AFWA Best Management Practices for Prevention, Surveillance, and Management of Chronic Wasting Disease (CWD):

First Supplement

A Report of the Association of Fish and Wildlife Agencies

ASSOCIATION of FISH & WILDLIFE AGENCIES

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Report Editors: Colin Gillin, Oregon Department of Fish and Wildlife, and Jonathan Mawdsley, Association of Fish and Wildlife Agencies

Contributors and Reviewers:

Charlie Bahnson, North Dakota Game and Fish Department
Johnathan Bordelon, Louisiana Department of Wildlife and Fisheries
Chris Cook, Alabama Department of Conservation and Natural Resources
Merril Cook, North Carolina Wildlife Resources Commission
Doug Cottam, Oregon Department of Fish and Wildlife
Mark Cunningham, Florida Fish and Wildlife Conservation Commission
Scott Durham, Louisiana Department of Wildlife and Fisheries
Matthew Eckert, Colorado Division of Parks and Wildlife
Colin Gillin, Oregon Department of Fish and Wildlife
Daniel Grove, University of Tennessee
Jeremy Hurst, New York State Department of Environmental Conservation
Lane Kisonak, Association of Fish and Wildlife Agencies
Gabriel Jenkins, Kentucky Department of Fish and Wildlife Resources
Anne Justice-Allen, Arizona Game and Fish Department
Jim LaCour, Louisiana Department of Wildlife and Fisheries
Jonathan Mawdsley, Association of Fish and Wildlife Agencies
Brandon Munk, California Department of Fish and Wildlife
Members of the North Carolina Chronic Wasting Disease Task Force
Kenny Ribbeck, Louisiana Department of Wildlife and Fisheries
Mark G. Ruder, Southeastern Cooperative Wildlife Disease Study
Sherri Russell, Missouri Department of Conservation
Charles Ruth, South Carolina Department of Natural Resources
Krysten Schuler, Cornell University College of Veterinary Medicine
Southeastern Association of Fish and Wildlife Agencies Cervid Working Group
Jonathon Shaw, North Carolina Wildlife Resources Commission
Kelly Straka, Michigan Department of Natural Resources
Jeb Williams, North Dakota Game and Fish Department
Peregrine Wolff, Nevada Department of Wildlife
Mary Wood, Wyoming Game and Fish Department
Chuck Yoest, Tennessee Wildlife Resources Agency

Citation: Gillin, C. M., and Mawdsley, J. R. (eds.) 2019. AFWA Best Management Practices for Surveillance, Management and Control of Chronic Wasting Disease (CWD): First Supplement. Association of Fish and Wildlife Agencies (AFWA), Washington, D. C. 24 pp.

Introduction

Chronic wasting disease (CWD; Williams and Young 1980), is considered by many North American wildlife managers and administrators as the most important disease threatening North American cervids. A fatal, transmissible, and degenerative disease of deer, elk, moose, and other species of the family Cervidae, CWD affects all native North American cervids. At this writing there are no effective therapies or vaccines for the disease, and no carcass- or animal-side test that can be readily deployed by hunters or state and provincial agency personnel. Furthermore, the causative agent of CWD – a misfolded protein or "prion" – is not easily degraded and causes persistent environmental contamination that contributes to the epidemiology and maintenance of the disease. Together, these unique circumstances leave state and provincial wildlife management agencies with relatively few options to mitigate the spread or effects of this disease (Gillin and Mawdsley 2018).

Between March, 2017, and September, 2018, the Association of Fish and Wildlife Agencies' (AFWA) Fish and Wildlife Health Committee developed the best management practices (BMPs) for prevention, surveillance, and management of CWD (Gillin and Mawdsley 2018). This guidance document represents contributions from more than 30 wildlife health specialists, veterinarians, biologists and agency leaders who are engaged in CWD management and prevention across North America. The document is built on peer-reviewed science and field-tested methods or professional opinion based on science and authors experience and designed to inform decisions regarding the prevention or management of CWD. The BMPs are presented in a format that provides AFWA Directors with topical summaries accompanied by "best practices" or guidance based on science, along with appropriate literature cited and other resources. Where appropriate, the document also provides agencies with options or alternatives, including those that may not be feasible or practical for all jurisdictions or under every scenario for any number of reasons including those involving agency authority, or because of legislative, statutory, regulatory, or policies currently in place which may limit suggested practices or actions.

Because our knowledge of this disease continues to evolve, the BMPs are meant to be a dynamic, living document that can be updated when new information is available. This first supplement to the original AFWA CWD BMPs presents information about four additional thematic areas (taxidermist and meat processor guidance, quarantine of infected facilities, interstate communication of positive CWD testing results, and responding to hunter inquiries regarding CWD testing) which were not addressed in the original set of BMPs released in September 2018. These topics were suggested as priority themes by AFWA member agency managers and Fish and Wildlife Health Committee members during subsequent discussions with AFWA staff and

editors. Similar to the 2018 document, the BMPs in this document are not meant to be prescriptive or to mandate programs at the state, federal, tribal, or territorial level; they should be regarded as a set of recommendations for agencies to consider as they develop or revise their CWD programs.

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Taxidermy and Meat Processing

Best Management Practices

Waste parts or tissues from taxidermy or meat processors should not be disposed of where they can be accessed by cervids and scavengers. Develop recommendations and educational materials for taxidermists and meat processors as well as hunters or others that handle or dispose of cervid carcasses or meat by-products. Some states/provinces may have (or want to consider) laws requiring taxidermists and meat processors to use approved waste tissue and carcass disposal protocols.

- **Meat processors should process carcasses individually and avoid mixing meat from multiple carcasses into ground meat products.** This practice is specifically related to public health concerns including but not limited to CWD. Although CWD-associated prion disease has never been documented in humans, minimizing risk and limiting human exposure to CWD prions by minimizing the mixing of potentially CWD-contaminated carcasses from untested animals is a food safety practice and should be considered a best management practice.

- **Meat processors and taxidermists should clean and sanitize equipment between animals.** If present, CWD prions from infected animals could contaminate processing equipment. Preventing contamination of uninfected carcasses through meat processing is important for limiting human exposure. Recommendations for proper cleaning of equipment can be found in Chapter 15- Recommended Decontamination and Disinfection Methods for Equipment of this document (Gillin and Mawdsley 2018). And though this practice will add inconvenience, time, and expense, this may be considered a best practice.

- **Minimize the handling of higher risk tissues from potentially infected cervid carcasses (e.g. brain, eyes, spinal cord, lymphatic tissues, etc.)** Specific guidelines should be tailored to the practices of taxidermists and meat processors or hunters. Individuals handling carcasses should wear disposable gloves, wash hands before and after handling carcasses and carcass parts, and disinfect equipment that may have been contaminated. [see Chapter 15 on Recommended Decontamination and Disinfection Methods for Equipment (Gillin and Mawdsley 2018)]

- **Develop regulations, policy, or administrative rule promoting acceptable waste disposal practices for hunting-based businesses such as taxidermists and meat processors.** Provide policy or administrative rule for meat processors and taxidermists to regulate transport, handling, and/or disposition of tissue waste from cervids. This guidance may be generic to include states or provinces where CWD has not been detected in tested animals. Provide regulatory direction for the types of carcass waste allowed into rendering or other disposal facilities using methods specific for waste from CWD endemic areas. Rendering and landfill facilities are often regulated through other agencies (State Department of Agriculture, county government, etc.) requiring coordinated policy/regulation development.
- **Request that taxidermists take part in programs that provide heads or samples to wildlife agencies for CWD surveillance including samples from older-age class males and captive cervid facilities.** Some states developed a cash incentive program for the collection of samples, while other states have developed training programs for taxidermists willing to collect samples.

- **State/Provincial wildlife agencies should provide information regarding in-state/province taxidermists and meat processors to hunters to reduce the potential for transportation of potentially infected carcasses or parts.** Wildlife agencies should promote the use of local taxidermy and meat processing services in the area the animal was harvested, prior to movement of the carcass out of the area**.**

- **Prohibit or specifically regulate taxidermy or meat processing businesses from having captive cervids (farmed, exhibit, or rehabbed animals) susceptible to CWD infection on the same premises at the business to limit exposure of live cervids to potentially contaminated tissues or environments.**

- **Prohibit feeding of taxidermy or meat processor cervid waste tissues or scraps to pets, livestock, zoo animals, or wildlife.**

Alternative strategies supporting these Management Practices include:

- Require permitting/license registration by administrative rule or statute for taxidermy and meat processing as regulated industries. As part of permitting/licensing of taxidermists and meat processors, require reporting of client and carcass harvest location when a CWD sample has been collected.

- Provide animal waste dumpsters to taxidermists or meat processors and on public lands to hunters for purposes of carcass disposal. Dumpster locations should be available and prioritized by proximity to CWD management areas or jurisdictional border crossings, and dumpster contents disposed of in a manner that minimizes risk of further CWD transmission.
- Hunters desiring a European mount from their harvested cervid should use a taxidermist in the state/province/area of harvest or remove all potentially infective tissue in the field or in the state/province of animal harvest.
- Develop a registry of taxidermy and meat processor businesses and provide information and updates to the business owners regularly.
- Develop an agency-approved Identification Program for taxidermists and meat processors that follows best management practices for prevention, surveillance, management, and control of CWD. Provide hunters location and contact information of taxidermy and meat processing businesses certified as following CWD best practices.

Supporting Strategies and Evidence

Many states and provinces regulate taxidermy or meat processing businesses. For all agencies, identification of these important hunting-based businesses and facility locations can simplify contact and cooperation with agency staff to better facilitate education and surveillance. Managers should develop practical recommendations for biosecure practices for taxidermists, meat processors, and hunters to help reduce the potential for transportation and spread of CWD. Taxidermist and meat processor businesses may receive animals from a large multi-state/province geographic area including areas where CWD has been detected in tested animals or as yet undetected foci of CWD. Due to the broad client-base these businesses service, increasing agency communication and cooperation with this business community can lead to better wildlife biosecurity and surveillance.

An initiative that many states and provinces have yet to explore is to actively engage hunting-based businesses to build stronger and more positive relationships through education and cooperatively working with business owners to encourage them to serve as ambassadors for surveillance and testing and appropriate carcass disposal within their industry and with their hunter clientele. Providing a program that includes training, education and a cooperative relationship between CWD staff, district biologists, and education staff with hunting-based business owners can improve the state/province's capacity for prevention, surveillance, management, and control of CWD.

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Quarantine of Infected Facilities

Best Management Practices

- **In an area where CWD has not been detected in tested free-ranging cervids with no prior CWD detection, animal containment areas (facilities, fenced fields or pastures, paddocks, pens, structures, trailers, etc.) which have housed captive animals known to be infected with CWD should be quarantined with fences and barriers maintained so that contaminated areas are made inaccessible to free-ranging susceptible animals until such time as:**

    1. the cessation of CWD prion viability in contaminated areas/surfaces is verified through validated testing (which is currently not available), or

    2. approved decontamination methods are developed and applied to the infected areas/facilities and soils and demonstrate the destruction, elimination, inactivation, or denaturing of CWD prions and elimination of associated risk of infection to susceptible animals.

- **All uninfected cervids (free-ranging and captive) should be prohibited/restricted from access to previously-infected CWD areas (facilities, fenced fields or pastures, paddocks, pens, structures, trailers, etc.) until either condition 1 or 2 as listed above has been demonstrated.**

- **In states/provinces where CWD has been detected in tested animals, the level of risk for maintaining fences on previously infected areas should be evaluated on a case-by-case basis to determine the risk of infection to free-ranging wildlife.**

Supporting Strategies and Evidence

Infectious prion proteins may persist in soils, paddocks, structures, and other contaminated environments for many years (Johnson et al. 2006; Seidel et al. 2007; Saunders et al. 2008; Saunders et al. 2012; Kuznetsova et al. 2014). Prions of the sheep disease, scrapie, remained infectious for at least 16 years in a sheep-house in Iceland (Georgsson et al. 2006). Mule deer (*Odocoileus hemionus*) became infected in two of three paddocks where infected deer carcasses had decomposed in situ ≈1.8 years earlier and in one of three paddocks where infected deer

resided 2.2 years earlier (Miller et al. 2004). Presently, the environmental contamination risk over time, or period CWD prions remain infective in soils and on other surfaces in the environment, is not known.

Methods and products have been proposed for the decontamination of equipment and surfaces exposed to infectious prions (see Chapter 15 in Gillin and Mawdsley 2018). However, these products generally rely on chemicals that are themselves toxic to the applicator at the prescribed concentrations (e.g. highly concentrated sodium hydroxide, NaOH or sodium hypochlorite, NaOCl) without appropriate protective equipment. Current recommendations for inactivation of prions on non-disposable materials are based on the use of bleach (NaOCl), soda or caustic lye (NaOH) and the moist heat of autoclaving with the combination of heat and chemicals being most effective (Rutala and Weber, 2010, Taylor and Woodgate 2003, WHO, 2000, and Hughson et al. 2016). Hypochlorous acid (HOCl) has also been considered as a relatively nontoxic alternative (Hughson et al. 2016), although it is not likely practical to apply on a large landscape scale. However, some of these methods warrant further evaluation (Sohn et al.2019).

The products/methods above are neither practical nor appropriate (or may not be legally permissible) for application at larger scales to treat contaminated facilities such as fields, paddocks, pens, structures, and transport vehicles. It is also unrealistic and impractical to expect that these methods would be applied to the habitat of free-ranging cervids. Given the demonstrated persistence of the infectious prion proteins in the environment over years and even decades, the best management practice is to assume that all contaminated facilities will remain contaminated until effective, feasible, and less toxic methods for facility decontamination is demonstrated and available. Therefore, if legally permissible for agencies to implement, CWD contaminated facilities should be placed under indefinite quarantine with fences maintained to restrict ingress and exposure of susceptible free-ranging cervids. Captive cervids should not be introduced or placed in previously infected areas (facilities, fenced fields or pastures, paddocks, pens, structures, trailers, etc.) which have housed animals or parts of animals or urine or feces known to be infected with CWD. Quarantine should be maintained until such time as methods become available for decontaminating these facilities and that can demonstrably eliminate prion infectivity and contamination.

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Inter-State/Province Communication of Positive CWD Test Results

Best Management Practices

- **States/provinces should make a concerted effort to educate their resident hunters, many who likely also hunt as nonresidents in other states/provinces, regarding carcass regulations in their resident/home state/province.** Non-resident hunters in any state/province have a likely probability of buying resident hunting and fishing licenses and taking part in those activities in their home state or province. States and provinces desiring to implement carcass or carcass parts import restrictions directed at resident citizens can most easily and cost effectively educate the highest number of sportsmen/women by notifying their own residents.

- **State/Provincial wildlife agencies in CWD-positive states/provinces should notify or remind non-resident hunters to check regulations of their home jurisdictions when purchasing their non-resident hunting licenses.** A website (e.g. AFWA or CWD Alliance) could serve as the repository for all state and provincial CWD regulations with carcass transport regulations. Regulatory language should be concise with agency-specific regulations hyperlinked from the central repository for the hunter to refer to his/her home state/province regulations. States/provinces should provide updated regulations to the repository website annually or biannually.

- **As state/provincial privacy laws permit, CWD-positive state and provincial agencies should notify (or acquire written permission if required) the hunter purchasing an out-of-state/province license, that the hunter's resident state/provincial agency will be contacted if their harvested animal tests positive for CWD.** When the hunter is notified of the status of their animal, the hunter's name and contact information will be provided to the hunter's home state/provincial wildlife agency to facilitate agency-hunter communication and collection and proper disposal of carcass parts and meat as needed, desired, or required. Hunters may also choose to retain and consume their CWD positive meat as permitted by state or provincial law.

Specific guidance for different harvest and testing scenarios and as state/provincial privacy laws and laboratory confidentiality policy permits

Regardless of state/province CWD status, all testing of harvested animals should be conducted as quickly as possible (in days/weeks versus months) to allow opportunity for hunters to properly dispose of CWD infected carcasses if necessary and provide hunters and agency staff better control and maintenance of transported and waste carcass tissues. Immunohistochemistry (IHC), typically has a 5-10 day turn-around and enzyme-linked immunosorbent assay (ELISA) requires 1-3 days to complete results depending on the capacity of the diagnostic laboratory (see Chapter 8 of Gillin and Mawdsley, 2018).

For animals tested in states/provinces other than where the animal was harvested :

- If the sample tests positive, the state/province submitting a sample for testing should ensure the results have been confirmed by IHC if CWD has not been detected in the harvest state/province/area and according to testing protocols established by USDA-APHIS and the National Animal Health Laboratory Network or Canadian National Animal Health Laboratory networks. Confirmation by IHC of an ELISA positive test may not be required in a CWD endemic area.

- Following documentation/confirmation of positive test results and as permitted by privacy laws, the submitting state/province should contact the wildlife health, game, wildlife management program, or state animal health official of the state/province where the animal was harvested to provide the test results and any available and legally permissible information concerning hunter data, hunt unit, animal data, harvest location, and date of harvest.

- The state/provincial wildlife agency where the animal was harvested should notify the hunter regarding the CWD positive test result and determine the location of the carcass or carcass parts. The hunter should be advised of CDC recommendations regarding consumption of meat from CWD positive animals.

- Meat or carcass parts of the test positive animal should be collected and disposed of by the state/provincial wildlife agency as appropriate and permissible by the hunter and state/provincial statutes or regulations.

Supportive Strategies and Evidence

The CWD agent can be present in nervous system tissue, lymphoid tissue, bones, muscle, and other tissues of infected cervids (Angers et al. 2006, Kramm et al. 2017). High risk tissues from cervids harvested in CWD-positive states/provinces are occasionally transported by non-resident hunters to their home state/province, potentially in violation of regulations prohibiting this practice. If infected tissues are discarded onto the landscape by hunters, taxidermists, or meat processors, environmental contamination may occur resulting in the possible introduction of CWD into new areas if a susceptible animal comes in contact with contaminated surfaces (Miller et al. 2004). Infectious prion proteins may persist in the environment for many years (Miller et al. 2004; Seidel et al. 2007; Saunders et al. 2008). Accordingly, native cervids could become infected if they are exposed to CWD prions in the environment. Although environmental sources of infectivity of CWD into a cervid population is difficult to confirm, it is suspected to be an important epidemiologic factor in the maintenance of this disease and CWD epidemics in natural populations (Miller et al. 2004). Because of this risk, most states/provinces have regulations prohibiting the importation of intact cervid carcasses from other states or provinces or, for some states/provinces, specifically from CWD-positive regions (Gillin and Mawdsley, 2018). All states/provinces allow limited and restricted tissues from harvested carcasses to be imported including deboned meat, clean skull cap and antlers, cleaned hide, and taxidermied products.

State/provincial agencies should provide carcass importation information to their resident hunters, fisherperson, and other sportsmen/women groups as many of these residents are also non-resident hunters in other states and provinces. This communication will provide the most cost effective and efficient effort. There will be fewer hunters that only hunt as non-residents in other states. Communicating with this population of non-resident hunters can be challenging and requires collaboration and hunter notification by the state/province the non-resident hunter has harvested his/her animal in and as state privacy laws allow. In addition to many of the other BMPs presented in Gillin and Mawdsley 2018, inter- state/province sharing of CWD detection results and communication between states and hunters regarding carcass transport regulations, may help in slowing the spread CWD by human activities.

There may be concern by some states/provinces managing CWD that strategies focusing on sharing personal contact information of hunters and identifying hunters harvesting a positive animal could erode trust between some hunters and management agencies. This may reduce opportunities to partner with hunters to address chronic wasting disease in free-ranging populations. For further discussion on this topic, please refer to the BMP discussion on Agency Response to Hunters Inquiries Regarding CWD Testing in this supplemental document.

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Agency Response to Hunter Inquiries Regarding CWD Testing

(Adapted from the Southeastern Wildlife Health Technical Group's "Guidance for State Wildlife Agencies Regarding Hunter Inquiries into Testing Harvested Cervids for Chronic Wasting Disease")

Best Management Practice

- **State/provincial agencies should have one or more options available for hunters to test their harvested animal for CWD.**

  Agencies may need to employ multiple strategies, dictated by the unique challenges such as surveillance program and sampling requirements, population density, and resources available to each state/province. For example, some states/provinces may incorporate hunter testing requests into their surveillance/ monitoring program, whereas others may choose to address requests through a separate program.

- **Public health recommendations should come from public health officials and state/provincial wildlife agencies should include their public health agency in addressing these recommendations.**

- **The CWD status message provided by state/provincial wildlife agencies should not be that a particular herd or area or jurisdiction is "free" of CWD, rather CWD has not been detected in tested animals.** This message is important for hunters to make informed decisions and includes an understanding of CWD as well as the limitations to surveillance and testing and acknowledging inherent uncertainty in any agency's CWD surveillance effort. Wildlife agencies should provide comprehensive information on CWD to hunters and on their website as the foundation of public outreach.

- **Wildlife agencies should establish CWD testing guidance for hunters in relation to the agency's current surveillance/monitoring program which may include proximity to known CWD-positive areas among other risk factors.** The CDC recommends testing for public health surveillance and risk assessment in areas where CWD is known to be present but does not define the extent of the area.

- **Wildlife agencies should present a clear message that CWD tests are used primarily as tools for surveillance and monitoring programs and are not approved as assuring or certifying food safety.** CWD has not been documented in humans or

been shown to pass the blood-brain barrier in humans from consumption of CWD positive animals. CDC recommendations are guidance toavoid consuming CWD positive animals [see Chapter 22, CWD and Public Health, in Gillin and Mawdsley 2018]. Testing can be considered an effective, but relative, tool when used at the individual or herd/population level to inform hunters that their risk of consuming meat from a CWD infected animal is likely low depending on where the animal was harvested, animal age, sex, and other factors. However, no test is 100% accurate or provides a guarantee and a NOT DETECTED test result does not eliminate the possibility an animal carries CWD at a low and undetectable level.

Frequently asked questions associated with best practices include:

Who collects the tissue samples?

***Wildlife agency personnel*:** Staff training on sample collection, storage, and shipment is a requirement of any agency CWD program. Collection site options include staffed game check stations and agency offices, or un-staffed agency sites such as coolers or barrels where heads are dropped off by hunters.

Hunters: Several state agencies allow hunters to collect their own CWD samples. Increased sample size is the primary benefit with this sampling method but an increase in the number of non-diagnostic samples and incomplete records may also be anticipated. State/provincial wildlife agencies must provide proper oversight, education, and outreach if allowing hunters to collect samples.

Veterinary diagnostic laboratories: Agencies may consider cooperative agreements with veterinary diagnostic laboratories involving protocols for hunters to directly deliver heads of harvested animals to the laboratory. Diagnostic laboratories may also assist in disposal of carcasses or carcass parts.

***Approved CWD sample collectors*:** State/provincial wildlife agencies may utilize partnerships with meat processors, taxidermists, and other non-wildlife state/provincial/federal agency personnel for CWD sample collection. The basic requirements of this surveillance method include training and certification/approval of non-agency personnel and sample collection and delivery protocols. The state/provincial wildlife agency can publish a list of approved collectors available to hunters. The associated costs and data ownership are considerations in the development of a program utilizing non-agency sample collectors.

Who delivers/ships the samples to the lab for testing?

State/provincial wildlife agency personnel will generally be responsible for submitting CWD samples from wild cervids harvested in the state/province. However, if non-agency sample collectors are utilized, the wildlife agency should provide oversight and protocols to ensure accurate and complete records throughout the diagnostic process.

Which lab(s) can be used?

Wildlife agencies should identify CWD testing laboratories appropriate for sample submissions if non-agency sample collectors submit samples. States/provinces without diagnostic capabilities should direct hunter-collected sample submissions to appropriate state/provincial laboratories and communicate with the laboratory to facilitate communication of results back to the state/provincial wildlife agency. Specific instructions on proper shipping techniques should be supplied to the shipper. The list of USDA-approved CWD laboratories can be found at (https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/lab- info-services/sa_approved_labs/ct_approved_labs)

Who pays?

Sample testing costs and payment source will vary and will be determined by agency/jurisdictional policy, funding resources, demand by hunters and requirements of the agency's surveillance or monitoring program. Cost may include collection of the sample, shipping supplies, diagnostic test fee, and associated administrative costs. Payment sources may include the agency funding, grants, the hunter, or in combination. Information regarding the purpose, objectives, and procedures should be included in public outreach. Hunters paying for some or all of the sample collection and testing can lead to potential data ownership issues and test results may not be reported directly to the appropriate wildlife agency.

Who receives results?

State/provincial wildlife agencies should directly receive the CWD test results on all cervids tested in their jurisdictions. Similarly, hunters harvesting animals in CWD management areas must receive test results as quickly as possible accounting for data processing time limitations due to shipping, diagnostic processing, number of samples submitted, etc.. Many states/provinces have web-based systems allowing hunters to

access test results online after receiving an identification number for their sample. Agencies may also call individual hunters when their harvested animal tests positive.

Agencies must communicate with hunters the expectations and time limitations involving testing and potential delays receiving test results. Meat may need to be frozen if the hunter choses to wait on the result before consumption.

Supporting Strategies and Evidence

Public Health Communications with Hunters

On August 17, 2017, the U. S. Centers for Disease Control and Prevention (CDC) updated their recommendations on minimizing human exposure to CWD based upon research findings from an ongoing study documenting experimental CWD transmission to macaques by ingestion of skeletal muscle from pre-clinical CWD-positive cervids. Although other experimental CWD prion transmission attempts in macaques have failed to repeat the results (Race et al. 2018) and no CWD infections have been reported in humans, these findings prompted the CDC to make minor modifications to their recommendations, which can be accessed online at: https://www.cdc.gov/prions/cwd/prevention.html.

The relevant Canadian food safety recommendations can be found at:

https://www.inspection.gc.ca/animals/terrestrial-animals/diseases/reportable/cwd/eng/1330143462380/1330143991594

http://www.inspection.gc.ca/animals/terrestrial-animals/diseases/reportable/cwd/fact-sheet/eng/1330189947852/1330190096558

Current CDC recommendations should be used by wildlife agencies to coordinate with their state/provincial public health agencies. A Frequently Asked Questions document and talking points should be developed for hunters and other members of the public.

Throughout the CDC language, there is an emphasis on “areas with CWD.” However, the strength of CWD surveillance data is variable across the country and these BMPs recommend all states/provinces implement testing protocols to provide hunters a voluntary program to determine CWD status (detected or not detected) of their harvested animal, regardless of CWD status in the state or province.

Some additional thoughts on wildlife agency communications with hunters

Agencies should consider strategies that focus on positive interaction and communication with hunters to facilitate improved mitigation of the biological, economic, and social impacts of CWD. Programs focused on providing tools and resources to hunters with a positive emphasis could provide hunters with critical education and information and help to provide incentive for compliance with regulations. Similarly, jurisdictions can work to foster communication and collaboration across jurisdictional lines to identify areas that may benefit from improved hunter contact, improved information/education/signage, or improved access to appropriate tools to help hunters in surveillance and testing and to comply with carcass transport and other regulations. For example, programs that provide easy access to carcass disposal options placed strategically along critical access points may offer hunters an opportunity to comply with carcass transport regulations and appropriately dispose of carcass parts when they are hunting in areas where they may be unfamiliar with appropriate disposal locations.

Programs focused on building partnerships with hunters may promote greater efficacy in mitigating concerns over carcass movements than regulations that create a penalty or disincentive to having an animal tested. These programs may help to garner support from hunters to address chronic wasting disease and provide better information/education to hunters on how they can be a part of the solution. Building positive relationships with hunters related to the unpleasant concept of disease related to the wholesomeness of hunting may encourage hunters to serve as ambassadors for surveillance and testing and appropriate disposal of carcass parts as well as better compliance with regulations.

Current management recommendations suggest that harvest may be an important component of CWD management in free-ranging populations (WAFWA 2017). The best available science as it relates to the prevention, surveillance, management and control of CWD maintains a strong foundation in human dimensions (see Chapter 17, Human Dimensions, in Gillin and Mawdsley, 2018) and in maintaining positive relationships and interactions between agencies and hunters to support CWD control strategies as well as those that help in prevention. Jurisdictions must weigh the relative benefits of any strategy in testing for prevention and surveillance or to mitigate risk and determine what strategies may prove most effective in addressing CWD in their jurisdiction.

Literature Cited

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