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Managing a Killer

AFWA SETS BEST PRACTICES FOR PREVENTING AND MANAGING CHRONIC WASTING DISEASE

By Jonathan R. Mawdsley, Colin M. Gillin and John R. Fischer

Credit: John Fischer, Southeastern Cooperative Wildlife Disease Study

▲ **Most deer that test positive for CWD look healthy. Samples from hunter-harvested deer are obtained and tested much more often than from sick or dead deer.**

Chronic wasting disease (CWD) is a 100% fatal neurodegenerative disease that affects species in the family Cervidae, including North American deer (all *Odocoileus* species), elk (*Cervus canadensis*) and moose (*Alces alces*). Originally discovered in captive mule deer (*Odocoileus hemionus*) at a Colorado research facility in 1967, CWD has now been found in 26 U.S. states and four Canadian provinces, with recent detections in wild white-tailed deer (*Odocoileus virginianus*) in Mississippi and Tennessee, captive red deer (*Cervus elaphus*) in Quebec, captive reindeer (*Rangifer tarandus*) in Illinois and moose in Norway and Finland.

Unlike many human or wildlife diseases which are caused by bacteria or viruses, CWD is caused by a misfolded protein called a prion. Other prion diseases include bovine spongiform encephalopathy ("mad cow") disease in cattle, Creutzfeldt-Jakob disease in humans and scrapie in sheep. In these diseases, individual misfolded prion proteins can cause normal proteins to misfold, leading to a chain reaction in which the misfolded proteins accumulate in the central nervous system, resulting in cell death and the loss of nervous system function.

In the case of CWD, infected animals shed misfolded prion proteins into the environment through feces, urine and saliva, which can infect other susceptible animals. Prions are not easily degraded by enzymes or bacteria and are also remarkably resistant to common laboratory disinfectants and cleaning methods. Consequently, prions may remain infectious in the environment for years or even decades, binding to certain soils.

Prion diseases are notoriously difficult to treat or diagnose in the early stages of disease, and in the case of CWD there are no known treatments, vaccines or cures available. In addition, there are no practical live-animal or carcass-side tests that would enable managers to diagnose cases of CWD in the field. Confirmation of CWD cases requires testing of lymphoid and central nervous system tissues of the suspect animal by laboratories accredited by the U.S. Department of Agriculture.

In the United States, wild populations of deer, elk, moose and other cervid species are managed by state fish and wildlife agencies. These agencies are struggling to manage the ongoing spread of CWD within the nation's wild cervid populations. A 2017 survey conducted by the Association of Fish and Wildlife Agencies (AFWA) found that, on average,

▼ **Oregon Department of Fish and Wildlife biologists collect samples from an elk for CWD testing.**

Credit: Colin Gillin/Oregon Department of Fish and Wildlife

Credit: Mike Hopper/Kansas Department of Parks, Wildlife and Tourism

▶ **This clinically affected white-tailed buck tested positive for CWD in Sherman County, Kansas.**

state fish and wildlife agencies were spending over $400,000 annually on CWD surveillance and monitoring, with some states spending as much as $2 million per year on these activities.

To help state agencies combat the threat to cervid populations from CWD, in 2017 the AFWA Fish and Wildlife Health Committee began developing a set of best management practices (BMPs) for the prevention, surveillance and management of CWD. Over a period of 18 months, a team of over 30 wildlife health specialists, veterinarians, biologists and agency leaders drafted a set of concise recommendations that address 18 topic areas of immediate relevance to CWD management.

▼ **This clinically affected white-tailed buck tested positive for CWD in Rawlins County, Kansas.**

Credit: Kevin Klag/Kansas Department of Parks, Wildlife and Tourism

These BMPs received extensive review over a six-month period from fish and wildlife agency technical staff and leadership and were approved by the AFWA Fish and Wildlife Health Committee in September 2018. The BMPs also were endorsed by the directors of the 50 U.S. state fish and wildlife agencies in a formal resolution, which was passed at the AFWA Annual Meeting on September 12, 2018.

The AFWA CWD BMPs are built on the best peer-reviewed science and field-tested methods that can inform decisions regarding CWD prevention or management. These BMPs have been designed to provide wildlife managers and agency leadership with topical summaries accompanied by best practices or guidance based on science, along with appropriate citations from the scientific literature and other resources. Where appropriate, the BMPs also provide agencies with options or alternatives, including those that may not be feasible or practical for all jurisdictions or under every scenario. Because our knowledge of this disease continues to evolve, these BMPs are intended to be a dynamic, living document that can be updated when new information becomes available.

The AFWA CWD BMPs are grouped in four broad thematic areas: prevention, surveillance, management and supporting activities.

Prevention of further spread of CWD is essential to protecting the health of the continent's wild cervid populations. Key strategies for preventing the spread of CWD include restricting movements (particularly interstate movements) of all live cervids and high-risk cervid parts and products, as well as a cessation of practices such as feeding and baiting that promote unnatural concentrations of cervids and facilitate disease transmission.

Surveillance strategies for CWD include the use of USDA-approved laboratories and testing methodologies, as well as the design and deployment of statistically robust sampling designs to search for novel cases of

CWD in wild cervid populations and to monitor the presence of the disease in infected populations.

Management approaches include the development of CWD response plans for individual states or jurisdictions, the implementation of an appropriate response to an initial detection of CWD in a particular state or jurisdiction, steps to manage CWD prevalence in infected populations, applying appropriate restrictions on activities such as rehabilitation and carcass disposal and implementing decontamination and disinfection procedures to control contamination and prion spread.

Important supporting activities include the development and deployment of communications and outreach strategies that engage partners, stakeholders and the general public, as well as undertaking targeted research to address key information needs in CWD prevention and management. Other important supporting activities include enhancing existing regulations, improving management and monitoring of captive cervid herds and developing appropriate public health precautions.

Specific research needs that were identified by AFWA's team of CWD experts include 1) identifying the most effective techniques for prevention, surveillance and management; prion detection and diagnostics; and disease epidemiology; 2) investigation of human dimensions issues such as the impact of CWD on hunting practices and hunting-related expenditures; 3) determination of the cost of CWD to state and provincial economies; 4) determination of the costs of CWD to wildlife agencies, individual hunters and other stakeholders; and 5) identification of other sources of funding for CWD prevention, surveillance and management.

The complete list of best management practices — and a 111-page technical report with additional details — is available at the website of the association's Fish & Wildlife Health Committee. The text of the resolution in support of the BMPs can also be found there.

Because our knowledge of CWD and disease management strategies continues to evolve, additional best management practices are currently in development and will be posted to the website of AFWA's Fish and Wildlife Health Committee as they become available and are adopted by AFWA's leadership. Our intent is to make this set of best management practices a "living document" that will be updated as needed on an ongoing basis in order to reflect the best available current scientific knowledge regarding CWD prevention, surveillance and management. ■

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