

RECOMMENDATIONS FOR REDUCING THE SPREAD OF CHRONIC WASTING DISEASE (CWD)

Wisconsin Department of Natural Resources, 2014



This document includes recommended practices to reduce and prevent the spread of CWD through voluntary implementation by Wisconsin citizens. Through the use of these recommendations with the cooperation of hunters, landowners, and other agencies and organizations, the potential influence of human related introductions of CWD may be reduced.



CONTENTS

Introduction.....	3
Background	3
What is CWD and how is it spread?.....	3
Why do we need to reduce the spread of CWD?	3
What is being done in Wisconsin?	3
Recommended Practices	4
Preventing Unnatural Concentrations of Deer	4
Artificial Water Structures and Disease	4
Using Scents to Attract Deer	4
Urine Based Scents and CWD.....	4
Transporting of Carcasses	5
Carcass Transportation	5
Handling of Carcasses	6
Field Dressing and Butchering	6
Disposing of Carcasses.....	7
Carcass Disposal.....	7
Decontaminating Equipment.....	7
General Cleanup	8
Disinfection	8
Implementing other Strategies.....	8
Sick Suspect Deer Reporting and Harvesting Guidelines	8
Controlling the Distribution and Intensity of CWD through Deer Harvest	9
Staying Informed.....	9
Summary	10
Acknowledgements.....	10
Works Cited	11

INTRODUCTION

Background

Since 2002, when CWD was first found in Wisconsin's wild deer herd, the Department of Natural Resources (DNR) has focused management on reducing and containing the spread of the disease. The control of CWD has proven very challenging, but in the time since its first discovery in the state, much has been learned about the disease and how it is spread. This document is intended to provide information on CWD, and the guidelines developed to reduce its transmission in Wisconsin.

What is CWD and how is it spread?

CWD is a fatal neurological disease that belongs to a group of diseases known as transmissible spongiform encephalopathies (TSEs). Affecting deer, elk and moose, it causes a characteristic spongy degeneration of the brains of infected animals, resulting in emaciation, excessive drinking and urination, abnormal behavior, loss of bodily functions, and death. The known CWD infectious agent, or prion, is very resistant to destruction and disinfection by normal procedures, making it very difficult to contain^{1,14}.

CWD transmission occurs when disease prions are shed by infected animals through saliva, urine, feces and natural decomposition after death¹⁶. Because CWD prions bind to substrate^{22,23} and are extremely resistant in the environment¹, transmission may be both direct and indirect¹⁸. This means that not only is CWD spread through contact between deer and their saliva, urine and feces, but also through contact between deer and contaminated environments^{16,17}.

Why do we need to reduce the spread of CWD?

CWD has persisted in the southern portion of Wisconsin since 2002. Prevalence rates show an overall increasing trend in all sex and age classes, with prevalence in adult male deer more than doubling in some areas between 2002 and 2013. Wisconsin has also seen an increase in the area of occurrence of the disease, with several CWD positive deer found in areas outside the known location of disease in southern Wisconsin.

Evidence from monitoring in the western United States, where CWD has persisted for decades, along with analytic modeling, suggest that prevalence can reach high levels and increasing disease prevalence rates can reduce deer populations, perhaps drastically^{10,18}.

There is an ever increasing risk to Wisconsin's deer population and strong hunting culture as CWD spreads and prevalence rates increase, putting a drain on our general ability to control the disease. Without efforts to control the spread of CWD now, it has the potential to be damaging to not only our deer herd, but also the social and economic stability of many communities in Wisconsin³⁴.

What is being done in Wisconsin?

Since the discovery of CWD in Wisconsin in 2002, over 180,000 free-ranging deer have been tested, of which over 2,000 have tested positive. Surveillance has focused on determining prevalence trends in the southern portion of the state as well as detecting

new outbreaks throughout the state. DNR is continuing to work with stakeholders to increase our knowledge of CWD and adapt management strategies. DNR monitors and records statewide reports of sick deer and conducts testing of suspect animals. DNR also seeks to prevent the spread of CWD by reducing the potential influence of human related introductions of CWD.

RECOMMENDED PRACTICES

The following voluntary recommendations, assembled by DNR, address transmission reduction of CWD in Wisconsin, and are supplemental to current regulations.

Preventing Unnatural Concentrations of Deer

Artificial Water Structures and Disease

Water is one of the most common vehicles for environmentally transmitted diseases¹³. Although prion molecules are hydrophobic, and cannot exist freely in water, they exist bound to particulate and organic matter in aquatic environments⁷. Organic matter in water troughs allows for increased prion accumulation and the potential for prolonged infectivity compared to clean water sources¹⁵.

Artificial water structures, such as water troughs and guzzlers, placed on the landscape, whether for agricultural purposes or specifically for wild animals, are accessed by deer. These water structures can repeatedly attract deer at concentrated sites²¹, allowing for increased contact between animals and the potential for disease transmission.

Increased prion accumulation in water containing organic particulates, and increased contact rates associated with artificial water structures pose the potential risk of CWD transmission among deer.

Recommendation – follow these practices to reduce potential disease transmission at artificial water structures:

- a. Place water structure in locations undesirable or inaccessible to deer
- b. Keep water clean of organic matter and particulates
- c. Replace water frequently
- d. Frequently clean water structure with a 50:50 bleach water solution
- e. Avoid the use of stainless steel and porous materials for construction of water containment structure
- f. Do not intentionally place water structure on the landscape for deer

Using Scents to Attract Deer

Urine Based Scents (UBS) and CWD

UBS are used in a number of different ways, many of which involve direct contact between the scent and the environment. Use of urine-based scents has the potential to spread CWD to areas where it has previously not been detected. Assessing the risk of

UBS use is important in order to develop CWD management programs. Initial results of ongoing research indicate that CWD and other TSE prions can be found in the urine of infected animals. The effects of UBS use in the environment is unknown, however because of the nature of the CWD disease prion, the long-term cumulative effect is important to consider.

Urine used for scents and attractants is typically collected from farmed deer at both large commercial and small-scale operations. Although WI deer and elk farms that produce urine for scent products must participate in the state's CWD monitoring program, products used in WI may come from large interstate operations. There are a variety of unregulated processes used to collect this urine, and they often result in the accumulation of a mixture of secretions, therefore providing concurrent contamination risk¹². There are currently no standard regulations to ensure that urine collected for use in scents and attractants is disease-free.

According to Wisconsin baiting and feeding regulations, scents, including UBS, may be used for hunting deer and other wild animals. Regulations establish a 2 oz. scent limit for broad application and requirement that scents shall not be placed or deposited in a manner that is accessible for consumption by deer, and scents shall be removed daily at the end of hunting hours established for deer. In addition to mandatory restrictions of scent use to limit the spread of disease, use the following voluntary alternatives that focus on a contained approach by reducing the amount of scent on the environment and the ways that deer access it, or by eliminating its use altogether.

Recommendation – use the following techniques to eliminate any contact between UBS and soil, vegetation, and deer:

- a. Use commercially produced “scent-wicks” that are dipped into the bottle of scent, and hung on a twig or branch
- b. Use scents in re-sealable containers that can be placed on a stake in the ground or hung upright in a tree to prevent scents from contacting the soil or surrounding vegetation
- c. Consider eliminating the use of urine-based scents altogether by using synthetic or food based scents

Transporting of Carcasses

Carcass Transportation

Movement (natural or human-assisted) of infected animals is a key pathway in the spread of CWD. The infectious nature of the CWD prion contributes to an increased risk of transmission not only where live animals are concentrated, but also where dead animals are transported to if not disposed of in a proper manner^{29,32}.

Hunter harvested deer carcasses are often moved across geographic barriers. This human-assisted movement of carcasses has the potential to cause the spread of CWD where it would otherwise be much less likely through the natural movements of deer in a wild population²⁰.

In the counties of Wisconsin that are affected by CWD, restrictive carcass transportation regulations are currently in place to limit the spread of disease. With findings of CWD positive deer across the state, there are several new locations that have carcass transportation restrictions. Consider voluntary application of regulations from CWD affected counties to all areas of the state.

Recommendation – while transportation from states/provinces with CWD is already regulated, the following recommendations expand on transportation practices that can reduce the risk of spreading CWD:

- a. Do not transport whole wild deer carcasses or any deer brain, spinal cord, or lymph tissue to areas outside the county or adjacent county that the animal was harvested
- b. Do not transport whole carcasses or any deer brain, spinal cord, or lymph tissue from a state/province that has CWD into WI
- c. Use processors and/or taxidermists that practice approved disposal methods

For more information on carcass transportation and a complete description of current regulations in WI, please view:

- [deer carcass transportation regulations \(DNR\)](#)

Handling of Carcasses

Field Dressing and Butchering

CWD prions accumulate in certain tissues, such as brain, spinal cord, lymph nodes, and spleen, but are still present, typically in lower concentrations, in other tissues such as fat and salivary glands^{6,19}. Precautions should be observed while processing deer in order to reduce prion contamination in venison and the environment.

Recommendation – use the following guidelines to limit the spread of CWD prions while processing a deer:

Field dressing

- a. Seek to minimize contact with the brain, spinal cord, spleen and lymph nodes by storing them in a sealed plastic bag until they can be disposed of in a landfill
- b. Use knives and utensils dedicated for field dressing
- c. Remove all internal organs
- d. Dress and bone out harvested animals in field, or take directly to a processor
- e. Limit contact between the carcass and the environment by placing a disposable sheet of plastic or cardboard between the carcass and the transportation vehicle
- f. Double bag and seal any loose carcass parts (ie. head, quarters, innards) in transit

Processing

- a. Use a disposable cutting surface such as clean plywood or paneling
- b. Do not use household knives and utensils; use separate equipment for each deer
- c. Process individual deer separately; store meat from individual deer in separate, well-labeled storage containers

- d. Minimize contact with brain, spinal cord, spleen and lymph nodes; use designated equipment when dealing with these tissues
- e. Trim meat a generous distance away from shattered bone, especially near the skull or spine
- f. Avoid sawing through bone where possible, however if removing the head or antlers, use a designated, disposable saw blade; do not cut through edible portions of meat with a blade used to cut bone
- g. Completely bone out the meat and remove all fat and connective tissue
- h. Seal all disposable materials and equipment used for processing in plastic trash bags; dispose in a landfill

If using a licensed game processor, request that they completely bone out the animal, remove lymph nodes prior to grinding the meat, and store meat separate from other processed animals.

For more information on safe handling procedures for deer processing, view:

- [UW-Madison pamphlet](#)
- [WI Division of Public Health information](#)

Disposing of Carcasses

Carcass Disposal

Because of the risk of environmental contamination through the decomposition of a CWD-positive carcass¹⁷, it is important that the carcasses of deer possibly infected with CWD, including all bones and other waste from butchering, be disposed of in a way that protects uninfected deer from exposure.

While there are disposal methods that destroy prions, such as incineration at 1800 degrees Fahrenheit or digestion in sodium hydroxide, these methods are cost-prohibitive and not practical for the public. Instead, the DNR recommends disposal of carcass waste in a landfill. This option is safe, cost-effective, and provides the best barrier between possibly contaminated material and the environment⁴.

Recommendation – the following option is the accepted method of deer carcass disposal:

- a. Dispose of carcass waste via your regular municipal waste stream or directly in a landfill.

For more information on deer carcass disposal please view:

- [carcass disposal recommendations \(DNR\)](#)

Decontaminating Equipment

Personal protective equipment (PPE), such as boots, gloves, clothing, etc., supplies, facilities, and vehicles exposed to potentially CWD infected tissues and environments should be properly cleaned and disinfected after each use.

General Cleanup

CWD prions persist throughout the body of an infected animal, even before the onset of clinical symptoms^{9,24,26}. While handling and moving deer tissue, prions may bind to surfaces and remain infectious for long periods of time^{1,6,17}. It is important to minimize the spread of infectious material by properly cleaning work surfaces, equipment, and clothing.

Recommendation – follow these procedures to properly contain and clean equipment exposed to potentially CWD infected tissues:

- a. Line trash receptacles with non-porous, single-use liners that can be sealed or enclosed
- b. Minimize infectious material in wastewater drains by removing and disposing of solids and other carcass debris from work surfaces, equipment, and PPE
- c. Pressure wash any vehicles or equipment to be moved to and from areas of known CWD contamination
- d. Properly contain carcass waste in double-lined trash bags and dispose of in acceptable landfill
- e. Properly contain disposable clothing and equipment in double-lined trash bags and dispose of in landfill
- f. Thoroughly wash non-disposable PPE prior to removal from contaminated site

Disinfection

Not only is it important to clean all materials and surfaces that have been exposed to potentially contaminated tissues of all organic solids, but also to use additional methods to attempt to deactivate the disease agent (prion). CWD prions are unusually resistant to traditional chemical and physical disinfection and sterilization methods^{14,35}. The most generally accepted method for complete decontamination of prion infected material is incineration at 1800 degrees Fahrenheit. But because incineration is impractical for most people, it is recommended that equipment and surfaces undergo disinfection by soaking in a bleach water solution²².

Recommendation – use these strategies to promote prion decontamination:

- a. Keep instruments and other materials moist between exposure and cleaning/decontamination
- b. Soak all appropriate processing equipment and surfaces in a 50:50 bleach water solution for at least 1 hr.
- c. Rinse all equipment and surfaces with clean, hot water after soaking in bleach water solution

Implementing Other Strategies

Sick and Suspect Deer Reporting and Harvesting Guidelines

Public involvement in sick and suspect deer reporting not only allows for efficient removal of individual animals capable of transmitting disease throughout the population, but also increases our knowledge of disease distribution and spread.

Clinical signs of CWD include: no fear of humans, teeth grinding, notable weakness, drooping of head and ears, excessive thirst, difficulty swallowing, walking in set patterns, nervousness, loss of coordination, excessive salivation, diminished tone of facial muscles, excessive urination, severe emaciation and dehydration, inability to stand.

Recommendation – consider the following references regarding sick/suspect deer:

- a. If you see a deer exhibiting clinical symptoms of CWD, contact your local DNR office, local biologist, conservation warden or law enforcement official.
 - i. Outside of an open deer hunting season, a DNR or law enforcement official may dispatch the deer, or a DNR official may give you permission to do so yourself
 - ii. During an open deer hunting season, you may harvest the animal with a valid deer hunting license. If possible, register the animal at a CWD sampling station to allow for efficient testing. The tag used on the sick/suspect animal will be replaced.
- b. If you see multiple dead deer in an area, contact your local DNR office.

For more information on early disease detection and sick deer guidelines, please view:

- [What to do if you see a sick deer](#)

Controlling the Distribution and Intensity of CWD through Deer Harvest

While dispersal of infected animals may be the main source for disease movement across the landscape, other factors such as population density and disease prevalence may affect local rates of disease establishment, transmission and growth²⁷.

Continuing to hunt and harvest wild deer increases the likelihood of removing infected individuals from the landscape and likely reduces the contact between individual animals or groups of animals³³. Not only will this potentially reduce the rate of disease spread, but also the non-direct transmission through environmental contamination by infected deer.

Recommendation – the following options present hunting opportunities:

- a. Help control deer populations by continuing to hunt
- b. If you own land, consider allowing hunters onto your property to hunt
- c. Take advantage of agricultural damage hunting permits when possible
- d. Take advantage of extended hunting seasons opportunities

Staying Informed

Although we have learned a lot about CWD since its discovery in Wisconsin, there is still much to be discovered about the disease and its impact on Wisconsin's deer herd. As new information becomes available, management strategies are adapted and new goals are developed.

It is important that Wisconsin's hunters, landowners and citizens stay informed about the latest scientific knowledge and recommendations for managing this disease, and

especially critical that we work together to support adaptive CWD management in Wisconsin.

Recommendation – use the following links to stay informed on updated CWD information:

- a. [Know CWD](#)
- b. [CWD Alliance](#)

SUMMARY

CWD has the potential for significant negative impacts on the future of deer and deer hunting wherever it exists. Increasing prevalence rates and expanding geographic areas of disease occurrence suggest that CWD will continue to spread throughout Wisconsin. The damaging effects of CWD (eg. decreased herd size and structure) are slow to progress, making it difficult to monitor management success; however, continuing efforts to control its spread is currently our best option. As new information is discovered, management strategies must be adapted.

The strategies described in this document can aid in the cooperative efforts of DNR, hunters, landowners and other key stakeholders to reduce the potential influence of human related introductions of CWD.

ACKNOWLEDGEMENTS

This document was authored by Kathryn Witkowski. Special thanks to the Wisconsin Conservation Congress Deer and Elk Study Committee, the Interagency Health and Science Team, DNR's CWD Team Leaders, Robert Rolley, Mike Samuel, Kevin Wallenfang, Bradley Hutnik, Tim Marien, Tami Ryan, and Lindsey Long for review and comments. For more information, contact the Bureau of Wildlife Management at (608) 266-8204.

Works Cited:

- ¹Brown, P., and D. C. Gajdusek. 1991. Survival of scrapie virus after 3 years' interment. *Lancet* 337:269-270. ---prion resistance
- ²Common Sense: Handling and processing venison. Madison, WI: WI Department of Agriculture, Trade and Consumer Protection, 2009. PDF.
- ³Clark, Melissa. 2010. Doe and fawn title picture. Madison, WI.
- ⁴Environmental Protection Agency (EPA) Region 8. Recommended Best Management Practices for Disposal of Laboratory Waste Potentially Contaminated with Chronic Wasting Disease (CWD). 2004.
- ⁵Fleener, Jason. "The great de-bait: deer feeding and baiting complicate herd management and drive wedges between hunters, state agriculture and the nonhunting public." *Wisconsin Natural Resources magazine*. February 2009. WI Natural Resources magazine Web. 12 June 2013.
- ⁶Fox, K. A., J. E. Jewell, E. S. Williams, and M. W. Miller. 2006. Patterns of Prp^{CWD} accumulation during the course of chronic wasting disease infection in orally inoculated mule deer (*Odocoileus hemionus*). *Journal of General Virology* 80:3451-3461.
- ⁷Gale P, C. Young, G. Stanfield and D. Oakes. 1998. Development of a risk assessment for BSE in the aquatic environment. *Journal of Applied Microbiology*. 84:467-477.
- ⁸Garner, M. S. 2001. Movement patterns and behavior at winter feeding and fall baiting stations in a population of white-tailed deer infected with bovine tuberculosis in the northeastern lower peninsula of Michigan. Dissertation, Michigan State University, East Lansing, USA.
- ⁹Gough, K.C., Maddison, B.C., 2010. Prion transmission: prion excretion and occurrence in the environment. *Prion* 4, 275–282.
- ¹⁰Gross, J. E., and M. W. Miller. 2001. Chronic wasting disease in mule deer: Disease dynamics and control. *Journal of Wildlife Management* 65:205-215.
- ¹¹Joly, D. O., M. D. Samuel, J. A. Langenberg, J. A. Blanchong, C. A. Batha, R. E. Roleey, D. P. Keane, and C. A. Ribic. 2006. Spatial epidemiology of chronic wasting disease in Wisconsin white-tailed deer. *Journal of Wildlife Diseases* 42(3):578-588
- ¹²Long, L., White paper on UBS use. WI DNR. 2012
- ¹³Maluquer de Motes C, et. al. (2008) Detection and survival of prion agents in aquatic environments. *Water Resources*. 42(10-11):2465-72.

- ¹⁴Michigan State University. Biological Safety Manual: Recommended Biosafety Practices for Handling Prions and Prion-Infected Tissues. East Lansing Michigan, 2012.
- ¹⁵Miles SL, Takizawa K, Gerba CP, Pepper IL. 2011. Survival of infectious prions in water. *J Environ Sci Health A Tox Hazard Subst Environ Eng.* 46(9):938-43.
- ¹⁶Miller, M. W., E. S. Williams. 2003. Prion disease: Horizontal prion transmission in mule deer. *Nature* 425:35-36.
- ¹⁷Miller, M. W., E. S. Williams, N. T. Hobbs, L. L. Wolfe. 2004. Environmental Sources of Prion Transmission in Mule Deer. *Emerging Infectious Disease* 10(6): 1003-1006.
- ¹⁸Miller, M. W., N. T. Hobbs, and S. J. Tavener 2006. Dynamics of prion disease transmission in mule deer. *Ecological Applications* 16:2208–2214
- ¹⁹Race, B., K. Meade-White, R. Race, and B. Chesebro. 2009. Prion infectivity in fat of deer with chronic wasting disease. *Journal of Virology* 83(18):9608-9610.
- ²⁰Rogers, K. G., S. J. Robinson, M.D. Samuel, and D. A. Grear. 2011. Diversity and distribution of white-tailed deer mtDNA lineages in chronic wasting disease (CWD) outbreak areas in Southern Wisconsin, USA. *Journal of Toxicology and Environmental Health* 74(22-24):1521-1535.
- ²¹Rosenstock, S.S., M. J. Rabe, C.S. O'Brien, and R. B. Waddell. 2004. Studies of wildlife water developments in southwestern Arizona: wildlife use, water quality, wildlife diseases, wildlife mortalities, and influences on native pollinators. Arizona Game and Fish Department, Research Branch Technical Guidance Bulletin No. 8, Phoenix, 15 pp.
- ²²Rutala, W.A., D. J. Weber. 2010. Guideline for Disinfection and Sterilization of Prion-Contaminated Medical Instruments. *Infection Control and Hospital Epidemiology* Vol. 31, No. 2.
- ²³Saunders, S. E., J. C. Bartz, and S. L. Bartelt-Hunt. 2009. Influence of prion strain on prion protein adsorption to soil in a competitive matrix. *Environmental Science Technology* 43(14):5242-4248.
- ²⁴Saunders, S.E., Bartelt-Hunt, S.L., Bartz, J.C., 2012. Occurrence, Transmission, and Zoonotic Potential of Chronic Wasting Disease. *Emer. Infect. Dis.* 18
- ²⁵Schauber, E.M., D. J. Storm, C. K. Nielsen. 2007. Effects of joint space use and group membership on contact rates among white-tailed deer. *Journal of Wildlife Management* 71:155-163.
- ²⁶Sigurdson, C. J., E. S. Williams, M. W. Miller, T. R. Spraker, K. I. O'Rourke, and E. A. Hoover. 2001. Oral transmission and early lymphoid tropism of chronic wasting disease

PrPres in mule deer fawns (*Odocoileus hemionus*). *Journal of General Virology* 80:2757-2764.

²⁷Storm, D. J., M. D. Samuel, R. E. Rolley, P. Shelton, N. S. Keuler, B. J. Richards, and T. R. Van Deelen. 2013. Deer density and disease prevalence influence transmission of chronic wasting disease in white-tailed deer. *Ecosphere* 4(1):10.

²⁸Thompson, A. K., M. D. Samuel, and T. R. VanDeelen. 2008. Alternative feeding strategies and potential disease transmission in Wisconsin white-tailed deer. *Journal of Wildlife Management* 72(2):416-421.

²⁹Transport and Disposal of Hunter-killed Cervid Carcasses: Recommendations to Wildlife Agencies to Reduce Chronic Wasting Disease Risks, Carcass Transport and Disposal Working Group. International Association of Fish and Wildlife Agencies, 2006.

³⁰Van Deelen, T. R. Chronic Wasting Disease and the Science in support of the Ban on Baiting and Feeding Deer

³¹Warnke, K.K., C. N. Jaques. Baiting and feeding of deer in Wisconsin. 2008. WI DNR update.

³²Williams, E. S., M. W. Miller, T. J. Kreeger, R. H. Kahn, and E. T. Thorne. 2002. Chronic Wasting disease of deer and elk: a review with recommendations for management. *The Journal of Wildlife Management* 66:551–563.

³³Wisconsin's chronic wasting disease response plan: 2010-2025. WI Department of Natural Resources. 2010. PDF

³⁴WI Department of Natural Resources (WDNR). Baiting and feeding deer has potential to spread disease, limit deer movement. Weekly News article. 14 October 2008. WI DNR Central Office. 29 May 2013.

³⁵World Health Organization (WHO). 2000. WHO infection control guidelines for transmissible spongiform encephalopathies. Report of a WHO consultation, Geneva, Switzerland, 23-26 March 1999.

