

SCWDS BRIEFS

A Quarterly Newsletter from the
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SPECIAL CWD ISSUE - II

Chronic wasting disease (CWD) continues to dominate the news when it comes to cervid health issues. In view of numerous developments since our updates in 2014 (SCWDS BRIEFS, Vol. 30, Nos. 1 & 3), the growing number of affected jurisdictions, and the importance of this disease, we are devoting this entire newsletter to CWD. We first did this in 2002 when its detection in Wisconsin elevated CWD to a national issue. At that time, CWD had been found in wild deer and/or elk in five states and in 20 captive elk herds in six states; currently it has been detected in free-ranging cervids in 22 states and in 75 captive deer and/or elk herds in 16 states. The prion that causes CWD also has been found in wild and captive cervids in Alberta and Saskatchewan, captive cervids in South Korea, and most recently in free-ranging reindeer and moose in Norway. Because we didn't have space for all of the significant CWD developments here, we will include more information in our next issue.

CWD in Wild Cervids, May 2016

Two additional states have confirmed CWD in free-ranging cervid populations since our last update. In May 2015, the Michigan Department of Natural Resources detected CWD in a female white-tailed deer (WTD) euthanized in East Lansing in Ingham County after it displayed signs of central nervous system disease. Subsequent culling and testing of wild WTD in the area over the summer yielded two more positive deer; all three positive animals were genetically related and were located within a mile of each other. As of June 2016, more than 5,200 deer have been tested with four more positive deer found, all within the five-county CWD Management Zone (MZ). The first MI case detected was in a captive WTD in 2008 in Kent County.

In February 2016, the Arkansas Game and Fish Commission (AGFC) announced that CWD was detected for the first time in the state in a wild elk killed by a hunter in 2015 in Newton County. Arkansas' elk population, which is estimated at 600-700 animals and has been hunted since 1998, was reestablished through the release of animals translocated from CO (107) and NE (5) from 1981-85. The elk came from an area in CO where CWD never has been detected; the source(s) of the NE elk is less clear. In March, the AGFC announced CWD was detected in two WTD found dead in Newton County.

The AGFC subsequently initiated Phase I of its CWD response plan by randomly collecting and testing 266 WTD in a core area in Newton and adjacent Boone County: 62 positive animals were detected, including 12 deer less than one year old, indicating a prevalence of 23% (females=20%, males=32%). Phase II was conducted to determine the CWD distribution throughout the state and comprised testing WTD and elk found sick or dead, including road kills, and nearly 1,000 animals were tested through May 31. Preliminary results indicate CWD detection in Boone, Carrol, Madison, Newton, and Pope Counties. The positive deer in Pope County is more than 40 miles south of the core affected area. The total number of wild deer and elk in which CWD has been confirmed is 93 (89 WTD and 4 elk).

Several states that previously found CWD have reported increased prevalence and/or geographic distribution. In January 2015, the Maryland Department of Natural Resources (MD DNR) announced that four CWD-positive WTD bucks were harvested in 2014 within the CWD MZ in Allegany County. In March 2016, the MD DNR announced that five additional WTD tested positive; four were within the CWD MZ, but one deer came from Cumberland, outside the CWD

Continued...

MZ. The first MD case was reported in 2011 and the current total is 11.

In Missouri, a buck harvested in 2014 in Cole County tested positive for CWD. Cole County is several counties south of the North CWD MZ, where 11 more cases were found in 2014. A seven-county Central CWD MZ was established around the Cole County case but no more positive deer have been detected. However, CWD was confirmed in 2015 in a buck harvested in Franklin County in east-central Missouri outside the Central and North MZ's. Six more positive deer were detected in 2015 within the North CWD MZ.

The Pennsylvania Game Commission (PGC) reported finding 12 more CWD-positive wild WTD in 2015, more than doubling the number found from 2012-2014. All 22 of PA's positive wild deer have come from Disease Management Area 2 (DMA-2) in south-central PA. However, DMA-2 has been expanded to 2,846 square miles due to the finding of CWD-positive deer near its periphery. The other two DMA's (1 & 3) in PA are centered on captive WTD facilities in which the CWD prion has been detected. CWD has not been found in wild deer in either of these DMAs.

One of the positive wild deer in 2015 was harvested by a hunter who unlawfully took the carcass to a deer processor located far outside DMA-2, and the specified risk materials (brain, spinal cord, and lymphoid tissues) from this animal went to a rendering facility. The PGC reported that 5,654 deer were tested statewide in 2015, with 1,604 from DMA-2.

The Texas Parks and Wildlife Department announced in February 2016 that CWD was confirmed in a wild mule deer in Hartley County. This is the eighth case of CWD found in wild mule deer in TX since 2012; however, the other seven were detected in the Hueco Mountains in West Texas where the prevalence is believed to be 10-15%. Hartley County borders New Mexico in the Texas Panhandle, and additional surveillance is planned in this area.

In Wisconsin, 3,144 deer were tested statewide during the 2015 CWD sampling season and 298 were positive. The prevalence continues to increase in affected deer populations in Wisconsin: Within the Southwest Wisconsin

monitoring area that includes northwestern Dane and northeastern Iowa Counties, prevalence was found to be roughly 30% in bucks >2 ½ years old, 15% in adult does, and 10% and 8% in yearling bucks and does, respectively. In the core endemic area in north-central Iowa County, the prevalence rose from <5% to >45% in adult bucks and to >25% in adult does from 2002-2015. In northwestern Iowa County, the prevalence in adult males climbed from <3% in 2008 to >25% in 2015, an annual increase of approximately 4%.

In Wyoming, the Game and Fish Department (WGFD) reported that 1,747 deer, elk, and moose were tested in 2015 for CWD with 98 positive animals (21 elk, 65 mule deer, and 12 WTD). CWD was detected for the first time in five new deer hunt areas and four new elk hunt areas. Of the samples tested, 85% came from hunter-killed animals, 8% from targeted (appeared to have CWD) animals primarily within the known affected areas, and 7% from road kills, primarily from outside the endemic area.

In April 2016, the Wyoming Game and Fish Commission approved a new CWD Management Plan that had been made available for public review twice since autumn 2015. Wyoming's management plan had not been updated since 2006, and revision was deemed appropriate in view of CWD's spatial expansion within the state as well as new CWD and prion research findings.

The following points are from the Executive Summary of the new plan.

- The purpose of this Plan is to provide flexible and adaptable direction for spread, prevention, and management of CWD in cervids.
- The Plan consists of Disease Management, Applied Research, Public Information, and Funding, with one of the stated goals to manage deer, elk, moose and their habitats to delay the spread of CWD and reduce its effects on wildlife health and human enjoyment of wildlife resources.
- Based on known CWD epidemiology in wild cervids, eradication currently is not realistic, but it is the desired long-term management objective.

- The WGFD will conduct surveillance to monitor and estimate distribution and prevalence of CWD and coordinate CWD research and management with other state, federal, tribal agencies and entities of higher education, universities and others.

(Prepared by Kevin Niedringhaus & John Fischer)

CWD in Norway

On April 4, 2016, the Norwegian Veterinary Institute (NVI) announced that CWD had been diagnosed in a wild, adult, female reindeer (*Rangifer tarandus*). The sick reindeer was discovered in early March by Norwegian Institute for Nature Research scientists capturing animals for radio-collaring in a mountainous area in southern Norway. It died shortly thereafter and was submitted to the NVI for necropsy. It was tested for CWD as part of Norway's national surveillance program, was found to be positive by three different methods (ELISA, western blot, and immunohistochemistry), and later was confirmed by the World Organization for Animal Health (OIE) Reference Laboratory for CWD in Canada. Since then, CWD has been reported in two wild moose (*Alces alces*) in an area distant from the affected reindeer. Plans are underway for the NVI and Environmental Directorate to develop more information on CWD prevalence in reindeer and moose and to evaluate any potential changes in cervid populations.

The cases in Norway represent the first detection of CWD in Europe. Previously, CWD had been known to occur in wild and captive cervids only in parts of the United States and Canada, and in captive cervids in South Korea following the importation of infected elk from Canada between 1994 and 1997. While reindeer have been shown to be experimentally susceptible to CWD, the Norwegian case marks the first natural infection that has been found. Natural CWD infection has been seen in low numbers of moose in North America since 2005. (Prepared by Betsy Elsmo)

CWD in Captive Cervids, May 2016

The following information primarily is excerpted from reports provided by USDA-APHIS-Veterinary Services (VS) on developments during Fiscal Years (FY) 2015 and 2016 (October 2014 -

September 2016). The article also includes information from state agencies as well as notes including updates since the original VS reports. The FY2015 information was provided to the U.S. Animal Health Association's Committee on Wildlife Diseases in October 2015. The meeting minutes can be found at <http://www.usaha.org/Committees/WildlifeDiseases.aspx>.

In FY2015, CWD was identified in eight farmed cervid herds: one WTD breeding herd in PA, one elk breeding herd in UT, one WTD breeding herd and one WTD hunting preserve in OH (owned by the same individual), two WTD breeding herds in WI, one WTD and elk herd in TX, and a second WTD herd in TX (traced from the first positive TX herd). The positive animals in OH, TX and UT are the first reported captive animals in those states.

In October 2014, the National Veterinary Services Laboratories (NVSL) confirmed CWD in a 6-year-old doe from a captive WTD breeding facility in PA that was euthanized and tested because it was classified as a CWD-exposed animal that previously resided in two trace-back exposed herds. This herd was assembled in 2013 through the purchase of 16 animals from other Herd Certification Program (HCP)-certified herds in PA, and had been under quarantine for receiving exposed animals from a trace-back exposed herd. The remaining eight WTD were depopulated with Federal indemnity in February 2015, and no additional positive animals were detected.

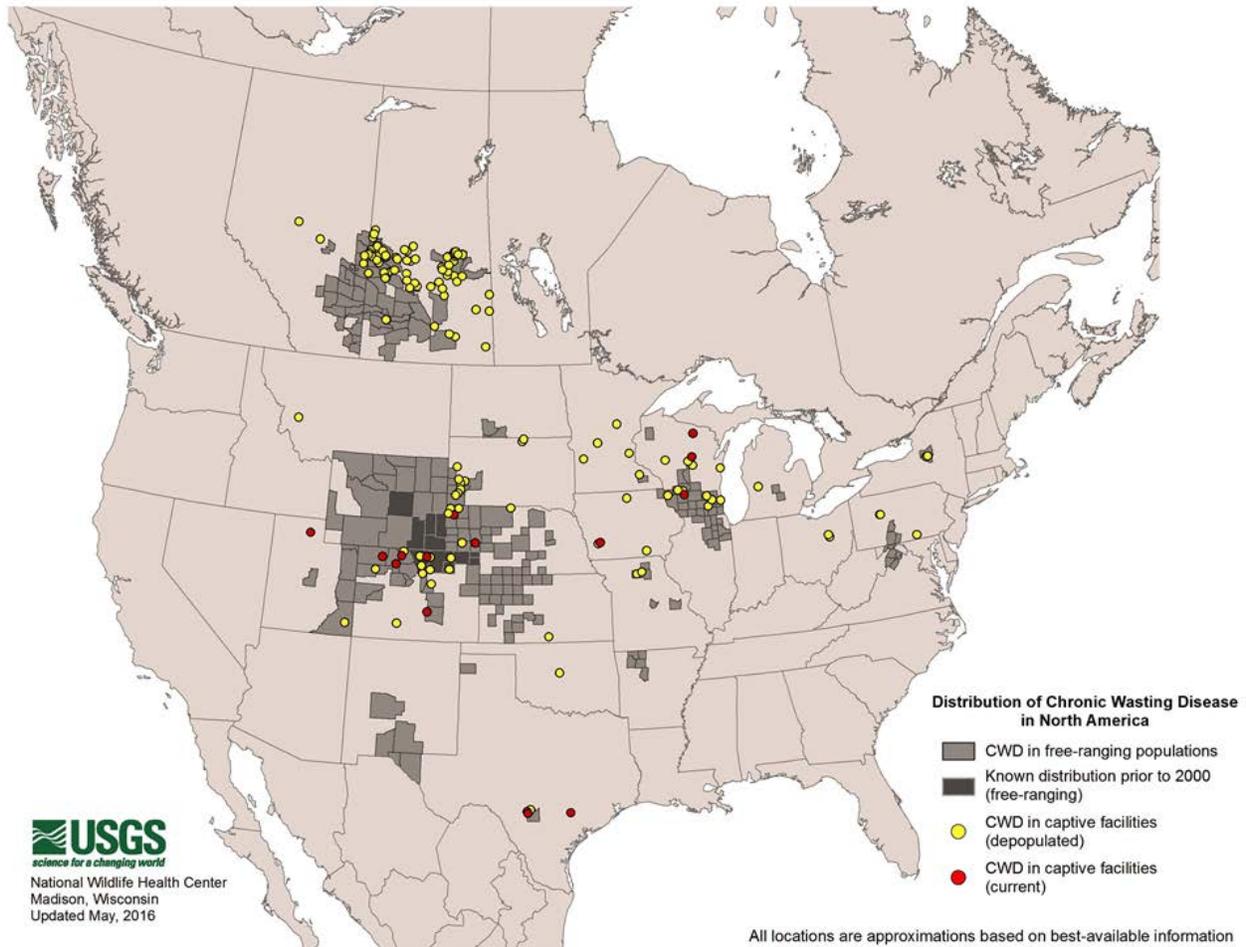
In October 2014, NVSL confirmed CWD in a buck from a captive WTD hunt preserve in OH, the first detection in the state. The herd had been quarantined since April 2014, because it was a trace-forward herd from a CWD-exposed herd in PA. The positive animal was traced to its herd of origin, a certified captive breeding herd in PA, through DNA testing. In April 2015, the remaining 224 WTD were depopulated with no positive deer detected. USDA did not provide indemnity.

In March 2015, NVSL confirmed CWD in a doe from a WTD breeding herd in OH owned by the same individual as the affected OH hunt preserve. The doe was received from a WI farm in February 2013. In May 2015, NVSL confirmed a second case in the OH herd. This herd was established in 2012 with the purchase of a CWD-certified herd. (continued on page 6)

Chronic Wasting Disease Timeline

1967	<ul style="list-style-type: none"> Wasting syndrome observed in captive mule deer at Colorado wildlife research facility
1975-81	<ul style="list-style-type: none"> CWD in Toronto Zoo deer that came from Denver Zoo
1978	<ul style="list-style-type: none"> CWD diagnosed as a transmissible spongiform encephalopathy
1979	<ul style="list-style-type: none"> CWD in captive mule deer at Wyoming wildlife research facility
1981	<ul style="list-style-type: none"> CWD in wild elk in Colorado
1985	<ul style="list-style-type: none"> CWD in wild mule deer in Colorado & Wyoming
1996	<ul style="list-style-type: none"> CWD in captive elk farm in Saskatchewan; 38 other positive linked farms found later in SASK
1997	<ul style="list-style-type: none"> CWD in captive elk facilities in South Dakota
1998	<ul style="list-style-type: none"> CWD in captive elk in Montana & Oklahoma Model Program for Surveillance, Control, and Eradication of CWD in Domestic Elk presented at USAHA meeting to establish standards in monitoring and controlling transmission
1999	<ul style="list-style-type: none"> WHO indicates no evidence CWD is transmissible to humans, but exposure should be avoided
2000	<ul style="list-style-type: none"> CWD in wild mule deer in Nebraska & Saskatchewan Research - environmental contamination & subclinical infection contribute to transmission
2001	<ul style="list-style-type: none"> CWD in captive elk in Kansas CWD in captive elk in South Korea imported from infected Saskatchewan herd CWD in wild white-tailed deer in South Dakota USDA declares CWD emergency in captive elk; Federal funds available for CWD control
2002	<ul style="list-style-type: none"> CWD in captive elk in Minnesota & captive white-tailed deer in Alberta CWD in wild and captive white-tailed deer in Wisconsin CWD in wild white-tailed deer in Illinois, mule deer in New Mexico, elk in South Dakota Joint CWD Task Force of USDA/DOI/States/Universities develops <i>Plan for Assisting States, Federal Agencies and Tribes in Managing CWD in Wild and Captive Cervids</i> (National CWD Plan) Colorado establishes guidelines to minimize transport of high risk carcass materials 1st International CWD Symposium held in Denver, Colorado
2003	<ul style="list-style-type: none"> CWD in wild mule deer in Utah APHIS funds available for CWD work in captive and wild cervids (through 2011) USDA publishes Proposed Rule for CWD herd certification and interstate shipping program (HCP) to eradicate CWD from captive deer and elk and to minimize spread to naïve herds Research - horizontal transmission of CWD likely important in CWD epidemiology
2004	<ul style="list-style-type: none"> CWD in wild elk in New Mexico National CWD Plan progress report published and new priorities discussed Research - environmental sources, decomposed carcasses can maintain and prolong outbreaks
2005	<ul style="list-style-type: none"> CWD in captive and wild white-tailed deer in New York CWD in wild mule deer in Alberta, moose in Colorado, white-tailed deer in West Virginia
2006	<ul style="list-style-type: none"> CWD in captive white-tailed deer in Minnesota CWD in wild white-tailed deer in Kansas USDA publishes CWD HCP Final Rule– never implemented Research - prion can be found in muscles of infected deer; can be transmitted in saliva and blood
2007	<ul style="list-style-type: none"> Research - prions in environment more infective in particular soil types
2008	<ul style="list-style-type: none"> CWD in captive deer in Michigan CWD in wild elk in Saskatchewan, moose in Wyoming
2009	<ul style="list-style-type: none"> APHIS plans to withdraw 2006 CWD Final Rule and issue a new rule based on 2006 rule and the 2009 proposed rule
2009	<ul style="list-style-type: none"> Research - CWD may be a plausible explanation for local deer population declines in Colorado; prions shed in feces in early stages of CWD in infected deer; prions are present in urine and saliva

2010	<ul style="list-style-type: none"> • CWD in captive white-tailed deer in Missouri • CWD in wild white-tailed deer in North Dakota and Virginia
2011	<ul style="list-style-type: none"> • CWD in wild white-tailed deer in Maryland • CWD in wild white-tailed deer in Minnesota • Severe reduction of USDA funds for CWD work
2012	<ul style="list-style-type: none"> • CWD in captive white-tailed deer in Iowa and in Pennsylvania • CWD in wild white-tailed deer in Missouri; CWD in wild mule deer in west Texas • APHIS Interim Final Rule for CWD Herd Certification and Interstate Movement and CWD Program Standards published • Research - possible link between scrapie and CWD
2013	<ul style="list-style-type: none"> • CWD in wild white-tailed deer in Pennsylvania
2014	<ul style="list-style-type: none"> • CWD in captive deer in Ohio • CWD Program Standards revised • APHIS CWD Final Rule implemented • Research - plants may play a role in CWD transmission and environmental maintenance; experimental aerosol transmission in white-tailed deer
2015	<ul style="list-style-type: none"> • CWD in wild white-tailed deer in Michigan • CWD in captive white-tailed deer in Texas • Research – plants can bind prion superficially and uptake prions from contaminated soil
2016	<ul style="list-style-type: none"> • CWD in wild elk and deer in Arkansas; CWD in wild reindeer and moose in Norway



In spring and fall of 2013, animals were added from at least 9 OH herds, 1 WI herd, 17 PA herds, and 3 IN herds. The OH herd had been quarantined since April 2014 because of traces from several CWD-exposed or positive herds in PA, including the herd that was the source of the positive deer in the OH hunt preserve. The OH breeding herd had received over 120 animals from these herds. In June 2015, this herd was depopulated with federal indemnity: 241 animals, including 44 fawns, were euthanized and tested. Sixteen (7%) more deer were positive: They came from five certified herds in OH and four in PA.

In December 2014, NVSL confirmed CWD in a captive elk killed at a hunt park in northern UT, where it had been for three weeks. All hunter-killed animals at the park must be tested for CWD. The elk was traced back to its herd of origin, which was quarantined. The herd was assembled in 1999 with bulls, and later with cows, that originated from CO. Historical testing records for the herd were unavailable. The remaining 70 elk were depopulated using Federal indemnity funds in March 2015 and 25 (36%) elk were positive.

In October 2014, NVSL confirmed CWD in a doe born in 2012 on a Richland County farm within the WI CWD Management Zone. The remaining 51 deer were euthanized in November 2014, and 7 (15%) more positives were found. Two of the positive animals were purchased with the last deer added in January 2013. All sales from this herd were to shooting preserves. This premises was double-fenced and had been compliant in a HCP for over 10 years.

In June 2015, NVSL confirmed CWD in a doe from a WTD breeding herd in Eau Claire County, WI. The doe was a natural addition found dead with no signs of CWD. This is the first case, captive or wild, in the county. Since 2003, this herd had tested 391 animals for CWD with "not detected" (ND) results, while 317 animals tested ND from the associated hunt preserve. A second positive natural addition doe was confirmed in September. Several escape episodes have occurred from this herd. *(This herd was depopulated in November 2015: 28 of 163 adult deer tested positive, 65 fawns were not tested. A total of 33/169 deer (20%) were confirmed as CWD-positive in this herd including two bucks that escaped in May and were killed in October and*

November: One was killed 13 miles north and the other was killed 11 miles southwest of the facility.)

In November 2015, NVSL confirmed CWD in a natural addition buck on a WTD hunting/breeding facility in Oneida County, WI. The herd consists of approximately 400 deer and is under quarantine. In January 2016, CWD was detected in a captive WTD buck from a herd of 15 deer held on one acre for public exhibition in the CWD-endemic area within Iowa County, WI. The herd continues to be under quarantine as it has been since 2008 due to the presence of CWD in wild deer within five miles of the facility.

In June 2015, NVSL confirmed CWD in a WTD buck from a captive WTD and elk breeding herd in Medina County, TX, the first CWD detection in farmed cervids in TX. The buck was born on the premises. Over 40 pen mates, dams, and other high-risk deer were euthanized and tested: CWD was found in two more deer. All three positive deer had the same artificial insemination sire; however, the significance of this is unclear. In the past five years, 130 WTD from 33 facilities moved into the positive herd and 838 WTD moved out to 147 different herds. One positive WTD was found in September in one of the trace-out herds in Lavaca County. Additionally, 23 elk were moved from the index herd to another TX herd in 2014. All trace-outs were intrastate except for two premises in Mexico. Premises that received WTD from the index herd are under movement restrictions (*ca. October 2015*). APHIS-VS paid indemnity and depopulated the index herd in September: no more animals tested positive.

In February 2016, NVSL confirmed CWD in a captive-bred WTD buck harvested from a release site in Medina and Uvalde Counties, TX. The deer's origin was identified as an onsite breeding facility, and the breeder pen and release site are considered index premises. The breeder facility currently consists of approximately 2,400 WTD and is under quarantine. In April 2016, a tonsil biopsy from a doe in this herd tested positive for CWD, and this was confirmed through post-mortem testing. Also in April 2016, another affected captive TX herd was identified when CWD was confirmed in a WTD doe that was born onsite. The breeding facility is 2.5 miles from another positive herd in Medina County, contains approximately 1,000 WTD, and received deer 2-3

years ago from the first positive TX facility. Over 60 deer in this herd have been tested by tonsil biopsy since the positive animal was identified, and all results were ND.

In January 2016, NVSL confirmed CWD in an elk from a WTD/elk hunt preserve in Pottawattamie County in southwestern Iowa. A WTD breeding facility owned by the same producer was depopulated in 2012 after confirmation of CWD in the herd. The hunt preserve is under quarantine, and the plan is to “hunt out” the remaining animals. (Assembled by John Fischer with information from APHIS-VS, Texas Parks and Wildlife Department, and Wisconsin Department of Agriculture, Trade, and Consumer Protection.)

CWD – The First Five Decades

The Wildlife Management Institute (WMI) sponsored a Special Session on “Science-Based Management Strategies for Fish and Wildlife Diseases” at the recent North American Wildlife and Natural Resources Conference in Pittsburgh, Pennsylvania. One of the papers presented during the session was “*The First Five (or More) Decades of Chronic Wasting Disease: Lessons for the Five Decades to Come*” by Michael W. Miller of the Colorado Division of Parks and Wildlife and John Fischer of SCWDS, and the summary is as follows:

Chronic wasting disease (CWD), an infectious prion disease of at least five cervid species, has run the gamut from minor scientific curiosity to national crisis since the syndrome’s first recognition in the late 1960s. As of April 2016, CWD had been reported in captive and/or free-ranging cervids in the United States (24 states), Canada (three provinces), South Korea, and Norway. With few exceptions (New York and perhaps Minnesota in the US), once in the wild the disease has persisted in reporting jurisdictions

in the face of widely varied control attempts. Natural and anthropogenic factors have contributed to the geographic spread and persistence of CWD: Natural factors include prolonged incubation, multiple routes of agent shedding, the agent’s environmental persistence, and migratory and dispersal movements of wild cervids; anthropogenic factors include movements of infected live animals (and perhaps infectious tissues and other materials), concentrating susceptible host species, and other artificial wildlife management practices. Many facets of CWD biology and ecology now are well understood, but science informing effective management and control strategies remains comparatively incomplete. Eradicating CWD appears infeasible given its extensive distribution and other epidemiological attributes. Regardless, adaptive approaches for containing foci and reducing infection and transmission rates have shown some promise and deserve further attention. Such pursuits undoubtedly will be more difficult to champion and garner support for in sociopolitical climates ranging from apathetic to combative, particularly when control prescriptions impinge upon or conflict with commercial and sport hunting interests. We believe there are two important motivations for making progress toward sustainable containment and control strategies for CWD in the coming decades: First, data from several sources suggest that heavily-infected cervid populations will not thrive in the long-term. Second, data on CWD prions and experience with other animal prion diseases suggest minimizing human exposure to these agents is prudent.

The Transactions of the 81st North American Wildlife and Natural Resources Conference, including all of the papers from the fish and wildlife disease and other sessions, will be available later this year at <http://www.wildlifemanagementinstitute.org/>.

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