Background

CWD was first detected in Wisconsin on February 28, 2002. The Department of Natural Resources management goal at that time was to minimize the negative impact of CWD on wild and farmed deer and elk populations and to the state’s economy, hunters, landowners and others dependent upon healthy wild and farmed populations of deer and elk. Management program objectives included: 1) defining the geographic distribution and prevalence of infection, 2) investigating the possible origin of the disease in the state, 3) minimizing the potential spread of CWD to new areas, 4) eradicating the disease in the affected area, 5) enhancing scientific information about the disease, 6) using the best available scientific information to guide management, and 7) providing the public with timely, complete, and accurate information.

Management of disease in free-ranging wildlife populations generally is difficult, expensive, and controversial, particularly when significant population reduction is a part of the plan. Control of CWD in a high density, free-ranging white-tailed deer population had not been previously attempted and there are no proven techniques for control of CWD in free-ranging populations.

Over the past eight years, we have learned much about CWD and the challenges involved in managing the disease. We have also learned much about people’s views on CWD and CWD management. It is the consensus opinion of wildlife disease experts that, without intervention, CWD will spread further in Wisconsin and prevalence of the disease will increase where it is currently found. A lack of disease management will, over the long term, likely result in decreased deer populations and decreased opportunities for the enjoyment of this valuable resource in the state of Wisconsin.

This document represents an effort to use the best information currently available to update the state’s CWD management plan and guide the DNR’s response to CWD for the next 15 years.

Disease Overview

CWD is a fatal nervous system disease known to infect white-tailed deer, mule deer, moose, and elk. It belongs to a group of fatal diseases of animals known as transmissible spongiform encephalopathies, or TSEs. Other TSEs include scrapie in sheep, bovine spongiform encephalopathy (BSE, also called “mad cow disease”) in cattle, and Creutzfeldt-Jakob disease in humans.

TSEs are thought to be caused by an abnormal form of a normally occurring protein called a prion. Infection occurs by conversion of normal prion proteins into a disease-associated, mis-folded form that is highly resistant to degradation. CWD is characterized by slow accumulation of abnormal prions in tissues, especially nervous and lymphoid tissues, where subsequent tissue degradation eventually results in host death.

Clinical signs of the disease typically appear more than 1.5 years after infection, as accumulation of prions results in the destruction of brain tissues. Animals in the later stages of the disease exhibit behavioral changes and progressive weight loss. Clinical signs are not unique to the disease and each could be due to another condition such as malnutrition, vehicle trauma, etc. Currently, there are no available treatments for infected individuals or vaccines for CWD and all infections are believed to be fatal. Management efforts to control CWD are complicated by the protracted course of the disease, likely multiple routes of transmission, lack of early clinical signs,
and persistence of infectious prions in the environment. The National CWD Management Plan recognizes host population reduction as the control method most likely to be effective for controlling CWD in free-ranging deer.

**Agency Responsibility**

The Department of Natural Resources holds the public trust responsibility for managing wildlife as embodied in State Statute 29.011 Title to wild animals (1) *The legal title to, and the custody and protection of, all wild animals within this state is vested in the state for the purposes of regulating the enjoyment, use, disposition and conservation of those wild animals.*

The DNR’s responsibility for ensuring healthy wildlife populations is further described in Administrative Code NR 1.015(2): *The primary goal of wildlife management is to provide healthy life systems necessary to sustain Wisconsin’s wildlife populations for their biological, recreational, cultural and economic values. Wildlife management is the application of knowledge in the protection, enhancement and regulation of wildlife resources for their contribution toward maintaining the integrity of the environment and for the human benefits they provide.*

The DNR must balance its responsibility for managing all wildlife in the state with its responsibility for maintaining a healthy deer herd. It is with that responsibility in mind that this 15-year plan for managing CWD has been developed.

**Role of Ojibwe Indian Tribes**

Although the State of Wisconsin has the public trust responsibility for managing wildlife it also has a responsibility to recognize the role that the Ojibwe Indian tribes play in the use of these same wildlife resources. There must be close, coordinated consultation between the state of Wisconsin and the Ojibwe Indians when dealing with wildlife issues on or near the various reservations and this is especially true with CWD. In the ceded territories of Wisconsin, the state’s management options are, in some instances, significantly narrowed by the tribes’ treaty rights and there is an increased responsibility for the state to consult with tribes about wildlife management issues, including the management of CWD. In addition, Governor Doyle’s policy regarding consultation with Wisconsin’s Indian tribes (2005) calls for the Wisconsin DNR to consult with the tribes when making natural resources management decisions.

**Principles of CWD & Disease Management**

Several assumptions, based on the best available science, guide the recommendations in this response plan.

- CWD was introduced into the state, is not part of our native ecosystems, and its distribution is currently limited to areas in southern Wisconsin.
- CWD is transmitted from deer to deer.
- CWD prions can persist in environmental reservoirs which likely serve as a source for transmission.
- CWD is consistently lethal, and there are currently no effective vaccines or treatments.
- Though a small percentage of Wisconsin deer appear to have reduced susceptibility to disease from CWD (and therefore may transmit CWD over a longer period of time), there has been no genetic profile identified that provides complete resistance to CWD infection.
- CWD is a slowly progressive disease; therefore, success of CWD management techniques cannot be measured over a few years.
- A major means by which CWD can move across the landscape is through the movement of deer and deer carcasses.
Rate of disease spread is affected by the density of deer and the number of infected deer.

There is no evidence that CWD will “disappear” or “run its course” on its own in the absence of management.

**Risks and Potential Future Impacts of the Disease**

There are documented health risks to deer and elk from CWD and ongoing questions about possible health risks to humans, livestock, and other domestic and wild animals. Additionally, there are secondary risks to economic, socio-cultural, and ecosystem values from the effects of the disease and its management.

**Deer Herd**

The discovery of CWD in southern Wisconsin poses a significant risk to the state’s white-tailed deer population and the culture of deer hunting in the state. Wisconsin has nearly 700,000 deer hunters who have harvested an average of 470,000 deer annually during the past 10 years. The effect of CWD on the wild deer population over the next decade may be low. However, studies of Wisconsin wild deer data and real-world data from Colorado and Wyoming show that without control efforts, CWD prevalence can reach high levels and become geographically widespread. Additionally, both the analytic modeling and the Colorado and Wyoming monitoring suggest CWD can reduce deer populations, perhaps drastically. Prevalence in adult male mule deer on some local winter ranges in Colorado more than doubled during a six year period (1997–2002), reaching levels of 25–40%. A study in Boulder, Colorado showed that prevalence among 46 adult male mule deer sampled was 41% and prevalence among 69 adult female mule deer was 20%. The study concluded that high prevalence and shortened lifespan of infected deer is sufficient to have produced the observed 45% population decline. Preliminary findings from research in Wyoming have estimated a prevalence of 28% among white-tailed deer and have documented shorter lifespans among CWD positive animals.

**Human Health**

Risk of transmission to humans appears to be low, but that risk cannot be dismissed. The Centers for Disease Control and World Health Organization (WHO) state that there is no scientific evidence that CWD causes human illness; however, WHO and the Wisconsin Department of Health Services (DHS) both recommend that no part of an animal known to have CWD be consumed by humans and that safe handling and processing procedures are followed.

**Livestock Health**

The risk of transmission to traditional livestock is likely low but cannot be dismissed altogether. There is evidence, based on experiments involving a few animals, that CWD from mule deer is not readily transmitted to cattle and sheep. However, a laboratory study suggests the possibility that CWD from white-tailed deer may be more easily transmitted to livestock. When CWD is injected directly into the brain, it has been shown that cattle and sheep can be infected. However, there have been no infections in studies where cattle are exposed orally or when cattle co-habit with infected mule deer. The risk to farm-raised cervids is high. CWD has been identified in nine farm-raised cervid herds in Wisconsin since 2002.

**Economics**

Deer hunting contributes more than 7 million days of recreation each year in Wisconsin. In 2006, deer hunting generated nearly $900 million dollars in retail sales and nearly $1.4 billion in total impact to the state’s economy.

Should prevalence and distribution of CWD increase dramatically, the disease could severely affect the social and economic stability of the state.
communities that depend on hunting. Surveys of deer hunters suggest that nearly half would stop hunting if CWD prevalence increased to 50% and losses of deer hunters would be even greater if a linkage is ever made between CWD and human disease. This could have significant effects on the economic vitality of rural communities that are dependent on hunting revenue, preservation of cultural and family traditions, management and control of deer populations, funding for wildlife management programs, and public support for wildlife management.

If prevalence or distribution of CWD increases substantially it is likely that hunter demand for CWD testing of harvested deer will rise. Therefore, the costs of dealing with CWD increase if disease spreads, assuming that the state continues testing pantry deer, regulating disposal of deer carcasses, and testing hunter-killed deer. If a link to human or cattle health problems is ever established, it could convert the management of the Wisconsin deer herd into a multi-million dollar pest control program.

**Socio-cultural**

Wisconsin survey results indicate that the public wants the DNR to do something to control CWD. Surveys of Wisconsin hunters suggest that if risks to human or livestock health are identified, or if the severity of the disease increases, the willingness of hunters to harvest deer may decline. As a consequence of reduced hunting pressure, the deer population in the CWD affected area may actually increase for a period of time before expected disease-mortality related population declines occur. This could exacerbate already existing impacts from over-abundant deer populations in southern Wisconsin (agriculture damage, deer-vehicle collisions, etc.). The effects of CWD on deer populations and hunting traditions will likely develop over decades, whereas the effects of CWD control efforts (e.g. extended hunting seasons, earn-a-buck regulations, reduced deer populations) on hunting traditions are felt more quickly.

**Ojibwe Culture**

Waawaaskishi (white-tailed deer) and Waawaaskishikewin (deer hunting) are important elements of Ojibwe culture and life-way. In the Ojibwe worldview, all animals have a role to play and all have an important place. Many animal species are credited with providing indispensable service to the Ojibwa in their time of need. In Ojibwe lore, it is said that Waawaaskishi offered up himself to the Ojibwe when they found themselves starving and in need of food. The deer meat that came from this harvest sustained the Ojibwe people and Waawaaskishi was given special recognition for this service. To this day, deer hunting and the food that Waawaaskishi provides continues to sustain the Ojibwe. However, this service that Waawaaskishi provided to the Ojibwe in their time of need also has earned deer a place in their spiritual well-being. Thus, Waawaaskishi offers sustenance to the Ojibwe people, not only for their physical well-being, but also for their spiritual well-being. Because of the special significance of deer to the Ojibwe people, CWD poses a real threat to the tribes and their tribal culture. CWD has the potential to disrupt an important part of the Ojibwe social structure as well as leading to the decline in physical and spiritual health of Indian people.

**Ecosystems**

The risks that CWD pose to the larger ecosystem are poorly understood at this time. Numerous species of mammals and birds have been documented to feed on deer carcasses and gut piles, and other species could be exposed to prions shed into the environment. To date, testing of common mammalian scavengers (raccoons, coyotes, and opossums) from the southwestern Wisconsin affected area has not detected evidence of a prion disease in those species and laboratory studies with mink, raccoon, skunk, and ground squirrels have not
been able to demonstrate natural transmission. In contrast, experimental infection studies have shown potential for CWD to be transmitted to meadow voles and other rodents. If voles were to become naturally infected in the wild, it is possible that they could facilitate transmission to other species.

Indirect ecosystem effects are possible as a result of deer population changes. If increasing disease intensity reduces hunter numbers and therefore deer harvest declines, deer populations may increase in the short-term and ecosystem impacts resulting from overabundant deer populations (forest regeneration, browsing on preferred plant species, loss of nesting habitat for shrub-nesting birds, etc.) could intensify. If disease increases to the point that deer populations are significantly reduced then food availability could be reduced for a number of mammalian and avian species in southern Wisconsin (e.g. coyote, American crow, turkey vulture), although these species are generalists and not highly dependent on deer. If CWD were to spread to northern Wisconsin, reduced deer populations could negatively affect gray wolves and bears. Northward expansion of CWD would also threaten the health of Wisconsin’s fledgling elk population.

A Brief History of CWD in Wild Cervids and its Management in Wisconsin

CWD was initially documented in a Colorado research facility in 1967. It was first found in a free ranging animal in 1981, when it was diagnosed in a Rocky Mountain elk, also from Colorado. CWD has been discovered in farmed and/or free-ranging populations of wild deer, moose, or elk in 18 states and two Canadian provinces (Figure 1).

The Wisconsin DNR began active surveillance for CWD in 1999 following increased awareness of interstate transport of elk from CWD-infected western game farms. Through fall 2001, approximately 1,100 hunter-harvested deer had been sampled from across the state. In February 2002, the DNR was notified that

Figure 1. 2010 Map of Chronic Wasting Disease in North America
three deer harvested the previous fall from Deer Management Unit 70A in western Dane County had tested positive for CWD. This discovery launched an intensive surveillance effort in Wisconsin that continues today and includes nearly 160,000 samples from wild white-tailed deer as of June 2010, 1,354 of which have tested CWD-positive. Surveillance has been continuously conducted since 2002 in the southern portions of the state and routinely on a rotating basis throughout the rest of the state. Sampling intensity has been sufficient in the majority of the state to have a high degree of confidence that CWD would have been detected if the disease existed at 1% prevalence during the time of surveillance. CWD has been found in 12 southern Wisconsin counties. The current CWD Management Zone encompasses all the known locations of CWD test-positive free-ranging deer (Figure 2).

There appear to be two central areas of CWD infection in Wisconsin (Figure 3). One is centered in western Dane and eastern Iowa counties. The second is located in northern Illinois and extends into southeastern Wisconsin. Illinois first detected the presence of CWD in this area in the fall of 2002 and as of June 2010, 294 CWD positive deer have been found. Disease monitoring areas have been established within each central infection area in Wisconsin.

**Figure 2.** CWD Management Zone Map (including boundaries of western core, Baraboo, and eastern monitoring areas)
Analysis of the sex and age composition of positive deer over the past eight years in Wisconsin has shown that disease prevalence has increased with age and that prevalence in males has been higher than in females, indicating an historical faster rate of increase. Recently, however, there is some evidence that prevalence in yearling females may now be increasing faster than in other age and sex classes. This may be important since females, in general, tend to be better indicators of local prevalence levels than males due to their tendency to stay near their birth range. What the underlying mechanism, if any, is driving this recent trend remains unclear at this time and only through continued monitoring and analysis will it be determined if prevalence levels continue to increase. Overall, there has been an increasing trend in prevalence in all sex and age classes.

**Figure 3.** Cumulative CWD positive locations of white-tailed deer in Wisconsin and Illinois.

**Figure 4.** Estimated prevalence and exponential trend lines of CWD in yearling and adult male (left) and female (right) white-tailed deer from the western core monitoring area, 2002-2009. Vertical lines are 95% confidence intervals.
classes in the western and eastern Wisconsin core monitoring areas. Since 2002, prevalence in the western core among adult males has risen from about 10% to over 12%, and in adult females from about 4% to about 6%. In the same area during the same period, prevalence in yearling males has increased from about 2% to about 4%, and in yearling females from 2% to nearly 6% (Figure 4). Prevalence increases are also evident in the eastern monitoring area where prevalence in adult males has increased from 2% to 8% and in adult females from 1% to 4% between 2003-2009. Very few fawns have tested positive for CWD (23 out of more than 15,000 tested since 2002).

Analyses of the geographic distribution of disease show that the disease is not evenly distributed throughout the affected areas. Disease prevalence is much higher near the centers of each infection and declines with increasing distance from the center. In a few sections near the center of the southwest infection, overall prevalence has been 5–8%. These spatial patterns are consistent with two separate disease introductions at some time in the past (likely more than 20 years ago) with growth in prevalence near the points of introduction and spread to the current distribution.

Hunters and landowners play a pivotal role in managing deer and CWD in Wisconsin. Statewide deer population goals and disease management goals cannot be met without the continued support of hunters and landowners across the state. Over the last decade, nearly 700,000 deer hunters have killed an average of over 470,000 deer each year in Wisconsin. Seven of the ten highest deer harvests ever recorded in Wisconsin have occurred during the past 10 years. Over the last 25 years, hunters have doubled the total deer kill/deer hunting license sold from approximately 0.25 deer killed/license sold to more than 0.5 deer killed/license sold.

However, it has been eight years since CWD was discovered in Wisconsin and it is apparent that greater hunter participation in management efforts is needed and that recreational hunting alone will not be enough to effectively manage CWD. Broad public understanding and support is needed to manage this disease and this support must be demonstrated not just through attitudinal changes, but also through behavioral changes.

Over the past eight years, many deer hunters have demonstrated an unwillingness to change their behavior in response to “risks” that seem remote, uncertain, and long term, even when most hunters indicate a general concern about CWD. Current CWD prevalence levels are low in most areas of the CWD Management Zone and the likelihood is also low that a hunter will harvest a CWD positive deer, much less one that is clinically ill. Not surprisingly, hunters’ perception of risks from CWD is limited by the fact that most have not yet experienced the impacts of the disease directly.

Deer population reduction is the available disease control method most likely to be effective in controlling CWD in free-ranging deer. Over the past 50 years, regulated hunting has been shown to be an ecologically sound, socially beneficial, and fiscally responsible method of managing deer populations. Hunter harvest in the CWD Management Zone during the past eight years appears to have reduced the deer population in this region but it has not been sufficient to cause substantial, widespread population decline. Surveys have shown that while hunters acknowledge the potential for long-term negative impacts from CWD, they are largely unconvinced that the risks to the deer resource are immediate enough to warrant substantially altering their hunting behavior.

Disease management in free-ranging wildlife populations is difficult. If there are no methods to control the disease agent or treat the effects of the disease (such as vaccines), wildlife disease management often involves lowering the populations of infected and susceptible animals. Because there are currently no
practical, effective systems for CWD vaccination or treatment, CWD management focuses on lowering the overall deer populations and the number of infected deer. In an effort to achieve these goals in the CWD-MZ, Wisconsin has implemented a variety of approaches. Methods have included 1) extended hunting seasons with liberal bag limits to achieve overall herd reduction, 2) out-of-season shooting permits issued to landowners with property in high prevalence areas, 3) government-agency sharpshooters to strategically reduce local populations, and 4) incentives aimed at focused deer removal. Intensified public hunting was intended to achieve significant deer population reduction and removal of positive deer over large geographic areas while landowner permits, agency sharpshooters, and a payment-for-positives incentive were intended to focus culling efforts in high prevalence areas. Earn-a-buck regulations were used during seven of the last eight deer-hunting seasons to focus harvest on the antlerless (doe and fawn) component of the population because harvesting does has the greatest effect on the reduction of deer populations. Current analyses suggest that the deer population in the CWD Management Zone increased substantially during the 1990s, peaked at over 200,000 in 2002, and has been slowly declining since then (Figure 5).

Illinois has pursued a strategy of expanded public hunting regimes supplemented by localized, intensive sharpshooting in an effort to increase population turnover with a goal of preventing spread of CWD and eventually eliminating CWD from the affected populations. Sharpshooting has contributed more than 20% of the deer removed from the four Illinois counties that have been the primary focus of management efforts during the past five years. The goal is to annually augment the hunting season kill by significantly reducing post-hunt local deer populations in known CWD areas. Illinois is currently evaluating the effectiveness of their first five years of CWD management. Preliminary analyses indicate that they have achieved both local herd reductions and a corresponding decline in local prevalence levels in certain age and sex classes. The Wisconsin and Illinois efforts to manage and respond to CWD are inextricably linked to the success or failure of one another, and to formally acknowledge this fact, the two states signed a memorandum of understanding in mid 2010. It will be imperative that the two states continue to work together on a mutual goal for CWD management to have a chance at success.

In other states and provinces, approaches to CWD management and response vary depending upon such factors as length of time the disease has been present, cervid population density, human and financial resources, and social dynamics. In areas where CWD may be recently introduced, such as New York or West Virginia, and not yet established, disease eradication or containment is being considered as the ultimate goals for management. In states where there has been sufficient surveillance to document that CWD is established and widely distributed, such as Colorado and Wyoming, managers have refrained from committing to disease eradication because it is likely unachievable given current tools.

Varieties of strategies additional to deer population reduction have been adopted in jurisdictions as part of CWD response plans. A number of states and provinces have cervid

![Figure 5. Estimated post-hunt deer population in deer management units currently affected by CWD (includes portions of 54B, 73B, and 77C that are outside of the CWD Management Zone).](image)
feeding and/or baiting bans or restrictions in place. Carcass movement restrictions are in place in 36 states and 2 Canadian provinces. Selective culling of clinical suspects is common practice. Localized population reduction and focal culling by agency personnel have been used by disease-affected states and provinces to try to manage the disease and gather additional surveillance data.

Increasing scientific knowledge about CWD has been a priority of the DNR since the disease was discovered in the state. A comprehensive research plan was developed and numerous research projects were actively supported through either direct funding or sharing of tissues and data. This research has expanded our understanding of many facets of the disease including: 1) genetic susceptibility of whitetailed deer to CWD, 2) deer social organization and movement patterns, 3) effects of artificial feeding and baiting on deer interactions, 4) binding of prions to soils, and 5) attitudes and behaviors of hunters and landowners in the CWD affected area. In addition, research to improve the diagnostic tools for detecting CWD has significantly reduced the cost of CWD surveillance and shortened the time required to notify most hunters of their test results. However, the DNR’s financial support for CWD research was greatly reduced in 2007 due to reductions in both state and federal funding for CWD management in Wisconsin.

The DNR spent approximately $5 million annually on CWD management from 2002 through 2006. Funding for management came primarily from hunting license revenue along with some federal funding, which was mostly provided by the United States Department of Agriculture. The limited availability of outside funding has required the DNR to redirect wildlife program staff and program dollars to maintain sufficient efforts on CWD management and control. From 2007 through 2009, with budget cuts at the state and federal level, expenditures on CWD management were cut in half, to approximately $2.5 million.

In the summer of 2007, the DNR began a seven-month process of engaging an 18-member Stakeholder Advisory Group in a discussion about the next phase of CWD management in Wisconsin. The goal of the CWD dialogue was for the public and the DNR to reach decisions on how to manage chronic wasting disease to minimize the impact of the disease on Wisconsin’s free-ranging deer population, the habitats and biological systems that include deer, the economy, hunters, landowners, and other constituents that benefit from a healthy deer herd. Selected recommendations from the Stakeholder Advisory Group final report were incorporated into the season framework and regulations that were implemented during the 2008 deer season. The work of the Group also helped to inform the objectives and actions contained in this plan. In 2009, a draft of this CWD plan was thoroughly reviewed by an outside panel of wildlife disease, ecology, and sociology experts from around North America. Their recommendations helped shape and strengthen several areas of the final plan.

DNR wildlife biologist works with a hunter to locate the property on which he killed his deer as part of disease surveillance efforts.