# TENNESSEE BIODIVERSITY CONSERVATION
# Managing Chronic Wasting Disease in Tennessee

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Something momentous happened to Tennessee's wildlife in late 2018, and not in a good way.

"In December 2018, Tennessee became the 26th state to detect chronic wasting disease (CWD) within its borders. The initial detections were a result of the Tennessee Wildlife Resources Agency's (TWRA) statewide surveillance efforts of hunter-harvested deer which has been occurring since 2002," says Chuck Yoest, CWD Coordinator for TWRA. The surveillance had been put in place because CWD has been a slow-moving crisis for wildlife in the deer and elk (cervid) family since it was first identified in captive mule deer at a research facility in Colorado in 1967.

> Chronic wasting disease is the only form of transmissible spongiform encephalopathy known to affect free-ranging wildlife.

According to the USGS, "CWD is one member of a family of diseases called transmissible spongiform encephalopathies (TSEs), which includes scrapie in sheep and goats, bovine spongiform encephalopathy (commonly called "mad cow disease") in cattle, and Creutzfeldt-Jakob disease in humans. CWD is the only TSE known to affect free-ranging wildlife."

**No cure, no treatment, no preventative, no eradication - only management**

"Chronic wasting disease has no cure, no treatment, no preventative, and it's 100% fatal in animals that catch it," says Dr. Daniel Grove, Assistant Professor of Wildlife Health for University of Tennessee Extension who also serves as the wildlife veterinarian for TWRA. "All we can do is try to prevent the disease from spreading, which we do by managing deer habitat, populations, hunting, and feeding with the goal of maintaining a low rate of prevalence of the disease."

> "Chronic wasting disease has no cure, no treatment, no preventative, and it's 100% fatal in animals that catch it." -Daniel Grove, TWRA wildlife veterinarian

The cause of CWD is like something straight out of science fiction: it's a highly infectious prion, a type of misfolded protein that causes misfolding in all the other same type proteins with which it comes into contact in the body. As one scientific journal article notes, it is "difficult to understand how a protein can adopt two stable and different folded structures and that one of them can transform the other one into itself." Yet this is exactly what happens, and in the process the animal's brain and other tissues are eaten away.

Once an animal has caught CWD, it sheds the protein in its urine, feces, and saliva. Grove describes CWD transmission: "CWD spreads through mutual grooming between deer within family units, as well as through shared sites such as feeding stations, rubs and scrapes used during the rut, or natural salt licks. White-tailed deer form

matriarchal units, and bucks tend to form bachelor groups during the non-rut season. There also tends to be a higher prevalence of CWD in bucks because they move among family units during the rut."

Once the prions are in the environment, they are essentially permanent. "In captivity prions are deposited throughout the length of the infection, with a higher load as the infection goes on," says Grove, "We don't know as much about what happens in the wild. However, prions are nearly indestructible. They have to burn at a temperature over 1800 degrees to be destroyed! Compare that to an average campfire temperature of from 800 to 1000 degrees, 1200 at most."

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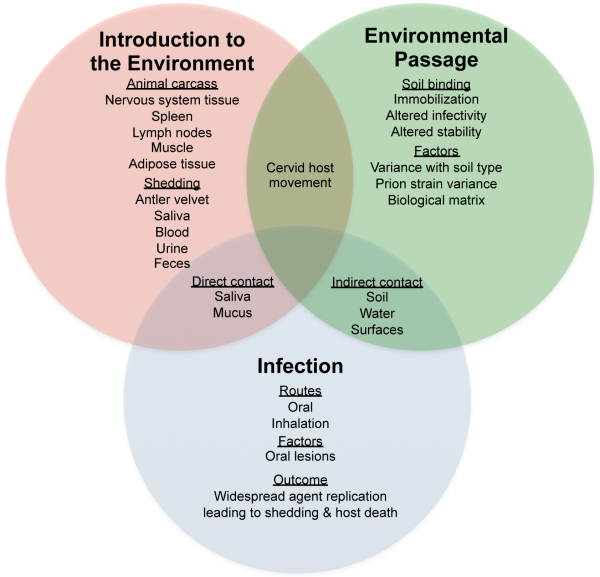



Behavior of Prions in the Environment
Bartelt-Hunt SL, Bartz JC (2013) Behavior of Prions in the Environment: Implications for Prion Biology. PLoS Pathog 9(2): e1003113. https://doi.org/10.1371/journal.ppat.1003113

**Keeping prevalence low**

How can prevalence be kept low? The main way is by keeping less deer on the landscape.

"That's the reality," says Grove, "we need to decrease the number of times the infected animals interact with the uninfected. If there are 100 deer in a square mile with 10% prevalence of the disease, then that means there is a 1 in 10 chance of a healthy animal coming into contact with an infected animal. But even at that small scale, those 10 animals are dropping a lot of infectious prions where they feed, sleep, and rut, and the prions are permanent in the environment."

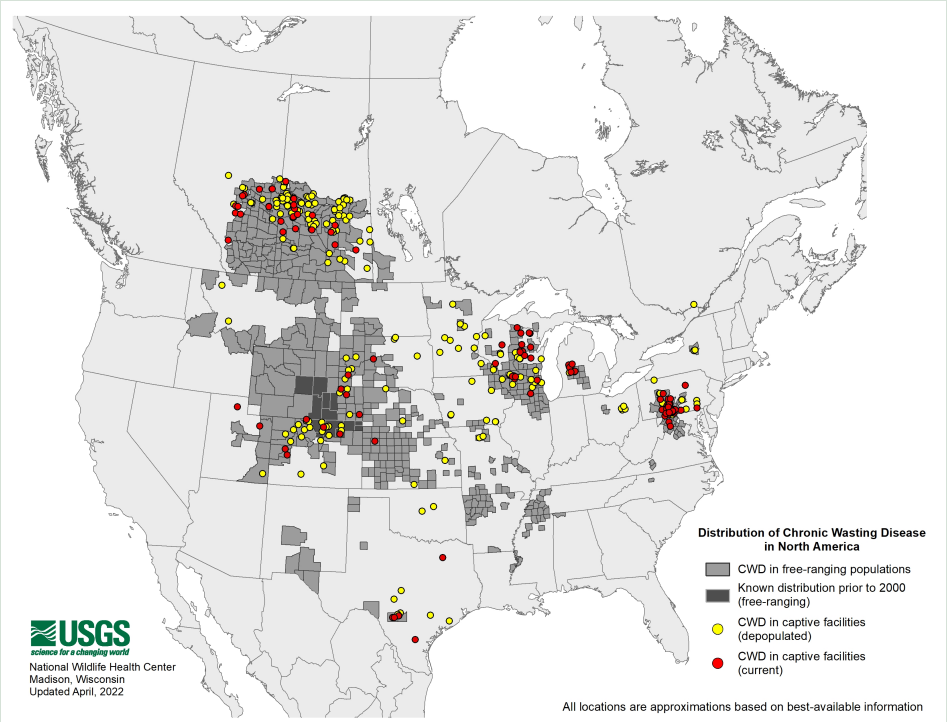
Dr. Grove—who has dealt with CWD for years, in CO and WI while conducting research and in ND when it first entered the state, as the state wildlife agency veterinarian—explained that the lower the prevalence, the lower the likelihood of spread of the disease. "The challenge for wildlife managers in general is that we don't generally see the effects of changes we make to habitat and disease management for 10 to 20 years. Right now, the deer on the landscape are there as a result of habitat management that began 15 years ago. But in today's instant gratification society, if people don't see the effects of management right away, they tend to lose faith. There isn't a good instant fix for this disease, and that's what people want."

> Keeping prevalence low is the best way to manage CWD, and the primary method for limiting prevalence is to keep less deer on the landscape. This decreases the number of times that infected animals interact with those that are uninfected.

Future management of CWD where it is confirmed will likely include increased hunting opportunities. Hunting is one of the best tools for managing the population and the disease itself, according to Dr. Grove. "If prevalence is not controlled," he explains, "then once CWD

reaches a level of 40 to 50%, this means most deer in an area will come into contact with the disease. Wisconsin (which discovered CWD in 2002) has already seen their deer population's age structure change, with far fewer older deer.

"It takes about 8 to 18 months for CWD to kill a deer. As younger animals become infected, they aren't able to survive long enough to reproduce," says Grove. Females may produce none or only one fawn before succumbing. Thus the population can reach a point where it is unable to reproduce itself.

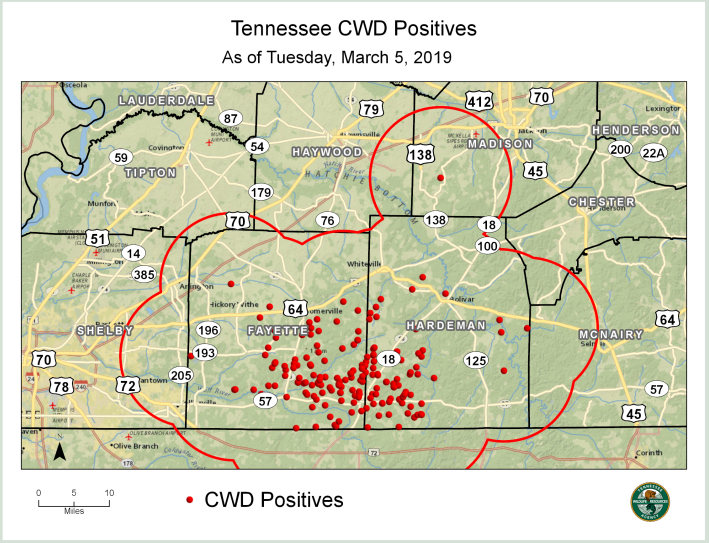



Distribution of Chronic Wasting Disease in North America, USGS National Wildlife Health Center, https://www.usgs.gov/media/images/distribution-chronic-wasting-disease-north-america-0

**Ground zero in Tennessee**

CWD is undergoing a "dramatic spread across North America, has been found in South Korea, and, recently, has been identified for the first time in Europe in free-ranging reindeer (*Rangifer tarandus tarandus*) and moose in Norway."

CWD was first confirmed in the Southeastern states when it showed up in white-tailed deer in Virginia in 2010, followed in quick succession by cases in Missouri, Maryland, and Texas. Then in 2015, an elk collected in Arkansas tested positive, and in February 2018 Mississippi confirmed CWD in deer.




In mid-December 2018, white-tailed deer collected in two counties in Hardeman and Fayette counties in western Tennessee were confirmed positive. As of March 2019, CWD, which is considered an endemic disease in North America, had also been confirmed in Madison County, TN Those three counties in Tennessee are considered positive, and an additional five adjacent counties (McNairy, Chester, Haywood, Tipton, and Shelby) are considered at high risk (they have confirmed CWD cases within 10 miles of their border). According to Dr. Grove, the initial prevalence of CWD in Tennessee's Hardeman and Fayette counties was estimated at between 8 and 10% of the population.

The Chronic Wasting Disease Alliance provides an excellent timeline of CWD's spread since 1967.

**What you can do to contain CWD**

**For hunters:** Currently, TWRA recommends a variety of best practices for hunters to help avoid the spread of CWD in Tennessee. These include:

- Honor legal restrictions placed on the importation of carcasses (meat) from other states into the Tennessee.
- Use synthetic deer and elk lures, as those made from actual urine could contain CWD.
- In CWD positive and high risk counties, harvest your bag limit and provide deer meat for testing.
- Abide by wildlife feeding and carcass exportation restrictions.
- Follow best practices for carcass disposal, designed to minimize the exposure of deer to prions in the environment. These practices include leaving and burying unused parts of the animal at the harvest location.
- Bag up unused remains and send them to the landfill.
- Use a meat processor to process your meat separately from that of others.
- Report sick or abnormal acting deer or elk to your TWRA regional office.

"These measures are meant to help prevent the spatial distribution of CWD from expanding and to decrease the prevalence of the disease where it exists," says Yoest. "TWRA is now in the process of developing a long-term disease management plan." For a more detailed overview of CWD in Tennessee, view TWRA's CWD recorded seminar from March 2019.

The national Centers for Disease Control (CDC) states it is not certain whether CWD can be passed to humans. The CDC recommends hunters hunting in areas with CWD strongly consider having deer or elk tested for the disease before they eat the meat. The CDC further advises if animals test positive for CWD that people do not eat the meat from those animals.

Deer visibly shows signs of chronic wasting disease. -Terry Kreeger, Wyoming Game and Fish and Chronic Wasting Disease Alliance

**For non-hunters:** Even if you do not hunt, you also have a role in containing the spread of CWD. Feeding wildlife is now prohibited in counties that are positive or high-risk for CWD. You may not place grain, salt products, minerals, or other consumable natural and manufactured products, with very few exceptions, although this does not apply to bird feeders near a home or deer food plots. Elimination of feeding stations will reduce the congregation of deer and therefore the transmission of CWD.

Deer affected with CWD take from 10 to 18 months before they show symptoms, which may include salivation, progressive weight loss, excessive thirst and urination, listlessness, or holding the head in a lowered position with drooping ears. Anyone who believes they have seen a deer suffering from CWD or another disease should contact their TWRA regional office.

**Future prospects for deer in Tennessee**

The current task for wildlife managers is to manage for the long-term. "We can still grow deer in the face of the disease and have a thriving deer population in the early stages after disease is introduced," says Grove.

The sad truth, however, is that even while keeping prevalence low, the spread of long-lived prions in the environment over time means that someday we may still see far fewer deer on the landscape in Tennessee. "This is what other states with CWD have seen. However," cautions Grove, "not to try preventing its spread would be irresponsible."

Anyone who believes they have seen a deer suffering from CWD or another disease should contact their TWRA regional office.

The situation brings poignant new meaning to the old saying, *Absence makes the heart grow fonder.*

To stay up to date, consult www.CWDinTennessee.com.