing the rules so that animals imported from a high-risk area could only be imported to one place and cannot be moved around. It could even be added that by the end of the year those animals must be dead and tested.

Dr. Leibsle stated that the second suggestion was not feasible. He gave an example of an imported bull that was purchased for a large sum of money. If for some reason it did not sell during the year, the rules should not state that the animal should be destroyed just for the sake of testing. An arbitrary kill date for animals is not fair or feasible. In regards to the first suggestion, it comes back to record keeping and trying to keep track of individual animals that poses a problem. Having to restrict the movements of animals is also a restriction of commerce. Dr. Leibsle feels that the $40 for the CWD test is a cost of business.

Kami Marriott stated that testing 100% is virtually impossible because sometimes animals die and they are not discovered in time to test. She asked what the consequences will be in that situation.

Dr. Leibsle stated that getting rid of the CWD waivers happened because there were some ranchers that were sending in more waivers than death certificates and test results. If an animal dies and cannot be tested that information can be added to the death certificate along with an explanation. To answer her question regarding consequences, it would depend on whether it was feasible to achieve it or if it was due to mismanagement or malfeasant.

Kami stated that Utah requires 95% testing to account for the animals that cannot be tested. The goal is always 100%, but accepting 95% gives a little leeway for those animals that cannot be tested.

Brad Smith shared his support for the rules as written. In response to previous question regarding feasibility of 100% testing. His suggestion would be to keep testing at 100% and then have exceptions for times when testing is not feasible.

Travis Lowe was concerned about the rule and exceptions and how it could be interpreted and applied in the future by future state veterinarians.

Dr. Leibsle stated he would rather see things in rules instead of being left up to the discretion of administrators.

David Miller asked if the discussion regarding percent of testing is the same as the discussion that happened regarding testing red deer.

Dr. Leibsle stated that they were two different issues. One test had to do with the percent of purity. However, Kami's comment was that if you do not test one animal you are already out of compliance of the 100% requirement. If the percent of testing is set at 95% it allows for those instances where testing is not feasible.

Garret Visser from the Idaho Wildlife Federation stated that he appreciated the discussion of all stake holders and stated that he supported the rules as they were written.

Dr. Leibsle reviewed the changes made to the Rules Governing the Importation of Animals, specifically section 600 regarding Domestic Cervidae. Rule 600.02 states that all imported Cervidae must originate from a herd in good standing and participating in the National CWD Herd Certification Program. The Deworming requirement was also changed to only being required if you are importing from east of the 100th meridian and must be done 180 days prior to importation. Rule 601.02. regarding Red Deer Genetic Factor is being struck from the rules. Also rule 605 was changed to include reindeer being required to originate from herds enrolled in a CWD monitoring program. Lastly, the rule states that no elk or reindeer that have ever been located within a CWD endemic area shall be imported into Idaho.

Dr. Leibsle called for stakeholder input regarding the options available and conducted a straw poll within the meeting.

Billy Rasmussen stated that he would like 100% of imports to be tested with 10% for existing herd and 95% to 100% for incidental deaths.

Brad Smith stated that he would like no importation from any state or province that has CWD and 100% testing across the board for all facilities, but recognizes that industry would not support that and thinks the current proposal is a good middle ground and supports the rules as currently written.

Chase Jones was concerned for producers who are strictly breeding elk for export but would like to import a bull for breeding. He would like to see a way that they could import and still test at the 10% level.

Ed Benhardt stated the rules do not affect him because he is not an Idaho resident and did not want to comment.

Garrett Visser from the Idaho Wildlife Federation stated that he agreed with Brad Smith that the rules as proposed seemed to be a fair middle ground and he supported them.

Kami Marriott agreed with 100% testing of imports if they come from within a 25-mile radius of an endemic area. If the animals come from an area outside of a high-risk area then the 10% testing rule should apply and 10% testing should also apply to existing herds. She also brought up a rectal biopsy test and asked if it could also be used, especially with increased testing. It could even be used in conjunction with standard testing to compare results.

Dr. Leibsle stated that the rectal biopsy test is an unproven test and could not be put in rule. However, he thought that there could be a pilot project developed to establish a data set for the test. He went on to say that he contacted USDA and the rectal biopsy test is allowed in certain specific cases. It is allowed only with white tail deer and no sooner than two years after the exposure to a CWD animal. The USDA recommended not to use rectal biopsy any sooner than four years after exposure for elk.

Rulon supports the rule change if there could be a two-tier status, so that breeders in the state who decide not to import from within the 25-mile radius would only need to be required to do the 10% testing. A producer who imports from within the 25-mile radius would have his status downgraded and any producer who buys from him would have their status downgraded and would need to test 100%.

Travis Lowe is concerned about using the other state's definition of endemic area. He gave an example of a state veterinarian that claims there is a prion test for bones and found a bone that purportedly had prions and now the veterinarian wants there to be an 11-mile radius of double fencing. He also brought up rectal biopsy testing in other states and stated that USDA tends to be behind in regards to testing.

Trisha Hebdon, stated that Idaho Fish and Game supports the rule as written.

David Miller agreed with Rulon, Kami and Billy and would like imports defined as higher and lower risk and have 100% testing for those within 25 or 50 miles of an endemic area, but for those importing from lower risk areas having 10% testing.

Dr. Leibsle thanked everyone for their participation in negotiated rulemaking. Additional comments are due no later than June 20th. The final version of the strawman will be posted on the website, which will be the version submitted to DFM and sent to the 2022 legislature. Once the proposed rule is published, there will be an ability to comment, but only to request a public hearing. Dr. Leibsle called for additional questions and comments and upon hearing none, turned the meeting over to Lloyd Knight.

Lloyd stated that comments could be submitted to rulesinfo@isda.idaho.gov by June 20th.

David Miller asked what the final date for submission of rules to DFM. Lloyd stated that he could not send them in until after the comment period, so they would probably be sent to DFM the middle of next week.

David then asked if he also needed to send in a written comment, or if the poll taken during the meeting was sufficient. Lloyd stated that they welcome written comments because they become part of the record, but the comments made at the meeting will be part of the minutes and written record.

Kami asked if the strawman would be posted before the rules are sent downtown. Lloyd stated that they would only post another version if there were a lot of changes.

Lloyd adjourned the meeting at 10:30 AM MDT.

02.04.19 – RULES GOVERNING DOMESTIC CERVIDAE

000. LEGAL AUTHORITY.
This chapter is adopted under the legal authority of Sections 25-203, 25-305, 25-601, and 25-3704, Idaho Code. ( )

001. ~~TITLE AND~~ SCOPE.

~~**01. Title**. The title of this chapter is "Rules Governing Domestic Cervidae." ( )~~

01~~2~~. **Scope**. These rules govern procedures for the detection, prevention, control and eradication of diseases among domestic cervidae, and facilities, record keeping, and reporting requirements of domestic cervidae ranches. ( )

002. – 003. (RESERVED)

004. INCORPORATION BY REFERENCE.
The following documents are incorporated by reference. ( )

01. Bovine Tuberculosis Eradication, Uniform Methods and Rules, Effective January 1, 2005. This document can be viewed online at https://www.aphis.usda.gov/animal_health/animal_diseases/tuberculosis/downloads/tb-umr.pdf. ( )

02. Code of Federal Regulations, Title 9, Part 161, January 1, ~~2016~~2021. This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

03. Code of Federal Regulations, Title 9, Part 55, January 1, ~~016~~2021.This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

04. Code of Federal Regulations, Title 9, Subchapter A, Part 1 and 2, January 1, ~~016~~2021.This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

005. -- 009. (RESERVED)

010. DEFINITIONS.

~~**01. Accredited Veterinarian**. A veterinarian approved by the Administrator and USDA/APHIS/VS, in accordance with Title 9, Part 161, CFR, January 1, 2004, to perform functions required by cooperative state-federal animal disease control and eradication programs.~~ ( )

0~~2~~1. **Approved Laboratory**. NVSL, an AAVLD accredited laboratory that is qualified to perform CWD diagnostic procedures, or a laboratory designated by the Administrator to perform CWD diagnostic procedures. ( )

0~~3~~2. **Approved Slaughter Establishment**. A USDA inspected slaughter establishment at which ante-mortem and post-mortem inspection is conducted by USDA inspectors. ( )

0~~4~~3. **Area Veterinarian in Charge**. The USDA/APHIS/VS veterinary official who is assigned to supervise and perform official animal health activities in Idaho. ( )

0~~5~~4. **Breed Associations and Registries**. Organizations maintaining permanent records of ancestry or pedigrees of animals, individual animal identification records and records of ownership. ( )

~~**06.** **Certificate**. An official document issued by a state or federal animal health official or an accredited veterinarian at the point of origin of a shipment of cervidae that contains information documenting the age, sex, species, individual identification of the animals, the number of animals, the purpose of the movement, the points of origin and destination, the consignor, the consignee, the status of the animals relative to official diseases, test results and any other information required by the state animal health official for importation or translocation. ( )~~

0~~7~~5. **Cervid Herd**. One (1) or more domestic cervidae or groups of domestic cervidae maintained on common ground or under common ownership or supervision that may be geographically separated but can have interchange or movement. ( )

0~~8~~6. **Cervidae**. Deer, elk, moose, caribou, reindeer, and related species and hybrids including all members of the cervidae family and hybrids. ( )

0~~9~~7. **Chronic Wasting Disease**. A transmissible spongiform encephalopathy of cervids that is a nonfebrile, transmissible, insidious, and degenerative disease affecting the central nervous system of cervidae. ( )

~~1~~08. **Commingling**. Within the last five (5) years, the animals have had direct contact with each other, had less than thirty (30) feet of physical separation, or shared management equipment, pasture, or surface water sources, except for periods of less than forty-eight (48) hours at sales or auctions when a state or federal animal health official has determined such contact presents minimal risk of CWD transmission. ( )

~~11~~09. **Custom Exempt Slaughter Establishment**. A slaughter establishment that is subject to facility inspection by USDA-FSIS, but that does not have ante-mortem and post-mortem inspection of animals by USDA inspectors. ( )

1~~2~~0. **CWD-Adjacent Herd**. A herd of domestic cervidae occupying premises that border a premises occupied by a CWD positive herd, including herds separated by roads or streams. ( )

1~~3~~1. **CWD-Exposed Animal**. A cervid animal that is not exhibiting any signs of CWD, but has had contact within the last five (5) years with cervids from a CWD-positive herd or the animal is a member of a CWD-exposed herd. ( )

1~~4~~2. **CWD-Exposed Herd**. A herd of cervidae in which no animals are exhibiting signs of CWD, but: ( )

a. An epidemiological investigation indicates that contact with CWD positive animals or contact with animals from a CWD positive herd has occurred in the previous five (5) years; or ( )

b. A herd of cervidae occupying premises that were previously occupied by a CWD positive herd within the past five (5) years as determined by the designated epidemiologist; or ( )

c. Two (2) herds that are maintained on a single premises even if they are managed separately, have no commingling, and have separate herd records. ( )

1~~5~~3. **CWD-Positive Cervid**. A domestic cervid on which a diagnosis of CWD has been confirmed through positive test results on any official cervid CWD test by an approved laboratory. ( )

1~~6~~4. **CWD-Positive Herd**. A domestic cervidae herd in which any animal(s) has been diagnosed with CWD, based on positive laboratory results, from an approved laboratory. ( )

1~~7~~5. **CWD-Suspect Cervid**. A domestic cervid for which laboratory evidence or clinical signs suggests a diagnosis of CWD. ( )

1~~8~~6. **CWD-Suspect Herd**. A domestic cervidae herd in which any animal(s) has been determined to be a CWD-suspect. ( )

1~~9~~7. **Death Certificate**. A form, approved by the administrator, provided by the Division for the reporting of cervidae deaths and for reporting sample submission for CWD testing. ( )

~~20~~18. **Designated Epidemiologist**. A state or federal veterinarian who has demonstrated the knowledge and ability to perform the functions required under these rules and who has been selected by the Administrator to fulfill the epidemiology duties relative to the state domestic cervidae disease control program. ( )

~~21~~19. **Disposal**. Final disposition of dead cervidae. ( )

2~~2~~0. **Domestic Cervidae**. Fallow deer (*Dama dama*), elk (*Cervus elaphus*) or reindeer (*Rangifer tarandus*) owned by a person. ( )

2~~3~~1. **Domestic Cervidae Ranch**. A premises where domestic cervidae are held or kept, including multiple premises under common ownership. ( )

2~~4~~2. **Electronic Identification**. A form of unique, permanent individual animal identification such as radio frequency identification tag, radio frequency identification implant, or other forms approved by the Administrator. ( )

23. **Endemic Area**. A geographical area designated by a state animal health official in the state of origin where animals located within that area are subject to an increased risk of acquiring a contagious disease. Most commonly in reference to Tuberculosis or Chronic Wasting Disease.

2~~5~~4. **Escape**. Any domestic cervidae located outside the perimeter fence of a domestic cervidae ranch and not under the immediate control of the owner or operator of the domestic cervidae ranch. ( )

2~~6~~5. **Federal Animal Health Official**. An employee of USDA/APHIS/VS who is authorized to perform animal health activities. ( )

2~~7~~6. **Harvest**. Any healthy domestic cervid that is intentionally and lethally removed from a domestic cervidae facility, by an owner, designated employee or customer of the facility, strictly for the purposes of either shooting or meat production. Harvested include cervids slaughtered at an approved or custom-exempt slaughter establishment. ( )

2~~8~~7. **Herd of Origin**. A cervid herd, on any domestic cervidae ranch or other premise, where the animals were born, or where they were kept for at least one (1) year prior to date of shipment. ( )

2~~9~~8. **Herd Status**. Classification of a cervidae herd with regard to CWD. ( )

~~30~~29. **Intrastate Movement Certificate**. A form approved by the Administrator, and available from the Division, to document the movement of domestic cervidae between premises within Idaho. ( )

3~~1~~0. **Individual CWD Herd Plan**. A written herd management agreement and testing plan developed by the herd owner and approved by the Administrator to identify and eradicate CWD from a positive, source, suspect, exposed, or adjacent herd. ( )

3~~2~~1. **Limited Contact**. Incidental contact between animals of different herds in separate pens off of the herd's premises at fairs, shows, exhibitions and sales. ( )

3~~3~~2. **National CWD Herd Certification Program**. A federal-state-industry cooperative program administered by APHIS and implemented by participating states that establishes CWD surveillance and testing standards that owners must achieve before interstate transport of cervids will be permitted. ( )

3~~4~~3. **Official CWD Test**. A test approved by the Administrator and conducted at an approved laboratory to diagnose CWD. ( )

3~~5~~4. **Official Identification**. Identification, approved by the Administrator, that individually, uniquely, and permanently identifies each cervid. ( )

3~~6~~5. **Operator**. A person who has authority to manage or direct a domestic cervidae ranch. ( )

3~~7~~6. **Premises**. The ground, area, buildings, and equipment utilized to raise, propagate, control, or harvest domestic cervidae. ( )

3~~8~~7. **Quarantine**. An order issued on authority of the Administrator, by a state or federal animal health official or accredited veterinarian, prohibiting movement of cervids from any location without a written restricted movement permit. ( )

3~~9~~8. **Quarantine Facility**. A confined area where selected domestic cervidae can be secured and isolated from all other cervidae and livestock. ( )

~~40~~39. **Ranch Management Plan**. A written plan for a domestic cervidae ranch that sets forth best management practices that mitigates the introduction or dissemination of disease among domestic cervidae. ( )

4~~1~~0. **Reidentification**. The identification of a domestic cervid which had been officially identified, as provided by this chapter, but which has lost the official identification device, or the tattoo or official identification device has become illegible. ( )

4~~2~~1. **Restrain**. The immobilization of domestic cervidae in a chute, other device, or by other means for the purpose of efficiently, effectively, and safely inspecting, treating, vaccinating, or testing. ( )

4~~3~~2. **Restricted Movement Permit**. An official document that is issued by the Administrator, AVIC, or an accredited veterinarian for movement of animals from positive, suspect, or exposed herds. ( )

4~~4~~3. **Source Herd**. The herd or herds from where a producer acquired their existing livestock. ~~A herd from which at least one (1) cervid has originated within the previous five (5) years and that cervid has been diagnosed CWD positive. ( )~~

4~~5~~4. **State Animal Health Official**. The Administrator, or Administrator's designee. ( )

4~~6~~5. **Status Date**. The date on which the Administrator approves in writing a herd status change with regard to CWD. ( )

4~~7~~6. **Trace Back Herd**. An exposed herd in which at least one (1) CWD positive animal resided within any of the previous sixty (60) months prior to diagnosis with CWD. ( )

4~~8~~7. **Trace Forward Herd**. A herd that has received exposed animals from a positive herd within sixty (60) months prior to the diagnosis of CWD in the positive herd or from the identified point of entry of CWD into the positive herd. ( )

4~~9~~8. **Traceback**. The process of identifying the movements and the herd of origin of CWD positive, or exposed animals, including herds that were sold for slaughter. ( )

~~50~~49. **Wild Cervidae**. Any cervid animal not owned by a person. ( )

5~~1~~0. **Wild Ungulate**. Any four (4) legged, hoofed herbivore, including cervids and other ruminants, not owned by a person. ( )

5~~2~~1. **Wild Ungulate Cooperative Herd Plan**. A plan, developed cooperatively by the owner of the domestic cervidae ranch, the ISDA, and the Idaho Department of Fish and Game to determine the disposition of any wild ungulates that are found to be located on a domestic cervidae ranch. ( )

011. ABBREVIATIONS.

01. **AAVLD**. American Association of Veterinary Laboratory Diagnosticians. ( )

02. **APHIS**. Animal and Plant Health Inspection Service. ( )

03. **AVIC**. Area Veterinarian in Charge. ( )

04. **AZA**. Association of Zoos and Aquariums. ( )

05. **CFR**. Code of Federal Regulations. ( )

06. **CWD**. Chronic Wasting Disease. ( )

07. ~~**CWDP**. Chronic Wasting Disease Program.~~ ( )
HCP. Herd Certification Program.

08. **ISDA**. Idaho State Department of Agriculture. ( )

09. **NAEBA**. North American Elk Breeders Association. ( )

10. **NVSL**. National Veterinary Services Laboratory. ( )

11. **TB**. Tuberculosis. ( )

12. **UM&R**. Uniform Methods and Rules. ( )

13. **USDA**. United States Department of Agriculture. ( )

14. **VS**. Veterinary Services. ( )

012. APPLICABILITY.
These rules apply to all domestic cervidae located in, imported into, exported from, or transported through the state of Idaho. ( )

~~**013.** AZA Accredited Facilities And USDA Licensed Facilities.~~
~~AZA accredited facilities and facilities licensed by USDA under 9CFR Subchapter A Parts 1 and 2 as licensees, dealers, exhibitors, research facilities and zoos are exempt from the provisions of this chapter provided that: ( )~~

~~**01.** **Movement Between AZA and USDA Facilities**. AZA accredited and USDA licensed facilities may not sell, give, or in any way transfer cervidae to persons or domestic cervidae ranches within Idaho, except other to AZA accredited or USDA licensed facilities. ( )~~

~~**02.** **Transfer of Cervidae**. Any AZA accredited or USDA licensed facility that in any way transfers cervidae, or title to cervidae, to any person in Idaho, except to other AZA accredited or USDA licensed facilities, must comply with all of the provisions of this chapter. ( )~~

~~**014. IMPORTATION OF DOMESTIC CERVIDAE.**~~

~~All domestic cervidae imported into the state of Idaho must comply with the requirements of the APHIS National CWD Herd Certification Program and IDAPA 02.04.21 "Rules Governing the Importation of Animals," which apply to domestic cervidae.~~ ( )

01~~5~~3. -- 019. (RESERVED)

020. LOCATION OF DOMESTIC CERVIDAE.

Any person who owns or has control of domestic cervidae in Idaho that are not located on a domestic cervidae ranch that is in compliance with the applicable provisions of this chapter, ~~or on an AZA accredited or USDA licensed facility in compliance with this chapter~~, is in violation of these rules. ( )

01. Department Action. In addition to any other administrative or civil action, the department may seize, require removal from the state, require removal to a domestic cervidae ranch that is in compliance with the provisions of this chapter, or require disposal of any domestic cervidae that are not located on a domestic cervidae ranch, an AZA accredited facility, or a USDA licensed facility which is in compliance with the provisions of this chapter. ( )

~~**02. Reindeer**. Reindeer may not be owned, possessed, propagated or held in Idaho north of the Salmon River in order to protect the wild caribou herd in northern Idaho.~~ ( )

0~~3~~2. Exceptions. The Administrator may grant exceptions from the provisions of Section 020 on a case specific basis. ( )

0~~4~~3. Natural Disasters. Damage caused to domestic cervidae ranch facilities by natural disasters does not constitute a violation of this chapter, provided that the owner or operator begins any necessary repairs immediately upon discovering the damage, acts expeditiously, as determined by the Administrator, to complete any necessary repairs and reports the extent and cause of any damage to the Division within twenty-four (24) hours of the discovery of the damage. ( )

0~~5~~4. Notification of Temporary Exhibition. Producers must notify ISDA, in advance, of any event where a reindeer will be exhibited outside of an approved cervidae facility. ISDA must be provided with the date and location of the event as well as a description of the temporary facility and an escape plan protocol.

021. OFFICIAL IDENTIFICATION.

All domestic cervidae must be individually, permanently, and uniquely identified, with two (2) types of official identification approved by the Administrator. ( )

01. Reporting of Identification. The unique individual identification number, type of identification, and the name, address, and telephone number of the owner of each animal identified must be reported to the Administrator, in writing, by the owner or operator. ( )

02. Identification Assigned. Official identification, once assigned to an individual animal, may not be changed or transferred to another animal. Animals that lose identification devices must be re-identified in accordance with Section 031. ( )

03. Progeny. All progeny of domestic cervidae must be officially identified by December thirty-first of the year of birth, upon sale or transfer of ownership, or upon leaving the domestic cervidae ranch, whichever is earlier. ( )

04. Visible Identification. At least one (1) of the official types of identification used must be visible from one hundred and fifty (150) feet. ( )

022. TYPES OF OFFICIAL IDENTIFICATION.

All domestic cervidae must be individually identified by two (2) of the following types of official identification, at least one (1) of the types of official identification must be a bangle or lamb tag that is visible from one hundred fifty

(150) feet. ( )

01. Official USDA Ear Tag. ( )

02. Tattoo. Legible skin tattoo using an alphanumeric tattoo sequence that has been recorded with the Division of Animal Industries and applied to either the ear or escutcheon. ( )

03. Electronic Identification. A form of electronic identification, approved by the Administrator. ( )

04. Official NAEBA Eartag. ( )

05. Official ISDA Cervidae Program Ear Tag. A tamper resistant, unique number sequenced, individual identification tag approved by the Administrator. ( )

06. Official HASCO Brass Lamb Tag. A brass lamb tag engraved with farm name and individual animal identification number. ( )

~~**07. Freeze Brands**. Legible, freeze brands that uniquely identify the individual domestic cervid.~~ ( )

0~~8~~7. Ranch Specific Unique Bangle or Lamb Tags. The Administrator may grant written approval for the use of bangle or lamb tags that are: ranch specific; tamper resistant; uniquely numbered; and correlated with another type of official identification on the annual inventory report. ( )

0~~9~~8. Other Identification. Other forms of unique individual identification approved by the Administrator. ( )

~~**023. NATIONAL CWD HERD CERTIFICATION PROGRAM OFFICIAL IDENTIFICATION.**~~
~~All domestic cervidae enrolled in the National CWD Herd Certification Program are required to be identified with two (2) forms of identification for each animal. One (1) form of identification must be a nationally unique official animal identification that uses an APHIS-approved numbering system that is linked to the CWD National Database or equivalent ISDA database. The second form of identification must be unique to the individual animal within the herd and also be linked to the CWD National Database or equivalent ISDA database. ( )~~

~~**01. APHIS-Approved Identification Devices**. ( )~~

~~**a.** Electronic Identification; ( )~~

~~**b.** Official USDA Tamper-Resistant Ear Tag; ( )~~

~~**c.** Legible Ear or Flank Tattoo; and ( )~~

~~**d.** Other forms of Identification as approved by APHIS Administrator. ( )~~

0234. -- 029. (RESERVED)

030. OFFICIAL VISIBLE IDENTIFICATION.

01. Ear Tags. All domestic cervidae must be identified with a bangle or lamb tag that is visible from one hundred fifty (150) feet. ( )

02. Size. The large portion of the bangle or lamb tag must be at least two (2) square inches. ( )

03. Color. No visible identification may have a primary color of brown, black, pink, tan, or silver. ( )

04. **Camouflage Patterns**. No visible identification may utilize camouflage patterns. ( )

031. REIDENTIFICATION OF DOMESTIC CERVIDAE.

~~No domestic~~ Permanent official identification in domestic cervidae that has been lost or is no longer legible may be replaced only for the purpose to reestablish their original identity. ~~were marked with official identification may be re-tattooed for the purpose of reestablishing their identification nor re-ear-tagged with an official identification ear tag at any time subsequent to the original identification, except that re-tattooing or re-ear-tagging for the purpose of reestablishing the official identification is allowed only under the following conditions:~~ ( )

01. ~~**Supervision**. Reidentification is accomplished under the supervision of an accredited veterinarian, or state or federal animal health officials.~~ ( )

~~**02.** **Permanent Identification**. Animals that are presented for reidentification have some permanent identification that identifies the animals as those originally officially identified such as an individual animal registration tattoo, or other approved permanent identification, provided that such identification was submitted on the annual inventory report or other official record.~~ ( )

~~**03.** **Inventory Evaluation**. In absence of permanent identification, the Administrator may conduct an investigation or inventory evaluation to determine identity of the animal that is being presented for reidentification.~~
( )

~~**04.** **Reproduction of Original Tattoo**. Re-tattooing must reproduce the original tattoo that was placed in the animal's ear at the time of official identification.~~ ( )

02~~05~~. **Records**. All animals that have been re-identified must be reconciled to their original identification on the annual ISDA inventory form, due on Dec. 31st of each year. ~~The accredited veterinarian or state or federal animal health official who supervises the reidentification must correlate the new identification with previous identification and record the ear tag or other identification numbers, the tattoo symbols and the owner's name and address and submit the reidentification record to the Division within ten (10) days of the date of reidentification.~~ ( )

032. -- 039. (RESERVED)

040. INSPECTIONS.

To prevent the introduction and dissemination, or to control and eradicate diseases, state and federal animal health officials are authorized to inspect cervidae records, premises, facilities, and domestic cervidae to ensure compliance with the provisions of this chapter and other state or federal laws or rules applicable to domestic cervidae. State and federal animal health officials must comply with the operation's biosecurity protocol so long as the protocol does not inhibit reasonable access to:)

01. **Entry**. Enter and inspect, at reasonable times, the premises of domestic cervidae ranches and inspect domestic cervidae. ( )

02. **Access to Records**. Review or copy, at reasonable times, any records that must be kept in accordance with these rules. ( )

041. ~~**-- 049. (RESERVED)**~~

~~050. Genetics.~~

~~Domestic cervidae that have red deer genetic influence may not be imported into Idaho. Additionally, any domestic cervidae located in Idaho that are identified as having red deer genetic influence will be destroyed, removed from the state, or neutered.( )~~

~~051. --~~ 059. (RESERVED)

060. WILD CERVIDAE.

Wild cervidae may not be confined, kept or held on a domestic cervidae ranch. ( )

01. Duty of Ranch Owner. It is the duty of owners of all domestic cervidae ranches to take precautions, and to conduct periodic inspections, to ensure that wild cervidae are not located within the perimeter fence of any domestic cervidae ranch. ( )

02. Notification of Administrator. All owners or operators of domestic cervidae ranches must notify the Administrator within twenty-four (24) hours of gaining knowledge of the presence of wild cervidae inside the perimeter fence of the domestic cervidae ranch. ( )

03. Failure to Notify the Administrator. The failure of any owner or operator of a domestic cervidae ranch to notify the Administrator of the presence of wild cervidae within the perimeter fence of a domestic cervidae ranch is a violation of this chapter. ( )

04. Idaho Department of Fish and Game. Upon receiving notification that wild cervidae are on a domestic cervidae ranch, the Administrator will notify the Idaho Department of Fish and Game. ( )

~~**05. Wild Ungulate Cooperative Herd Plan**. The Idaho Department of Fish and Game will cooperate with ISDA and the owners or operators of domestic cervidae ranches where any wild cervidae or wild ungulates are present within the external perimeter fence of the domestic cervidae ranch to develop and implement a site specific written herd plan to address the disposition of the wild cervidae or wild ungulates. ( )~~

061. -- 069. (RESERVED)

070. SUPERVISION OF DOMESTIC CERVIDAE PROGRAM.

A department veterinary medical officer will provide routine supervision of the domestic cervidae program. ( )

071. -- 0~~79~~<u>89</u>. (RESERVED)

~~**080. DISPOSAL OF DOMESTIC CERVIDAE.**~~

~~All domestic cervidae carcasses and parts of carcasses not utilized for human consumption, except parts of carcasses utilized for taxidermy purposes, must be disposed of in compliance with IDAPA 02.04.17, "Rules Governing Dead Animal Movement And Disposal." ( )~~

~~**081. -- 089. (RESERVED)**~~

090. FEES.

01. Annual Assessment Fee. A fee, not to exceed ten dollars ($10) per head per year on elk or three dollars ($3) per head per year on fallow deer and reindeer, is hereby assessed on all domestic cervidae in the state to cover the cost of administering the program covered in these rules. The fee includes all domestic cervidae present at the ranch as of December 31 ~~and all domestic cervidae that die during the same calendar year~~. This fee is due January first of each year. The annual assessment fee may be reduced if program revenue accumulates to a balance of at least one hundred thousand dollars ($100,000) in excess of the projected annual cost of operating the program, as determined by the Department on July 1 of each year. ( )

02. Import, Export, and Movement Fees. The fees imposed in Section 25-3708(2) through (4), Idaho Code, are due no later than December 31 of each year<u>.</u>~~, but the Department requests all movement fees be submitted within five (5) business days of the movement of the domestic cervids~~. ( )

091. -- 099. (RESERVED)

100. DOMESTIC CERVIDAE RANCHES.

In order to prevent the introduction or dissemination of diseases, and to control or eradicate diseases, all domestic cervidae ranches must comply with the disease control, facility, and record keeping requirements and all other provisions of this chapter. ( )

01. Each Premises. Each separate premises where domestic cervidae are kept or held must comply with all of the provisions of this chapter. ( )

~~**02. Vehicle Access**. Domestic cervidae ranches must have motorized vehicle access to the restraining system on each premises, during the portion of the year that cervidae are held or kept on the premises, adequate to facilitate disease prevention and control as determined by the Administrator. ( )~~

~~**03. Premises Registration**. Each premises where domestic cervidae are kept or held must be registered with the Division and assigned a unique, individual number approved by the Administrator. ( )~~

101. DOMESTIC CERVIDAE RANCH FACILITY REQUIREMENTS.

Prior to populating the facility with domestic cervids, ~~A~~all domestic cervidae ranches are required to have facilities that include, but are not limited to, perimeter fence, restraining system, gathering system, water system, and if required, a quarantine facility. ( )

01. Maintenance. All facilities must be maintained, at all times that domestic cervidae are present, to prevent the escape of domestic cervidae or ingress of wild cervidae. ( )

02. Inspections. To ensure compliance with this chapter, state or federal animal health officials will inspect all premises where domestic cervidae are, or will be, possessed, controlled, harvested, propagated, held, or kept. ( )

~~**a.** Each domestic cervidae ranch will be inspected no less than once every five (5) years. Domestic cervidae ranches may be inspected more frequently if requested by the owner or if specified in a ranch management plan. The Administrator may require additional facility inspections as necessary to aid in the prevention, control, or eradication of disease or to ensure compliance with the provisions of this chapter or other state or federal rules applicable to domestic cervidae. ( )~~

~~**b.** All facilities relating to the handling or raising of domestic cervidae will be inspected. ( )~~

102. PERIMETER FENCE REQUIREMENTS.

A perimeter fence, completely enclosing the domestic cervidae ranch to be constructed of high-tensile, non-slip woven wire or other fencing material approved by the Administrator. ( )

01. Elk and Fallow Deer. For elk and fallow deer, the fence must be a minimum of eight (8) feet in height for its entire length at all times. ( )

02. Reindeer. For reindeer, ~~the~~ fences constructed and approved prior to 2021 must be at least six (6) feet in height for its entire length at all times. All reindeer fences constructed and approved in 2021 or later must be at least eight (8) feet in height for its entire length at all times. ( )

03. Wire. The top two (2) feet of each fence may be smooth, barbed or woven wire (at least twelve and one-half (12-1/2) gauge) with horizontal strands spaced not more than six (6) inches apart. ( )

a. Wire must be placed on the animal side of the fence to prevent pushing the wire away from the posts. ( )

b. Wire must be attached to all posts at the top, bottom, and not more than eighteen (18) inches apart between the top and bottom of the wire. ( )

04. Posts. Wooden posts used in the perimeter fence must be at least butt-end treated with a commercially available preservative and have a minimum of four (4) inch top for line posts and a minimum of five (5) inch top for corner posts. Metal pipe posts must be a minimum of two and one-eighth (2-1/8) inches outside diameter with a three-sixteenths (3/16) inch wall thickness for line posts and two and seven-eighths (2-7/8) inches outside diameter with a seven thirty-seconds (7/32) inch wall thickness for corner posts. Posts must be spaced no more than twenty-four (24) feet apart, with stays, supports or braces as needed, and be placed in the ground a minimum of three (3) feet. ( )

05. Gates. Each domestic cervidae ranch must have gates that prohibit the escape of domestic cervidae or the ingress of wild cervidae. ( )

06. Fence Maintenance. Fences must be maintained, at all times that domestic cervidae are present, to prevent domestic cervidae from escaping or native wild cervidae from entering the enclosure. ( )

07. Exceptions. The Administrator may grant exceptions to the specifications in Section 102 on a case specific basis. ( )

103. GATHERING AND RESTRAINING SYSTEM.

Each domestic cervidae ranch must have a system for humanely and effectively gathering and restraining domestic cervidae for the purpose of inspecting, identifying, treating, or testing of animals by state or federal animal health officials. ( )

01. Gathering System. Each domestic cervidae ranch must have a system that facilitates the gathering of domestic cervidae so as to be able to move the domestic cervidae through the restraining system, at any time of the year that domestic cervidae are present. ( )

02. Restraining System. A system approved by the Administrator, to immobilize domestic cervidae for the purpose of efficient, effective, and safe handling for inspecting, treating, vaccinating, or testing. ( )

03. Exceptions. The Administrator may grant exceptions to the provisions of this section on a case specific basis. ( )

~~**104. WATER SYSTEM.**~~

~~Each domestic cervidae ranch must have a water system adequate to supply the need of the cervidae herd. ( )~~

10~~5~~4. QUARANTINE FACILITY.

If animals are to be imported onto the domestic cervidae ranch, a quarantine facility, approved by the Administrator, must be provided for holding animals until any disease retesting is accomplished or other requirements are met. ( )

10~~6~~5. -- 199. (RESERVED)

200. RECORDS AND REPORTING.

01. Reports. Owners of domestic cervidae ranches must submit complete and accurate reports to the Administrator. Failure to submit complete and accurate reports within the designated time frames is a violation of this chapter. ( )

02. Records. All owners of domestic cervidae ranches, during normal business hours, must present to state or federal animal health officials, for inspection, review, or copying, any cervidae records deemed necessary to ensure compliance with the provisions of this chapter. ( )

03. Notification. State ~~or federal~~ animal health officials will attempt to notify the owners or operators of domestic cervidae ranches, and premises where records are kept prior to any inspections. ( )

04. Emergencies. In the event of an emergency, as determined by the Administrator, the notification requirements of Section 200 may be waived. ( )

201. ANNUAL INVENTORY REPORT.

01. Inventory Report. All owners of domestic cervidae ranches must submit annually, to the Administrator, a complete and accurate inventory and summary report form of all animals held no later than December 31st of each year containing the following minimum information: ( )

a. Name and address of the domestic cervidae ranch. ( )

b. Name and address of the owner of the domestic cervidae ranch. ( )

c. Date the inventory was completed. ( )

02. Individual Domestic Cervidae. For each individual domestic cervidae that was located on the domestic cervidae ranch during the year for which the report is being made, the following information must be provided: ( )

a. All types of official and unofficial identification; ( )

b. Species; ( )

c. Sex; and ( )

d. Age or year born. ( )

202. INVENTORY VERIFICATION.

~~State or federal animal health officials will verify all domestic cervidae ranch inventories of animals held and individual animal identification annually. ( )~~

01. Visible Identification. Individual animal identification verification may be accomplished by visually noting the unique official visible identification number or visually noting an unofficial visible identification number if the number is correlated with two (2) forms of official identification on the inventory submitted by the cervidae producer. The Administrator may, on a case by case basis, grant written permission for ranch specific unique bangle tags to be used for official identification. ( )

02. Duty to Gather and Restrain. It is the duty of the owner of each domestic cervidae ranch to gather and restrain any domestic cervidae that state or federal animal health officials determine are not readily identifiable for inventory verification purposes. The Administrator determines the suitability of the restraint system. ( )

203. ~~CHANGE OF ADDRESS.~~ (RESERVED)

~~Owners of domestic cervidae ranches must notify the Division in writing within thirty (30) days of any change in the address of the owners of domestic cervidae, the owner of the domestic cervidae ranch, or the domestic cervidae ranch. ( )~~

204. ESCAPE OF DOMESTIC CERVIDAE.

It is the duty of each owner or operator of a domestic cervidae ranch to take all reasonable actions to prevent the escape of domestic cervidae from a domestic cervidae ranch. ( )

01. Notification of Escape. When any domestic cervidae escape from a domestic cervidae ranch, the owner or operator of the domestic cervidae ranch must notify the Administrator by phone, facsimile, or other means approved by the administrator within twenty-four (24) hours of the discovery of the escape. ( )

02. Duty to Retrieve Escaped Cervidae. It is the duty of each owner or operator of a domestic cervidae ranch to retrieve or otherwise bring under control all domestic cervidae that escape from a domestic cervidae ranch. ( )

03. Fish and Game. The Administrator will notify the Idaho Department of Fish and Game of each escape. ( )

~~**04. Sheriff and State Brand Inspector**. When domestic cervidae escape from a domestic cervidae ranch and the owner or operator is unable to retrieve the animals within twenty-four (24) hours, the Administrator may notify the county sheriff or the state brand inspector of the escape pursuant to Title 25, Chapter 23, Idaho Code. ( )~~

0~~5~~4. Capture. In the event that the owner or operator of a domestic cervidae ranch is unable to retrieve escaped domestic cervidae in a timely manner, as determined by the Administrator, the Administrator may effectuate the capture of the escaped domestic cervidae to ensure the health of Idaho's livestock and wild cervidae populations. ( )

0~~6~~5. Failure to Notify. Failure of any owner or operator of a domestic cervidae ranch to notify the Administrator within twenty-four (24) hours of the discovery of an escape of domestic cervidae is a violation of this chapter. ( )

0~~7~~6. Taking of Escaped Domestic Cervidae. A licensed hunter may legally take domestic cervidae that have escaped from a domestic cervidae ranch only under the following conditions: ( )

a. The domestic cervidae has escaped and has not been in the control of the owner or operator of the domestic cervidae ranch for more than seven (7) days; and ( )

b. The hunter is licensed and in compliance with all the provisions of the Idaho Department of Fish and Game rules and code. ( )

205. NOTICE OF DEATH~~OF DOMESTIC CERVIDAE.~~

~~Notice of death of domestic cervidae twelve (12) months or older and all domestic cervidae officially identified and inventoried that died on a ranch or at an approved slaughter or custom exempt slaughter establishment must be submitted by the owner or operator to the division on a report approved by the Administrator:( )~~All domestic cervidae that die on a ranch or are sent to slaughter must be reported to the Department except for calves that died prior to being reported on an annual inventory.

01. Submission of Death Certificates. A complete and accurate copy of all CWD sample submission forms/death certificates must be submitted to the division on a form approved by the Administrator ~~by regular mail, facsimile, electronic mail, or by other means as approved by the Administrator within ten (10) business days of when the owner or operator knew or reasonably should have known of the death.~~ no later than Dec. 31st in the year the animal died. ~~The CWD sample submission form/death certificate must contain the following minimum information:( )~~

~~**a.** Name and address of the domestic cervidae ranch; and ( )~~

~~**b.** Name and address of the owner of the domestic cervidae ranch. ( )~~

~~**02. Individual Domestic Cervidae**. For each individual domestic cervidae death, the following minimum information must be provided: ( )~~

~~**a.** All individual identification numbers; ( )~~

~~**b.** Sex; ( )~~

~~**c.** Age or year born; ( )~~

~~**d.** Date and time of death; ( )~~

~~**e.** Cause of death; ( )~~

~~**f.** Specify animals submitted for CWD testing; and ( )~~

~~**g.** Dated signature. ( )~~

206 -- 207. (RESERVED)

~~**207. NOTIFICATION OF EXPOSURE TO DISEASE.**~~
~~Any owner, operator, veterinarian practicing in Idaho, laboratory conducting cervidae testing, or any other person who has reason to believe that domestic cervidae are exposed to or infected with a dangerous or reportable disease or parasite must notify the Division immediately. ( )~~

208. INTRASTATE MOVEMENT CERTIFICATE.
All owners of domestic cervidae ranches who move cervidae, from one premises to another, including movement from one (1) premises to another premises owned, operated, leased, or controlled by the owner, within the state of Idaho must submit, to the Administrator, a complete and accurate intrastate movement certificate signed by the owner, ~~within ten (10) business days of the movement~~no later than Dec 31st in the year the movement occurred. ~~The Administrator will provide blank intrastate movement certificates to the owners of domestic cervidae ranches upon request~~. The intrastate movement report must be submitted to the division on a form approved by the Administrator. ( )

209. RANCH MANAGEMENT PLAN.

~~**01. Voluntary Ranch Management Plan**. A domestic cervidae ranch may apply, on a form prescribed by the Administrator, to enter into a voluntary ranch management plan. The ranch management plan will be developed cooperatively by the owner or authorized agent and the Administrator. For the ranch management plan, the Administrator will conduct a risk assessment considering the factors in Subsection 209.03. A voluntary ranch management plan may, notwithstanding other rule requirements to the contrary, establish inventory verification requirements and CWD sampling requirements specific for a domestic cervidae ranch. Failure to adhere to an approved voluntary ranch management plan is a violation of these rules. ( )~~

0~~2~~1. Mandatory Ranch Management Plan. Domestic cervidae ranches are required to develop and implement an approved ranch management plan if the ranch is found in violation of Sections 060, 204 or 500 of these rules. The ranch management plan must be completed and implemented within six (6) months of the disposition of the violation. For the ranch management plan, the Administrator will conduct a risk assessment considering the factors in Subsection 209.03. Failure to comply with the mandatory ranch management plan is a violation of these rules. ( )

0~~3~~2. Risk Assessment for Ranch Management Plans. The Administrator will conduct a risk assessment for each ranch management plan. A ranch management plan will not include a double fencing requirement but may require that double gates be installed. The Administrator will consider the following factors when conducting a risk assessment at a domestic cervidae ranch: ( )

a. Risk of egress. The risk of egress may be evaluated based on, but not limited to, history of domestic cervidae escape during the previous five (5) years, recovery rate of escaped domestic cervidae, length of time domestic cervidae were outside of the perimeter fence, annual average precipitation, topography, altitude and tree density. ( )

b. Risk of ingress. The risk of ingress may be evaluated on, but not limited to, history of ingress during the previous five (5) years, annual average precipitation, topography, altitude, tree density and proximity to wildlife migration corridors. ( )

c. Compliance with CWD sample submission. The Administrator may, based on a risk assessment of the facility, adjust the number of tissue sample submissions required under this rule. The adjustment will be based on, but not limited to, the following: ( )

i. Whether the domestic cervidae on the ranch have commingled with any domestic cervids of unknown CWD status. ( )

ii. Whether the domestic cervidae ranch has been in compliance with all requirements of Title 25, Chapter 35, Idaho Code, and these rules. ( )

iii. Whether the domestic cervidae ranch has had documented cases of ingress of wild cervids or egress of domestic cervidae within the eighteen (18) months prior to the risk assessment. ( )

210. -- 249. (RESERVED)

250. INTRASTATE MOVEMENT OF DOMESTIC CERVIDAE.
All live domestic cervidae moving from one premises to another premises within the state of Idaho must be officially identified, except calves during the year of birth accompanying their dam, and accompanied by: ( )

~~**01. TB Test**. An official negative test for tuberculosis of all cervidae over twelve (12) months of age, conducted within the last ninety (90) days, or written permission from the Administrator, except: ( )~~

~~**a.** Animals originating from an accredited, qualified or monitored herd, as described in "Bovine Tuberculosis Eradication, Uniform Methods and Rules," effective January 1, 2005, if they are accompanied by a certificate signed by an accredited veterinarian or the Administrator stating such domestic cervidae have originated directly from such herd; or ( )~~

~~**b.** Those domestic cervidae consigned directly to an approved slaughter establishment or domestic cervidae approved feedlot; or ( )~~

~~**c.** Those domestic cervidae moving from one premises to another premises owned, operated, leased, or controlled by the same person. ( )~~

0~~2~~1. Intrastate Movement Certificate. All intrastate movements of live domestic cervidae, including movement from one premises to another premises owned, operated, leased, or controlled by the same person, must be reported to ISDA on the annual inventory form, due Dec. 31st in the year the movement occurred. ~~accompanied by a complete and accurate intrastate movement certificate, which has been signed by the owner or operator of the domestic cervidae ranch where the movement originates and includes a statement of the CWD and TB status of the cervidae. ( )~~

~~**03. Movement of Cervidae Between Accredited AZA or USDA Licensed Facilities**. Movement of cervidae between accredited AZA and USDA licensed facilities is exempt from the requirements of this chapter. All other movement from AZA accredited or USDA licensed facilities must comply fully with all of the provisions of this chapter. ( )~~

251. -- ~~299~~300. (RESERVED)

~~**300. DISEASE CONTROL.**~~
~~The Administrator may require domestic cervidae in the state to be tested for brucellosis (Brucella abortus or Brucella suis), tuberculosis (Mycobacterium bovis), meningeal worm (Parelaphostrongylus tenuis), muscle worm (Elaphostrongylus cervus), CWD or for other diseases or parasites determined to pose a risk to other domestic cervidae, livestock, or wildlife.~~ ( )

301. DUTY TO RESTRAIN.
It is the duty of the owner of each domestic cervidae ranch to gather and restrain domestic cervidae for testing when directed to do so in writing by the Administrator. The Administrator determines the suitability of the restraint system. ( )

302. TESTING METHODS.
The Administrator determines appropriate testing procedures and methods. ( )

~~**303. TESTING, TREATMENT, QUARANTINE, OR DISPOSAL REQUIRED.**~~

~~The Administrator determines when testing, treatment, quarantine, or disposal of domestic cervidae is required at any domestic cervidae ranch pursuant to Title 25, Chapters 2, 3, 4, 6, and 37, Idaho Code. If the Administrator determines that testing, treatment, quarantine, disposal of domestic cervidae, or cleaning or disinfection of premises is required, a written order will be issued to the owner describing the procedure to be followed and the time period for carrying out such actions. ( )~~

~~**304. QUARANTINES.**~~
~~All domestic cervidae animals or herds that are determined to be exposed to, or infected with, any disease that constitutes an emergency, as provided in Title 25, Chapter 2, Idaho Code, will be quarantined. ( )~~

~~**01. Infected Herds**. Infected herds or animals must remain under quarantine until such time that the herd has been completely depopulated and the premises has been cleaned and disinfected as provided by the Administrator, or the provisions for release of a quarantine established in these rules have been met. ( )~~

~~**02. Exposed Herds**. The quarantine for exposed herds or animals may take the form of a hold order which remains in effect until the exposed animals have been tested and the provisions for release of a quarantine as established in these rules have been met. ( )~~

~~**03. Validity of Quarantine**. The quarantine is valid whether or not acknowledged by signature of the owner. ( )~~

~~**305. DECLARATION OF ANIMAL HEALTH EMERGENCY.**~~
~~The Director is authorized to declare an animal health emergency. ( )~~

~~**01. Condemnation of Animals**. In the event that the Director determines that an emergency exists, animals that are found to be infected, or affected with, or exposed to an animal health emergency disease may be condemned and destroyed. ( )~~

~~**02. Indemnity**. Any indemnity is paid in accordance with Sections 25-212 and 25-213, Idaho Code. ( )~~

~~**03. Notification to Administrator**. Every owner of cervidae, every breeder or dealer in cervidae, every veterinarian, and anyone bringing cervidae into this state who observes the appearance of, or signs of any disease or diseases, or who has knowledge of exposure of the cervidae to diseases that constitute an emergency must give immediate notice to the Administrator by telephone, facsimile, or other means as approved by the Administrator. ( )~~

~~**04. Failure to Notify**. Any owner of cervidae who fails to report as herein provided forfeits all claims for indemnity for animals condemned and slaughtered or destroyed on account of the animal health emergency.~~ ( )

303~~306~~. -- ~~399~~499. (RESERVED)

~~**400. BRUCELLOSIS.**~~
~~Owners of domestic cervidae ranches must comply with the provisions of IDAPA 02.04.20, "Rules Governing Brucellosis," that apply to domestic cervidae.~~ ( )

~~**401. -- 449. (RESERVED)**~~

~~**450. TUBERCULOSIS.**~~

~~**01. Change of Ownership**. All domestic cervidae that are sold, or are in any way transferred from one person to another person in Idaho are required to be tested negative for TB within ninety (90) days prior to the change of ownership or transfer, except: ( )~~

~~**a.** Animals originating from an accredited, qualified or monitored herd, as described in "Bovine~~

~~Tuberculosis Eradication, Uniform Methods and Rules," effective January 1, 2005, if they are accompanied by a certificate signed by an accredited veterinarian or the Administrator stating such domestic cervidae have originated directly from such herd; or ( )~~

~~**b.** Those domestic cervidae consigned directly to an approved slaughter establishment or domestic cervidae approved feedlot. ( )~~

~~**c.** The Administrator, following an evaluation, may grant exceptions to the provisions of this Section on a case-by-case basis. ( )~~

~~**02. Rules and UM&R**. Owners of domestic cervidae ranches must comply with the provisions of IDAPA 02.04.03, "Rules Governing Animal Industry," that apply to domestic cervidae, and the Bovine Tuberculosis Eradication, UM&R, Effective January 1, 2005. ( )~~

~~**451. -- 499. (RESERVED)**~~

500. SURVEILLANCE FOR CWD.

01. ~~**Slaughter**~~**Routine Surveillance**. Brain tissue from ~~no less than ten percent (10%) of all~~ domestic ~~cervidae~~elk and reindeer sixteen (16) months of age or older at the time of death~~that are slaughtered at approved slaughter establishments or custom exempt slaughter establishments~~ must be submitted annually ~~by the owner of the slaughtered cervidae~~ to official laboratories ~~to be tested or examined~~ for CWD testing as provided for in these rules, under the following conditions:. ~~If ten (10) or less cervids on a domestic cervidae ranch are slaughtered in a calendar year, at least one (1) testable brain sample must be submitted to meet the annual CWD surveillance requirement. Tissues samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement.~~

a. No less than ten (10) percent of cervids harvested or slaughtered.

b. No less than one hundred (100) percent of cervids that die for any reason other than slaughter or harvest.

c. Tissues samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement.

d. Fallow deer are exempt from CWD testing.

~~**02. Domestic Cervidae Ranches Surveillance**. Brain tissue from no less than ten percent (10%) of all domestic cervidae elk and reindeer sixteen (16) months of age or older that are harvested on domestic cervidae ranches must be submitted for CWD testing annually. If ten (10) or less cervids on a domestic cervidae ranch are harvested in a calendar year, at least one (1) testable brain sample must be submitted to meet the annual CWD surveillance requirement. In addition to the tissue samples from the harvested domestic cervidae, brain tissue from one hundred percent (100%) of all domestic cervidae sixteen (16) months of age or older that die for any reason other than being harvested must also be submitted for CWD testing annually. Reindeer and fallow Fallow deer are exempt from CWD testing. unless the reindeer and fallow deer are part of a CWD positive, exposed, trace, source, or suspect herd or part of an elk herd. The owner or operator of the domestic cervidae ranch must submit all tissue samples to an official laboratory to be tested for CWD, as provided for in these rules. Tissues samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement. In the event a domestic cervidae ranch cannot submit a testable brain sample, the domestic cervidae ranch must submit a CWD Sample Submission Waiver Request within ten (10) business days of determining that a testable brain sample cannot be submitted. ( )~~

02. Enhanced CWD Surveillance. Brain tissue from one hundred percent (100%) of all domestic elk and reindeer sixteen (16) months of age or older that die for any reason on a facility will be required to be tested for CWD for a period of sixty (60) months under the following conditions:

a. A facility has imported cervids from a location within twenty-five (25) miles from a confirmed case of CWD in wild cervids.

b. A facility has received cervids via intrastate movement from a facility under enhanced CWD surveillance requirements at the time of the transfer.

c. The duration of the enhanced CWD surveillance requirements are based upon the most recent date of movement that meets the criteria listed in this Section.

501. COLLECTION OF SAMPLES FOR CWD TESTING.

~~Only accredited veterinarians, state and federal animal health officials, and other persons, approved by the Administrator, may collect brain or other tissue samples for CWD testing.~~ Obex ~~S~~samples must be collected immediately upon discovery of the death of a domestic cervid. ( )

~~**01. Brain Samples**. Only persons trained by state or federal animal health officials, and approved by the Administrator, may remove the obex portion of the brainstem for submission as the sample for CWD testing. ( )~~

~~**02. Submission of Head**. Only persons trained by state or federal animal health officials, and approved by the Administrator, may submit a head with the official identification attached to the head as the sample for CWD testing. ( )~~

~~**03. Handling of Samples**. All CWD samples must be handled in a manner that prevents degradation of the sample. ( )~~

~~**04. Sample Submission Time**. Fresh samples for CWD testing must be submitted, to an approved laboratory, within seventy-two (72) hours of the date of collection. Formalin preserved samples must be submitted, to an approved laboratory, within ten (10) business days of the date of collection. ( )~~

0~~5~~1. Non-Testable or Samples That Do not Contain Appropriate Tissues. The Administrator may conduct an investigation to determine if a domestic cervidae ranch is complying with the provisions of Section 500 if: ( )

~~**a.** The owner or operator of a domestic cervidae ranch submits samples for CWD testing which are non-testable; or ( )~~

~~**b.** The owner or operator of a domestic cervidae ranch submits samples for CWD testing that do not contain the obex portion of the brainstem or other appropriate tissues, if available, for CWD testing. ( )~~

~~c~~a. The owner or operator of a domestic cervidae ranch submits samples for CWD testing which cannot be identified to the animal of origin. ( )

0~~6~~2. Failure to Meet Annual CWD Tissue Submission Requirement. An owner or operator of a domestic cervidae ranch who fails to submit samples for CWD testing or who fails to meet the annual tissue submission requirements of this chapter, or both, is in violation of these rules, except the Administrator may approve, in writing, a variance from sample submission requirements on a case specific basis. ( )

502. OFFICIAL CWD TESTS.

01. Official Tests. Official tests for CWD, approved by the Administrator, include: ( )

a. ~~Histopathology~~Enzyme Linked Immunosorbent Assay (ELISA); ( )

b. Immunohistochemistry; ( )

c. ~~Western Blot;~~ ( )

d. Negative Stain Electron Microscopy; ( )

e. ~~Bioassay;~~ and ( )

02. **Other Scientifically Validated Test**. The Administrator may approve other scientifically validated laboratory or diagnostic tests to confirm a diagnosis of CWD. ( )

503. CWD STATUS.

CWD status is validated pursuant to the Federal CWD Herd Certification program standards.~~based on the number of years that a herd of domestic cervidae has been determined to be in compliance with the provisions of this chapter, during which there is no evidence of CWD in the herd. ( )~~

~~**01.** **Status Review**. The Administrator will review the CWD status of each domestic cervidae herd located in Idaho on at least an annual basis. ( )~~

~~**02.** **Status Date**. The status date is the date that the Administrator approves a change in the CWD status of a domestic cervidae herd in Idaho. ( )~~

~~**03.** **Cervidae of Lesser Status**. If a herd of domestic cervidae has contact with cervidae of a lesser status, the status of the herd with the higher status will be lowered to the status of the cervidae with the lesser status. ( )~~

~~**04.** **Change of Ownership**. A herd's status may remain with the herd when a change of ownership, management or premises occurs, if there is no contact with cervidae of lesser status, and no previous history of CWD on the premises. ( )~~

~~**05.** **Contact with CWD Positive Animals**. Any herd of domestic cervidae that has contact with CWD positive or exposed animals may have its status reduced or removed. ( )~~

504. INVESTIGATION OF CWD.

An epidemiological investigation will be conducted on all CWD positive, suspect, and exposed animals and herds, herds of origin, source herds, all adjacent herds, and all trace herds as determined by the Administrator. ( )

01. **Quarantine**. All positive, suspect, and exposed herds or animals, herds of origin, adjacent herds, and herds having contact with positive or exposed animals must be quarantined; and ( )

02. **Identification**. CWD suspect and exposed animals must be identified and remain on the premises where they are found until they have met the provisions for release of quarantine established in this chapter, are destroyed and disposed of as directed by the Administrator, or are moved at the Administrator's direction on a restricted movement permit. ( )

505. DURATION OF CWD QUARANTINE.

Quarantines imposed because of CWD in accordance with this chapter remain in effect until one (1) of the following criteria are met: ( )

01. **CWD Positive Herds**. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after five (5) years of compliance with an individual herd CWD plan and all provisions of these rules, during which there was no evidence of CWD. ( )

02. **CWD Suspect Herds**. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd as determined by the Administrator. ( )

03. **Source Herds and Herds of Origin**. The quarantine may be released after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd and that the herd is not the source of infection as determined by the Administrator. ( )

04. Exposed Herds. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd as determined by the Administrator. ( )

05. Adjacent Herds. The quarantine may be released when directed by the Administrator based upon an epidemiological investigation and in consultation with the designated epidemiologist. ( )

06. Fencing Requirements. Any owner of a domestic cervidae ranch who chooses to remain under quarantine for five (5) years must construct a second perimeter fence that meets the requirements for perimeter fence, as provided in Section 102, such that no domestic cervidae on the domestic cervidae ranch can get within ten (10) feet of the original exterior perimeter fence or as approved by the Administrator. ( )

07. Complete Depopulation. The quarantine may be released after: ( )

a. Complete depopulation of all cervidae on the premises as directed by the Administrator; and ( )

b. The premises have been free of all livestock as specified in an individual CWD herd plan approved by the Administrator; and ( )

c. The soil and facilities have been cleaned, treated, decontaminated, or disinfected as directed by the Administrator. ( )

08. Disposal of Positive or Exposed Cervidae. All CWD positive or exposed domestic cervidae must be disposed of as directed by the Administrator. ( )

~~**506. CLEANING, TREATING, DECONTAMINATING, OR DISINFECTING.**~~
~~Premises must be cleaned, treated, decontaminated, or disinfected under state or federal supervision as directed by the Administrator within fifteen (15) days after CWD positive or suspect animals have been removed. ( )~~

~~**01. Exemptions**. The Administrator may authorize, in writing, an exemption from cleaning, treating, decontaminating, or disinfection requirements on a case-by-case basis. ( )~~

~~**02. Extension of Time**. The Administrator may authorize, in writing, an extension of time for cleaning and disinfection under extenuating circumstances. ( )~~

~~**03. Requests for Extensions or Exemptions**. The owner of the contaminated facility must submit requests for extensions or exemptions to the Administrator in writing. ( )~~

~~507~~506. -- 999. (RESERVED)

From:	Dr. Scott Leibsle
To:	Dr. Scott Leibsle
Cc:	_Rulesinfo
Subject:	Rules Governing Domestic
Date:	Thursday, June 3, 2021 1:32:57 PM
Attachments:	image003.png

Cervidae stakeholders –

Thank you to everyone who has participated, thus far, in ISDA's negotiated rulemaking meetings for Rules Governing Domestic Cervidae. Regarding the remaining issues left to reach a consensus (i.e. – wild CWD import proximity, CWD testing requirements, fence height and red deer testing), ISDA has thoroughly reviewed all submitted comments in the rulemaking record as well as testimony provided in the previous 2 meetings. Proposed changes to the rule that address each of these issues, based upon stakeholder input, have been posted to the ISDA rulemaking website. Please go to https://agri.idaho.gov/main/i-need-to/see-lawsrules/rulemaking/isda-rulemaking-2021-2022/ to review the current version of the domestic cervidae strawman in advance of the final rulemaking meeting, scheduled for June 16th @ 830am. Please keep in mind all written comments must be submitted to ISDA no later than June 20 to be included in the rulemaking record.

A summary of the proposed changes is as follows:

Section 050. Red Deer Gene Testing. Until a reliable test can be validated, ISDA cannot enforce red deer gene testing requirements.
Section 102. Fencing Requirements. All reindeer fences constructed and approved during or after 2021 must be 8 feet in height. Reindeer fences constructed prior to 2021 may remain at 6 feet in height.
Section 500. CWD testing/import requirements. See proposed language below.

A new subsection in IDAPA 02.04.19.500.01 has been created:

03. Ranches Receiving Imports or Transfers. Brain tissue from one hundred percent (100%) of all domestic elk and reindeer sixteen (16) months of age or older that die for any reason on a facility that receives imported or transferred cervids must be submitted for CWD testing for no less than sixty (60) months following the most recent date of import or transfer. Fallow deer are exempt from CWD testing. The owner or operator of the domestic cervidae ranch must submit all tissue samples to an official laboratory to be tested for CWD, as provided for in these rules. Tissue samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement.

In summary….if a ranch receives ANY imported or transferred animals (regardless of origin), that ranch must then test ALL cervids that die for the next 5 years….not just the ones that were imported. If a producer operates multiple facilities and imports/transfers animals to only one of those facilities….all cervids in all facilities owned by that producer must test at 100%. If a producer does not import or transfer any animals into their facility, the existing CWD testing requirement will remain in effect (10% harvested; 100% non harvest deaths).

Because the CWD testing requirement is being increased for importing facilities, the 25 mile "minimum safe distance" from a wild CWD case requirement for imported animals will be removed. Standard import rules will apply….imports from within an officially designated CWD endemic area are still prohibited and all imports must be consistent with federal herd certification requirements.

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Rulemaking Summary

IDAPA 02.04.19 – Rules Governing Domestic Cervidae

Where is the rulemaking authority?

Authority for this rulemaking resides in the Title 25 Chapter 3704 Idaho Code – Domestic Cervidae Farms

What does this rule do?

These rules govern procedures for the detection, prevention, control and eradication of diseases among domestic cervidae, and facilities, record keeping, and reporting requirements of domestic cervidae ranches.

What is the agency proposing to change?

The agency has performed Zero Based Regulation to simplify, clarify or remove outdated, unnecessary or irrelevant language in sections highlighted blue in the attached strawman. The amended language in these sections does not change the regulatory impact, scope, intent or authority in the current rule.

The agency has conducted an internal audit of this rule and identified multiple sections that may require amendments due to inaccurate or confusing language, recommendations to improve the efficiency of the program or changes that must be made to coincide with recent statutory amendments. The changes listed below, and highlighted in yellow in the attached strawman, do result in a change to the regulatory impact, scope, intent or authority in the current rule.

- Updating incorporations by reference to current version (Section 004)
- Create a definition of “endemic area” (section 010)
- Correct and clarify definition of “source herd” (section 010)
- Remove prohibition on reindeer farming north of the Salmon River; define what requirements are necessary to transport a reindeer off property for temporary exhibition (Section 020)
- Remove the fee for domestic cervidae that die during the same calendar year (Section 090)

- All facility requirements must be approved prior to population with cervids (Section 101)
- Require a summary report form be submitted with the annual inventory (Section 201)
- Change the due date for intrastate movement fees (Section 208)
- Require reindeer be included in CWD testing requirements (Section 500)

Recent discussions with industry and stakeholders have identified the topics listed below, and highlighted in green in the attached strawman, for review and potential amendment:

- Modification to the Red Deer Gene Factor testing and management requirements (Section 050)

02.04.19 – RULES GOVERNING DOMESTIC CERVIDAE

000. LEGAL AUTHORITY.
This chapter is adopted under the legal authority of Sections 25-203, 25-305, 25-601, and 25-3704, Idaho Code. ( )

001. TITLE AND SCOPE.

01. Title. The title of this chapter is "Rules Governing Domestic Cervidae." ( )

02. Scope. These rules govern procedures for the detection, prevention, control and eradication of diseases among domestic cervidae, and facilities, record keeping, and reporting requirements of domestic cervidae ranches. ( )

002. – 003. (RESERVED)

004. INCORPORATION BY REFERENCE.
The following documents are incorporated by reference. ( )

01. Bovine Tuberculosis Eradication, Uniform Methods and Rules, Effective January 1, 2005. This document can be viewed online at https://www.aphis.usda.gov/animal_health/animal_diseases/tuberculosis/downloads/tb-umr.pdf. ( )

02. Code of Federal Regulations, Title 9, Part 161, January 1, ~~2016~~2021. This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

Commented [DSL1]: Update to 2021 version. Accredited veterinarian standards.

03. Code of Federal Regulations, Title 9, Part 55, January 1, ~~2016~~2021.This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

Commented [DSL2]: Update to 2021 version. CWD regulations

04. Code of Federal Regulations, Title 9, Subchapter A, Part 1 and 2, January 1, ~~2016~~2021.This document can be viewed online at https://www.govinfo.gov/content/pkg/CFR-2016-title9-vol1/pdf/CFR-2016-title9-vol1-chapI-toc-id4.pdf. ( )

Commented [DSL3]: Update to 2021 version. Animal welfare regulations.

005. -- 009. (RESERVED)

010. DEFINITIONS.

~~**01. Accredited Veterinarian**. A veterinarian approved by the Administrator and USDA/APHIS/VS, in accordance with Title 9, Part 161, CFR, January 1, 2004, to perform functions required by cooperative state-federal animal disease control and eradication programs. ( )~~

Commented [DSL4]: Redundant…defined in 9 CFR 55 & 9 CFR 161

02. Approved Laboratory. NVSL, an AAVLD accredited laboratory that is qualified to perform CWD diagnostic procedures, or a laboratory designated by the Administrator to perform CWD diagnostic procedures. ( )

03. Approved Slaughter Establishment. A USDA inspected slaughter establishment at which ante-mortem and post-mortem inspection is conducted by USDA inspectors. ( )

04. Area Veterinarian in Charge. The USDA/APHIS/VS veterinary official who is assigned to supervise and perform official animal health activities in Idaho. ( )

05. Breed Associations and Registries. Organizations maintaining permanent records of ancestry or pedigrees of animals, individual animal identification records and records of ownership. ( )

~~**06. Certificate**. An official document issued by a state or federal animal health official or an accredited veterinarian at the point of origin of a shipment of cervidae that contains information documenting the age, sex, species, individual identification of the animals, the number of animals, the purpose of the movement, the points of origin and destination, the consignor, the consignee, the status of the animals relative to official diseases, test results and any other information required by the state animal health official for importation or translocation.~~ ( )

Commented [DSL5]: Definition unnecessary…CVI already a state and federal requirement

07. Cervid Herd. One (1) or more domestic cervidae or groups of domestic cervidae maintained on common ground or under common ownership or supervision that may be geographically separated but can have interchange or movement. ( )

08. Cervidae. Deer, elk, moose, caribou, reindeer, and related species and hybrids including all members of the cervidae family and hybrids. ( )

09. Chronic Wasting Disease. A transmissible spongiform encephalopathy of cervids that is a nonfebrile, transmissible, insidious, and degenerative disease affecting the central nervous system of cervidae. ( )

10. Commingling. Within the last five (5) years, the animals have had direct contact with each other, had less than thirty (30) feet of physical separation, or shared management equipment, pasture, or surface water sources, except for periods of less than forty-eight (48) hours at sales or auctions when a state or federal animal health official has determined such contact presents minimal risk of CWD transmission. ( )

11. Custom Exempt Slaughter Establishment. A slaughter establishment that is subject to facility inspection by USDA-FSIS, but that does not have ante-mortem and post-mortem inspection of animals by USDA inspectors. ( )

Commented [DSL6]: clarification

12. CWD-Adjacent Herd. A herd of domestic cervidae occupying premises that border a premises occupied by a CWD positive herd, including herds separated by roads or streams. ( )

13. CWD-Exposed Animal. A cervid animal that is not exhibiting any signs of CWD, but has had contact within the last five (5) years with cervids from a CWD-positive herd or the animal is a member of a CWD-exposed herd. ( )

14. CWD-Exposed Herd. A herd of cervidae in which no animals are exhibiting signs of CWD, but: ( )

a. An epidemiological investigation indicates that contact with CWD positive animals or contact with animals from a CWD positive herd has occurred in the previous five (5) years; or ( )

b. A herd of cervidae occupying premises that were previously occupied by a CWD positive herd within the past five (5) years as determined by the designated epidemiologist; or ( )

c. Two (2) herds that are maintained on a single premises even if they are managed separately, have no commingling, and have separate herd records. ( )

15. CWD-Positive Cervid. A domestic cervid on which a diagnosis of CWD has been confirmed through positive test results on any official cervid CWD test by an approved laboratory. ( )

16. CWD-Positive Herd. A domestic cervidae herd in which any animal(s) has been diagnosed with CWD, based on positive laboratory results, from an approved laboratory. ( )

17. CWD-Suspect Cervid. A domestic cervid for which laboratory evidence or clinical signs suggests

a diagnosis of CWD. ( )

18. **CWD-Suspect Herd**. A domestic cervidae herd in which any animal(s) has been determined to be a CWD-suspect. ( )

19. **Death Certificate**. A form, approved by the administrator, provided by the Division for the reporting of cervidae deaths and for reporting sample submission for CWD testing. ( )

20. **Designated Epidemiologist**. A state or federal veterinarian who has demonstrated the knowledge and ability to perform the functions required under these rules and who has been selected by the Administrator to fulfill the epidemiology duties relative to the state domestic cervidae disease control program. ( )

21. **Disposal**. Final disposition of dead cervidae. ( )

22. **Domestic Cervidae**. Fallow deer (*Dama dama*), elk (*Cervus elaphus*) or reindeer (*Rangifer tarandus*) owned by a person. ( )

23. **Domestic Cervidae Ranch**. A premises where domestic cervidae are held or kept, including multiple premises under common ownership. ( )

24. **Electronic Identification**. A form of unique, permanent individual animal identification such as radio frequency identification tag, radio frequency identification implant, or other forms approved by the Administrator. ( )

Endemic Area. A geographical area designated by a state animal health official in the state of origin where animals located within that area are subject to an increased risk of acquiring a contagious disease. Most commonly in reference to Tuberculosis or Chronic Wasting Disease.

Commented [DSL7]: New definition

25. **Escape**. Any domestic cervidae located outside the perimeter fence of a domestic cervidae ranch and not under the immediate control of the owner or operator of the domestic cervidae ranch. ( )

26. **Federal Animal Health Official**. An employee of USDA/APHIS/VS who is authorized to perform animal health activities. ( )

27. **Harvest**. Any healthy domestic cervid that is intentionally and lethally removed from a domestic cervidae facility, by an owner, designated employee or customer of the facility, strictly for the purposes of either shooting or meat production. ( )

28. **Herd of Origin**. A cervid herd, on any domestic cervidae ranch or other premise, where the animals were born, or where they were kept for at least one (1) year prior to date of shipment. ( )

29. **Herd Status**. Classification of a cervidae herd with regard to CWD. ( )

30. **Intrastate Movement Certificate**. A form approved by the Administrator, and available from the Division, to document the movement of domestic cervidae between premises within Idaho. ( )

31. **Individual CWD Herd Plan**. A written herd management agreement and testing plan developed by the herd owner and approved by the Administrator to identify and eradicate CWD from a positive, source, suspect, exposed, or adjacent herd. ( )

32. **Limited Contact**. Incidental contact between animals of different herds in separate pens off of the herd's premises at fairs, shows, exhibitions and sales. ( )

33. **National CWD Herd Certification Program**. A federal-state-industry cooperative program administered by APHIS and implemented by participating states that establishes CWD surveillance and testing standards that owners must achieve before interstate transport of cervids will be permitted. ( )

34. **Official CWD Test**. A test approved by the Administrator and conducted at an approved laboratory to diagnose CWD. ( )

35. **Official Identification**. Identification, approved by the Administrator, that individually, uniquely, and permanently identifies each cervid. ( )

36. **Operator**. A person who has authority to manage or direct a domestic cervidae ranch. ( )

37. **Premises**. The ground, area, buildings, and equipment utilized to raise, propagate, control, or harvest domestic cervidae. ( )

38. **Quarantine**. An order issued on authority of the Administrator, by a state or federal animal health official or accredited veterinarian, prohibiting movement of cervids from any location without a written restricted movement permit. ( )

39. **Quarantine Facility**. A confined area where selected domestic cervidae can be secured and isolated from all other cervidae and livestock. ( )

40. **Ranch Management Plan**. A written plan for a domestic cervidae ranch that sets forth best management practices that mitigates the introduction or dissemination of disease among domestic cervidae. ( )

41. **Reidentification**. The identification of a domestic cervid which had been officially identified, as provided by this chapter, but which has lost the official identification device, or the tattoo or official identification device has become illegible. ( )

42. **Restrain**. The immobilization of domestic cervidae in a chute, other device, or by other means for the purpose of efficiently, effectively, and safely inspecting, treating, vaccinating, or testing. ( )

43. **Restricted Movement Permit**. An official document that is issued by the Administrator, AVIC, or an accredited veterinarian for movement of animals from positive, suspect, or exposed herds. ( )

44. **Source Herd**. The herd or herds from where a producer acquired their existing livestock. ~~A herd from which at least one (1) cervid has originated within the previous five (5) years and that cervid has been diagnosed CWD positive. ( )~~

Commented [DSL8]: Clarify & standardize the definition

45. **State Animal Health Official**. The Administrator, or Administrator's designee. ( )

46. **Status Date**. The date on which the Administrator approves in writing a herd status change with regard to CWD. ( )

47. **Trace Back Herd**. An exposed herd in which at least one (1) CWD positive animal resided within any of the previous sixty (60) months prior to diagnosis with CWD. ( )

48. **Trace Forward Herd**. A herd that has received exposed animals from a positive herd within sixty (60) months prior to the diagnosis of CWD in the positive herd or from the identified point of entry of CWD into the positive herd. ( )

49. **Traceback**. The process of identifying the movements and the herd of origin of CWD positive, or exposed animals, including herds that were sold for slaughter. ( )

50. **Wild Cervidae**. Any cervid animal not owned by a person. ( )

51. **Wild Ungulate**. Any four (4) legged, hoofed herbivore, including cervids and other ruminants, not owned by a person. ( )

52. **Wild Ungulate Cooperative Herd Plan**. A plan, developed cooperatively by the owner of the domestic cervidae ranch, the ISDA, and the Idaho Department of Fish and Game to determine the disposition of any wild ungulates that are found to be located on a domestic cervidae ranch. ( )

011. ABBREVIATIONS.

01. **AAVLD**. American Association of Veterinary Laboratory Diagnosticians. ( )

02. **APHIS**. Animal and Plant Health Inspection Service. ( )

03. **AVIC**. Area Veterinarian in Charge. ( )

04. **AZA**. Association of Zoos and Aquariums. ( )

05. **CFR**. Code of Federal Regulations. ( )

06. **CWD**. Chronic Wasting Disease. ( )

07. ~~**CWDP**. Chronic Wasting Disease Program.~~ ( )
HCP. Herd Certification Program.

Commented [DSL9]: Updated abbreviation.

08. **ISDA**. Idaho State Department of Agriculture. ( )

09. **NAEBA**. North American Elk Breeders Association. ( )

10. **NVSL**. National Veterinary Services Laboratory. ( )

11. **TB**. Tuberculosis. ( )

12. **UM&R**. Uniform Methods and Rules. ( )

13. **USDA**. United States Department of Agriculture. ( )

14. **VS**. Veterinary Services. ( )

012. APPLICABILITY.
These rules apply to all domestic cervidae located in, imported into, exported from, or transported through the state of Idaho. ( )

~~013. **AZA ACCREDITED FACILITIES AND USDA LICENSED FACILITIES.**~~
~~AZA accredited facilities and facilities licensed by USDA under 9CFR Subchapter A Parts 1 and 2 as licensees, dealers, exhibitors, research facilities and zoos are exempt from the provisions of this chapter provided that: ( )~~

~~**01.** **Movement Between AZA and USDA Facilities**. AZA accredited and USDA licensed facilities may not sell, give, or in any way transfer cervidae to persons or domestic cervidae ranches within Idaho, except other to AZA accredited or USDA licensed facilities. ( )~~

~~**02.** **Transfer of Cervidae**. Any AZA accredited or USDA licensed facility that in any way transfers cervidae, or title to cervidae, to any person in Idaho, except to other AZA accredited or USDA licensed facilities, must comply with all of the provisions of this chapter. ( )~~

~~014. Importation Of Domestic Cervidae.~~

~~All domestic cervidae imported into the state of Idaho must comply with the requirements of the APHIS National CWD Herd Certification Program and IDAPA 02.04.21 "Rules Governing the Importation of Animals," which apply to domestic cervidae.~~ ( )

015. -- 019. (RESERVED)

020. LOCATION OF DOMESTIC CERVIDAE.

Any person who owns or has control of domestic cervidae in Idaho that are not located on a domestic cervidae ranch that is in compliance with the applicable provisions of this chapter, ~~or on an AZA accredited or USDA licensed facility in compliance with this chapter~~, is in violation of these rules. ( )

01. Department Action. In addition to any other administrative or civil action, the department may seize, require removal from the state, require removal to a domestic cervidae ranch that is in compliance with the provisions of this chapter, or require disposal of any domestic cervidae that are not located on a domestic cervidae ranch, an AZA accredited facility, or a USDA licensed facility which is in compliance with the provisions of this chapter. ( )

~~**02. Reindeer**. Reindeer may not be owned, possessed, propagated or held in Idaho north of the Salmon River in order to protect the wild caribou herd in northern Idaho.~~ ( )

Commented [DSL10]: 2021 Statutory Amendment

03. Exceptions. The Administrator may grant exceptions from the provisions of Section 020 on a case specific basis. ( )

04. Natural Disasters. Damage caused to domestic cervidae ranch facilities by natural disasters does not constitute a violation of this chapter, provided that the owner or operator begins any necessary repairs immediately upon discovering the damage, acts expeditiously, as determined by the Administrator, to complete any necessary repairs and reports the extent and cause of any damage to the Division within twenty-four (24) hours of the discovery of the damage. ( )

05. Notification of Temporary Exhibition. Producers must notify ISDA, in advance, of any event where a reindeer will be exhibited outside of an approved cervidae facility. ISDA must be provided with the date and location of the event as well as a description of the temporary facility and an escape plan protocol.

Commented [DSL11]: Comment submitted. Jim Lowe supports this change.

021. OFFICIAL IDENTIFICATION.

All domestic cervidae must be individually, permanently, and uniquely identified, with two (2) types of official identification approved by the Administrator. ( )

Commented [DSL12]: Mandated in statute. 25-3703A

01. Reporting of Identification. The unique individual identification number, type of identification, and the name, address, and telephone number of the owner of each animal identified must be reported to the Administrator, in writing, by the owner or operator. ( )

02. Identification Assigned. Official identification, once assigned to an individual animal, may not be changed or transferred to another animal. Animals that lose identification devices must be re-identified in accordance with Section 031. ( )

03. Progeny. All progeny of domestic cervidae must be officially identified by December thirty-first of the year of birth, upon sale or transfer of ownership, or upon leaving the domestic cervidae ranch, whichever is earlier. ( )

04. Visible Identification. At least one (1) of the official types of identification used must be visible from one hundred and fifty (150) feet. ( )

022. TYPES OF OFFICIAL IDENTIFICATION.

Commented [DSL13]: Mandated in statute. 35-3703A

All domestic cervidae must be individually identified by two (2) of the following types of official identification, at least one (1) of the types of official identification must be a bangle or lamb tag that is visible from one hundred fifty

(150) feet. ( )

01. Official USDA Ear Tag. ( )

02. Tattoo. Legible skin tattoo using an alphanumeric tattoo sequence that has been recorded with the Division of Animal Industries and applied to either the ear or escutcheon. ( )

03. Electronic Identification. A form of electronic identification, approved by the Administrator. ( )

04. Official NAEBA Eartag. ( )

05. Official ISDA Cervidae Program Ear Tag. A tamper resistant, unique number sequenced, individual identification tag approved by the Administrator. ( )

06. Official HASCO Brass Lamb Tag. A brass lamb tag engraved with farm name and individual animal identification number. ( )

~~**07. Freeze Brands**. Legible, freeze brands that uniquely identify the individual domestic cervid.~~ ( )

08. Ranch Specific Unique Bangle or Lamb Tags. The Administrator may grant written approval for the use of bangle or lamb tags that are: ranch specific; tamper resistant; uniquely numbered; and correlated with another type of official identification on the annual inventory report. ( )

Commented [DSL14]: Leave language intact. David Miller

09. Other Identification. Other forms of unique individual identification approved by the Administrator. ( )

~~023. National CWD Herd Certification Program Official Identification.~~
~~All domestic cervidae enrolled in the National CWD Herd Certification Program are required to be identified with two (2) forms of identification for each animal. One (1) form of identification must be a nationally unique official animal identification that uses an APHIS-approved numbering system that is linked to the CWD National Database or equivalent ISDA database. The second form of identification must be unique to the individual animal within the herd and also be linked to the CWD National Database or equivalent ISDA database. ( )~~

Commented [DSL15]: Federal program requirements. Redundant language. 9 CFR 55

~~**01. APHIS-Approved Identification Devices**. ( )~~

~~a. Electronic Identification; ( )~~

~~b. Official USDA Tamper-Resistant Ear Tag; ( )~~

~~c. Legible Ear or Flank Tattoo; and ( )~~

~~d. Other forms of Identification as approved by APHIS Administrator. ( )~~

024. -- 029. (RESERVED)

030. OFFICIAL VISIBLE IDENTIFICATION.

Commented [DSL16]: Mandated in statute. 25-3703A

01. Ear Tags. All domestic cervidae must be identified with a bangle or lamb tag that is visible from one hundred fifty (150) feet. ( )

02. Size. The large portion of the bangle or lamb tag must be at least two (2) square inches. ( )

03. Color. No visible identification may have a primary color of brown, black, pink, tan, or silver.

( )

04. Camouflage Patterns. No visible identification may utilize camouflage patterns. ( )

031. REIDENTIFICATION OF DOMESTIC CERVIDAE.

~~No domestic~~ Permanent official identification in domestic ~~cervidae~~cervidae ~~-~~that has been lost or is no longer legible may be replaced only for the purpose to reestablish their original identity. ~~-were marked with official identification may be re-tattooed for the purpose of reestablishing their identification nor re-ear-tagged with an official identification ear tag at any time subsequent to the original identification, except that re-tattooing or re-ear-tagging for the purpose of reestablishing the official identification is allowed only under the following conditions:~~ ( )

~~**01. Supervision**. Reidentification is accomplished under the supervision of an accredited veterinarian, or state or federal animal health officials.~~ ( )

~~**02. Permanent Identification**. Animals that are presented for reidentification have some permanent identification that identifies the animals as those originally officially identified such as an individual animal registration tattoo, or other approved permanent identification, provided that such identification was submitted on the annual inventory report or other official record~~. ( )

03. Inventory Evaluation. In absence of permanent identification, the Administrator may conduct an investigation or inventory evaluation to determine identity of the animal that is being presented for reidentification. ( )

~~**04. Reproduction of Original Tattoo**. Re-tattooing must reproduce the original tattoo that was placed in the animal's ear at the time of official identification.~~ ( )

05. Records. All animals that have been re-identified must be reconciled to their original identification on the annual ISDA inventory form, due on Dec. 31st of each year.~~The accredited veterinarian or state or federal animal health official who supervises the reidentification must correlate the new identification with previous identification and record the ear tag or other identification numbers, the tattoo symbols and the owner's name and address and submit the reidentification record to the Division within ten (10) days of the date of reidentification~~. ( )

032. -- 039. (RESERVED)

040. INSPECTIONS.

To prevent the introduction and dissemination, or to control and eradicate diseases, state and federal animal health officials are authorized to inspect cervidae records, premises, facilities, and domestic cervidae to ensure compliance with the provisions of this chapter and other state or federal laws or rules applicable to domestic cervidae. State and federal animal health officials must comply with the operation's biosecurity protocol so long as the protocol does not inhibit reasonable access to:~~(~~)

01. Entry. Enter and inspect, at reasonable times, the premises of domestic cervidae ranches and inspect domestic cervidae. ( )

02. Access to Records. Review or copy, at reasonable times, any records that must be kept in accordance with these rules. ( )

041. -- 049. (RESERVED)

~~**050. GENETICS.**~~

~~Domestic cervidae that have red deer genetic influence may not be imported into Idaho. Additionally, any domestic cervidae located in Idaho that are identified as having red deer genetic influence will be destroyed, removed from the state, or neutered. ( )~~

051. -- 059. (RESERVED)

Commented [DSL17]: Mandated in statute 25-3705

Commented [DSL18]: Mandated in statute (25-3704)

Commented [DSL19]: Mandated in statute 25-3705

Commented [DSL20]: Comment submitted. Keep language intact. ICL, IWF, IDFG

Commented [DSL21]: Remove instate removal requirement. David Miller, Jeff Siddoway

060. WILD CERVIDAE.
Wild cervidae may not be confined, kept or held on a domestic cervidae ranch. ( )

01. Duty of Ranch Owner. It is the duty of owners of all domestic cervidae ranches to take precautions, and to conduct periodic inspections, to ensure that wild cervidae are not located within the perimeter fence of any domestic cervidae ranch. ( )

02. Notification of Administrator. All owners or operators of domestic cervidae ranches must notify the Administrator within twenty-four (24) hours of gaining knowledge of the presence of wild cervidae inside the perimeter fence of the domestic cervidae ranch. ( )

03. Failure to Notify the Administrator. The failure of any owner or operator of a domestic cervidae ranch to notify the Administrator of the presence of wild cervidae within the perimeter fence of a domestic cervidae ranch is a violation of this chapter. ( )

04. Idaho Department of Fish and Game. Upon receiving notification that wild cervidae are on a domestic cervidae ranch, the Administrator will notify the Idaho Department of Fish and Game. ( )

05. ~~**Wild Ungulate Cooperative Herd Plan**. The Idaho Department of Fish and Game will cooperate with ISDA and the owners or operators of domestic cervidae ranches where any wild cervidae or wild ungulates are present within the external perimeter fence of the domestic cervidae ranch to develop and implement a site specific written herd plan to address the disposition of the wild cervidae or wild ungulates. ( )~~

061. -- 069. (RESERVED)

070. SUPERVISION OF DOMESTIC CERVIDAE PROGRAM.
A department veterinary medical officer will provide routine supervision of the domestic cervidae program. ( )

071. -- 079. (RESERVED)

~~080. Disposal Of Domestic Cervidae.~~
~~All domestic cervidae carcasses and parts of carcasses not utilized for human consumption, except parts of carcasses utilized for taxidermy purposes, must be disposed of in compliance with IDAPA 02.04.17, "Rules Governing Dead Animal Movement And Disposal." ( )~~

081. -- 089. (RESERVED)

090. FEES.

01. Annual Assessment Fee. A fee, not to exceed ten dollars ($10) per head per year on elk or three dollars ($3) per head per year on fallow deer and reindeer, is hereby assessed on all domestic cervidae in the state to cover the cost of administering the program covered in these rules. The fee includes all domestic cervidae present at the ranch as of December 31 ~~and all domestic cervidae that die during the same calendar year.~~ This fee is due January first of each year. The annual assessment fee may be reduced if program revenue accumulates to a balance of at least one hundred thousand dollars ($100,000) in excess of the projected annual cost of operating the program, as determined by the Department on July 1 of each year. ( )

02. Import, Export, and Movement Fees. The fees imposed in Section 25-3708(2) through (4), Idaho Code, are due no later than December 31 of each year, but the ~~Department requests all movement fees be submitted within five (5) business days of the movement of the domestic cervids.~~ ( )

091. -- 099. (RESERVED)

100. DOMESTIC CERVIDAE RANCHES.

Commented [DSL22]: Mandated in statute. 25-3705B

Commented [DSL23]: Redundant language

Commented [DSL24]: Stop assessment for cervids greater than 12 years old. Jeff Siddoway.

Billy Rasmussen.

Commented [DSL25R24]: Not feasible for ISDA to implement – having to verify age of animal if there is a discrepancy.

Commented [DSL26]: Mandated in statute. 25-3708

Commented [DSL27]: 2020 statutory amendment

In order to prevent the introduction or dissemination of diseases, and to control or eradicate diseases, all domestic cervidae ranches must comply with the disease control, facility, and record keeping requirements and all other provisions of this chapter. ( )

01. Each Premises. Each separate premises where domestic cervidae are kept or held must comply with all of the provisions of this chapter. ( )

~~**02. Vehicle Access**. Domestic cervidae ranches must have motorized vehicle access to the restraining system on each premises, during the portion of the year that cervidae are held or kept on the premises, adequate to facilitate disease prevention and control as determined by the Administrator. ( )~~

~~**03. Premises Registration**. Each premises where domestic cervidae are kept or held must be registered with the Division and assigned a unique, individual number approved by the Administrator.~~ ( )

101. DOMESTIC CERVIDAE RANCH FACILITY REQUIREMENTS.

Prior to populating the facility with domestic cervids, ~~A~~all domestic cervidae ranches are required to have facilities that include, but are not limited to, perimeter fence, restraining system, gathering system, water system, and if required, a quarantine facility. ( )

01. Maintenance. All facilities must be maintained, at all times that domestic cervidae are present, to prevent the escape of domestic cervidae or ingress of wild cervidae. ( )

02. Inspections. To ensure compliance with this chapter, state or federal animal health officials will inspect all premises where domestic cervidae are, or will be, possessed, controlled, harvested, propagated, held, or kept. ( )

~~**a.** Each domestic cervidae ranch will be inspected no less than once every five (5) years. Domestic cervidae ranches may be inspected more frequently if requested by the owner or if specified in a ranch management plan. The Administrator may require additional facility inspections as necessary to aid in the prevention, control, or eradication of disease or to ensure compliance with the provisions of this chapter or other state or federal rules applicable to domestic cervidae. ( )~~

~~**b.** All facilities relating to the handling or raising of domestic cervidae will be inspected. ( )~~

102. PERIMETER FENCE REQUIREMENTS.

A perimeter fence, completely enclosing the domestic cervidae ranch to be constructed of high-tensile, non-slip woven wire or other fencing material approved by the Administrator. ( )

01. Elk and Fallow Deer. For elk and fallow deer, the fence must be a minimum of eight (8) feet in height for its entire length at all times. ( )

02. Reindeer. For reindeer, ~~the~~ fences constructed and approved prior to 2021 must be at least six (6) feet in height for its entire length at all times. All reindeer fences constructed and approved in 2021 or later must be at least eight (8) feet in height for its entire length at all times. ( )

03. Wire. The top two (2) feet of each fence may be smooth, barbed or woven wire (at least twelve and one-half (12-1/2) gauge) with horizontal strands spaced not more than six (6) inches apart. ( )

a. Wire must be placed on the animal side of the fence to prevent pushing the wire away from the posts. ( )

b. Wire must be attached to all posts at the top, bottom, and not more than eighteen (18) inches apart between the top and bottom of the wire. ( )

04. Posts. Wooden posts used in the perimeter fence must be at least butt-end treated with a commercially available preservative and have a minimum of four (4) inch top for line posts and a minimum of five

Commented [DSL28]: Mandated in statute. 25-3705A

Commented [DSL29]: Mandated in statute. 25-3705

Commented [DSL30]: Comment submitted. Double fencing requirement for all domestic cervidae farms in Boundary and Bonner county. ICL

Commented [DSL31]: Comment submitted. Increase fence height requirement to be equal to elk facilities (8'). IWF, ICL

Commented [DSL32]: Comment submitted. Maintain 6' height requirement for reindeer. Jim Lowe

(5) inch top for corner posts. Metal pipe posts must be a minimum of two and one-eighth (2-1/8) inches outside diameter with a three-sixteenths (3/16) inch wall thickness for line posts and two and seven-eighths (2-7/8) inches outside diameter with a seven thirty-seconds (7/32) inch wall thickness for corner posts. Posts must be spaced no more than twenty-four (24) feet apart, with stays, supports or braces as needed, and be placed in the ground a minimum of three (3) feet. ( )

05. Gates. Each domestic cervidae ranch must have gates that prohibit the escape of domestic cervidae or the ingress of wild cervidae. ( )

06. Fence Maintenance. Fences must be maintained, at all times that domestic cervidae are present, to prevent domestic cervidae from escaping or native wild cervidae from entering the enclosure. ( )

07. Exceptions. The Administrator may grant exceptions to the specifications in Section 102 on a case specific basis. ( )

103. GATHERING AND RESTRAINING SYSTEM.

Each domestic cervidae ranch must have a system for humanely and effectively gathering and restraining domestic cervidae for the purpose of inspecting, identifying, treating, or testing of animals by state or federal animal health officials. ( )

01. Gathering System. Each domestic cervidae ranch must have a system that facilitates the gathering of domestic cervidae so as to be able to move the domestic cervidae through the restraining system, at any time of the year that domestic cervidae are present. ( )

02. Restraining System. A system approved by the Administrator, to immobilize domestic cervidae for the purpose of efficient, effective, and safe handling for inspecting, treating, vaccinating, or testing. ( )

03. Exceptions. The Administrator may grant exceptions to the provisions of this section on a case specific basis. ( )

~~104. Water System.~~

~~Each domestic cervidae ranch must have a water system adequate to supply the need of the cervidae herd.~~ ( )

105. QUARANTINE FACILITY.

If animals are to be imported onto the domestic cervidae ranch, a quarantine facility, approved by the Administrator, must be provided for holding animals until any disease retesting is accomplished or other requirements are met. ( )

106. -- 199. (RESERVED)

200. RECORDS AND REPORTING.

01. Reports. Owners of domestic cervidae ranches must submit complete and accurate reports to the Administrator. Failure to submit complete and accurate reports within the designated time frames is a violation of this chapter. ( )

02. Records. All owners of domestic cervidae ranches, during normal business hours, must present to state or federal animal health officials, for inspection, review, or copying, any cervidae records deemed necessary to ensure compliance with the provisions of this chapter. ( )

03. Notification. State or federal animal health officials will attempt to notify the owners or operators of domestic cervidae ranches, and premises where records are kept prior to any inspections. ( )

04. Emergencies. In the event of an emergency, as determined by the Administrator, the notification requirements of Section 200 may be waived. ( )

201. ANNUAL INVENTORY REPORT.

01. Inventory Report. All owners of domestic cervidae ranches must submit annually, to the Administrator, a complete and accurate inventory and summary report form of all animals held no later than December 31st of each year containing the following minimum information: ( )

a. Name and address of the domestic cervidae ranch. ( )

b. Name and address of the owner of the domestic cervidae ranch. ( )

c. Date the inventory was completed. ( )

02. Individual Domestic Cervidae. For each individual domestic cervidae that was located on the domestic cervidae ranch during the year for which the report is being made, the following information must be provided: ( )

a. All types of official and unofficial identification; ( )

b. Species; ( )

c. Sex; and ( )

d. Age or year born. ( )

202. INVENTORY VERIFICATION.

~~State or federal animal health officials will verify all domestic cervidae ranch inventories of animals held and individual animal identification annually.~~ ( )

01. Visible Identification. Individual animal identification verification may be accomplished by visually noting the unique official visible identification number or visually noting an unofficial visible identification number if the number is correlated with two (2) forms of official identification on the inventory submitted by the cervidae producer. The Administrator may, on a case by case basis, grant written permission for ranch specific unique bangle tags to be used for official identification. ( )

02. Duty to Gather and Restrain. It is the duty of the owner of each domestic cervidae ranch to gather and restrain any domestic cervidae that state or federal animal health officials determine are not readily identifiable for inventory verification purposes. The Administrator determines the suitability of the restraint system. ( )

~~203. Change Of Address.~~

~~Owners of domestic cervidae ranches must notify the Division in writing within thirty (30) days of any change in the address of the owners of domestic cervidae, the owner of the domestic cervidae ranch, or the domestic cervidae ranch.~~ ( )

204. ESCAPE OF DOMESTIC CERVIDAE.

It is the duty of each owner or operator of a domestic cervidae ranch to take all reasonable actions to prevent the escape of domestic cervidae from a domestic cervidae ranch. ( )

01. Notification of Escape. When any domestic cervidae escape from a domestic cervidae ranch, the owner or operator of the domestic cervidae ranch must notify the Administrator by phone, facsimile, or other means approved by the administrator within twenty-four (24) hours of the discovery of the escape. ( )

02. Duty to Retrieve Escaped Cervidae. It is the duty of each owner or operator of a domestic cervidae ranch to retrieve or otherwise bring under control all domestic cervidae that escape from a domestic cervidae ranch. ( )

Commented [DSL33]: Mandated in statute. 25-3703

Commented [DSL34]: Mandated in statute. 25-3705A

03. **Fish and Game**. The Administrator will notify the Idaho Department of Fish and Game of each escape. ( )

~~**04.** **Sheriff and State Brand Inspector**. When domestic cervidae escape from a domestic cervidae ranch and the owner or operator is unable to retrieve the animals within twenty-four (24) hours, the Administrator may notify the county sheriff or the state brand inspector of the escape pursuant to Title 25, Chapter 23, Idaho Code.~~ ( )

05. **Capture**. In the event that the owner or operator of a domestic cervidae ranch is unable to retrieve escaped domestic cervidae in a timely manner, as determined by the Administrator, the Administrator may effectuate the capture of the escaped domestic cervidae to ensure the health of Idaho's livestock and wild cervidae populations. ( )

06. **Failure to Notify**. Failure of any owner or operator of a domestic cervidae ranch to notify the Administrator within twenty-four (24) hours of the discovery of an escape of domestic cervidae is a violation of this chapter. ( )

07. **Taking of Escaped Domestic Cervidae**. A licensed hunter may legally take domestic cervidae that have escaped from a domestic cervidae ranch only under the following conditions: ( )

a. The domestic cervidae has escaped and has not been in the control of the owner or operator of the domestic cervidae ranch for more than seven (7) days; and ( )

b. The hunter is licensed and in compliance with all the provisions of the Idaho Department of Fish and Game rules and code. ( )

205. NOTICE OF DEATH ~~OF DOMESTIC CERVIDAE~~.

~~Notice of death of domestic cervidae twelve (12) months or older and all domestic cervidae officially identified and inventoried that died on a ranch or at an approved slaughter or custom exempt slaughter establishment must be submitted by the owner or operator to the division on a report approved by the Administrator:( )~~All domestic cervidae that die on a ranch or are sent to slaughter must be reported to the Department except for calves that died prior to being reported on an annual inventory.

01. **Submission of Death Certificates**. A complete and accurate copy of all CWD sample submission forms/death certificates must be submitted to the division on a form approved by the Administrator ~~by regular mail, facsimile, electronic mail, or by other means as approved by the Administrator within ten (10) business days of when the owner or operator knew or reasonably should have known of the death.~~ no later than Dec. 31st in the year the animal died. ~~The CWD sample submission form/death certificate must contain the following minimum information:( )~~

~~**a.** Name and address of the domestic cervidae ranch; and ( )~~

~~**b.** Name and address of the owner of the domestic cervidae ranch. ( )~~

~~**02.** **Individual Domestic Cervidae**. For each individual domestic cervidae death, the following minimum information must be provided: ( )~~

~~**a.** All individual identification numbers; ( )~~

~~**b.** Sex; ( )~~

~~**c.** Age or year born; ( )~~

~~**d.** Date and time of death; ( )~~

~~**e.** Cause of death; ( )~~

~~**f.** Specify animals submitted for CWD testing; and ( )~~

~~**g.** Dated signature. ( )~~

206. (RESERVED)

~~207. Notification Of Exposure To Disease.~~
~~Any owner, operator, veterinarian practicing in Idaho, laboratory conducting cervidae testing, or any other person who has reason to believe that domestic cervidae are exposed to or infected with a dangerous or reportable disease or parasite must notify the Division immediately. ( )~~

208. INTRASTATE MOVEMENT CERTIFICATE.
All owners of domestic cervidae ranches who move cervidae, from one premises to another, including movement from one (1) premises to another premises owned, operated, leased, or controlled by the owner, within the state of Idaho must submit, to the Administrator, a complete and accurate intrastate movement certificate signed by the owner, within ~~ten (10) business days of the movement~~no later than Dec 31st in the year the movement occurred. The Administrator will provide blank intrastate movement certificates to the owners of domestic cervidae ranches upon request. ( )

209. RANCH MANAGEMENT PLAN.

~~**01. Voluntary Ranch Management Plan**. A domestic cervidae ranch may apply, on a form prescribed by the Administrator, to enter into a voluntary ranch management plan. The ranch management plan will be developed cooperatively by the owner or authorized agent and the Administrator. For the ranch management plan, the Administrator will conduct a risk assessment considering the factors in Subsection 209.03. A voluntary ranch management plan may, notwithstanding other rule requirements to the contrary, establish inventory verification requirements and CWD sampling requirements specific for a domestic cervidae ranch. Failure to adhere to an approved voluntary ranch management plan is a violation of these rules. ( )~~

02. Mandatory Ranch Management Plan. Domestic cervidae ranches are required to develop and implement an approved ranch management plan if the ranch is found in violation of Sections 060, 204 or 500 of these rules. The ranch management plan must be completed and implemented within six (6) months of the disposition of the violation. For the ranch management plan, the Administrator will conduct a risk assessment considering the factors in Subsection 209.03. Failure to comply with the mandatory ranch management plan is a violation of these rules. ( )

03. Risk Assessment for Ranch Management Plans. The Administrator will conduct a risk assessment for each ranch management plan. A ranch management plan will not include a double fencing requirement but may require that double gates be installed. The Administrator will consider the following factors when conducting a risk assessment at a domestic cervidae ranch: ( )

a. Risk of egress. The risk of egress may be evaluated based on, but not limited to, history of domestic cervidae escape during the previous five (5) years, recovery rate of escaped domestic cervidae, length of time domestic cervidae were outside of the perimeter fence, annual average precipitation, topography, altitude and tree density. ( )

b. Risk of ingress. The risk of ingress may be evaluated on, but not limited to, history of ingress during the previous five (5) years, annual average precipitation, topography, altitude, tree density and proximity to wildlife migration corridors. ( )

c. Compliance with CWD sample submission. The Administrator may, based on a risk assessment of the facility, adjust the number of tissue sample submissions required under this rule. The adjustment will be based on, but not limited to, the following: ( )

i. Whether the domestic cervidae on the ranch have commingled with any domestic cervids of unknown CWD status. ( )

ii. Whether the domestic cervidae ranch has been in compliance with all requirements of Title 25, Chapter 35, Idaho Code, and these rules. ( )

iii. Whether the domestic cervidae ranch has had documented cases of ingress of wild cervids or egress of domestic cervidae within the eighteen (18) months prior to the risk assessment. ( )

210. -- 249. (RESERVED)

250. INTRASTATE MOVEMENT OF DOMESTIC CERVIDAE.

All live domestic cervidae moving from one premises to another premises within the state of Idaho must be officially identified, except calves during the year of birth accompanying their dam, and accompanied by: ( )

01. TB Test~~. An official negative test for tuberculosis of all cervidae over twelve (12) months of age, conducted within the last ninety (90) days, or written permission from the Administrator, except: ( )~~

~~**a.** Animals originating from an accredited, qualified or monitored herd, as described in "Bovine Tuberculosis Eradication, Uniform Methods and Rules," effective January 1, 2005, if they are accompanied by a certificate signed by an accredited veterinarian or the Administrator stating such domestic cervidae have originated directly from such herd; or ( )~~

~~**b.** Those domestic cervidae consigned directly to an approved slaughter establishment or domestic cervidae approved feedlot; or ( )~~

~~**c.** Those domestic cervidae moving from one premises to another premises owned, operated, leased, or controlled by the same person. ( )~~

Commented [DSL35]: Remove TB testing requirement for intrastate movement. David Miller. Chase Jones. Jeff Siddoway, Kami Marriot

02. Intrastate Movement Certificate. All intrastate movements of live domestic cervidae, including movement from one premises to another premises owned, operated, leased, or controlled by the same person, must be reported to ISDA on the annual inventory form, due Dec. 31st in the year the movement occurred. ~~accompanied by a complete and accurate intrastate movement certificate, which has been signed by the owner or operator of the domestic cervidae ranch where the movement originates and includes a statement of the CWD and TB status of the cervidae. ( )~~

~~**03. Movement of Cervidae Between Accredited AZA or USDA Licensed Facilities**. Movement of cervidae between accredited AZA and USDA licensed facilities is exempt from the requirements of this chapter. All other movement from AZA accredited or USDA licensed facilities must comply fully with all of the provisions of this chapter. ( )~~

251. -- 299. (RESERVED)

300. DISEASE CONTROL.

~~The Administrator may require domestic cervidae in the state to be tested for brucellosis (Brucella abortus or Brucella suis), tuberculosis (Mycobacterium bovis), meningeal worm (Parelaphostrongylus tenuis), muscle worm (Elaphostrongylus cervus), CWD or for other diseases or parasites determined to pose a risk to other domestic cervidae, livestock, or wildlife.~~ ( )

Commented [DSL36]: Redundant 25-218 & 02.04.03.522

301. DUTY TO RESTRAIN.

It is the duty of the owner of each domestic cervidae ranch to gather and restrain domestic cervidae for testing when directed to do so in writing by the Administrator. The Administrator determines the suitability of the restraint system. ( )

302. TESTING METHODS.

The Administrator determines appropriate testing procedures and methods. ( )

303. TESTING, TREATMENT, QUARANTINE, OR DISPOSAL REQUIRED.

~~The Administrator determines when testing, treatment, quarantine, or disposal of domestic cervidae is required at any domestic cervidae ranch pursuant to Title 25, Chapters 2, 3, 4, 6, and 37, Idaho Code. If the Administrator determines that testing, treatment, quarantine, disposal of domestic cervidae, or cleaning or disinfection of premises is required, a written order will be issued to the owner describing the procedure to be followed and the time period for carrying out such actions. ( )~~

304. QUARANTINES.

~~All domestic cervidae animals or herds that are determined to be exposed to, or infected with, any disease that constitutes an emergency, as provided in Title 25, Chapter 2, Idaho Code, will be quarantined. ( )~~

~~**01. Infected Herds**. Infected herds or animals must remain under quarantine until such time that the herd has been completely depopulated and the premises has been cleaned and disinfected as provided by the Administrator, or the provisions for release of a quarantine established in these rules have been met. ( )~~

~~**02. Exposed Herds**. The quarantine for exposed herds or animals may take the form of a hold-order which remains in effect until the exposed animals have been tested and the provisions for release of a quarantine as established in these rules have been met. ( )~~

~~**03. Validity of Quarantine**. The quarantine is valid whether or not acknowledged by signature of the owner. ( )~~

305. DECLARATION OF ANIMAL HEALTH EMERGENCY.

~~The Director is authorized to declare an animal health emergency. ( )~~

~~**01. Condemnation of Animals**. In the event that the Director determines that an emergency exists, animals that are found to be infected, or affected with, or exposed to an animal health emergency disease may be condemned and destroyed. ( )~~

~~**02. Indemnity**. Any indemnity is paid in accordance with Sections 25-212 and 25-213, Idaho Code. ( )~~

~~**03. Notification to Administrator**. Every owner of cervidae, every breeder or dealer in cervidae, every veterinarian, and anyone bringing cervidae into this state who observes the appearance of, or signs of any disease or diseases, or who has knowledge of exposure of the cervidae to diseases that constitute an emergency must give immediate notice to the Administrator by telephone, facsimile, or other means as approved by the Administrator.~~ ( )

04. ~~**Failure to Notify**. Any owner of cervidae who fails to report as herein provided forfeits all claims for indemnity for animals condemned and slaughtered or destroyed on account of the animal health emergency.~~ ( )

306. -- 399. (RESERVED)

~~400. Brucellosis.~~

~~Owners of domestic cervidae ranches must comply with the provisions of IDAPA 02.04.20, "Rules Governing Brucellosis," that apply to domestic cervidae.~~ ( )

401. -- 449. (RESERVED)

450. TUBERCULOSIS.

~~**01. Change of Ownership**. All domestic cervidae that are sold, or are in any way transferred from one person to another person in Idaho are required to be tested negative for TB within ninety (90) days prior to the change of ownership or transfer, except: ( )~~

Commented [DSL37]: Idaho Code 25-218

Commented [DSL38]: 25-2 Idaho Code

Commented [DSL39]: 25-212 Idaho Code

Commented [DSL40]: 25-212 Idaho Code

Commented [DSL41]: Remove TB testing requirement for change of ownership. David Miller.

~~**a.** Animals originating from an accredited, qualified or monitored herd, as described in "Bovine Tuberculosis Eradication, Uniform Methods and Rules," effective January 1, 2005, if they are accompanied by a certificate signed by an accredited veterinarian or the Administrator stating such domestic cervidae have originated directly from such herd; or~~ ( )

~~**b.** Those domestic cervidae consigned directly to an approved slaughter establishment or domestic cervidae approved feedlot.~~ ( )

~~**c.** The Administrator, following an evaluation, may grant exceptions to the provisions of this Section on a case-by-case basis.~~ ( )

~~**02. Rules and UM&R.** Owners of domestic cervidae ranches must comply with the provisions of IDAPA 02.04.03, "Rules Governing Animal Industry," that apply to domestic cervidae, and the Bovine Tuberculosis Eradication, UM&R, Effective January 1, 2005.~~ ( )

451. -- 499. (RESERVED)

500. SURVEILLANCE FOR CWD.

01. Slaughter ~~Surveillance~~. Brain tissue from no less than ten percent (10%) of all ~~domestic cervidae~~elk and reindeer sixteen (16) months of age or older that are slaughtered at approved slaughter establishments or custom exempt slaughter establishments must be submitted annually by the owner of the slaughtered cervidae to official laboratories to be tested or examined for CWD as provided for in these rules. If ten (10) or less cervids on a domestic cervidae ranch are slaughtered in a calendar year, at least one (1) testable brain sample must be submitted to meet the annual CWD surveillance requirement. Tissues samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement. ( )

02. ~~Domestic Cervidae~~ Ranches ~~Surveillance~~Receiving No Imports or Transfers. Brain tissue from no less than ten percent (10%) of all domestic ~~cervidae~~ elk and reindeer sixteen (16) months of age or older that are harvested on domestic cervidae ranches must be submitted for CWD testing annually. If ten (10) or less cervids on a domestic cervidae ranch are harvested in a calendar year, at least one (1) testable brain sample must be submitted to meet the annual CWD surveillance requirement. In addition to the tissue samples from the harvested domestic cervidae, brain tissue from one hundred percent (100%) of all domestic cervidae sixteen (16) months of age or older that die for any reason other than being harvested must also be submitted for CWD testing annually. ~~Reindeer and fallow~~ Fallow deer are exempt from CWD testing. ~~unless the reindeer and fallow deer are part of a CWD positive, exposed, trace, source, or suspect herd or part of an elk herd.~~ The owner or operator of the domestic cervidae ranch must submit all tissue samples to an official laboratory to be tested for CWD, as provided for in these rules. Tissues samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement. ~~In the event a domestic cervidae ranch cannot submit a testable brain sample, the domestic cervidae ranch must submit a CWD Sample Submission Waiver Request within ten (10) business days of determining that a testable brain sample cannot be submitted.~~ ( )

03. Ranches Receiving Imports or Transfers. Brain tissue from one hundred percent (100%) of all domestic elk and reindeer sixteen (16) months of age or older that die for any reason on a facility that receives imported or transferred cervids must be submitted for CWD testing for no less than sixty (60) months following the most recent date of import or transfer. Fallow deer are exempt from CWD testing. The owner or operator of the domestic cervidae ranch must submit all tissue samples to an official laboratory to be tested for CWD, as provided for in these rules. Tissues samples submitted to an official laboratory that are untestable or are given an indeterminate test result do not count towards the tissue submission requirement.

501. COLLECTION OF SAMPLES FOR CWD TESTING.

~~Only accredited veterinarians, state and federal animal health officials, and other persons, approved by the Administrator, may collect brain or other tissue samples for CWD testing.~~ Samples must be collected immediately upon discovery of the death of a domestic cervid. ( )

Commented [DSL42]: Comment submitted. Increase CWD testing requirement to 100% for all deaths. ICL, IWF

Commented [DSL43]: Would like to see additional wild cervid surveillance to justify increase in domestic testing. Chase Jones; David Miller

Commented [DSL44]: New section.

~~**01.** **Brain Samples**. Only persons trained by state or federal animal health officials, and approved by the Administrator, may remove the obex portion of the brainstem for submission as the sample for CWD testing. ( )~~

~~**02.** **Submission of Head**. Only persons trained by state or federal animal health officials, and approved by the Administrator, may submit a head with the official identification attached to the head as the sample for CWD testing. ( )~~

~~**03.** **Handling of Samples**. All CWD samples must be handled in a manner that prevents degradation of the sample. ( )~~

~~**04.** **Sample Submission Time**. Fresh samples for CWD testing must be submitted, to an approved laboratory, within seventy-two (72) hours of the date of collection. Formalin preserved samples must be submitted, to an approved laboratory, within ten (10) business days of the date of collection.~~ ( )

05. **Non-Testable or Samples That Do not Contain Appropriate Tissues**. The Administrator may conduct an investigation to determine if a domestic cervidae ranch is complying with the provisions of Section 500 if: ( )

~~**a.** The owner or operator of a domestic cervidae ranch submits samples for CWD testing which are non-testable; or ( )~~

~~**b.** The owner or operator of a domestic cervidae ranch submits samples for CWD testing that do not contain the obex portion of the brainstem or other appropriate tissues, if available, for CWD testing. ( )~~

c. The owner or operator of a domestic cervidae ranch submits samples for CWD testing which cannot be identified to the animal of origin. ( )

06. **Failure to Meet Annual CWD Tissue Submission Requirement**. An owner or operator of a domestic cervidae ranch who fails to submit samples for CWD testing or who fails to meet the annual tissue submission requirements of this chapter, or both, is in violation of these rules, except the Administrator may approve, in writing, a variance from sample submission requirements on a case specific basis. ( )

502. OFFICIAL CWD TESTS.

01. **Official Tests**. Official tests for CWD, approved by the Administrator, include: ( )

a. ~~Histopathology~~Enzyme Linked Immunosorbent Assay (ELISA)~~;~~ ( )

b. Immunohistochemistry; ( )

c. ~~Western Blot;~~ ( )

d. Negative Stain Electron Microscopy; ( )

e. ~~Bioassay;~~ and ( )

02. **Other Scientifically Validated Test**. The Administrator may approve other scientifically validated laboratory or diagnostic tests to confirm a diagnosis of CWD. ( )

503. CWD STATUS.

CWD status is validated pursuant to the Federal CWD Herd Certification program standards.~~based on the number of years that a herd of domestic cervidae has been determined to be in compliance with the provisions of this chapter, during which there is no evidence of CWD in the herd.~~ ( )

~~**01.** **Status Review**. The Administrator will review the CWD status of each domestic cervidae herd located in Idaho on at least an annual basis. ( )~~

~~**02.** **Status Date**. The status date is the date that the Administrator approves a change in the CWD status of a domestic cervidae herd in Idaho. ( )~~

~~**03.** **Cervidae of Lesser Status**. If a herd of domestic cervidae has contact with cervidae of a lesser status, the status of the herd with the higher status will be lowered to the status of the cervidae with the lesser status. ( )~~

~~**04.** **Change of Ownership**. A herd's status may remain with the herd when a change of ownership, management or premises occurs, if there is no contact with cervidae of lesser status, and no previous history of CWD on the premises. ( )~~

~~**05.** **Contact with CWD Positive Animals**. Any herd of domestic cervidae that has contact with CWD positive or exposed animals may have its status reduced or removed. ( )~~

504. INVESTIGATION OF CWD.

An epidemiological investigation will be conducted on all CWD positive, suspect, and exposed animals and herds, herds of origin, source herds, all adjacent herds, and all trace herds as determined by the Administrator. ( )

01. **Quarantine**. All positive, suspect, and exposed herds or animals, herds of origin, adjacent herds, and herds having contact with positive or exposed animals must be quarantined; and ( )

02. **Identification**. CWD suspect and exposed animals must be identified and remain on the premises where they are found until they have met the provisions for release of quarantine established in this chapter, are destroyed and disposed of as directed by the Administrator, or are moved at the Administrator's direction on a restricted movement permit. ( )

505. DURATION OF CWD QUARANTINE.

Quarantines imposed because of CWD in accordance with this chapter remain in effect until one (1) of the following criteria are met: ( )

01. **CWD Positive Herds**. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after five (5) years of compliance with an individual herd CWD plan and all provisions of these rules, during which there was no evidence of CWD. ( )

02. **CWD Suspect Herds**. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd as determined by the Administrator. ( )

03. **Source Herds and Herds of Origin**. The quarantine may be released after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd and that the herd is not the source of infection as determined by the Administrator. ( )

04. **Exposed Herds**. The quarantine may be released after the herd is completely depopulated as provided in Subsection 505.07, or after a minimum of five (5) years of compliance with an individual CWD herd plan and all provisions of these rules and during which there was no evidence of CWD, or an epidemiologic investigation determines that there is no evidence CWD exists in the herd as determined by the Administrator. ( )

05. **Adjacent Herds**. The quarantine may be released when directed by the Administrator based upon an epidemiological investigation and in consultation with the designated epidemiologist. ( )

06. **Fencing Requirements**. Any owner of a domestic cervidae ranch who chooses to remain under quarantine for five (5) years must construct a second perimeter fence that meets the requirements for perimeter fence, as provided in Section 102, such that no domestic cervidae on the domestic cervidae ranch can get within ten (10) feet of the original exterior perimeter fence or as approved by the Administrator. ( )

07. Complete Depopulation. The quarantine may be released after: ( )

a. Complete depopulation of all cervidae on the premises as directed by the Administrator; and ( )

b. The premises have been free of all livestock as specified in an individual CWD herd plan approved by the Administrator; and ( )

c. The soil and facilities have been cleaned, treated, decontaminated, or disinfected as directed by the Administrator. ( )

08. Disposal of Positive or Exposed Cervidae. All CWD positive or exposed domestic cervidae must be disposed of as directed by the Administrator. ( )

~~506. Cleaning, Treating, Decontaminating, Or Disinfecting.~~
~~Premises must be cleaned, treated, decontaminated, or disinfected under state or federal supervision as directed by the Administrator within fifteen (15) days after CWD positive or suspect animals have been removed. ( )~~

~~**01. Exemptions**. The Administrator may authorize, in writing, an exemption from cleaning, treating, decontaminating, or disinfection requirements on a case-by-case basis. ( )~~

~~**02. Extension of Time**. The Administrator may authorize, in writing, an extension of time for cleaning and disinfection under extenuating circumstances. ( )~~

~~**03. Requests for Extensions or Exemptions**. The owner of the contaminated facility must submit requests for extensions or exemptions to the Administrator in writing. ( )~~

507. -- 999. (RESERVED)

Commented [DSL45]: Redundant. 25-218 & 02.04.03.590-1