Idaho Department of Fish and Game

2018

STRATEGY FOR

CHRONIC WASTING DISEASE

PREVENTION, DETECTION, AND MANAGEMENT FOR IDAHO'S WILD CERVIDS (DEER, ELK, AND MOOSE)

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EXECUTIVE SUMMARY

The Idaho Fish and Game Commission (Commission) and Idaho Department of Fish and Game (IDFG) are responsible for preserving, protecting, perpetuating, and managing Idaho's wildlife, including the continued supply for hunting, fishing, and trapping. Chronic Wasting Disease (CWD) is an infectious and fatal disease with potential to negatively impact wild populations of cervids (elk, deer and moose) in Idaho. CWD currently occurs in Wyoming, Montana, and Utah, but IDFG's sampling program has not detected it in Idaho. The Commission has directed IDFG to prioritize reducing CWD impacts in Idaho through prevention, surveillance, and management of CWD should it occur.

A key objective of IDFG's 2015 Strategic Plan provides Commission Direction to "Eliminate the impacts of fish and wildlife disease on populations, livestock, and humans." The 2014 Elk and 2008 Mule Deer Management Plans also include objectives to reduce the potential disease impacts to elk or livestock, thereby maintaining healthy and productive populations.

IDFG's prior CWD plans included monitoring for CWD. Annual CWD surveillance has occurred in Idaho at hunter check stations since 1997, with 15,900 cervids (mule deer, white-tailed deer, elk, and moose) sampled from around the state, with no CWD detections to date.

This 2018 CWD Strategy:

- Incorporates the latest knowledge and practices for CWD detection and management.
- Recommends Commission administrative rule changes and IDFG actions to prevent introduction and spread of CWD in Idaho.
- Provides a framework for a statistically sound surveillance approach to detect CWD if it were present.
- Identifies potential Commission and IDFG actions to reduce the spread of CWD if it is detected in Idaho, based on reducing population density in free-ranging cervids and quarantine/removal at captive facilities.
- Provides a framework for internal and external communications regarding CWD.
- Identifies the roles of other state/federal agencies in addressing the animal health impacts of CWD, as well as responding to CWD-related public health questions and concerns.
- Commits to integrating the latest knowledge, research, and population modeling tools available for effective CWD prevention, detection, and management.

The 2018 CWD Strategy will replace all preceding CWD plans. IDFG will review the Strategy every 5 years or sooner, depending on Idaho's disease status and need.

BACKGROUND

Chronic Wasting Disease (CWD) is an infectious disease of cervids caused by misfolded proteins (prion) that are transmitted by ingestion of prions from contaminated environmental components or directly from contact with infected animals. The disease has a long incubation period and a long period of prion shedding. The disease is always fatal in cervids and is preceded by prolonged neurological degeneration and dysfunction. A prion is not a bacterium, a virus, or fungi. A prion cannot be treated, or controlled with conventional measures; there is no known cure for an animal suffering from CWD. There are ways to decrease the infectivity of prions, but the environmental treatments are not practical for large-scale use.

Since 1997, the World Health Organization has recommended that all known agents of prion disease be kept from entering the food chain and the U.S. Centers for Disease Control and Prevention (CDC) supports this recommendation (https://www.cdc.gov/prions/cwd/index.html). The CDC states that hunters should have their meat tested for CWD prior to consumption if hunting in a known CWD-positive area, and to avoid consumption of any tissue from CWD-positive animals. Chronic Wasting Disease prions are distributed throughout the organs and tissues of affected animals, with lymphoid tissue, tonsil, and nervous tissues being the most heavily infected. Prions have also been detected in saliva, urine, feces, fat, muscle, kidney, and antler velvet. Advances in testing have allowed for the detection of prions in much smaller amounts, resulting in the ability to detect CWD in samples from seemingly healthy cervids, improving the understanding of how prions spread. The same advancements have also allowed for experimentation in tracing infectivity of saliva, urine, and blood (Haley et al. 2016 and Henderson et al. 2015). Better understanding of which tissue types contain prions, and how an infected animal sheds prions, may assist wildlife managers in proactive prevention and moderating the transmission of the disease. Deer have significantly higher CWD prion levels than elk, suggesting that deer may be more important for transmission of CWD than elk (Race et al. 2007). Understanding the obstacles posed during long incubation periods prior to CWD diagnosis, the geographical locations where an animal may be shedding prions into the environment and which species have a higher likelihood of shedding may change wildlife and habitat management practices.

Chronic Wasting Disease is density and frequency of contact dependent (Storm et al. 2013) with both horizontal (animal-to-animal) transmission and environmental contamination serving as prion pathways. The horizontal spread of CWD has been attributed to both natural and anthropogenic (human caused) factors. The natural factors include the properties of the prion (prolonged incubation, multiple routes of shedding, prolonged periods of shedding, environmental stability) as well as the natural migration patterns of free-ranging deer and elk. High-density winter and summer ranges, with multiple species overlap on these ranges, may increase transmission opportunities for CWD. Dispersal may enhance the spread of CWD to far greater distances than typical migration (Conner and Miller 2004). Anthropogenic factors are the artificial translocation and the congregation of cervids. Examples include long-distance movement and placement in high-fence operations or artificial movement of animals to due to management decisions such as winter feeding, rehabilitation permits, and relocations (Miller and Fischer 2016). Chronic Wasting Disease prions can remain viable on feeding surfaces and on items like the instruments and tools used for sampling or handling of infected animals. Standard

cleaning and disinfecting techniques do not kill the CWD prions. Tools suspected of CWD contamination can be cleaned using an enzymatic or alkaline digestion technique followed by high temperature autoclaving. There are no practical methods or solutions to clean and disinfect animal pens, corrals, soils, or plants. Carcasses require incineration at very high temperatures ($\geq 1{,}800^0$ Fahrenheit) to destroy the prions.

Once CWD prions are on the landscape, it is considered improbable that they will be removed. Prions have been found to have a greater affinity for certain soil types and remain stable for many years under laboratory conditions. Experiments have shown plants can take up prions from the soil and animal waste, leading to infection of grazing animals (Pritzkow et al. 2015). In addition, CWD prions appear to remain infectious in carcasses for ≥ two years (Miller et al. 2004). There is no cure once a cervid is infected and no treatment available; prevention is the best option for protecting the long-term health of Idaho's cervids.

Multiple studies have shown that heavily infected cervid populations do not thrive in the long term (Almberg et al. 2011, Monello et al. 2014, Williams et al. 2014). A study in Wyoming focusing on a local population of mule deer estimated a 21% annual decline and extinction within 40 years due to high CWD prevalence (24%), (DeVivo et al. 2017). A similar Wyoming study of white-tailed deer with high CWD prevalence (33%), estimated extinction in 48 years at the current level of mortality and fecundity (Edmunds et al. 2016).

While strides have been made in understanding CWD, there is still incomplete knowledge on how best to manage the disease. The persistence of prions in the environment and the inability to restrict animal movement limit feasible management options. Management approaches in other states have not resulted in the eradication of CWD. In the two exceptions, New York and Minnesota, a quick response to low prevalence and small geographic distribution of CWD-positive animals resulted in containment and eradication to date. Other states typically found an expanding geographic distribution and increasing prevalence despite management actions (Miller and Fischer 2016, Uehlinger et al. 2016). A recent review of CWD management practices concluded most actions were too little, too late, too restricted, too passive, or of insufficient duration to be successful. Based on lessons learned from past CWD management actions, the critical need is for states to set realistic CWD control objectives incorporating existing and prospective field data: and to apply any management action with sufficient spatial and temporal coverage to be effective (Miller and Fischer 2016). Early public engagement, before CWD is documented in Idaho, will be essential to build necessary public support for the management actions required to effectively contain and control CWD expansion in Idaho. Any attempt at controlling CWD will require decades of effort, time, and money to achieve results that can be sustained. Many management actions center on suppressing the CWD-affected population in an effort to contain further spread. Such actions are achieved by combinations of agency culling, hunter harvest, predator management, cessation of agency management practices (e.g., winter feeding and translocations), and in extreme cases, experimentation with controlled burning of contaminated environments. The development of models incorporating CWD prevalence analysis have allowed some agencies to estimate the amount of hunting pressure, predation, and CWD risk a population can withstand without threat of extinction (Dulberger et al. 2010, Galloway et al. 2017, Miller et al. 2008).

PREVENTION

Routes for spreading CWD-causing prions, or cervid exposure to CWD, include natural animal migration, transport of live animals and infected carcasses (particularly brains and spinal tissue), and activities that concentrate animals, such as winter feeding. Prevention of disease transmission is the most cost effective CWD management tool available. This 2018 Strategy focuses prevention efforts on practical measures that address significant transmission risks and have a reasonable likelihood of compliance. While much is unknown about CWD, the contributions of natural and human activities in the spread of CWD are well documented (Miller and Fischer 2016).

Idaho has some laws and rules that prevent the spread of CWD via transport of live captive animals. This Strategy recommends additional actions to reduce risks from both captive and wild animals, as well as carcass transport.

Current Requirements:

- A person must obtain a permit from IDFG to import, export, or transport captive mule and white-tailed deer and moose. This includes authority to restrict import and possession from CWD-positive animals. IDAPA 13.01.10; Idaho Code 36-103, 36-104(b), 36-501, and 36-504.

- People hunting in or transporting carcasses from other states are required to follow any carcass export/transport rules of the state(s) from which they harvest the cervid or are traveling through to their final destination.

- The Idaho State Department of Agriculture (ISDA) regulates the importation, possession, and health of domesticated elk, fallow deer, and reindeer under Idaho Code Title 25, Chapter 37. ISDA rules require that any of these animals imported into Idaho originate from a herd in good standing that complies with the National CWD Herd Certification Program. IDAPA 02.04.19. ISDA regulates red deer and sika deer as deleterious exotic animals, and a person must obtain a permit from ISDA to import, possess, or transport these species.

- Under Idaho Code 36-106(e)(9), ISDA and IDFG are jointly responsible for a comprehensive health program for all deer, elk, and moose imported into, transported through, or resident within Idaho. ISDA and IDFG administrative rules provide authority for testing, quarantine, and slaughter of animals to address infectious diseases.

Recommended actions:

- Limit the import and possession of carcass transport:
    - Limit the import into Idaho the carcass or any part of a wild deer, elk or moose from another state, province of Canada, or Country with any documented case of CWD; limit the transport of the carcass or any part of a wild deer, elk or moose

out of any CWD Management Zone designated by IDFG Commission to any part of the state that is not a designated CWD Management Zone. IDAPA 13.1.10

- Limit the Possession of the carcass or any part of a wild deer, elk, or moose that: has been imported from another state, province or country (other than Canada) with a documented case of CWD; or transported out of any CWD Management Zone designated by the Idaho Fish and Game Commission to any part of the state that is not a designated CWD Management Zone. IDAPA 13.1.10

    - The following exemptions will be allowed:
        - Meat that is cut and wrapped
        - Quarters or deboned meat that do not include brain or spinal tissue
        - Edible organs that do not include brains
        - Hides without heads
        - Upper canines (buglers, whistlers, or ivories)
        - Finished taxidermy and dried antlers
        - Cleaned and dried skulls or skull caps

- Ban the importation and possession of possession, importation, transport, sale, barter, or trade of elk (wild), moose, mule deer, white-tailed deer, fallow deer, or muntjac deer in Idaho. IDAPA 13.1.10
- Ban the unauthorized feeding of deer and elk by the public within any CWD Management Zone designated by the Idaho Fish and Game Commission, similar to ISDA rules banning private feeding of big game in areas of eastern Idaho for protection against brucellosis transmission. IDAPA 02.04.25
- Ban the use of natural cervid urine for hunting big game, allowing for the use synthetic liquid scent. IDAPA 13.01.17
- Integrate CWD risks into consideration by IDFG and its winter feeding advisory committees prior to making the decision to provide supplemental feed under IDAPA 13.01.18 and Idaho Code 36-123.
- Provide additional education/guidance to hunters and the general public on their critical role in preventing the spread of CWD, including the need for proper disposal of cervid carcasses (whole or in part), especially when animals test positive for CWD or are harvested from CWD positive areas.

SURVEILLANCE

Since 1997, IDFG has sampled nearly 16,000 mule deer, white-tailed deer, elk, and moose for CWD. IDFG typically acquired these samples at hunter check stations, with a goal of annually sampling 1,000 animals evenly distributed among the seven IDFG administrative regions. Past strategies did not take into account potential variability in CWD prevalence among species, demographics, populations, or geographic regions.

In the fall of 2017 IDFG began a new surveillance program to provide a statistically sound, effective platform for detecting CWD. Mule deer typically exhibit greater CWD prevalence than other species in western states (Miller et al. 2000) therefore they will be the initial focal species for Idaho's CWD surveillance approach. The program is based on Population Management Units (PMUs) from the Idaho Mule Deer Management Plan (Idaho 2008). Due to the robust white-tailed deer harvest and substantial populations in the North Idaho and Lower Salmon PMUs, IDFG will also implement surveillance for both deer species in these two PMUs.

Weighted Surveillance System

It is unlikely that sufficient samples will be available at the PMU scale to reliably detect a minimum threshold of 1% CWD prevalence; therefore IDFG identified six sampling units (Figure 1) by combining PMUs based on geographic proximity and understanding potential movements of individuals between PMUs.

CWD prevalence varies among gender and age classes. IDFG will sample both genders, and adult and yearling deer. The risk for CWD infection in a particular sample also varies based on the animal from which it was collected (*e.g.,* hunter harvest, road-killed, other animals found dead, individual exhibiting symptoms consistent with CWD infection). IDFG will assign sampled individuals a weight ("point value"), based on their relative risk of CWD prevalence and demographic category (Table 1). IDFG selected these values using data from mule deer in CWD positive areas in Colorado (Walsh and Otis 2012) and white-tailed deer in Wisconsin's CWD management zone (Jennelle et al. 2018) (Table 1).

IDFG's goal is to acquire enough samples in each sampling unit to attain 95% confidence in our ability to detect CWD at a 1% prevalence rate in the population. Based on the literature, this requires a point value of at least 300 in each sampling unit. In rare instances where samples are insufficient to meet this goal, IDFG will report a confidence estimate in the statistical ability to detect a given prevalence threshold, based on the actual achieved sample size. Additionally, IDFG will try to collect samples from each PMU within a sampling unit in proportion to the PMU's respective population. The actual number of samples required will vary, depending on the risk and demographic composition of sampled individuals.

Table 1. Relative weights ("points") for demographic groups of mule deer and white-tailed deer counted toward sample size goals in Idaho's weighted surveillance program.

Demographic Group	Mule Deer	White-tailed Deer
Symptomatic female	13.60	9.09
Symptomatic male	11.50	9.09
Road-killed male/female	1.90	0.22
Found dead male/female	1.90	7.32
Harvest adult female	0.56	1.30
Harvest adult male	1.00	3.23
Harvest Yearling female	0.33	0.85
Harvest Yearling male	0.19	1.00

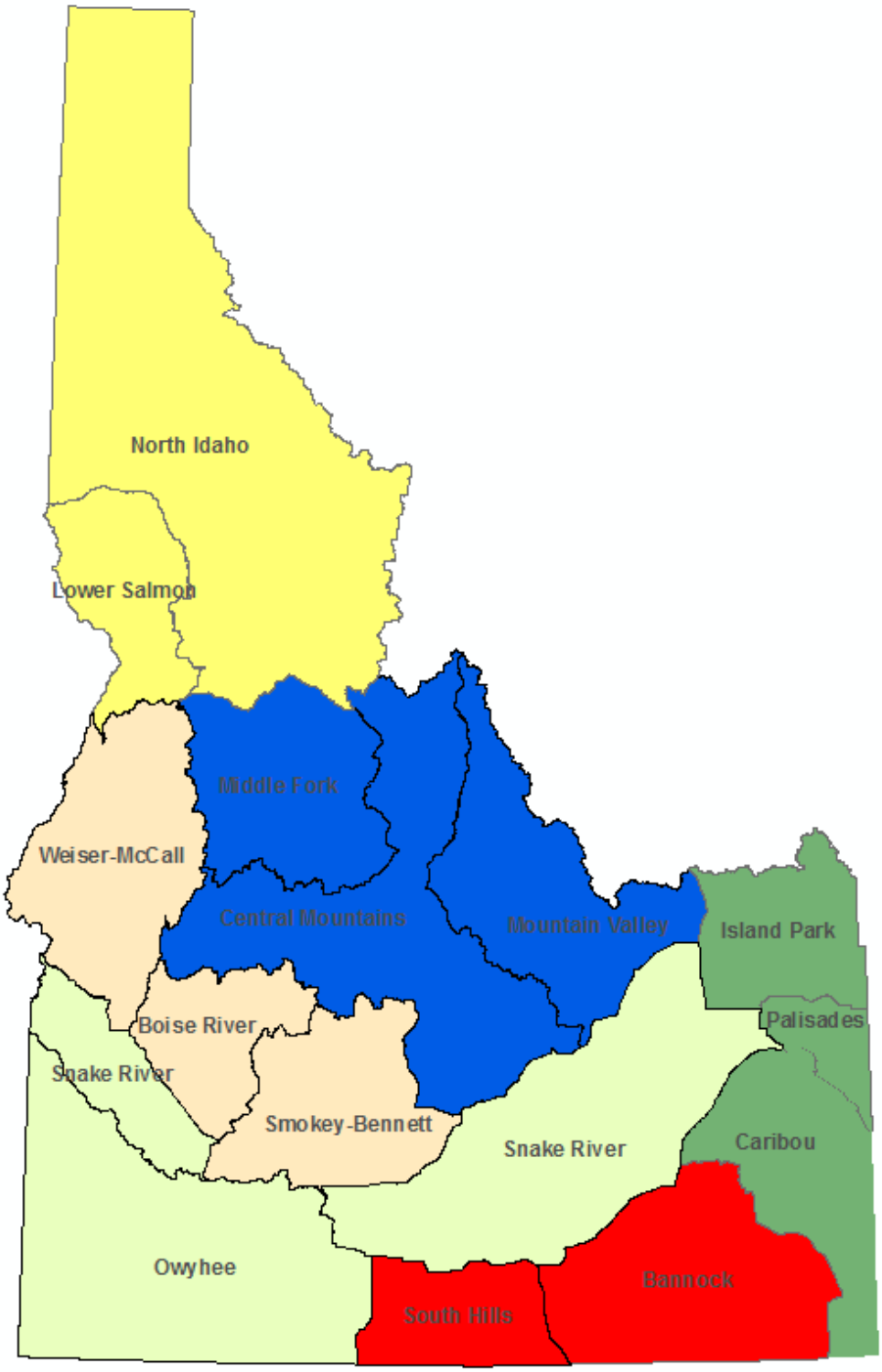

Figure 1. Chronic wasting disease (CWD) surveillance sampling units.

Annual Sampling

IDFG will sample the Island Park-Palisades-Caribou sampling unit annually, as CWD has been confirmed in wild deer and moose in western Wyoming geographically adjacent to this sampling unit. Migration routes also put this unit at a higher risk for CWD than other sampling units. IDFG will conduct surveillance in the other five sampling units on a four-year rotation. This sampling schedule (Table 2) uses fiscal and staff resources efficiently, to provide intensive localized surveillance with increased confidence in detection probability. Included in annual sampling will be any deer, elk, or moose exhibiting clinical signs of CWD anywhere in Idaho. IDFG will also continue to sample all mortalities detected in adult and yearling deer, elk, and moose radio-collared in IDFG research and monitoring projects. The timeframe for annual sampling will be from July 1 to June 30.

Table 2. Sampling schedule for weighted CWD surveillance in Idaho, 2017-2021.

2017-2018	2018-2019	2019-2020	2020-2021
Car-Pal-IP[a]	Car-Pal-IP[a]	Car-Pal-IP[a]	Car-Pal-IP[a]
WMc-BR-SmB[b]	Ow-SnR[c]	NID-LS[d]	CM-MV-MF[e]
	Ban-SH[f]	NID-LS WT*[g]	

[a] Car-Pal-IP = Caribou, Palisades, Island Park PMUs
[b] WMc-BR-SmB = Weiser-McCall, Boise River, Smokey-Bennett PMUs
[c] Ow-SnR = Owyhee, Snake River PMUs
[d] NID-LS = North Idaho, Lower Salmon PMUs
[e] CM-MV-MF = Central Mountain, Mountain Valley, Middle Fork PMUs
[f] Ban-SH = Bannock, South Hills PMUs
[g] Mule deer are the surveilled species in all sampling units except for NID-LS, where the schedule rotation includes both mule deer (NID-LS) and white-tailed deer (NID-LS WT*).

Sample Acquisition

IDFG will continue to sample animals at hunter check stations. To collect samples to meet desired sample sizes, IDFG will likely need to reach out to hunters through other methods, such as announcements via website, other media, taxidermists, game processors, etc. (outreach per the CWD Strategy Communication Plan). IDFG will also collect samples from road-killed animals or other animals found dead.

Trained staff will collect retropharyngeal lymph nodes from deer and retropharyngeal lymph nodes and/or obex samples from elk and moose using proper personal protective equipment.

Monitoring Following CWD Detection

If IDFG detects CWD in a sample unit, the objective of surveillance will change to determine: (1) the initial CWD prevalence rate in the population or subpopulation as a baseline, (2) changes in prevalence over time, (3) changes in prevalence as related to changes in population management strategy, and (4) geographic distribution of the disease over time.

IDFG will adapt post-detection surveillance on a geographic basis and scale appropriate for the location, estimated prevalence, and post-detection management strategies, as described below in the Post-Detection Management section.

Surveillance Resource Needs

The current annual sampling budget of $82,800 is based on continued non-detection of CWD and use of existing hunter check station and radio-collar programs, without significant change in staffing. For surveillance where no CWD has been detected, budget and personnel needs will only increase if IDFG needs to increase personnel in the field, increase the number of check stations, or implement mandatory sample submission to collect sufficient samples.

If IDFG detects CWD, budget and personnel needs will increase to support more intensive sampling, and IDFG will adjust budget and staff resources accordingly.

POST-DETECTION MANAGEMENT

CWD Management Team

IDFG will establish a CWD Management Team(s) for Post-Detection Management. An IDFG CWD Management Team will generally include the following roles and responsibilities:

Team Leader (Deputy Director Operations)
Programmatic Wildlife Implementation (Wildlife Bureau)
Local/Regional Wildlife Implementation (Regional Office)
Veterinary Health (Wildlife Veterinarian)
Communications Implementation (Communications Bureau)

Positive Sample Result

An animal is "suspect" for CWD upon the first positive test and after a confirmatory retest, the animal is considered "positive." A retest will be run on the same sample or an additional sample when available.

Positive Sample Result in Wild Cervids

If IDFG receives a "suspect" CWD positive result in a wild cervid, IDFG will assemble a CWD Management Team. The Team will designate an initial CWD-positive area and consider appropriate management and communication actions. IDFG will inform ISDA and Idaho Department of Health and Welfare, Division of Health (IDHW) of the positive status to provide an integrated response as appropriate. (If retest/additional sampling do not confirm the initial positive, the Team will retire)

If the initial result is confirmed, IDFG will designate a CWD Management Zone in relation to the collection location of the positive sample. The defined area of a CWD Management Zone will be determined by considering time of year, location, species, age and sex of the positive animal(s), and available information about the movements and migratory patterns of the affected

species in that area. If feasible and with Commission approval, IDFG will promptly collect additional samples from the CWD Management Zone to assess the geographic distribution and prevalence of the disease. These additional samples will be used to determine prevalence rates in a non-weighted random sampling design that differs from pre-detection surveillance. Samples will be distributed among sex and age classes in a manner that reflects the predicted age and sex ratios in the CWD management zone, excluding fawns. IDFG will strive to acquire sufficient samples to attain 95% confidence in our ability to assess prevalence rates within a 3% margin of error. The number of samples necessary will vary depending on the estimated population size within the CWD management zone.

The CWD Management Team will establish an adaptive monitoring protocol and management plan for a designated CWD Management Zone. The CWD Management Team will base management actions on CWD prevalence and distribution in the CWD Management Zone.

Positive Sample Result at Captive Animal Facility

Captive Elk, Fallow Deer, Reindeer

Idaho Code Title 25, Chapter 37; IDAPA 02.04.19 gives ISDA jurisdiction over captive cervids (elk, fallow deer and reindeer). Should a positive CWD detection occur at a captive cervid facility under ISDA jurisdiction, IDFG will assemble a CWD Management Team to coordinate with ISDA and IDHW on actions and communication objectives under the agency's respective jurisdictions.

Captive White-tailed Deer, Mule Deer, Moose

IDFG will assemble a CWD Management Team upon a "suspect" result in a captive cervid under IDFG jurisdiction (white-tailed deer, mule deer, moose). The Team will designate an initial CWD-positive area and consider appropriate management and communication actions. IDFG will inform ISDA and IDHW of the positive status to provide an integrated response as appropriate. (If retest/additional sampling do not confirm the initial positive, the Team will retire.)

IDFG will immediately quarantine the captive cervid facility and conduct an inventory of all animals on the facility. IDFG will evaluate animal records and perform trace-in and trace-back on all animals for at least the previous five years. Animal tracing may require the assistance of ISDA or other entities. IDFG will continue to manage captive animals at the facility under quarantine, or lethal removal will be considered as appropriate. IDFG will test all animals that are lethally removed and dispose of carcasses appropriately.

Sampling of Wild Cervids Outside of Captive Cervid Facility with Positive Sample

Regardless of whether captive cervids are under ISDA or IDFG jurisdiction, with Commission approval, IDFG will promptly collect additional samples from the CWD Management Zone to assess the geographic distribution and prevalence of the disease in a perimeter area (1-5 km) surrounding the captive facility to determine whether CWD is present, and if so, its prevalence

and distribution. Samples will be distributed among sex and age classes in a manner that reflects the predicted age and sex ratios in the CWD management zone, excluding fawns. IDFG will strive to acquire sufficient samples to attain 95% confidence in our ability to assess prevalence rates within a 3% margin of error. The number of samples necessary will vary depending on the estimated population size within the CWD management zone. IDFG will use Commission approved hunts as much as possible for sample collection, and will use staff and contractors as needed to ensure sufficient sample collection.

The boundaries of the CWD positive surveillance sampling area will expand should CWD positive animals be detected outside the initial sampling area(s) and will continue to expand until positive animals are no longer detected. The CWD Management Team will develop an adaptive monitoring protocol and management plan appropriate for the particular CWD Management Zone.

CWD Management Actions

Management of CWD is presumed to be possible, but involves a long-term commitment, likely for decades, with repeated treatments and surveillance to evaluate the effectiveness of management actions. Few data-driven experiments exist to evaluate the effectiveness and consequences of CWD management actions. There have been numerous modeling experiments, and most suggest that overall effectiveness of CWD management actions correlates to CWD prevalence in the management zone.

Management actions in free-ranging cervid populations are generally ineffective in eliminating CWD. This is because of the difficulty in removing CWD prions once they are represent in a free-ranging environment and the lack of treatment, cure, or vaccine. Therefore, management actions generally include measures aimed at reducing populations to limit the potential spread of the disease through contact. They include attempts to eradicate CWD through reducing infected animals on the landscape, culling infected or suspect populations, and managing for certain age classes and sex ratios.

Tools and management actions are outlined below (their order does not imply preference). IDFG may use multiple tools to reach management objectives. The CWD Management Team will establish an adaptive monitoring protocol and management plan for a CWD Management Zone. The Team will base management actions on CWD prevalence and distribution in the CWD Management Zone, with implementation at the Zone, GMU, or PMU level as appropriate.

IDFG will use hunter participation and existing hunt strategies where and when feasible in the implementation of a CWD management plan, but achieving management objectives may require more intensive intervention.

General Actions for any CWD Management Zone

- Provide proactive communication and educational outreach for hunters and general public per Communication Plan.
- Increase surveillance through adaptive protocol as described in Surveillance section.
- Prohibit carcass export from the CWD management zone and restrict carcass disposal.

- Identify ways to assess effectiveness of management actions.

Management Options

1. *CWD Containment at a prescribed prevalence*

   Objective: To contain CWD within a geographic area at a prescribed prevalence (between 0-2% prevalence would be optimal to manage for population level effects).

   Actions:
   - Reduce wild cervid density by removing animals to achieve the prescribed prevalence. Removing animals should use hunters if feasible. IDFG and USDA Wildlife Services (USDA WS) may remove animals if target goals cannot be met.
   - Test all mortalities for CWD.

   Hunt structure options to achieve prescribed prevalence:
   - Manage for a younger age structure in the population.
   - Reduce buck to doe ratios to five bucks:100 does.
   - Shift season timing to November and December.
   - Change bag limit to "either sex."
   - Increase hunter participation.
     - Increase tag numbers.
     - Convert controlled hunts to "general" hunts.
     - Increase bag limits.

   Considerations:
   - Long-term effort required to manage the population at <2% prevalence
   - Long-term management at lower density based on prevalence
   - Concerns of hunters and the general public in altering hunt structures and managing populations at lower densities
   - Uncertainty of effectiveness of management actions in containing disease in the CWD Management Zone

2. *Localized Eradication*

   Objective: Eradicate CWD in a localized population (a captive cervid facility or a small, defined geographic area).

   Action:
   - Remove all susceptible cervids in the facility or area on a repeated basis. Removing animals in a localized wild population should use hunters if feasible, likely through use of a special hunt. IDFG and USDA WS may remove animals if target goals cannot be met.
   - Test all mortalities for CWD.
   - This action will require repeated removals in the area.

Considerations:

- Difficulty in achieving total eradication
- Not feasible on a large scale
- Likely requires long-term (multiple years), consistent effort required to keep a CWD Management Zone free of wild cervids
- Difficulty in sustaining public support for the length of time needed for effective eradication.
- Expense of eradication activities performed by agency personnel or USDA WS

3. *Targeted Culling (Hot Spot Management)*

Objective: Reduce local populations of affected cervids by removing positive individuals and associated social groups in localized areas to control prevalence, transmission, and spread to adjoining areas.

Action(s):

- Capture, collect tissue sample, and radio-collar animals.
- Where lab results return a positive result, remove the CWD-positive radio-collared animal and any animals in the immediate social group(s) associated with the positive animal(s). Removing animals would use hunters if feasible, through special hunts with strictly defined rules and target goals. IDFG and USDA WS personnel may provide additional assistance if hunters cannot meet the target goals.
- Test all mortalities for CWD.

Considerations:

- Live animal testing through rectal or tonsil biopsy is not currently an approved diagnostic test for CWD. However, testing protocols are available and many research groups are working to validate test procedures. Live animal testing protocols for CWD require genetic characterization of marked animals to interpret the sensitivity of the test.
- This approach requires knowledge of CWD prevalence and infection within the CWD management zone, and would not be feasible in early stages after discovery of CWD.
- Targeted culling activities using mark-recapture protocols may require helicopter capture.
- Concerns of hunters and the general public in altering hunt structures
- Expense associated with additional resources for intensive capture and collaring (*e.g.,* helicopter time, GPS collars, higher testing costs, including genotyping)
- Uncertainty of effectiveness of management actions in containing CWD

Management Resource Needs

IDFG will need to further explore options for appropriate carcass disposal and associated costs. IDFG is developing a system to notify hunters of CWD test results in a timely manner (see Communications Section).

Research and Development

Researchers at institutions worldwide are trying to better understand CWD and the underlying etiology of disease transmission and persistence. Researchers are also trying to develop tools for managing CWD. IDFG will explore use of new tools, validated tests, and other research findings as they become available.

IDFG will evaluate information it collects from CWD-positive free-ranging individuals including age, sex and genotyping results to better understand trends in genetic, age, and sex susceptibility to CWD. IDFG will also factor CWD prevalence into Integrated Population Models used to estimate populations for species management decisions in general.

Research regarding vaccines and contraceptives for herd management is commonly identified as having potential for CWD management. Even if a vaccine were developed, vaccine delivery for wild populations generally presents challenges for delivery, whether through feed, aerosol, etc. Similarly, contraception to control population density and growth is generally not feasible in large free-ranging populations; however, USDA WS is licensed to distribute a GnRH product for cervids, which has been effective in long-term reductions in small local cervid populations. IDFG will continue to evaluate these options in light of ongoing research and practical challenges.

COMMUNICATIONS

A critical component of this Strategy is effective communication about CWD, both with the public and among government agencies with animal and public health responsibilities.

The Chiefs of the Communications Bureau and Wildlife Bureau will assign a team, with Regional Office participation, to support communications planning under an adaptive approach that prepares content and processes. Communication planning will describe the various communication roles, or functions, required to achieve communication objectives. Communication goals, objectives, and functions will differ between pre-detection and post-detection scenarios, IDFG is currently engaging in messaging and information campaigns for pre-CWD detection.

Coordination with Cooperating Agencies

Federal, state, and local public health agencies are responsible for making public health recommendations regarding CWD. These agencies have concerns over the potential introduction of CWD into Idaho and will have responsibility for communications regarding some aspects of CWD. ISDA is the lead agency in Idaho for communications on health of captive elk, fallow deer, and reindeer in Idaho. Should CWD be detected in the state, ISDA will be providing recommendations to protect captive herds and facilities.

IDFG will rely on the Centers for Disease Control (CDC), IDHW and local Idaho Public Health Districts (PHDs) for recommendations regarding potential human health risks associated with exposure to CWD. IDFG communications will link or otherwise refer to CDC, IDHW, and PHD recommendations regarding CWD's potential effects on human health, including safety risks

associated with the consumption of meat from CWD-positive animals. Since the late 1990s the recommendation has been, for any prion disease, to make every effort to keep high risk tissues out of the human food supply (https://www.cdc.gov/prions/cwd/index.html). More recently, the CDC has recommended that hunters in areas known to have CWD positive animals have their meat tested and to avoid consumption of any tissue from CWD-positive animals.

Pre-Detection

Pre-detection communication focuses on raising awareness about CWD with Idaho hunters and the general public. Messaging includes the role hunters and the public can play in preventing CWD in Idaho and how hunters can help in CWD surveillance.

IDFG currently provides general information about what CWD is, how it is transmitted, and why IDFG is concerned about the potential for CWD in Idaho cervids. A website with a platform to create text and video content to address questions and provide links to other resources regarding CWD is under development. These resources include the CDC website (https://www.cdc.gov/) and the Chronic Wasting Disease Alliance (http://cwd-info.org/).

IDFG's web content will include current sampling surveillance areas, with video links explaining the purpose of CWD sampling and testing. Each fall, IDFG will issue a news release to inform hunters and the general public of the updated sampling and surveillance areas in the state and provide information on ways to submit samples for CWD testing. IDFG will also develop materials for use at hunter check stations.

Management of approvals for pre-detection communications is consistent with agency communications of statewide interest.

Post-Detection

The objective of post-detection communication is to inform hunters, cooperating agencies, and the general public about the presence of CWD in Idaho and IDFG's management actions.

IDFG will notify designated contacts within ISDA and IDHW of a CWD detection. These agency contacts will be responsible for informing Public Health Districts, the CDC, and other agencies (USDA, FDA, USGS) per internal agency protocol. IDFG's Communications Bureau will maintain a list of ISDA and public health communication points of contact and will coordinate communications planning with these agencies as their priorities allow.

Post-detection, the CWD Management Team will identify communication objectives; consistent messaging across agencies, identify staffing of communication functions and roles, and management of approvals for communication. IDFG has developed templates for internal information packets and a draft press release to communicate a CWD detection.

Details of communication and messaging for post-detection depend on the management action chosen. Signage posting, information packages, and web-services may need to be expanded depending on the services IDFG decides to provide to hunters in CWD positive areas.

In a post-detection scenario, the CWD Management Team will identify communication objectives and functions as described below.

Communication Functions

- Communication Leadership: Overall responsibility for development of communication objectives, strategies, and tactics

- Liaison(s): Internal coordination (IDFG and Commission) and external coordination with officials and other government agencies. Establish communications coordination mechanisms to enable efficient and effective communication with cooperating agencies

- Message Development and Material Production: Transform information into messages, questions and answer documents, video, and other communications tools to help audiences assess risk and take action, provide input to agency decisions, and access additional resources

- Media Relations: Responsibility for providing information to media, including social media (e.g., arranging press conferences, ensuring spokespersons are adequately briefed on common messaging goals)

- Website Management: Ensures that the latest information on the web regarding CWD is timely, and that web traffic, trends and questions are acknowledged and answered

- Management of Internal Approvals: Coordinate clearance and approval for the public release of information, communications materials, etc.

- Listening: Responsibility for gathering and analyzing perceptions and knowledge gaps surrounding CWD and reflect findings back into communication decision making

- Communication Evaluation: Ensures that communication processes and outcomes are assessed and measured, taking into account any identified knowledge gaps. Applies the results of evaluation to improve communication response efforts during current and future outbreak and in future responses

Communication Resource Needs regarding Hunter Notification of Sample Results

IDFG has identified a need to promptly inform hunters of sample results from their harvested animals. IDFG is evaluating methods of doing so, including a web-based reporting interface that would streamline the reporting process and allow hunters to follow-up based on their own interest. The Communications Bureau is developing that interface. Staff are also developing a CWD communications plan separate from this document to address the communication challenges and identify pre- and post-detection messaging to the public and hunters.

APPENDIX A

Case Studies in CWD Management by State

Eradication of CWD

New York – The first CWD positive deer were found in early April 2005 on two facilities in Oneida County (one white-tailed deer [WTD] captive facility and one WTD rehab and taxidermy operation). Both facilities were depopulated. Wild deer surveillance in a containment area (WM Unit 2P) was conducted by sharpshooters in a 10-mile radius from the infected facilities in April and 290 deer were sampled with two positive for CWD (a yearling female on 4/27/05 and a 3-year-old female on 5/15/05) in Oneida County. Mandatory carcass checks, testing, and movement restrictions were imposed in the containment area in addition to prohibitions on the possession and use of urine scent, importation of carcasses from outside the state, and deer rehabilitation were imposed within an 850 square mile containment area. No additional captive or wild cervids with CWD have been found through 2017.

Minnesota – The first positive cervids were three elk in two captive facilities in Aitkin, Stearns, and Benton counties discovered in 2002. In spring 2006, a captive WTD from a mixed deer/elk herd in Lac Qui Parle County was infected with CWD. In 2006, one WTD and one red deer in a captive facility in Ramsey County were CWD positive, and in 2009, an elk in a captive facility in Olmsted County was CWD positive. Intensive surveillance was initiated around these facilities from 2002-2004 and 28,000 wild WTD were tested with no CWD positive animals. Following the 2009 CWD positive captive elk, enhanced surveillance was again initiated around the captive facility and in the fall of 2010, one wild WTD was found near the positive captive elk facility. A CWD containment zone approximately 10 mi^2 was established in the immediate vicinity of the positive wild WTD and 4,000 WTD were removed by sharpshooters. Baiting and feeding deer was prohibited and carcass movement restrictions were implemented. Greatly increased hunter harvest and some selected sharpshooter culling were used to decrease deer density in the affected area. The aggressive culling apparently eliminated CWD from the area as no other wild WTD have been found to be positive for CWD.

Wisconsin – Despite several years of extensive surveillance of WTD for CWD, nearly 200 WTD were found to be positive for CWD over a 2-3 year period in Dane and Iowa counties. An eradication zone of 411 mi^2 was established with a CWD management zone surrounding the eradication zone. The goal of the eradication zone was total elimination of deer. Initial management efforts utilized hunters with extra seasons, longer seasons, no bag limits, and earn a buck rewards but ultimately sharpshooters were utilized due to public and hunter opposition when WTD densities were reduced from 40 to 20 deer per square mile. Ultimately, testing of deer showed two discrete core areas, one in central Wisconsin and one in south central Wisconsin adjacent to an area in north central Illinois that also had WTD positive for CWD. From 2002-2015, 193,000 WTD were tested for CWD and >3,000 deer tested positive with an increasing prevalence despite years of intensive management efforts. Holsman et al. (2010) showed that the massive reduction in deer density and numbers by Wisconsin Department of Natural Resources was met with sportsmen and landowner resistance and ultimately that resistance caused the management of CWD to be unsuccessful in reaching its objectives.

Management (Containment)

Alberta, Canada – Alberta (2002) – CWD was detected in captive elk in March 2002 and in captive WTD in October 2002. In February and March 2003, 250 deer were removed around each of the two positive captive facilities. Enhanced surveillance was initiated in east central

Alberta in response to the detection of CWD in wild mule deer (MD) in Saskatchewan and the positive captive WTD facility in Alberta. Wild, CWD positive MD were found in the area in September 2005. An immediate response was initiated to collect 50 deer in the immediate area of the positive wild MD. Subsequently MD and WTD were found to be CWD positive and local sharpshooters and enhanced hunting seasons were used to try to reduce deer density and control the transmission of CWD. Pybus (2012) summarized control efforts for CWD in Alberta and showed some limited success in some areas but differences between WTD and MD affected control efforts. Control efforts in Alberta stopped in 2008 due to hunter resistance and the apparent increased distribution and prevalence of CWD. Mule Deer appeared to be the driving force in CWD disease dynamics. Potapov et al. (2016) used Alberta data in a modeling effort and found hunter harvest in a non-selective deer harvest model was the most feasible approach for CWD management. However, the strategy is dependent on intensity of disease transmission to juveniles and behavioral differences between juvenile and older males. Overall, a harvest strategy focused on antlered males reduced CWD prevalence most consistently in these models.

Colorado – Geremia et al. (2015) showed the early large scale control efforts based on enhanced harvest to achieve population reductions of about 25% appeared to have contributed to reduced prevalence of CWD. However, Bergman et al. (2011) found dramatic increases in CWD prevalence in some areas despite targeted reductions in male cohorts possibly due to retention of older infected females in the population.

Illinois – The first wild WTD that tested positive for CWD was found in fall of 2002 near Rosco, in north central IL. A seven county containment zone was established in February 2003 with enhanced surveillance. A total of 185 deer were sampled with seven CWD positive animals. Unlimited permits and longer seasons were used to encourage hunter participation and hunter harvested animals were used for CWD surveillance in the affected area. Sharpshooters over bait reduced the WTD population with the goal to eliminate CWD and contain its spread. Intensive culling was done by sharpshooters on private property in January –March. Mateus-Pinilla et al. (2013) and Manjerovic et al. (2014) summarized six years of data on the effectiveness of using sharpshooters, hunters, and other options to decrease deer density targeting deer social groups at winter aggregation sites in Illinois. Moderate levels of density reduction (decreases of 25 deer/mi^2) over long-term time periods was successful in reducing or maintaining CWD prevalence, particularly in adult and yearling females. Public opinion was not supportive, but the efforts were successful in maintaining a low CWD prevalence.

Michigan (2015) – The first wild WTD positive for CWD was found in April 2015 in a six-year-old female from Inghram County. A core CWD zone of 3,153 mi^2 was established surrounded by a 1,441 mi^2 CWD management zone. An enhanced surveillance program was initiated in May 2016 in a three county area around the initial positive location. Five CWD positive WTD were found in the core zone and two CWD positive WTD were found in the management zone. A combination of options including utilizing an early antlerless season, increased antlered quota, removal of antler restrictions, and decreasing antlerless fees by 40% were used to encourage hunter participation. Testing and mandatory hunter check of all carcasses was required. In addition, disease control permits in the control zone were issued to landowners with more than five acres to be used between May 2015 and April 2016. Sharpshooters were used in a 2 mi radius of each CWD positive on private lands with owner permission. A genetic study of the

CWD positive animals showed significant familial relatedness between the animals and showed that deer movements in the social group were confined to one township in the three county area.

Pennsylvania (2012) – CWD was found in captive WTD in 2012 in Adams County. A CWD management area was established in the immediate vicinity and enhanced CWD surveillance was initiated statewide. In 2013, three wild WTD were found to be positive for CWD in Blau and Bedford counties within the CWD management area. An additional captive WTD was found in Jefferson County in 2014. By May 2015, an additional six wild WTD positive for CWD were found in the CWD management area using road-killed and harvested animals. This finding initiated mandatory testing of hunter harvested WTD, increased antlerless permits, and the prohibition of the removal of any deer parts from the high risk area including heads, spinal cord, spleen, canine teeth, brain material, unfinished taxidermy mounts, or brain-tanned hides. In addition, the rehabilitation of WTD, feeding and baiting, new captive WTD permits, and the removal of road-killed deer parts were banned. The disease management areas were delineated at the county level with two disease zones established.

Targeted Culling (Hot Spot Management)

Colorado –Nusser et al. (2008) developed the hot spot and spark model of CWD transmission, which initiated the Colorado Parks and Wildlife approach to selectively culling social groups of mule deer affected by CWD based on hunter collected samples or capture and testing of live animals. Wolfe et al. (2004) showed that tonsil biopsy of live captured mule deer was feasible to test about 50% of urban deer. Average costs were $325 per deer without testing or personnel costs. Gross and Miller (2001) used simulations of selective culling strategies for CWD management and showed that early intervention when CWD prevalence was <1% could eliminate CWD by removing <20% of the infected populations.

Monitoring Prevalence

Minnesota – In 2016, CWD was found in five WTD from three captive facilities in Crow Wing and Meeker counties in central Minnesota. An enhanced surveillance program was initiated around the captive facilities and four wild WTD were found to be CWD positive in December 2016 and January 2017 within a one mile area. Due to the possible connections to CWD in Iowa and Wisconsin, targeted surveillance was initiated in southeastern Minnesota. Initially, two male deer in Fillmore County tested positive for CWD, but as of May 2017, 11 of 1,179 deer tested were CWD positive in Filmore County, the same area as the CWD positive wild deer in 2016 and 2017.

Arkansas (2015) – After nearly 10 years of CWD surveillance, the first positive wild elk, a 2.5-year-old female, was found on October 6, 2015. A CWD core zone within a five-mile radius around the positive elk was established and enhanced surveillance began. A total of 300 deer and elk were removed and a 2.5–year-old female WTD was found to be CWD positive on March 6, 2016. A CWD management zone was established that encompassed 10 counties. Enhanced hunting seasons were utilized through 2017 and a total of 79 positive CWD animals have been found in seven counties with a prevalence of 23%. In addition, live deer importation was banned in 2002, carcasses from CWD positive states were banned in 2005, and a moratorium on captive breeder/dealer permits was put in place in 2006. In 2012, the importation of all cervid carcasses

into Arkansas was prohibited and the capture of wild WTD for captive operations was prohibited.

Wyoming – Wyoming identified CWD in captive cervids at the Sybille Wildlife Research Facility in the 1980s and in free-ranging mule deer and elk in the surrounding area a few years later. No active management actions have been taken, rather a systematic surveillance effort was done to monitor CWD prevalence in known areas and detect new areas of infection. Over time, CWD prevalence has increased, especially in white-tailed deer, and CWD distribution has expanded to include essentially all of the state except the far northwestern counties. There is great concern, both from Wyoming Game and Fish Department (WGFD) and the public about the encroachment of CWD into areas with winter feeding and Yellowstone and Grand Teton National Parks. The WGFD is currently trying to develop a CWD management and response plan.

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