

non-infectious prion

In the last two years, a formerly obscure wildlife disease known to only a few wildlife biologists, veterinarians and hunters, has become an issue of national concern. The disease, known as chronic wasting disease or CWD, was once confined to portions of Colorado and Wyoming, but is now found in 11 states and two Canadian provinces. CWD threatens to have long lasting impacts on the way deer and elk are managed and hunted.

CWD belongs to a group of diseases known as transmissible spongiform encephalopathies (TSEs). Other more commonly known TSEs include scrapie in sheep, bovine spongiform encephalopathy (also known as BSE or mad cow disease) in cattle, and Creutzfeld-Jakob disease (CJD) in humans. CWD and these other TSE diseases cause damage to brain tissue and are invariably fatal. Animals do not seem to develop immunity to CWD or the other TSEs.

The precise cause of CWD is not known, however, the most widely accepted theory is that CWD, and other TSEs are caused by an infectious agent called a prion. Prions are not bacterial or viral organisms, but instead, are mutant versions of proteins that are normally found in the body.

Prions have the ability to resist attack by enzymes and transform normal proteins into more prions. Accumulations of prions eventually kill nerve cells and cause holes to develop in the brain tissue. Brain tissue of infected animals has a sponge like appearance when microscopically examined.

## Are Louisiana's **DEER IN DANGER?**

### An LDWF Biologist Examines the Potential Threat of Chronic Wasting Disease

CWD appears to be limited to the deer family, also known as cervids. The disease has been found to naturally occur in white-tailed deer, mule deer, and elk. The susceptibility of other cervids such as fallow deer, red deer, and axis deer to CWD is unknown. Species outside of the deer family have been experimentally infected, but their vulnerability to natural infection is not known.

The precise means by which CWD is passed from animal to animal is unknown but appears to be through infected urine, feces or saliva. Infected animals may display a variety of symptoms that include emaciation, changes in behavior, increased drinking and urination, drooped head and ears, general weakness, dehydration, and depression.

CWD first appeared in deer research enclosures in Colorado in the 1960s, but was first thought to be a digestive malady. It was not diagnosed as a new TSE until 1978. The origin of CWD is uncertain. One hypothesis is that scrapie (the sheep TSE), mutated to infect deer. Another suggests that CWD spontaneously appeared in either wild or captive deer. It is not known where the disease originated from within the enclosures, or whether wild deer brought it into the Colorado research enclosures. Until it was discovered that an infectious disease was afflicting deer in these enclosures, these deer were sometimes released into the wild or transferred to other enclosures.

By the mid 1980s it was evident that CWD was established in wild deer and elk in north-central Colorado and southeastern Wyoming. Until 1996, CWD was thought to occur only in parts of Colorado and Wyoming. Since then, CWD has been found in privately owned captive deer or elk herds in Colorado, Kansas, Minnesota, Montana, Nebraska, Oklahoma, South Dakota, Wisconsin, and the Canadian provinces of Alberta and Saskatchewan. Only since 2000, has CWD been found in wild deer outside of north-central Colorado and southeastern Wyoming. Wild deer infected with CWD have since been found in western Colorado, Illinois, Nebraska, New Mexico, South Dakota, Wisconsin and Saskatchewan.

Rates of CWD infection in wild deer and elk have been variable. Infection rates in wild Colorado elk have been about one percent. Infection rates in Colorado mule deer have averaged about five percent, but in some areas have been as high as 15 percent. Until the recent discovery of CWD in wild deer in Wisconsin, the disease has occurred in areas with low-density populations. For example, the population density in South Dakota may be one deer per square mile. In contrast, Wisconsin may have 100 deer per square mile. Since CWD appears to be passed from animal to animal, high-density populations would likely lead to higher infection rates. There is also some evidence that infection rates among white-tailed deer could be higher than those observed in elk and mule deer. The CWD infection rate among 179 wild white-tailed deer that were trapped in a Nebraska elk enclosure was 50 percent. To make matters worse, some data suggest that infection rates within a population increase over time.

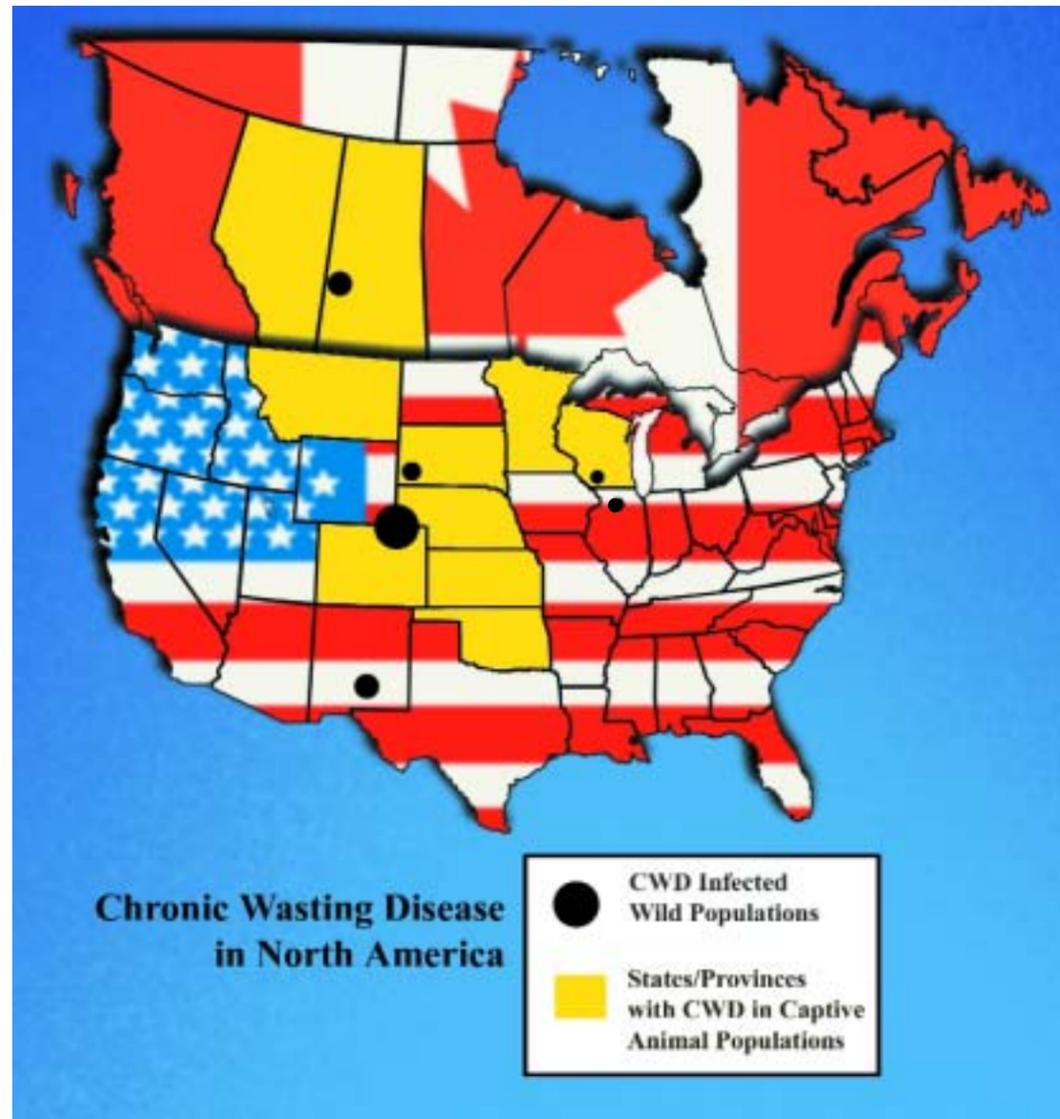
Computer modeling of the impacts of CWD on wild mule deer herds produces some disturbing results. Using data from Colorado and Wyoming mule deer populations, the models predict that CWD infection rates will increase, and lead to extinction of infected populations over several decades. If infection rates and transmission rates are even higher among white-tailed deer, the implications of unchecked CWD outbreaks may spell disaster for some white tailed deer populations.

These concerns led the Wisconsin Department of Natural Resources (DNR) to take extraordinary steps to address the recent CWD outbreak in Wisconsin's wild deer. The models suggest that the best chance to eliminate CWD is to dramatically reduce the infected population and minimize dispersal of infected animals. The Wisconsin DNR has embarked on a plan to destroy 25,000 – 50,000 deer in a 389-square mile area in south central Wisconsin. This is being accomplished by regulated year-round shooting in the affected area. The Colorado Division of Wildlife took similar action last spring when CWD infected mule deer were found in western Colorado. Several hundred deer and elk were killed during the spring of 2002 in an attempt to

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infectious prion





prevent the spread of CWD.

There is strong evidence to suggest that several of the CWD outbreaks in wild deer or elk originated from infected captive cervid herds. Although some will dispute the role of captive cervids in CWD outbreaks in wild deer or elk, there are indisputable characteristics of CWD and captive cervid operations that cause concern for wildlife agencies.

CWD has several characteristics that make it a particularly difficult disease to detect, manage, and control. First of all, there is no practical live-animal test for CWD. Microscopic examination of brain or tonsil tissue is the only way to detect the disease. Secondly, prions are very difficult to destroy and may persist in the environment

for an extended period of time. Therefore even after infected animals are removed, CWD may be passed on to new animals through a contaminated environment, such as a pen, pasture, or feeding area. Perhaps the most problematic characteristic of CWD is its long incubation period. Infected animals may appear healthy for several years before they exhibit symptoms and ultimately die. During this time they may be shedding prions and infecting other animals while appearing healthy.

Captive cervid facilities typically contain high densities of animals kept in close confinement. Shared feeding areas result in contact with urine, feces and saliva. Opportunities for transfer of CWD from animal to animal abound in these situations.

To make matters worse, animals are often transferred between facilities. Without a live animal test for CWD there is no way to be certain that CWD infected animals are not being moved between facilities. There are numerous examples of animals from CWD infected facilities being transferred to other facilities. In one such case, a single CWD positive elk herd in South Dakota was the source of infection for 39 elk herds in Saskatchewan.

If left to spread naturally, CWD infections might move a few miles a year among wild herds. Geographic barriers such as rivers or mountain ranges would likely restrict the spread. However, a shipment of infected captive deer or elk can spread CWD across the nation in a matter of days.

The spread of CWD has focused national attention on regulation of the captive cervid industry. In many states, including Louisiana, the captive cervid industry is at least partially regulated by the state agriculture agency, rather than the state wildlife agency. Understandably, the mission, goals, and law enforcement capabilities of agriculture agencies are appreciably different than those of wildlife agencies. The focus of the agricultural agencies has generally centered around development of the cervid industry and prevention of disease in the industry, with protection of wild deer or elk often being of secondary importance.

Wildlife agencies have become increasingly concerned about enforcement of regulations governing captive cervid facilities. Investigations of CWD outbreaks, and routine checks of cervid producers, have shown

that the records required by law and needed to trace animal movements are often inadequately maintained. Even more troubling is information indicating that there is a significant black market for illegally obtained wild deer and elk. These animals are shipped across the country without regard for health or transport regulations.

The livestock industry and its regulatory agencies have done an excellent job of controlling and preventing disease in cattle, sheep, and poultry. When disease outbreaks have occurred, they have been quickly and decisively addressed. Diseases in wildlife however, cannot be treated in the same manner. Wildlife cannot be corralled and vaccinated, nor can all wild animals be rounded up and destroyed. Given the problems associated with controlling a potentially devastating disease in wildlife such as CWD, it is imperative that a very cautious approach that emphasizes prevention be adopted.

Most states, including Louisiana have taken a two-tiered approach in addressing the CWD issue. Regulations to restrict or halt the movement of captive cervids have been instituted. Additionally, disease surveillance programs to monitor captive and wild deer or elk for CWD have been developed and implemented.

In order to protect Louisiana's wild deer from introduction of CWD, the Louisiana Wildlife and Fisheries Commission (LWFC) instituted a ban on the importation of deer into Louisiana. The Louisiana Livestock Sanitary Board took similar action and imposed a quarantine on deer and elk importation. The LWFC took the additional

Some hunters have expressed concern regarding the safety of consuming deer that may be infected with CWD. Currently, there is no strong evidence that CWD is transmissible to humans. However, public health officials recommend that human exposure to the CWD agent be avoided as they continue to assess the risk, if any, of CWD transmission to humans. The record concerning transmission of other TSEs from animals to humans is mixed. Scrapie is not transmitted from sheep to humans. However, bovine spongiform encephalopathy (mad cow disease) has been linked to cases of variant Creutzfeldt-Jakob disease in humans. If hunters are concerned, they should consult with their physician and take some common sense precautions. The Colorado Division of Wildlife suggests the following for hunters taking deer or elk from the CWD affected area of that state:

- Do not shoot, handle, or consume animals that appear sick
- Wear rubber gloves when field dressing or butchering carcasses
- Bone out the meat
- Minimize the handling of brain and spinal tissue
- Wash hands thoroughly after field dressing and butchering
- Don't eat brain, spinal cord, eyes, spleen, tonsils or lymph nodes of harvested animals
- Don't consume any portion of a CWD positive animal
- Have your animal processed individually without meat from other animals added to yours

It is important to remember that CWD has not been found in Louisiana.



Above, captive cervids, such as these elk, can transmit CWD more easily at common feeding areas. Wild deer, below, are subject to the same dangers when they congregate near feeders or food plots.

step of placing a moratorium on the issuing of new game breeder licenses for deer. Game breeder licenses are issued by the Department of Wildlife and Fisheries and required of people who raise white-tailed deer in captivity for non-commercial purposes. The LWFC also passed a resolution urging the Louisiana Department of Agriculture and Forestry (LDAF) to take similar action, and place a moratorium on issuing of new alternative livestock licenses for deer and elk. Alternative livestock licenses are issued by the LDAF, and are required of people who raise deer and elk in captivity for commercial purposes. LDAF however, plans to continue licensing deer and elk facilities in Louisiana.

At this time there is no information to suggest that deer in Louisiana are infected with CWD. However, in order to document the absence of CWD, or to identify areas where it



should be controlled if it has been unknowingly introduced, the Department of Wildlife and Fisheries has initiated a CWD surveillance program. During the 2002-03 deer hunting season, the Department of Wildlife and Fisheries will be collecting tissue samples from hunter-harvested deer in some areas of the state. The Department of Wildlife and Fisheries has already begun to monitor deer in licensed game breeder facilities. The Louisiana Department of Agriculture and Forestry will be monitoring licensed alternative livestock facilities containing deer and elk for CWD.

If CWD were found in wild deer in Louisiana, the Department of Wildlife and Fisheries would take action to determine the extent of the outbreak and control its spread. Increased testing of deer would occur, and steps to dramatically reduce the population in the area of the outbreak may also be taken. In a larger area surrounding the outbreak, the deer population may be reduced beyond current levels. Feeding and baiting would have to be eliminated to reduce deer to deer contacts.

Dealing with a CWD outbreak in wild deer could be expensive. States with CWD in wild deer have had to allocate several million dollars per year to CWD management and control programs. Additionally, millions of dollars and years of manpower would be diverted from other needed conservation efforts to address the CWD problem.

Keeping CWD out of Louisiana is of utmost importance to the Department of Wildlife and Fisheries. Wild white-tailed deer have ecological and sociological values that are nearly impossible to quantify. However, the economic activity generated by deer hunting can be quantified. In 1996, it was estimated that deer hunting in Louisiana generated over \$600 million in economic activity. This is over 20 times greater than the economic value of the captive cervid industry in Louisiana. A major CWD outbreak in Louisiana could forever change the way deer are managed and threaten the way of life so important to deer hunters and other conservationists. 🐾

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