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| Affected Resource 1 | Affected Resource 2 | Affected Resource 3 |
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| White Tailed Deer | | |
| Affected Resource 4 | Affected Resource 5 | |
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***Environmental Impact Statement on Rules to Eradicate Chronic Wasting Disease from Wisconsin's Free-Ranging White-tailed Deer Herd***

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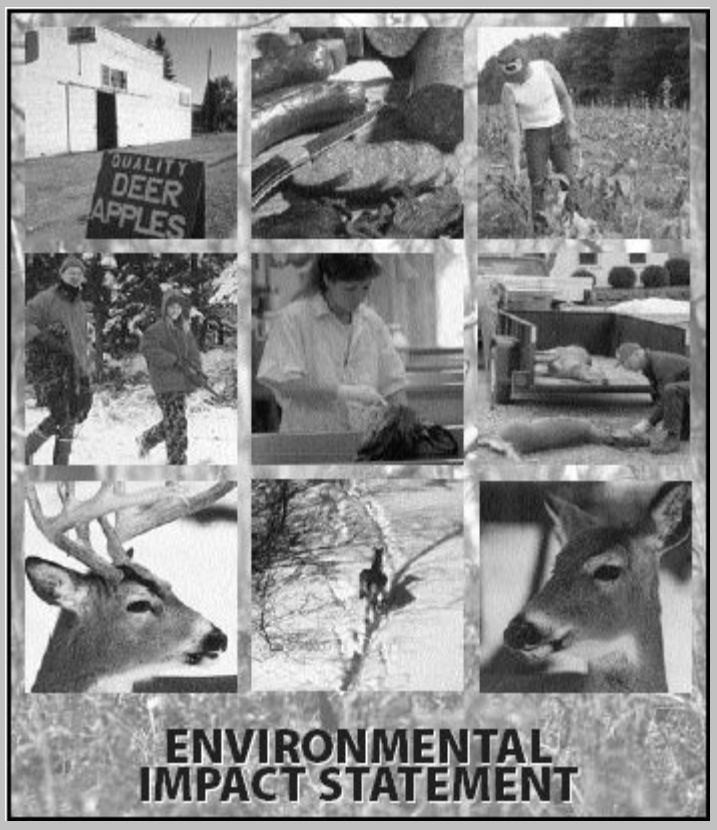


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**ENVIRONMENTAL IMPACT STATEMENT**

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***Environmental Impact Statement***
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# EXECUTIVE SUMMARY



This Environmental Impact Statement (EIS) assesses the effects posed by the Wisconsin Department of Natural Resources (DNR) rule orders WM-05-03 and WM-09-03 (Appendix B) pertaining to control efforts for Chronic Wasting Disease (CWD). The intent of this rule proposal is to authorize control efforts that would eliminate CWD where it exists in the state and protect Wisconsin's statewide deer herd from CWD. The proposed actions are based on the best science available, on experience from other states managing CWD, and expertise of wildlife disease scientists. Currently, the best approach for controlling CWD is to drastically reduce the deer herd in the affected area to eliminate the disease and to reduce the deer density around an affected area so diseased deer are less likely to encounter and transmit the disease to healthy deer. In addition, prohibiting activities that artificially concentrate deer, such as baiting and feeding, reduces the potential for disease spread when healthy deer would come into contact with a diseased deer or encounter a contaminated food source.

This EIS assesses the effects from the proposed actions of depopulating affected areas, reducing the deer herd in areas surrounding affected areas, and banning baiting and feeding statewide to control the disease. The tools used to accomplish depopulation and herd reduction are also assessed.

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## Background.

**What is Known about the Disease.**

CWD belongs to a family of diseases known as transmissible spongiform encephalopathies (TSEs). These diseases cause microscopic holes in brain tissues giving it a sponge-like appearance. TSEs include such diseases as scrapie in sheep, mad cow disease in cattle, mink encephalopathy, and Creutzfeldt-Jakob disease in humans. The causative agent is believed to be a deformed protein, called a prion, that is typically found in nervous and lymphatic tissues.

Animals that are in the later stages of the disease exhibit behavioral changes and progressive loss of body condition that invariably lead to death. Clinical signs are not unique to the disease and can be due to other conditions such as malnutrition. Currently, the most reliable test for diagnosing CWD requires the microscopic examination and/or immunohistochemistry (IHC) staining of a specific portion of the brain. Just recently, IHC tests for retrophryngeal lymph nodes have been validated and can indicate early (four to six months) CWD infection in deer.

Mule deer, white-tailed deer, and Rocky Mountain elk are known to be naturally susceptible to CWD. Both sexes and all age classes show relatively uniform susceptibility. In contrast, a variety of wild and domestic ungulate species appear to be resistant, or at least much less susceptible to CWD, although the numbers of animals tested remain small. So far, moose, pronghorn antelope, Rocky Mountain bighorn sheep, mouflon, mountain goats, and blackbuck held in contact with CWD-infected deer and elk or resident in premises where CWD occurred have not developed the disease. Domestic livestock are not known to be naturally susceptible to CWD. A few cattle, sheep, and goats have resided in research facilities where they were exposed to CWD infected deer or elk for prolonged periods without developing the disease.

No treatment is known and once infected the disease is fatal in deer and elk. Infected deer and elk can appear robust and healthy in the early stages of CWD. Experimentally, the time from exposure to onset of clinical signs of the disease was about 15 months and the average time to death was 23 months in captive mule deer. Among deer and elk residing in facilities with a long history of CWD, most natural cases occur in 2-7 year old animals.

Specific details regarding route(s) of transmission of CWD remain unknown. Contact between infected and non-infected animals via saliva, urine, and feces is the most likely route of transmission. The route of infection is believed to be oral. It is not known when during the course of infection an animal begins shedding abnormal prions, but it may be progressive throughout the course of the disease in deer. Concentration of deer and elk in captivity or by artificial feeding likely increases transmission among individuals.

The importance of environmental contamination in free-ranging animals is not clearly understood. Because prions are resistant to degradation in the environment, indirect transmission via contamination of the environment by excreta or through infected organs from infected animals is possible.

Little is known about the rate of disease transmission, disease prevalence, geographic spread of CWD, or the factors that affect these rates. Increases in CWD prevalence in Colorado and Wyoming have been relatively slow. Epidemiological modeling suggests that prevalence in Colorado and Wyoming may have increased 0.5 to 0.7% annually during the 1980s and 1990s. Transmission rates, however, would need to be much higher to simulate epidemics in captive deer populations where extremely high prevalence (50-90%) has been observed. These results suggest more intensive transmission under confinement or in high-density populations. Although it is not known whether transmission rates are dependent on wild deer density, the density of deer in Wisconsin's CWD management areas may be as much as 10 times the mule deer density in northeast Colorado and southeast Wyoming where CWD is endemic. This fact has prompted concern that transmission rates may be much higher in Wisconsin than in western mule deer. Because CWD is readily transmitted among captive deer and elk concentrated in pens, it is believed that transmission may also be facilitated by the concentration of animals by artificial feeding and baiting.

**How Deer Ecology Might Affect the Spread of CWD.**

Although uncertainty remains about the mechanism of CWD spread across landscapes, scientists generally believe that dispersing deer are a likely avenue of disease spread within a geographic region. Male and female fawns generally remain with their mother through their first year of life. Male fawns usually disperse from their natal ranges as they approach puberty (12-18 months of age), whereas female fawns often remain in the same social group and in the same geographic area as their mother. Dispersal distances in the Midwest suggests that long-distance movements (greater than 30 miles) are quite rare. In southern Wisconsin average dispersal distances for bucks and does were 3-4 miles.

White-tailed deer in southern Wisconsin have relatively high rates of reproduction and mortality, resulting in fairly rapid population turnover. Data suggests that during the 1990s the deer population in southwestern Wisconsin increased by at least 40% each year with the addition of fawns. Estimates of adult survival rates from demographic models for southern Wisconsin suggest that about 30% of males and 60% of females survived from year to year during the late 1990s. This rapid turnover of the deer population could aid in combating CWD if diseased deer are removed from the population before they become infectious and can transmit the disease to healthy deer. Deer, however, are likely infectious long before showing signs of the disease, thus intentional removal of diseased animals is difficult.

**Options for Controlling Wildlife Diseases.**

Standard goals for managing wildlife diseases are: 1) preventing the introduction of disease where it does not exist, 2) controlling the spread of existing disease from an affected area, and/or 3) eradicating existing disease. All three goals are desirable for managing CWD in Wisconsin. Four general strategies often used for wildlife disease management to achieve these goals are: 1) directly attacking the disease agent, 2) blocking the transmission of the disease among individuals, 3) managing environmental conditions to reduce transmission, and 4) reducing the population of infected or susceptible individuals below the threshold required for the disease to persist.

The options for managing CWD in Wisconsin include blocking the transmission of the disease to healthy individuals and uninfected deer populations and reducing the population of infected or susceptible individuals to a level below the threshold for the disease to persist. Accomplishing both of these strategies requires reducing the size of the deer herd and preventing the concentration of deer at bait or feeding sites to minimize contact of diseased deer with healthy deer and the potential for transmission through environmental contamination. Other options were not considered since there is no known vaccine or way to directly attack the disease agent, nor is there any known way to practically manage environmental conditions to reduce the transmission of the disease.

Population reductions may include: 1) a focal depopulation at a specific site of infection, 2) depopulation of an area surrounding the disease site to create a transmission barrier, and 3) general depopulation over a large area. The success of local or barrier depopulation is dependent on effective disease surveillance in order for control measures to be applied promptly in the correct location if disease is detected. Population reduction requires continued effort over multiple years to be effective due to the potential for population growth via reproduction and ingress. Depopulation has been used to control a variety of wildlife diseases including rabies, plague, avian cholera, tuberculosis, histoplasmosis, rinderpest, brucellosis, and foot-and mouth disease.

**How Other States are Managing CWD.**

CWD management plans have been developed nationally and in other states, including Colorado, Nebraska, and South Dakota.

Generally, the goals of these state and national plans are to: 1) minimize the potential for CWD spread; 2) manage infection rates within existing endemic areas according to each state's objectives; 3) eliminate the disease to the extent practicable when outbreaks occur in new areas; 4) support and conduct applied research that will expand knowledge of CWD; and 5) provide timely, complete, and accurate information about CWD to agency personnel and the public.

In addition, the recommendations of these state and national plans are that: 1) artificial feeding and baiting should be banned or discouraged in affected areas; 2) a more thorough understanding of CWD is needed for effective management of the disease and states should participate in ongoing and future research; 3) public hunting is an important tool for reducing deer and elk populations to reduce disease prevalence, but disease management should take precedence over recreational hunting opportunities if they are in conflict; 4) it may be necessary for agency personnel or agents to remove animals for disease management or research, and agencies should seek the authority needed for such actions; 5) state wildlife agencies should continue to work cooperatively with their public health agencies to monitor potential human health risks associated with CWD and develop strategies for sharing current information about CWD with hunters in affected areas; 6) state agencies should continue to work cooperatively with those agencies in their states that regulate the movement and testing of captive deer and elk; and 7) states should conduct surveillance to monitor the occurrence, distribution, and prevalence of CWD and the effectiveness of CWD management actions.

Thirty-one states are currently in the process of developing new and/or additional CWD regulations in response to these CWD management goals. Forty-six states conduct CWD testing of wild deer and elk, and two additional states are in the process of developing surveillance programs. In addition, at least 26 states and two Canadian provinces do not allow baiting of deer and elk. At least three states have enacted restrictions or are in the process of developing rules to restrict or ban baiting. At least 12 states do not allow the feeding of deer or elk, or

restrict the use of feed. Nine states and one Canadian province have put restrictions on the importation of hunter-harvested deer and elk parts and six states are discussing similar bans.

**History of CWD in Wisconsin.**

The Wisconsin Department of Natural Resources (DNR) began active CWD surveillance of hunter-harvested deer in 1999 and through 2001 had sampled approximately 1,100 deer throughout the state. The DNR was notified in February 2002 that three male deer harvested from Deer Management Unit 70A in western Dane County tested positive for CWD. A 12-mile radius surveillance area was designated that centered on the three index cases. During March and April 2002, 516 deer were collected from within the surveillance area of which 15 (2.9%) tested positive for CWD. However, prevalence of these positive cases was clustered and not uniformly distributed in the surveillance area.

A male white-tailed deer from a deer farm in Portage County tested positive for CWD in September of 2002 when it was sampled in compliance with the rule requiring testing of all carcasses if any part of the carcass is to leave the farm. This finding triggered an investigation which resulted in identifying a CWD positive female white-tailed deer on a Walworth County farm that same month. Another deer, assumed to have escaped from the same Walworth County farm in April 2002, was shot near the farm and tested positive for CWD in October 2002. All of the deer in the Walworth County herd were killed and tested for CWD in December 2002 and four additional CWD infected deer were identified. The CWD positive deer on both of these farms appear to have originated on a second Walworth County farm. All three farms were quarantined in September 2002 and the two remaining farms will stay under quarantine until they are depopulated.

As of January 31, 2003, 36% of the statewide tests results had been returned that were collected during the 2002 and early 2003 statewide CWD surveillance testing. A total of 38,764 total samples were taken (11,434 in the eradication zone, 5,808 in the Management Zone, and 21,470 in the remainder of the state, two were from unknown origins). Thus far, five white-tailed deer from the western part of the current CWD Management Zone have tested positive for the disease outside the current eradication zone. Until the discovery of these positives, all previous positive wild samples (53) were contained within the current eradication zone.

**Current Actions Taken by Wisconsin DNR to Control CWD.**

An interagency task force was formed in response to the discovery of CWD in Wisconsin to guide CWD management. The task force consisted of personnel from the Department of Natural Resources (DNR), Department of Agriculture, Trade, and Consumer Protection (DATCP), and Department of Health and Family Services (DHFS). The task force recommended additional surveillance in the spring of 2002. Based on the results of the surveillance sampling, the task force developed and implemented an aggressive disease management program via emergency rules in an attempt to eradicate CWD from the state. Management strategies included: 1) extensive testing to precisely determine the geographic distribution of CWD; 2) depopulation of deer in the area known to be infected with CWD; 3) reducing deer populations in surrounding areas to minimize risk of dispersing deer establishing new disease areas; 4) banning the use of bait for deer hunting and the artificial feeding of deer to reduce the probability of CWD transmission; and 5) conducting research to increase understanding of the disease and the effect of deer behavior on disease transmission.

These management strategies required special legislative authority and emergency administrative rules. A special session of the legislature was held in May 2002 to address CWD. The legislature passed the 2001 Wisconsin Act 108 (Appendix A) that authorized the DNR to regulate the feeding of wildlife, authorized DNR and cooperating agency staff to shoot deer from vehicles and to use aircraft, approved a supplemental appropriation to pay for CWD management, and authorized the extension of emergency rules.

The Natural Resources Board in June 2002 approved a package of emergency rules that created three CWD management zones: the CWD Eradication Zone (EZ), an Intensive Harvest Zone (IHZ), and the CWD Management Zone (in the proposed rule this zone is now called the Herd Reduction Zone or HRZ). The EZ was defined to extend 9½ miles from the original center of the known CWD positive deer and 4½ miles out from any additional positive deer. The deer population goal for the EZ was set to zero. The IHZ immediately surrounded

the EZ with borders defined on recognizable state and county roads. The HRZ extends out to road boundaries approximately 40 miles out from the EZ. The population goal in the HRZ was established at 10 deer per square mile of deer habitat. The emergency rule specified the conditions under which DNR staff can shoot deer from vehicles and aircraft. The rule identifies deer within the EZ to be causing a nuisance and authorizes the DNR to issue permits to landowners and their permitees to shoot deer during periods defined by the DNR throughout the year. The emergency rule also prohibited the statewide use of bait for deer hunting and the artificial feeding of deer to reduce the probability of CWD transmission. The rule expanded firearm options and deer seasons in state parks and authorized the issuance of replacement permits if hunters shoot diseased deer. The rule further specified transportation, registration, and disease sampling requirements for harvested deer.

During the 2002 CWD Management Zone hunts approximately 41,000 deer were harvested. Approximately 11,000 deer were killed in the IHZ.

Wisconsin Act 56, as of January 1, 2003, moved the authority to regulate captive white-tailed deer from the DNR to the DATCP, however deer farm fencing inspection authority remains with the DNR. Therefore, new fencing standards were created with an emergency rule until a rule could replace it. While incorporating many of the deer farm fence standards from ch. NR 16, Wis. Adm. Code, the rule increased the required height of new fences from 8 - 10 feet. It also phased in a requirement that deer farms be double fenced unless the deer farm is enrolled in the chronic wasting disease herd monitoring or herd surveillance program.

**Current Actions Taken by Other Wisconsin State Agencies.**

Emergency rules that restricted importation of deer and elk from out of state were written by the DATCP in Spring 2002. These rules require that only deer and elk from herds that have been enrolled in a state sponsored CWD monitoring program, or the equivalent, for five years may enter the state. The rules further dictate that all deer farmers that move live animals off their farm must be enrolled in the CWD monitoring program and that all carcasses, when any part of the carcass leaves the deer farm, must be tested for CWD.

The DATCP Board adopted a set of permanent rules in December 2002 that were similar to the emergency rules adopted in the previous spring. The permanent rules are strengthened by requiring owners of farm-raised deer to report all escapes within 48 hours and to notify a certified veterinarian within 24 hours of observing any signs or symptoms of CWD. The rules further require that every farm-raised deer over 16 months of age that dies on the premises be tested for CWD.

The DHFS has been working closely with DNR to help provide hunters and venison consumers with information about potential human risks and ways to minimize those risks so prospective hunters may make informed decisions. Currently, there is no scientific evidence that CWD poses a risk to human health. However, there are aspects of prion transmission that remain unknown, and no one can guarantee that absolutely no risk exists regarding human consumption of animals that may have contracted CWD. The DHFS is implementing a surveillance program for Creutzfeldt-Jakob disease (CJD) in humans. Clinical criteria are being developed for detecting and reporting cases of human prion disease. Funding has been obtained to ensure Wisconsin has the capacity to perform autopsies on people suspected of being infected with prion disease, to educate physicians, hospitals, and laboratories on the need to report all cases of prion disease, and to investigate unusual clusters or occurrences of CJD or CJD-like illnesses.

The Wisconsin Veterinary Diagnostic Lab (WVDL) made their facilities available for sample collection during the spring surveillance period and began the certification process in spring 2002 to obtain United States Department of Agriculture (USDA) authorization to run the immunohistochemistry (IHC) tests and rapid assays for CWD detection in Wisconsin. WVDL began testing CWD surveillance samples from hunter harvested deer in fall 2002 and is expected to complete testing of 38,000 samples by spring 2003.

The University of Wisconsin provided resources to assist with peer review of CWD management plans, computer modeling, CWD genetic and deer behavior research, and public outreach and education activities.

**Tribal Issues and Involvement.**

Wisconsin's Native American Indian tribes and the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) partner with the DNR in various natural resource management activities including deer management. The Wisconsin Chippewa tribes are entitled to harvest up to 50% of deer available for harvest in deer management units that fall within ceded territories. Tribal deer harvest occurs primarily in the northern deer management units, while limited harvest occurs in all other portions of the state except the south. None of the ceded territory falls in the southern portion of the state where the current eradication and herd reduction zones are located. The DNR would seek joint tribal participation if CWD is discovered in the ceded territories and would require the implementation of CWD control measures. GLIFWC assisted the DNR with the statewide surveillance efforts during fall 2002.

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## Wisconsin's CWD Management Plan.

A CWD Management Plan was developed in response to the discovery of CWD in Wisconsin. The goal for CWD management in Wisconsin is to minimize the negative impact of CWD on wild and captive 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 include: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. There are five major actions suggested in the plan: surveillance, human health protection, research, communication, and disease control.

Disease surveillance is key to the implementation of the management plan. Surveillance will be conducted throughout the state to determine the extent and prevalence of CWD.

Human health concerns will be addressed by the DHFS by monitoring cases of CJD and providing information to hunters and venison consumers on the safety of eating venison from CWD infected deer.

The DNR in cooperation with the University of Wisconsin and the U.S. Geological Survey's National Wildlife Health Center has begun a research program to expand the scientific information needed for managing CWD in Wisconsin and to evaluate the effectiveness of the CWD management program. This research program incorporates studies on disease dynamics, deer ecology, and hunter and landowner attitudes and desires.

Providing information about CWD has been a priority for the DNR. The DNR has communicated with the public in the most timely, complete, and accurate fashion possible. The DNR has used all available communication tools in this effort including news releases, television appearances, radio interviews, brochures, handouts, public meetings, and the Internet. A web site [http://www.dnr.state.wi.us/] has been established and is updated weekly with new information and test results from samples submitted by hunters.

Disease control goals may be accomplished by reducing the deer population within and adjacent to the affected area and banning baiting and feeding deer to limit the spread of the disease. Currently, Wisconsin's CWD management plan assumes that the disease is limited to southwest Wisconsin. The best management strategies for this situation are to depopulate the deer herd in the known affected area, reduce nearby deer populations to prevent expansion of CWD into adjacent areas, and implement a statewide ban on baiting and feeding. These plans are integrated with an intensive statewide surveillance program to determine the occurrence of the disease in other areas outside of the known affected area.

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## Depopulation.

**Assessment of Depopulation Action.**

Based on the best science available and consultation with CWD experts across the country, the best strategy to

eradicate CWD from an affected area is to establish a zone and reduce the deer herd to near zero within that zone. This prevents transmission of the disease both within and outside of the affected area, lowers the population of susceptible animals below the threshold that the disease can persist, and prevents the infectious agent from being shed into the environment. The basis for a population goal of near zero deer to eradicate the disease is based on models of CWD epidemiology and current understanding of the disease that suggest that CWD is a uniquely difficult disease to manage. Long incubation, subtle early clinical signs, absence of a practical live test, an extremely resistant infectious agent, possible environmental contamination, and incomplete understanding of transmission constrain options for controlling or eradicating CWD. Published studies for Colorado indicate that CWD will dramatically reduce mule deer populations to very low levels. A Wisconsin model using similar CWD transmission dynamics suggests high prevalence and dramatic population declines if CWD is allowed to spread unchecked for 20 years. Models further suggest that early, aggressive intervention via selective removal or more generalized population reduction show the greatest promise in preventing CWD from being established in new areas.

Selective removal of only clinical suspect animals in Colorado and Wyoming, however, has failed to reduce prevalence. Although depopulation to control CWD must be considered experimental, there appears to be no practical alternative.

***Proposed Action.*** The proposed action is to establish Eradication and Intensive Harvest Zones. An eradication zone (EZ), for the purpose of the proposed rule, is defined as those one square mile sections of land contained within or intersected by a 4½ mile radius drawn from the center of a section of land found to have contained an animal that tested positive for CWD. The biological basis for the 4½ mile radius is an attempt to balance the dispersal likelihood of potentially infected deer against the logistical difficulty of depopulating deer over a large area. An intensive harvest zone (IHZ), for the purposes of the proposed rule, is defined as the area which is bordered by highways and other readily identifiable features that surrounds an EZ. This proposed rule would create an IHZ surrounding the current EZ, however, future IHZs could be created through additional rules. The purpose of an IHZ is to allow for the implementation of more liberal hunting seasons separate from the remainder of the other zones. Liberal hunting seasons are proposed to reduce deer herd density. An IHZ would change from an earn-a-buck regulation to an eithersex regulation when the zone deer herd is reduced to five deer per square mile of deer habitat. As the deer population is reduced, it will become unreasonable to expect that a hunter must harvest an antlerless deer prior to harvesting a buck. The season length would remain unchanged to allow maximum opportunity for continued efforts to depopulate the affected area. The DNR would issue permits to landowners to remove deer outside of the scheduled hunting seasons in an EZ. DNR staff and staff from other cooperating agencies would supplement landowner removal efforts by shooting deer on lands where EZ landowners have authorized access.

***Effects.*** The likely effects of this action on the disease should be reduced transmission of the disease among individuals, fewer infected animals on the landscape, smaller geographic distribution of the disease, a population of susceptible animals lower than the threshold for the disease to persist, and less environmental contamination from diseased animals and the carcasses of diseased animals shedding abnormal prions. Depopulation of the deer herd in an EZ is expected to eradicate CWD from the affected area. However, the actual level of herd reduction would depend on landowner and hunter cooperation.

Effects of depopulation on ecosystems should generally be positive. Some tree regeneration and browse sensitive plant species have been suppressed at current deer densities, resulting in secondary negative impacts on ground and shrub-nesting birds and possibly small mammals. Native predators in Wisconsin, with the exception of wolves, are not dependent on deer. The presence of CWD in Wisconsin poses a threat to elk restoration because they are susceptible to CWD. Negative effects on native ecosystems associated with too few white-tailed deer have not been described or demonstrated in the scientific literature.

Socially and economically, the deer depopulation proposed for CWD EZs and IHZs would likely result in a loss of hunting recreation, hunting tradition, hunting associated businesses, and wildlife viewing opportunities. If CWD is discovered in the ceded territories depopulation of the deer herd could have an impact on the Chippewa tribes and the overall tribal deer harvest, depending on the extent and location of the disease. Deer population reductions can be expected to result in a reduction in deer damage to agricultural crops and timber resources

and fewer deer-vehicle accidents. These impacts would be expected to last for the duration of disease control efforts and subsequent repopulation of the area.

The rapid population reduction planned for these zones would require changes to deer herd monitoring procedures, because the traditional sex-age-kill method is dependent on fairly stable hunting season frameworks and harvest rates. Deer populations in these zones would be monitored using a combination of aerial surveys (helicopter and/or fixed-wing) and population modeling. Rapid population reduction may create a situation where hunter harvest exceeds hunter interest in consuming venison, generating the need to dispose of unwanted deer carcasses.

**Other Alternatives Considered.**

***No Action.*** Under this alternative, no EZ or IHZ would exist and no effort would be made to depopulate the deer herd in affected areas. Hunting season frameworks would not change. Zone T season structures could be used in selected deer management units if overwinter populations were sufficiently over goal and that a regular 9-day gun season would be insufficient to reduce herds to goal.

Based on current science and the experiences of other states, no intervention would likely result in increased prevalence, geographic spread of the disease, and corresponding reduction in deer populations resulting from the disease. For example, research in Colorado provides preliminary evidence of decreased adult survival in areas where CWD is established and of increasing prevalence in endemic areas over time. These findings support model predictions that the disease would increase in frequency of occurrence and would significantly impact deer populations in Wisconsin. There is no evidence at present of genetic resistance to CWD within mule and white-tailed deer. Although genetic resistance has not been studied extensively, preliminary results indicate that a very large portion of deer in Wisconsin are susceptible to CWD. Animals that die of CWD are adults, and susceptible genes would be passed to future generations before the animals became clinically ill and died from CWD. Management must be considered experimental because of the many scientific uncertainties regarding the basic epidemiology and ecology of CWD. However, this cannot be taken as an argument for waiting for new research or for doing nothing. Generally, CWD behaves in a manner similar to other infectious diseases, therefore it is reasonable to apply management techniques used for chronic, late-onset infectious diseases. Delaying management actions until more information is available may result in more costly and fewer options for eradicating this disease.

***Deer Population Reduction and Research*.** An effort would be made to reduce the high deer population through the use of hunting to a goal of 10 deer per square mile in the current CWD affected area under this alternative. Hunting season frameworks could be altered to facilitate this population reduction, but out of season shooting permits would not be issued to landowners, and agency personnel would likely not participate in removal activities. Hunter harvested deer would be sampled and tested for CWD to determine the distribution and prevalence of the disease and research on disease transmission would be conducted.

The reduction in deer population density in the affected area, together with the ban on baiting and feeding of deer, may slow the rate of increase in prevalence of CWD and slow the rate of geographic spread. However, these actions alone would not likely reduce prevalence or lead to the elimination of CWD from the state. Field data from Colorado and Wyoming demonstrate that CWD can persist, increase in prevalence, and spread to new areas in mule and white-tailed deer populations that occur at densities that are much lower (approximately 5-6 deer per square mile) than those in southwestern Wisconsin (75 or more deer per square mile). Extensive testing of hunter harvested deer would provide detailed information on the prevalence and distribution of CWD. Research would likely require several years before generating additional understanding of disease transmission mechanisms, during which time prevalence would likely increase and CWD may spread to new areas. The level of environmental contamination could increase because infected deer would remain in the affected area under this alternative.

***Live Test and Euthanize*.** This alternative would involve live trapping deer in affected areas, testing them to determine if they are infected with CWD, and euthanizing any positive individuals.

This alternative would require the existence of a reliable and practical CWD test for live animals and extensive time and effort devoted to trapping and sampling live deer. The primary limitation is the need to capture, handle, and hold the 25,000 to 30,000 deer that are estimated to be within the current 411-square mile EZ and potentially exposed to CWD. It would be very difficult to capture even a small percentage of the total deer population. Because deer in early stages of infection may not have detectable levels of CWD prions and could test negative, it would be necessary to hold test-negative deer and retest them over an extended period of time. Therefore, this alternative would not be an effective means of containing or eliminating CWD.

***Selective Removal of Individual Animals.*** This alternative would involve removal of selected individual deer that have the appearance of clinical symptoms of CWD or an identifiable subset of the population that may have a higher prevalence or a greater potential to spread the disease, (e.g., dispersing yearling males).

Although current evidence indicates that CWD occurs in clusters, little information is available about possible differences in prevalence of CWD among sex and age classes of white-tailed deer that might be used to design a selective removal program. This is one of the questions being addressed in the disease dynamics portion of Wisconsin's CWD research program. Selective removal of individual animals exhibiting clinical symptoms of CWD has been practiced in the endemic areas of Colorado and Wyoming for a number of years without success in reducing prevalence. The effectiveness of this technique may be limited by the long period of time (15 months or more) between infection and exhibition of clinical symptoms when clinical signs of CWD are subtle and may be unrecognizable on casual observation. During this time the diseased animal may be able to infect other susceptible individuals. Therefore, considering the limitations of this alternative, it would not be an effective means of containing or eliminating CWD.

**Assessment of Depopulation Program Tools.**

***Proposed Actions.*** A combination of tools would be necessary to achieve depopulation. No one tool is expected to achieve depopulation by itself. The proposed tools to accomplish depopulation include: 1) extended hunting seasons and unlimited antlerless tags; 2) earn-a-buck regulations followed by either sex harvest once a population threshold is reached; 3) state park and refuge hunting opportunities; 4) liberalized firearm restrictions; 5) harvest of deer by authorized agency shooters; 6) free landowner permits that exempt landowners and their designees from hunting license requirements and allow the harvest of deer outside established deer seasons; 7) potential use of aircraft to rally and harvest deer by agency personnel; and 8) authorize landowners and agency personnel to shoot over bait to aid the efforts to eliminate deer under highly controlled and regulated situations.

***Effects.*** These tools should give hunters every opportunity to participate in reducing the deer herd and result in the largest harvest of all alternatives considered. Public safety was given highest consideration and should be protected under the proposed tools. The incidence of trespass should remain unchanged since hunters still need permission to hunt on private land and landowners control to whom they give special landowner permits. There is potential for recreational conflicts including requiring all hunters except waterfowl hunters to wear blaze orange. This could limit success of fall turkey and archery deer hunters. The longer seasons may burden landowners with hunters asking permission to hunt. Longer seasons may also affect farmers concerned about their safety while harvesting crops, or the safety of their livestock while on pasture, during gun hunting seasons. Higher costs would occur and a greater workload would be placed on law enforcement officials and other DNR staff. Initially it is anticipated that there would be a period of increased hunting opportunity and therefore an increase in local revenues associated with hunting related business. However, in subsequent years, hunting opportunities are anticipated to decline with a decrease in the deer population, resulting in reduced revenues for local economies within an EZ. Baiting under permit would ensure that baiting only be done in controlled situations and with harvest expectations. This would provide another tool to achieve the goal of depopulation in an EZ. The risks associated with disease transmission over bait under these circumstances would be minimal because the goal is to remove all or nearly all of the deer in an EZ.

***Other Alternatives Considered.*** The following alternatives were considered: 1) traditional seasons or modest season extension; 2) require licenses of all hunters; 3) unlimited either-sex tags throughout the season (i.e., no earn-a-buck); 4) earn-a-buck with multiple antlerless deer per buck; 5) use a smaller or larger area to define an EZ; 6) contraception as a depopulation method; 7) depopulation through public hunting only; 8) depopulation

through landowner shooting only; 9) depopulation through agency shooting only; 10) depopulation using live capture and euthanasia; and 11) depopulation using toxicants. However, these were not viewed as viable alternatives to achieving the aggressive depopulation goals that have been established for an EZ and IHZ. A detailed analysis of these alternatives can be found in the sections of the EIS relating to the tools for achieving depopulation and herd reduction.

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## Herd Reduction.

**Assessment of Herd Reduction Program.**

If CWD transmission rates are density-dependent, then a reduction in the deer population of a Herd Reduction Zone (HRZ) could be expected to reduce the rate of spread should new affected areas become established by deer dispersing from an EZ. The proposed deer density for a HRZ is similar to the deer density in Colorado's endemic area where CWD has persisted with slow increases in prevalence. This would allow time for new CWD positive areas to be discovered through intense surveillance that would be conducted in a HRZ.

***Proposed Action*.** The proposed rule allows for the establishment of HRZs. The proposed population goal in a HRZ is 10 deer per square mile. The boundaries for this zone follow recognizable roads. The rule would also create a HRZ which is located approximately 40 miles from the center of the current known CWD-affected area. A 40-mile extent was chosen because deer, although uncommon, can disperse up to 30 miles. Liberal hunting seasons would be established in a HRZ to quickly reduce the deer population to 10 deer per square mile of deer habitat. In addition, intensive disease surveillance would be conducted within a HRZ.

***Effects.*** The primary effect of a low deer population at 10 deer per square mile of deer habitat would be to create a buffer around an EZ and IHZ that is anticipated to reduce the spread of disease from an EZ and to decrease ingress of deer back into an EZ.

Depending on the location of a HRZ the change in deer population goals could range from no change to a reduction of 67%. However, the actual success of herd reduction would depend on landowner and hunter cooperation.

Effects of herd reduction on ecosystems should generally be positive and similar to those discussed in the Depopulation section, however the effects are expected to be less than those experienced in an EZ/IHZ as a HRZ would have a higher deer population.

The deer herd reduction proposed for a HRZ would likely result in short-term loss of hunting recreation, hunting associated industries, and wildlife viewing opportunities. Research to address some of these issues is currently being conducted which should provide information on hunter behavior and attitudes. If CWD is discovered in the ceded territories deer herd reduction could have an impact on the Chippewa tribes and the overall tribal deer harvest, depending on the extent and location of the disease. Deer population reductions may result in less damage to agricultural crops and timber resources and fewer deer-vehicle accidents. These impacts would be expected to last for the duration of disease control efforts and subsequent repopulation of the area.

The rapid population reduction planned for a HRZ would require changes to deer herd monitoring procedures because the traditional sex-age-kill method is dependent on fairly stable hunting season frameworks and harvest rates. Deer populations in a HRZ would be monitored using a combination of aerial surveys (helicopter or fixed-wing) and population modeling. In addition, this action may create a situation where hunter harvest exceeds hunter interest in consuming venison, generating the need to dispose of unwanted deer carcasses.

**Other Alternatives Considered.**

***No Action*.** Under this alternative, no HRZ would exist and no effort would be made to reduce the deer population below the current deer management goal levels (10 to 30 deer per square mile of deer habitat). Hunting season frameworks would not change. Zone T season structures could be used in selected deer

management units if overwinter populations were sufficiently over goal and a regular 9-day gun season was determined to be insufficient to reduce herds to goal.

Because hunting season frameworks would not be altered under this alternative, the traditional sex-age-kill method could continue to be used to monitor changes in deer population size.

Current deer densities in Wisconsin are generally much higher than densities in Colorado. These higher densities may facilitate more rapid spread of CWD, making it more difficult to contain and eradicate the disease when infected deer disperse and establish new disease locations. Maintaining deer densities of 20-30 deer per square mile in the area surrounding an EZ would likely result in deer moving back into the zone, making it more difficult to eradicate the disease.

***Intensive Surveillance*.** Under this alternative, decisions about future population reductions would be deferred until intensive disease surveillance had been conducted within a HRZ. The intensity of surveillance conducted in a HRZ would be higher than in the rest of the state because of the higher risk of CWD spread associated with its close proximity to an EZ. No effort would be made to reduce the deer population in a HRZ below the current goal levels, until surveillance discovered the disease. Hunting season frameworks would not change. Zone T season structures could be used in selected deer management units if over winter populations were sufficiently over goal and a regular 9-day gun season was determined to be insufficient to reduce herds to goal.

The effects of this alternative on the deer population, deer population monitoring, and carcass disposal would likely be the same as those under the no action alternative. The intensity of sampling for CWD surveillance under this alternative would be greater than under the no action alternative. This would increase the probability that new disease areas were discovered at an early stage of infection. However, several years of intense surveillance would likely be needed before there is a solid understanding of disease risk in a HRZ. Therefore, it is possible that several years may elapse before new disease areas were discovered. Because current deer population goals in a HRZ are greater than those in Colorado's endemic area, CWD may spread more rapidly than in Colorado. Rapid spread from a newly affected area would substantially increase the difficulty of containing and eradicating the disease from a HRZ. Maintaining deer densities of 20-30 deer per square mile in the area surrounding an EZ would likely result in immigration into an EZ making it more difficult to eradicate CWD from the affected area.

**Assessment of Herd Reduction Tools.**

***Proposed Action.*** A combination of tools would be necessary to achieve herd reduction. No one tool is expected to achieve herd reduction by itself. The tools proposed to accomplish herd reduction include: 1) extended hunting seasons with unlimited antlerless tags; 2) earn-a-buck regulations; and 3) extended state park and refuge hunting seasons and regulations. HRZs would change to standard seasons and regulations in a deer management unit within a HRZ when the deer herd in that unit is reduced to 15 deer per square mile of deer habitat. These standard seasons along with Zone T seasons and regulations would be used to further reduce and keep the deer population at 10 deer per square mile of deer habitat.

***Effects.*** These tools should give hunters every opportunity to participate in reducing the deer herd and should result in the most effective harvest of all alternatives considered. Public safety was given highest consideration and should be protected under the proposed tools. The incidence of trespass should remain unchanged since hunters still need permission to hunt on private lands. There is potential for recreational conflicts including requiring all hunters except waterfowl hunters to wear blaze orange. This could reduce success somewhat for fall turkey and archery deer hunters. The longer seasons may burden landowners with hunters asking permission to hunt. Longer seasons may also affect farmers concerned about their safety while harvesting crops, or the safety of their livestock while on pasture, during gun hunting seasons. Higher costs would occur and a greater workload would be placed on law enforcement officials and other DNR staff. Initially it is anticipated that there would be a period of increased hunting opportunity and therefore an increase in local revenues associated with hunting related business. In subsequent years, however, hunting opportunities are anticipated to decline with a decrease in the deer population, resulting in reduced revenues for local economies within a HRZ. While herd reduction is ongoing, the high numbers of harvested animals promise excellent surveillance and disease discovery

possibilities.

***Other Alternatives Considered.*** The following alternatives were considered: 1) traditional seasons or modest season extension; 2) unlimited either-sex tags only (i.e. no earn-a-buck); and 3) earn-a-buck with multiple antlerless deer per buck. However, these alternatives were not determined to be viable alternatives to achieving the aggressive herd reduction goals that have been established for a HRZ. A detailed analysis of these alternatives can be found in the section of the EIS relating to the tools for achieving herd reduction.

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## Baiting and Feeding Ban.

**Assessment of Baiting and Feeding Ban.**

Based on the experience of outside experts and the recommendations of other state and national plans, significant disease risk may be reduced with a statewide prohibition of deer baiting and feeding. The practice of artificially supplementing the diet of free-ranging white-tailed deer through baiting and feeding has the effect of artificially concentrating deer, likely facilitating both increased animal-to-animal contact and exposure to potentially contaminated sites. A consequence of increased opportunity for contact would be an increased likelihood for transmission of the infectious disease among deer. Baiting and feeding of deer may allow CWD to become established in a population by enhancing the spread of the disease if an infected deer moves or is moved into a previously unaffected area. Prohibiting baiting and feeding is part of a comprehensive strategy, not a stand-alone solution.

***Proposed Action.*** A ban on baiting and feeding of deer is proposed statewide to limit or reduce the transmission of disease among deer.

***Effects.*** Banning deer baiting and feeding should reduce transmission of disease by reducing the amount of contact between individual deer and eliminating potentially contaminated food sites at which deer could become infected. An elimination of deer baiting and feeding would also likely reduce and maintain deer populations within the limits of habitat carrying capacity which is one of the most effective means of controlling infectious diseases.

There is potential for a reduced or increased harvest with a ban on baiting. If a reduced harvest were a result of the prohibition, then deer density may increase resulting in an increase in disease transmission. Studies to date have suggested small and inconsistent differences in success between hunters that use bait and those that do not bait. An analysis using Wisconsin data suggests that a prohibition on baiting would not be likely to significantly affect firearm harvest of antlerless deer, but might depress archery harvest.

During the 2002 Wisconsin deer seasons, there was a 19% reduction in the number of archery licenses and a 10% decrease in gun deer licenses sold from 2001 license sales. In addition, the preliminary analysis of the deer harvest data shows a 38% reduction in the archery harvest and a 10% reduction in the deer gun harvest. Until data from the 2002 CWD deer hunter survey are analyzed (Petchenik in prep.), it is not certain whether this reduction was due in part to the elimination of baiting as a hunting method, or whether concerns about CWD were the factors limiting participation and harvest.

The primary effect of a proposed ban on deer baiting and feeding would likely be a reduced risk of transmitting CWD to healthy deer. A primary biological consideration of baiting and feeding deer is the increased potential for disease transmission whenever animals are concentrated. Disease spread may be directly related to deer density, stress, and animal contact. CWD is one of many disease risks associated with feeding and baiting. The proposed action is anticipated to reduce the transmission of CWD between healthy and infected deer by: 1) reducing deer nose to nose contacts; 2) eliminating potentially contaminated food sites; and 3) reducing deer herd density to natural carrying capacity.

There are potential ecological effects associated with the ban on baiting and feeding. The proposed ban on baiting and feeding would likely have the greatest impact in northern forested environments. Populations in Wisconsin southern farmland are maintained well below maximum biological carrying capacity. Thus, artificial

energy from baiting and feeding may have minor effects on population dynamics and smaller effects on the environment in the southern farmland.

It is anticipated that a ban on baiting and feeding may result in a smaller deer herd due to a decrease in the artificial placement of food. A smaller deer herd may also result in less overall deer browsing and secondary ecological effects. In addition, the pattern of deer browsing may be more evenly distributed across the landscape. Supplemental feed may raise deer populations above levels that the natural environment will support. Artificial feed (baiting and feeding) may increase the density of deer and focus their browsing activity to the extent that other resources are damaged. A deer herd within the carrying capacity of the land should have adequate natural food resources, with less stress and competition for food, and should be less susceptible to starvation in winter and disease.

A ban on feeding may restore natural deer yarding in severe winters. Disease transmission in deer yards is likely less than at artificial feeding sites, because foraging behavior under natural conditions is fundamentally different than when deer are supplementally fed. In deer yards, deer eat a variety of woody plants and lichens on trees over a large geographical area and the potential for nose-to-nose contact over food or the consumption of food contaminated by feces and saliva is minimal. In contrast, the replacement of food at artificial feeding sites results in food being concentrated in small areas and likely fosters more nose-to-nose contacts among deer at potentially contaminated food sites.

A ban on baiting and feeding would likely have both positive and negative socio-economic effects. A ban on recreational feeding would likely reduce the enjoyment of residents who feed and observe deer. Businesses that sell bait and feed would be negatively affected. Many small businesses are highly dependent on sales of corn and other supplements to those that bait and feed deer. The overall impact on tourism is expected to be minor as deer would still be plentiful and readily observed in more natural settings. There is little evidence that prohibiting baiting would result in significant reductions in license sales. During the 2002 Wisconsin deer seasons, there was a 19% reduction in the number of archery licenses and a 10% decrease in gun deer licenses sold. Until data from the 2002 CWD deer hunter survey is analyzed, it is not certain whether this reduction was due in part to the elimination of baiting as a hunting method, or whether concerns about CWD were the factors limiting license sales. Eliminating feeding deer in the vicinity of houses close to roadways may decrease the risk of car-deer crashes. Violations relating to shooting hours, shooting from cabins, placement and quantity of bait have been significant and ambiguous enforcement issues in recent years. The prohibition of baiting and feeding would likely reduce these enforcement difficulties.

**Other Alternatives Considered.**

***No Action.*** If no action were taken, a 10-gallon limit of bait per site would continue, and no restrictions on the feeding of deer would exist.

Disease transmission risk would likely remain elevated when deer are artificially concentrated around food sources that are repeatedly replaced and likely become progressively more contaminated with feces, saliva, urine, and infectious material. Allowing baiting and feeding to continue may maintain high deer densities, causing an increased risk of disease transmission. Deer distribution may remain skewed toward areas of supplemental food, confounding harvest and disease management efforts by reducing hunter access to deer. Carrying capacity for deer may remain artificially elevated in forested zones causing undesirable browsing impacts on the forest environment. Likewise, deer behavioral patterns may remain altered as normal foraging breaksdown and timely deer yarding may be delayed in the north. Local communities may be forced to continue to promulgate feeding bans to address growing urban deer problems. Businesses selling baits and supplements would continue their economic activity. Car-deer crashes would likely continue to be an issue as homeowners continue to feed, attract, and hold deer near major roads. DNR enforcement of bait quantity, placement, and hunting hour violations would likely continue.

***Apply Ban to a Smaller Geographic Area*.** Under this alternative, the ban on baiting and feeding would be limited to areas of known infection and surrounding areas.

Given our current understanding of the occurrence of CWD and its transmission, the risk factors occur statewide. CWD has been discovered in free-ranging deer in southwestern Wisconsin and in captive deer facilities in central and southeast Wisconsin. Most recently, in the fall of 2002, CWD was diagnosed in a deer that had escaped from a game farm in southeastern Wisconsin. Deer dispersal movements of over 30 miles, although rare, have been observed in the Midwest. There are 821 captive deer and elk farms throughout the state that potentially could have received CWD-infected animals as there is no live-animal test for screening. The Interagency Health and Science Team deemed the entire statewide herd as a single "at risk" population for purposes of CWD management.

***Baiting and Feeding License*.** This alternative would create a special license for individuals that would allow them to place bait on their property under specific guidelines for hunting purposes or to feed deer for recreational viewing.

Licensing of baiting and feeding would likely allow the risks associated with disease transmission to continue. It would enable closer regulation, increase accountability, and quantify/control the extent and distribution of these activities. It would also generate revenue for conservation purposes and for enforcement and education related to baiting and feeding. However, to the extent that baiting and feeding resumed, the practices would likely also allow all of the adverse effects of baiting and feeding to continue much the same as noted for the no action alternative above.

***Quantity Restrictions*.** Various quantity restrictions have been evaluated under this alternative as a way to compromise on the prohibition of baiting and feeding of deer statewide.

This is unlikely to be effective in controlling the spread of disease. This question has been studied directly, and there appear to be problems associated with both large and small feed piles. Large piles tended to freeze during winter and deer used the warmth from their mouths and nostrils to thaw and consume food. Deer feeding in this manner may leave saliva and nasal droppings in the feed pile. Thus, disease agents may contaminate large food piles. Paradoxically, restricting baiting to five gallon limits replaced daily resulted in higher face to face contacts. While large bait piles may carry an increased likelihood that a diseased deer would be among those gathered, the higher rate of contact among individual deer over smaller piles may result in increased disease transmission.

***Placement Restrictions*.** This alternative evaluates strategies for placement (e.g., number of bait-sites per acre of land, distance from roads) and methods of placing food (e.g., broadcasting vs. piles).

Restrictions on the placement (location) of bait and feed for deer would not likely reduce disease transmission rates as deer would still congregate around food sources. Depending on the type of placement restriction proposed the alternative may or may not have a direct effect on deer herd dynamics, manageability, distribution, and behavior, human safety, and enforcement. Scattering feed also does not address the matter of environmental contamination as deer activity is still concentrated. The important difference between baiting-feeding and any natural forage (e.g., acorns) is the repeated replacement of the food in a given area. The replacement is the mechanism for allowing substantial ingestion of food or material from the site that might be contaminated by saliva or feces.

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unit population goal reviews, Deer 2000 hunting season framework development, establishment of the first Zone T herd reduction season, and coordination of the Deer Population Goals and Harvest Management Environmental Assessment. He is also an avid deer hunter.

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# RULE OVERVIEW



## Rule Description.

Rule orders WM-05-03 and WM-09-03 (Appendix B) proposes revisions to Chapters NR 10, 12, 19 and 45, Wis. Adm. Code, pertaining to CWD control efforts. The intent of this rule proposal is to help protect Wisconsin's statewide deer herd from CWD. These proposals draw upon the best available science and information. This rule reflects the DNR's recommendation that the best approach to controlling CWD is to drastically reduce the deer population in and near the affected area so that diseased deer are less likely to transmit the disease to healthy deer in and around the affected area. The rule would allow the DNR to reduce deer populations to as close to zero as possible within 4½ miles of any deer that tests positive for CWD and to reduce populations in the area surrounding the initial positive to 10 deer per square mile. The DNR also proposes to prohibit practices that cause deer to concentrate, such as baiting and feeding. If recreational opportunities conflict with these control efforts, a higher priority would be placed on disease control.

Wisconsin's CWD control plan was developed with the advice of CWD experts in other states and in consultation with the Wisconsin Department of Health and Family Services (DHFS), the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP), the Wisconsin Veterinary Diagnostic Lab (WVDL), and the University of Wisconsin. Saskatchewan, Colorado, and Nebraska have similar control efforts where deer herds are being drastically reduced in affected areas to slow or stop the spread of the disease.

Using an adaptive management approach, the proposed rule would implement the most effective CWD control strategies currently available. Adaptive management is a scientific approach that assumes that management actions must be taken with some level of uncertainty regarding the results, but integrates learning as part of the management process (Walters 1986). Adaptive management implements the best management strategy using an experimental design that allows testing the effectiveness of the program. The CWD management program will be monitored, and may be modified in the future as new information becomes available.

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## Rule Summary.

The proposed rules increase opportunities and incentives for harvesting deer in and around affected areas to reduce the spread of CWD. The rule authorizes the DNR to establish CWD management zones to delineate areas with special opportunities and requirements. . . . . These rules are aimed at controlling CWD where it is found. Preventative rules aimed at diminishing the probability that CWD will become established and spread

elsewhere include the proposed statewide deer baiting and feeding prohibitions.

The DNR may establish Eradication, Intensive Harvest, and Herd Reduction Zones to control CWD in and near known affected areas. New findings of CWD infections may necessitate identification of additional CWD zones. An Eradication Zone (EZ) would include sections of land within 4½ miles from the center of sections with a deer that tests positive for CWD. An Intensive Harvest Zone (IHZ) would include the EZ and adjacent land to nearby recognizable boundaries such as state and county highways and rivers that allow for clear communication of regulation differences. A Herd Reduction Zone (HRZ) would be an area adjacent to an IHZ where the herd would be managed at 10 deer per square mile of deer habitat to reduce the chance that CWD will spread and become established outside the IHZ. The EZ, IHZ, and HRZ boundaries would be established by emergency rule each spring. These boundaries may change based on results of each year's CWD testing and based on evolving CWD management strategies. This rule proposes the establishment of a HRZ and IHZ shown in Figure 3 around the current known positive CWD cases.

The legislature has granted temporary authorization for shooting from aircraft and vehicles by DNR employees, driving deer with aircraft, and landowners shooting from farm implements. This rule describes the conditions under which aircraft may be used for shooting deer (December 1 - April 15). This special authorization will expire June 30, 2004. Aircraft may be used for other purposes, such as surveys, any time of the year.

The proposed rule would establish a deer population goal of zero within an EZ where infected deer are known to occur, and a goal of less than 10 deer per square mile in the IHZ. The rule establishes a population goal of 10 deer per square mile of deer habitat for all deer management units and partial units in the HRZ.

The rule establishes longer hunting seasons and an earn-a-buck system to achieve the level of herd reduction that is needed in an IHZ/EZ and HRZ. For each antlerless deer shot, a hunter would earn the opportunity to harvest a buck. There is no limit to the number of bucks that are earned. IHZs would change from an earn-a-buck regulation to an either-sex regulation when the zone deer herd is reduced to five deer per square mile of deer habitat. As the deer population is reduced, it would become unreasonable to expect that a hunter must harvest an antlerless deer prior to harvesting a buck. The season length would remain unchanged to allow maximum opportunity for continued efforts to depopulate the affected area. HRZs would change from long hunting seasons and earn-a-buck regulations to standard seasons and regulations (with the option of Zone T seasons) in a deer management unit within the HRZ when the deer herd in that unit is reduced to 15 deer per square mile of deer habitat. Zone T seasons and regulations would be used to further reduce and keep the deer population at 10 deer per square mile of deer habitat if regular seasons were unable to get the deer population to within 20% of 10 deer per square mile of deer habitat.

Deer harvested in these zones would have to be registered in the zone of kill. Registration would be required by 5:00 p.m. on the day after the deer was killed. Hunters would be allowed to transport their deer outside of an IHZ or HRZ, but they still must register it in the zone of kill by 5:00 p.m. the day after harvest. It is important that hunters continue to register their deer in the zone of kill for implementation of hunting regulations (e.g., issuing earned buck tags) and collection of samples for CWD testing. The DNR does not have statutory authority to regulate movement of carcasses of registered deer. Statutory authority to regulate carcass movements is currently being sought, however, the DNR will recommend to hunters that all unused parts of deer carcasses be land-filled or incinerated.

Any legal firearm could be used, including rifles, in an IHZ. The safety record and greater range of effectiveness for rifles, together with the need to harvest all deer in this zone, lead to this recommendation. In a HRZ, firearms would be restricted to those normally allowed during the gun season for each county.

All hunters except waterfowl hunters would be required to wear clothing that is at least 50% blaze orange above the waist during the CWD gun hunts in any zone.

The DNR is asking all landowners in the affected area to cooperate with herd reduction. Non-participating landowners create refuges for both deer and the disease. The DNR is proposing that all DNR-managed lands also be opened to hunting for the same reason. State parks located within IHZs and HRZs would have consistent

seasons within these zones. These properties could continue to be exempted from hunting seasons if they are predominantly composed of designated-use areas or are in urban areas. Gun and archery seasons in these parks would begin on the Thursday nearest October 27 (same as October Zone T) and continue through three Sundays following Thanksgiving Day (same date as December Zone T), except that the seasons would not be open between the first four day hunt and the beginning of the traditional deer gun season in November for parks in the HRZs (same as all other lands in the HRZs). Normal hunting hours would apply except that the first four days would close at noon to reduce conflicts among recreationists during this high use weekend.

Deer removal permits would be issued to landowners in an EZ under the newly codified permitting process. Permits would be issued to landowners or to lessees and occupants with the permission of the landowner. Anyone could participate in these hunts if they have written permission from the landowner and meet the normal age, hunter safety, and other legal requirements to obtain a hunting license. Licenses would not be required for permit holders during gun and archery seasons in the EZ. There would be no limit on the number of deer killed. Harvested deer would have to be registered at a designated registration station.

The DNR may authorize landowners and their agents to shoot over bait by permit in an EZ. These permits would allow landowners to be cooperators with the DNR in winter removal operations. Permit conditions would ensure that baiting only be done in controlled situations and with performance expectations.

Baiting for any hunting purpose would be banned statewide to reduce the chance that a disease would become established and spread in local deer herds. An exemption is granted for baiting for bear if the bait is placed in a manner that the bait is not available to deer (i.e. in a hole or hollow stump with log or rock cap). Foods produced as a result of normal agricultural practices, standing crop foods plots, and natural vegetation are not considered bait in this regulation.

The DNR has the statutory authority to regulate the feeding of wildlife through June 30, 2004. During this time period, wildlife feeding would be prohibited where the feed is accessible to deer statewide to reduce the chance that a disease would become established and spread in local deer herds. This proposed rule would not prohibit bird and small mammal feeding where the feed is inaccessible to deer. The proposed rule would also continue to allow feeding of wildlife by people attending the feed as long as they removed the feed when they left the site. Devices that are designed to cast feed to the ground would be prohibited. Attendees at the CWD public meetings held around the state in summer 2002, asked the DNR to ban deer feeding statewide and similar responses were received from the CWD management questionnaire (Appendix D).

The proposed rule allows the DNR to issue replacement tags to hunters who surrender to the DNR deer believed to be diseased. This provision would encourage hunters to shoot potentially sick deer and have them tested.

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## Rule Authority.

DNR authority for these rules is granted in § 29.014, 29.033, 29.307, 29.335, 29.885, 227.11, and 227.24, Wis. Stats. Laws interpreted include § 29.033, 29.177, 29.307, 29.335, and 29.361, Wis. Stats.

## Estimated Cost and Funding Source.

The costs associated with the management and control of CWD in the state would pose a significant financial burden, including reduced license revenues and increased costs in subsequent years. A detailed fiscal analysis of this rule is available in Appendix E.

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***Environmental Impact Statement***
***on Rules to Eradicate Chronic Wasting Disease***
***in Wisconsin's Free-Ranging White-tailed Deer Herd***

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*For contact details regarding publication see Title Page*

# BACKGROUND



Because CWD is relatively new, much remains unknown about the disease, how it functions, its epidemiology, and transmission dynamics. Intensive research on CWD and how it affects cervid populations has only begun in the last decade. This chapter describes: 1) what is known about CWD at this time; 2) what is currently being done at the national and state levels to combat CWD; 3) the history of CWD in Wisconsin; and 4) what actions Wisconsin state agencies have taken up to this point in time to control the disease. This information was used to develop the CWD Management Plan and proposed rule assessed in this document.

## Description of Disease

CWD belongs to the family of diseases known as transmissible spongiform encephalopathies (TSEs), so called because these diseases cause microscopic holes in brain tissues giving it a sponge-like appearance. TSEs include diseases such as scrapie in sheep, bovine spongiform encephalopathy (BSE) in cattle, and Creutzfeldt-Jakob disease of humans. The causative agent is believed to be a proteaseresistant protein (or prion). These modified proteins are typically found in nervous and lymphatic tissues, but recently prions have been detected in muscle tissue of mice experimentally inoculated with BSE prion. Prions have not been detected in muscle tissue of naturally infected species, although research on prion diseases is unusually difficult because prions are difficult to detect.

No treatment is known, and the disease is typically fatal in cervids. Infected deer and elk can appear robust and healthy in the early stages of CWD and may take two or more years before they show clinical signs of the disease. The clinical signs are not unique to the disease and can be due to other conditions such as malnutrition. Currently, the "gold standard" or nationally recognized test for diagnosing CWD requires the microscopic examination and/or immunohistochemistry (IHC) staining of a specific portion (obex) of the brain. In addition, IHC tests for retrophryngeal lymph nodes (found in the head) can indicate early (4-6 months from the time of first exposure) CWD infection in deer (Wolfe et al. 2002, Wild et al. 2002).

**Figure 1.** Current known distribution of CWD in free-ranging and captive deer and elk populations.

The spread of CWD in wild animals is of great concern. The disease was originally described in captive animals 35 years ago in Colorado. CWD was first detected in free-ranging mule deer in 1981; however, epidemiological modeling suggests that CWD may have been present in Colorado and Wyoming for 15-20 years before it was discovered in freeranging deer (Miller et al. 2000). Over the last five years, however, CWD has been found in wild herds in several surrounding states and Canada (Figure 1). In 2002, CWD was detected in wild deer in South Dakota, New Mexico, Wisconsin, and most recently, Illinois. The recent detection of CWD in the wild white-tailed deer herd in Wisconsin is of particular concern due to the potential for rapid spread within white-tailed deer populations of substantially higher densities than in the previously identified endemic areas of Colorado, Wyoming, and Nebraska (2-5 deer per square mile). Fall deer densities in south-central Wisconsin can be as high as 75+ animals per square mile.

**Agent**

The agent causing CWD and other TSEs is incompletely characterized, but it appears to be a prion. Prions are proteins that are naturally produced in nerve, lymphoid, and the cells of other tissues. Most data support the hypothesis that the causative agent of CWD is an abnormal, protease-resistant form of the normal prion.

In humans, abnormal prions seem to arise most commonly via sporadic mutations or spontaneous conversion of normal proteins to abnormal prions, although there seem to be genetic and age factors related to susceptibility in humans. In animals, TSEs can be transmitted as food-borne diseases associated with animal products and can function like infectious agents. Spontaneous forms have not been identified. It is possible that abnormal prions resulted from spontaneous alteration of normal prions to abnormal prions with subsequent transmission to susceptible deer and elk. Alternatively, CWD could be a strain of scrapie that has adapted to cervids (Race et al. in review). Additional, though relatively weak, evidence for a link between scrapie and CWD is the moderate ability of abnormal prions to convert bovine normal prions in vitro (Raymond et al. 2000) and the susceptibility of goats to intracerebral exposure to the CWD agent (Williams and Young 1992). CWD also could have originated by infection with an unidentified prion strain. The CWD agent differs from the BSE agent, many strains of scrapie, and transmissible mink encephalopathy agent based on mouse strain typing and molecular (glycoform) pattern comparisons (Bruce et al. 1997, 2000; Race et al., in review). The marked similarity of central nervous system lesions, epidemiology, and glycoform patterns strongly suggests the CWD agent is the same in farmed, captive, and free-ranging deer and elk (Williams and Young 1993, Spraker et al. 2002). Whether multiple strains of these abnormal, protease-resistant prions occur in nature remains under study (Williams et al. 2002a).

Distinct prion strains (for TSEs) with specific host affinities, pathotypes, and molecular profiles have been recognized from studies of infected animals or tissues (Bruce et al. 1994, 1997, 2000; Raymond et al. 1997, 2000; Safar et al. 1998, 2000; Race et al., in review). The nature of these strain differences remains controversial and is still under investigation (Williams et al. 2002a). Strain typing experiments determined that CWD is not like known scrapie strains (Bruce et al. 2000), though direct comparisons with North American strains have not been conducted.

**Susceptibility**

Mule deer, white-tailed deer, and Rocky Mountain elk are known to be naturally susceptible to CWD. . . .Both sexes and all age classes show relatively uniform susceptibility (Miller et al. 2000, Williams et al. 2002a). In contrast, a variety of wild and domestic species appear to be resistant, or at least much less susceptible to CWD, although the numbers of animals tested remains small. So far, moose, pronghorn antelope, Rocky Mountain bighorn sheep, mouflon, mountain goats, and blackbuck held in contact with CWD-affected deer and elk or resident in premises where CWD occurred have not developed the disease. Domestic livestock are not known to be naturally susceptible to CWD. A few cattle, sheep, and goats have resided in research facilities with CWD for

prolonged periods without developing the disease. Cattle intensively exposed to CWD-infected deer and elk via oral inoculation or confinement with infected captive mule deer and elk have remained healthy for over five years (Williams et al. 2002b). These observations of apparent species barriers to efficient transmission are supported by molecular and intracerebral challenge studies (Raymond et al. 2000; Hamir et al. 2001; Williams and Young, unpubl. data).

Many species can be experimentally infected with CWD (and other TSEs) when exposed via intracerebral inoculation, an unnatural route of exposure commonly used to study prion diseases (Williams et al. 2002b). Mink, domestic ferret, squirrel monkey, mule deer, domestic goat, domestic cattle, and lab mice have been infected with CWD by this route (Williams and Young 1992; Bartz et al. 1998; Bruce et al. 1997, 2000; Hamir et al. 2001; Marsh, Young, and Williams, unpubl. data).

There is no known antibody response to the CWD agent (Williams et al. 2002a), although antibodies have been reported to offer resistance to disease in laboratory studies. Specific amino acids (Codon 132 methionine) were over-represented among free-ranging and farmed CWD-affected elk compared with unaffected elk (O'Rourke et al. 1999), indicating the potential for differential susceptibility. The vast majority of captive deer residing in endemic research facilities eventually contract CWD, but some individuals occasionally survive a lifetime without succumbing to CWD (Williams et al. 2002a). A specific genotype (PNRP), which plays a major role in the development of scrapie in sheep (Hunter et al. 1992, Bruce et al. 1994, O'Rourke et al. 1997), has not been demonstrated in deer, but remains under investigation (Williams et al. 2002a).

It has been suggested that some deer may possess a genetic resistance to CWD and that the fatal brain disease could be controlled by genetically improving the deer herd. Others have suggested that genetically engineering a CWD resistant deer may be possible. Current scientific evidence indicates that the vast majority of white-tailed deer are likely susceptible to CWD, and there is no evidence confirming genetic resistance in this species. While a genetic strategy may appear theoretically viable, there is no practical evidence to suggest that free-ranging deer could be manipulated by genetic engineering, artificial breeding, or propagation and release of animals in order to produced a genetically resistant population. Considering the long course of disease in deer, the high annual reproductive potential of females, and the limited ability to control breeding in free-ranging deer, strategies to manipulate genetic resistance of whitetailed deer to CWD is not currently practical.

Another theory suggests copper deficiency in deer and elk may be linked to CWD. Copper is a naturally occurring mineral vital to proper brain functions. Deer and elk may be become copper deficient when they live on crowded range where copper sources found mostly in natural browse are depleted. The basic argument is that copper deficiency may increase the susceptibility of deer and elk to CWD. It is important to note that although copper deficiencies have been linked to other diseases, there is no proven link to CWD susceptibility in wild deer and elk. Additional research is needed to determine if copper plays a role in the susceptibility of deer and elk to CWD.

**Transmission and Routes of Infection**

CWD is both transmissible and infectious, but specific details regarding transmission remain unknown (Williams et al. 2002a). In contrast to BSE, CWD does not appear to be exclusively a food-borne disease associated with rendered ruminant meat, bone meal, or animal protein products. Contact between infected and non-infected animals via saliva, urine, and feces is the most likely route of transmission. Data from CWD epidemics in captive cervids (Williams et al. 2002a) and field data from wild cervids provide strong evidence that lateral transmission (animal-to-animal) is the primary form of infection in susceptible animals. Computer simulations indicate that vertical transmission (in utero mother-to-offspring), if it occurs, is unlikely to maintain CWD in a deer population (Miller et al. 1998, 2000). Transmission via contact between susceptible and infectious individuals probably requires more than just transient exposure. The concentration of deer and elk in captivity or by artificial feeding probably increases the likelihood of direct transmission among individuals (Williams et al. 2002a). Interspecific transmission probably occurs among the three susceptible native cervid species (mule deer, white-tailed deer, and elk) when their ranges overlap.

Because prions are resistant to degradation in the environment (Brown and Gajdusek 1991), indirect

transmission via contamination of the environment by excreta (urine and feces) from infected animals is possible. Contaminated pens and pastures may have served as sources of infection in captive cervids, (Miller et al. 1998, Williams et al. 2002a). However, CWD apparently did not persist in several facilities that experienced a few cases of CWD and presumably were not heavily contaminated. The apparent persistence of abnormal prion in contaminated environments represents a significant potential obstacle to eradication of CWD from farmed cervid populations. The importance of environmental contamination in free-ranging animals is not clearly understood.

Based on available information, the brain, spinal cord, and the lymphoid tissues of the gut and head are likely to be the greatest source of infectious material (Spraker et al. 2002) (Figure 2). The brain and spinal cord, by virtue of its mass and high titer, and the lymphoid tissues of the gut and head, because of its access to the external environment, are of concern. Based on histology and immunohistochemistry (IHC), the abnormal prion deposition has also been detected in the pituitary and adrenal glands as well as the pancreas (Sigurdson et al. 2001).

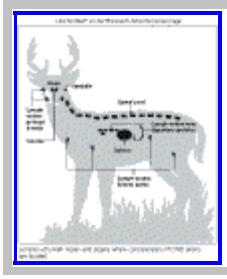
Because of the possibility of indirect transmission of CWD, the best methods for disposal of unwanted carcasses, parts of carcasses, or disinfecting tools used on CWD infected animals remain unclear. An abnormal prion is a highly resistant material that can retain infectivity under a wide range of conditions including treatment by heat (boiling and dry), irradiation, and most conventional disinfectants. Therefore, the choice of disposal method for CWD-infected and potentially infected carcasses and tissues and disinfecting tools used to butcher deer becomes an important concern or perceived concern for contaminating the environment. Environmental contamination with prions could possibly affect the health of free-living deer populations. Four methods of disposal have been suggested: landfills, burning at temperatures over 1200° F, rendering, and chemical digestion. Which method is best to contain and destroy the prions is unclear. A detailed discussion of these methods can be found in Appendix C.

**Pathobiology**

Experimental CWD challenge studies based on single-dose, oral infections have provided some insight into timing of the course of the disease. However, these conclusions are limited, because the course of infection may be inversely related to the exposure dose (Williams et al. 2002a). Experimentally, the minimum latency period (time from exposure to onset of clinical signs) was about 15 months and the average time to death was about 23 months (range 20 to 25 months) in mule deer (Williams et al. 2002a). The range of latency period in orally infected elk was approximately 12 to 34 months (Williams et al. 2002a). Duration is uncertain, but likely to be shorter in wild cervids. Among deer and elk residing in facilities with a long history of CWD, most natural cases occur in 2-7 year old animals, but some deer have survived longer than seven years in heavily infected facilities.

Although prion biochemistry is not well understood, the following is a likely route of prion amplification and transmission through animal systems (Figure 2). In natural cases, the route of infection is believed to be oral. In the gut, prions may be taken up by the lymphoid tissues (Peyer's patches), then transported around the body in lymphocytes. Nerves that supply the lymphoid tissues then allow prions to travel back up these tissues to the brain. Since lymphocytes carry prions, it is reasonable to assume that transport to other lymphoid tissues might occur in parallel through the blood. Prion replication is believed to occur in the lymphoid tissues, especially the spleen. When normal prions encounter CWD abnormal prions, the abnormal prions are thought to force the normal prions to change shape (both prions are the same amino acid sequences, but have different shapes). This shape-flipping is equivalent to the transmission of infection. The abnormal prions are resistant to degradation by the natural cellular protease enzymes, therefore, abnormal prions accumulate in the cell.

**Figure 2.** Location of lymph nodes and organs where concentration of CWD prions are located.



It is not known when during the course of infection an animal becomes infectious, but abnormal prion shedding may be progressive through the course of disease in deer (Williams et al. 2002a). Accumulation of abnormal prions in gut-associated lymphoid tissues (e.g., tonsils, Peyer's patches, lymph nodes) early in the latency period suggests that shedding through the alimentary tract via feces and saliva may occur (Sigurdson et al. 1999, Miller and Williams 2002, Spraker et al. 2002). Epidemiological models for elk and mule deer suggest shedding probably precedes onset of clinical disease. Demonstration of abnormal prions in lymph nodes and tonsils of deer early in incubation (Sigurdson et al. 1999, Wild et al. 2002) provides a reliable means of antemortem and preclinical diagnosis of CWD (Williams et al. 2002b). However, due to differences in pathogenesis of CWD in elk, sampling lymphoid tissue, such as tonsils in elk, does not appear to be sensitive enough to use as a reliable live diagnostic test (Williams et al. 2002b).

Animals that have clinical disease exhibit behavioral changes and progressive loss of body condition that invariably lead to death. Affected animals may walk repetitive courses, and may show subtle ataxia and wide-based stance. Subtle head tremors may occur. Affected animals may be found near water sources or in riparian areas, have periods of drowsiness, and carry their head and ears lowered. Affected animals continue to feed, but amounts of food consumed and/or digested are reduced, leading to gradual loss of body condition. Excessive drinking and urination are common in the terminal stages and many animals have excessive salivation and drooling, causing wetting of the hairs on the chin and neck (Williams et al. 2002b). Once the signs of CWD appear, the clinical course can vary from a few days to about a year, with most animals surviving from a few weeks to 3-4 months (Williams et al. 2002a). Clinical courses in wild cervids probably are shorter than in captive animals, because wild cervids must forage, find water, and are susceptible to predation. Aspiration pneumonia is a common finding at postmortem examination of terminal CWD cases. This condition presumably is due to difficulty swallowing, hypersalivation, and inhalation of foreign material into the lungs (Williams et al. 2002b). Clinical signs of CWD alone are not diagnostic, and definitive diagnosis is based on examination of the brain for spongiform lesions and/or accumulation of abnormal prion protein in the brain and lymphoid tissues by immunohistochemistry.

**Prevalence**

CWD can reach high prevalence in captive cervids (Williams et al. 2002a). In one facility, greater than 90% of the mule deer exposed for greater than two years either died or were euthanized due to clinical CWD (Williams and Young 1980). Recently, CWD prevalence greater than 50% has been found in white-tailed deer confined in association with an infected elk farm (Nebraska Game and Parks Commission 2002). Among captive elk, CWD was the primary cause of adult mortality in two research herds (Miller et al. 1998), and high prevalence has been reported from other farmed herds (Williams et al. 2002a).

Based on tissues from animals collected by hunters in the CWD-endemic area in Colorado, prevalence of pre-clinical CWD was estimated from approximately 1-15% in mule deer, 1-22 % in white-tailed deer, and less than 1 % in elk (Miller et al. 2000). In Wisconsin, prevalence of CWD in white-tailed deer was estimated at approximately 3 % in a newly discovered affected area, but local prevalence at the center of the area was approximately 13% from data collected in April 2002.

Prevalence was similar between male and female mule deer (5.5% vs. 3.6%), white-tailed deer (2.3% vs. 1.4%), and elk (0.7% vs. 0.3%) in the endemic area of Colorado (Miller et al. 2000). For mule deer, prevalence differed between age classes within each sex. Prevalence was consistent across age class for females, but increased through the 4-6 year class then declined in males (Miller et al. 2000). ). In Wisconsin, prevalence of CWD in white-tailed deer sampled in the spring and summer of 2002 did not vary among males and females (males: 2.8%, 95% confidence interval 1.1-5.7%, n = 250; females: 2.6%, 95% confidence interval 1.6-4.0%, n = 795), nor did prevalence change with age in the spring 2002 sample (odds ratio 1.13, 95% CI 0.93-1.39, n = 476).

**Factors Affecting Changes in Prevalence and Geographic Spread of CWD**

Little is known about the rate of increase in prevalence and geographic spread of CWD or the factors that affect these rates. CWD was first detected in free-ranging mule deer in 1981, however, epidemiological modeling suggests that CWD may have been present in Colorado and Wyoming for 15-20 years before it was discovered

in free-ranging deer (Miller et al. 2000). Surveillance in free-ranging mule deer populations did not begin until the mid-1990s. By 1999, the known endemic area of Colorado and Wyoming covered 15,000 square miles (Miller et al. 2000). Prevalence in mule deer within the endemic area varied among geographically distinct subpopulations from less than one percent to nearly 15%.

Increases in CWD prevalence in Colorado and Wyoming have been relatively slow. Epidemiological modeling suggests that prevalence in Colorado and Wyoming may have increased 0.5% to 0.7% annually during the 1980s and 1990s. Miller et al. (2000) characterized CWD in Colorado and Wyoming as an "epidemic with a protracted time scale". Simulation modeling, however, suggests that small changes in transmission rates can greatly affect the rate of change in CWD prevalence. Gross and Miller (2001) proposed that the rate of change in CWD prevalence is affected by 1) the rate of disease progression (incubation period and clinical course) within infected individuals, 2) the rate of CWD transmission between infected and susceptible individuals, and 3) the rate of population turnover (a function of reproduction and mortality). Miller et al. (2000) estimated 1.2-1.3 new infections per infectious animal per year for mule deer populations. These estimates were from relative low-density deer populations in Colorado and assume random, density-independent transmission among individuals. However, Miller et al. (2000) indicated that transmission rates would need to be much higher (about 3.5 new infections per infectious animal per year) to simulate epidemics in captive deer populations where extremely high prevalence (50-90%) has been observed. These results suggest more intensive transmission under confinement or in high-density populations. It is not known whether transmission rates are dependent on wild deer density and no studies have been conducted to directly measure CWD transmission among wild cervids. Mule deer densities in northeast Colorado and southeast Wyoming are much lower then white-tailed deer densities in southern Wisconsin. In addition, the deer populations in southern Wisconsin are more contiguous than the geographically distinct populations of mule deer in the Colorado and Wyoming endemic areas. The substantial difference in deer density and distribution of populations between these regions raises concerns that transmission rates may be higher in Wisconsin than in western mule deer. In addition, factors that influence CWD transmission rates are poorly understood, but likely there is a complex relationship between CWD transmission, the social organization and density of the cervid species, and habitat-related differences in dispersal and movement patterns.

Currently there are no data available to link animal densities to prevalence rates in wild cervids. Colorado is currently testing whether population density reduction results in reduced prevalence (Ver Steeg 2002). The density of deer in Wisconsin's CWD management areas may be as much as 10 times that of the density found in western free-ranging populations where CWD is endemic prompting concern about rapid spread of CWD. Because CWD is readily transmitted among captive cervids, it is believed that transmission may also be facilitated by the concentration of animals due to artificial baiting and feeding.

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## Deer Ecology as it Relates to CWD

The discovery of CWD in southwestern Wisconsin represents the first instance of the disease in a high density white-tailed deer population. Simulation modeling suggests that the rate of change in CWD prevalence can be greatly affected by small changes in transmission rates (Gross and Miller 2001). Factors that influence transmission rates are poorly understood, but transmission rates are likely affected by deer density and by species and habitat-specific differences in movement patterns and social structure of deer populations. In addition, deer ecology also affects the population consequences of CWD and the ability to manage the disease. Rates of reproduction, natural and human-caused mortality, and dispersal for white-tailed deer in southwest Wisconsin are likely very different from the published results of Rocky Mountain mule deer.

### Movements

Although uncertainty remains about the mechanism of CWD spread across landscapes, it is generally believed that dispersing deer are a likely avenue of disease spread. Male and female fawns generally remain with their mother through their first year of life. Female fawns often remain in the same social group as their mother. These matrilineal family groups consist of a dominant female, her female offspring, and their fawns (Mathews 1993, Aycrigg and Porter 1997). Matrilines tend to be philopatric, traveling together throughout most of the year (Hirth

1977). Prior to fawning, matrilines tend to separate such that each female occupies largely exclusive fawning ranges configured in a "rose-petal" arrangement with the dominant females at the center and subordinate females surrounding (Ozoga and Verme 1982). However, lack of available fawning habitat or disruption of the matrilines may result in female dispersal, especially among one and two-year olds (Nixon et al. 1991).

In contrast, male fawns usually disperse from their natal ranges as they approach puberty (12-18 months of age; Nelson 1993). Dispersing males often form social groups of unrelated individuals. These male groups separate during the breeding season, and breeding territories are established and defended by males that are mature enough or aggressive enough to assert local dominance. Sub-dominant males may show a range of breeding season behaviors from essentially non-participation to "floater" and interloper behaviors in and around established territories (Ozoga and Verme 1982).

Dispersal distances in the Midwest can be as long as 130 miles (Kernohan et al. 1994) although analysis of dispersal distance distributions (Nelson 1993) suggests that long-distance (greater than 30 miles) are quite rare and that median dispersal distances are more likely in the 5-10 mile range (Nelson 1993). If specific habitats are limited (e.g., forest in the intensively-row-cropped corn belt), median dispersal distances can be much larger (about 25 miles; Nixon et al. 1991). In southern Wisconsin, a total of 197 does and 87 bucks were marked during four studies conducted in the 1970s and early 1980s (Ishmael 1984, Wozencraft 1978, O'Brien 1976, Larson 1974). Movements were noted for six does and 12 bucks. The maximum distances recorded in these four studies ranged from 6-12 miles and mean distances were 3-4 miles. Etter et al. (2002) reported mean dispersal distances of 3-5 miles for doe and buck fawns in a study in the Chicago, Illinois suburban forest preserves.

**Reproduction and Mortality**

White-tailed deer in southern Wisconsin have relatively high rates of reproduction and mortality, resulting in fairly rapid population turnover. Midwestern habitats generally have lush temperate vegetation that provides ample forage and secure hiding places. As a result, female deer typically maintain a high nutritional plane, have high rates of reproduction, and survival of fawns is relatively high. Pregnancy rates in southern Wisconsin during the mid-1980s were 51% for fawns, 88% for yearlings, and 95% for adult does. Mean in utero litter sizes were 1.15 for fawns, 1.66 for yearlings and 1.90 for adult does (McCaffery et al. 1998). During the 1990s observed fawn:doe ratios during July-September averaged 1.06 in southwestern Wisconsin (Wisconsin DNR, unpubl. data). These reproductive parameters result in an average annual rate of increase of 1.4 between midwinter and the subsequent fall, meaning the population, on average, will increase by at least 40% per year from the addition of fawns.

Deer populations in southwestern Wisconsin are heavily hunted with average densities of more than 20 hunters per square mile of deer habitat on opening day of the November gun season. Estimates of adult survival rates from demographic models for southern Wisconsin average about 30% for males and 60% for females during the late 1990s (Wisconsin DNR, unpubl. data). The difference in adult survival rates between sexes has an overwhelming influence on the age and sex structure of the population.

Estimates of non-hunting mortality are not available for southwestern Wisconsin, but this type of mortality is believed to be minor. Coyotes can be an important source of neonatal mortality in areas associated with high deer density and limited fawning habitat (Nixon et al. 1991, Piccolo 2001), however, high late summer fawn:doe ratios in southwestern Wisconsin suggest that fawn survival is good. Deer-vehicle accidents are numerous in Wisconsin, but consequent population effects in rural areas are usually minor (Nixon et al. 1991, Van Deelen et al. 1997). Weather-related starvation occurs infrequently in southern Wisconsin (Wisconsin DNR 2001). Previously, disease has not been a significant source of deer mortality in Wisconsin. CWD and epizootic hemorrhagic disease (EHD), a viral disease transmitted by biting midges, have only recently been found in Wisconsin's wild deer herd. However EHD is seasonal, usually occurring in late summer and early fall, and ending when frost and cold weather kills the midges.

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## Wildlife Disease Control

Goals for managing wildlife diseases include: 1) preventing the introduction of disease; 2) controlling the spread of the existing disease; or 3) eradication of the disease (Wobeser 2002). Strategies for disease management include directly attacking the disease agent, blocking the transmission among individuals, managing environmental conditions to reduce transmission, or reducing the population of infected and susceptible individuals below the threshold required for the disease to persist.

Wobeser (1994) reviewed the use of population reduction as a technique for controlling disease in wild animals. This method is based on the premise that infectious disease is a density-dependent process (i.e., host population density is an important factor affecting the rate of transmission of contagious diseases). For many diseases there is a minimum threshold level of the host population below which transmission does not occur. However, because the transmission process differs for each disease the threshold level is different for every disease situation. The rate of disease transmission to susceptible hosts may depend on the contact rate among hosts, number of susceptible hosts, and the number of infected hosts. In addition, the social behavior of a wildlife species can influence the transmission of disease. Options for host population reduction include selective removal of diseased animals, general reduction of population density, and elimination of the total population that may have been exposed to the disease.

Depopulation has been used to control a variety of diseases including rabies, plague, avian cholera, tuberculosis, histoplasmosis, rinderpest, brucellosis, and foot-and-mouth disease. Depopulation has been used most frequently for diseases of carnivores, bats, rodents, and occasionally for game species. This likely reflects public perceptions and concern about the desirability of killing certain species. Population reduction, however, is being used as one of several strategies to control tuberculosis in white-tailed deer in Michigan (Thorne et al. 2000).

Population reduction is a race between the removal of animals from the population by all causes, including the reduction effort, and recruitment through reproduction and immigration from the adjacent area. The probability that a population reduction program will be successful is dependent upon the intensity, consistency, and duration of the control effort and the specifics of the disease-host relationship including the transmission process, duration of infectivity, and the host species reproductive rate and dispersal tendencies. Population reduction requires continued effort over a lengthy period of time to be effective due to the potential for population growth via reproduction and ingress.

Host population reductions can be classified as: 1) focal depopulation about a specific site; 2) depopulation of an area surrounding the disease to create a barrier; and 3) general depopulation over a large area. Depopulation has been more effective in preventing entry of a disease into an area than in trying to control an established disease. It has also been more effective in dealing with isolated areas of disease than with a widely distributed disease. Consequently, control efforts have tended to de-emphasize extensive population reduction over large areas in favor of intensive control on smaller areas. In addition, there has been a greater use of specific information about the ecology of both the host and the disease agent in planning the program. The success of local or barrier depopulation is dependent on effective disease surveillance in order for control measures to be applied promptly in the correct location. Delay in recognition or reporting may allow the disease to spread widely making it more difficult to control.

Although population reduction has been used in an attempt to manage many diseases, the degree of population reduction achieved and the success of such programs has been highly variable. It is difficult to assess the effectiveness of many population reduction efforts because few such programs have objectively evaluated the effect of the depopulation on disease control. Only subjective assessments of effectiveness are available for most depopulation programs.

The culling of over 22,000 deer in California in 1924 was successful in eradicating foot-and-mouth disease (Fletch 1970). Depopulation of wildlife species was an important component in efforts to control rinderpest epidemics in southern Africa during the 1910s and 1930s (Scott 1981). In contrast, host population reductions have been less successful in efforts to control myxomatosis in rabbits (Yuill 1981) and sylvatic plague in rodents (Olson 1981).

Early efforts to control rabies in vampire bats by destruction of bats at roosts were largely unsuccessful but development of more sophisticated methods of killing bats with poisons greatly increased the effectiveness of control efforts. Control efforts for vampire bat rabies have also benefited from increased knowledge of disease epizootiology and bat behavior that facilitated more precise geographic targeting of control activities. A 95% reduction of the vampire bat population in advance of a rabies epizootic in Argentina was successful in blocking the spread of the disease (Wobeser 1994). Vampire bat control efforts in Brazil and Venezuela were also successful in stopping outbreaks.

A massive depopulation of foxes, coyotes, wolves, and other carnivores was conducted in Alberta during 1952-54 in an effort to stop an epizootic of rabies. The program was viewed by some as successful due to the apparent eradication of the disease. However, the same epizootic diminished in other Canadian provinces at about the same time without similar depopulation programs (MacInnis 1987).

The effectiveness of depopulation of foxes for controlling a rabies epizootic in Europe is questionable. Gassing of dens and shooting for bounty during the 1960s was estimated to reduce the fox population by 80% in a control zone, limiting the spread of rabies into Denmark and eventually eliminating it. Similar efforts were successful in preventing a rabies epizootic from entering a disease-free area of Switzerland. Both of these efforts benefited from geographic barriers that helped limit movement of the disease. In contrast, fox rabies control efforts in other parts of Europe apparently were ineffective (MacDonald and Voigt 1985), likely due to the high reproductive rate in good quality habitat and long dispersal distances. These host biological characteristics necessitate a high level of effort to maintain areas free of foxes (Anderson et al. 1981).

During the early 1970s, Alberta used depopulation in an effort to prevent skunk rabies from entering the province. Poisoning, shooting, and trapping were used in a 30 km x 635 km zone along the border of Saskatchewan. In addition, depopulation activities were conducted within five km of all reported rabid skunks outside of the border zone. The program was judged to be successful in reducing the spread of rabies but it did not totally prevent occurrences of rabies in Alberta. Subsequent rabies outbreaks in Alberta were effectively contained by intensive skunk control (Rosatte et al. 1986). In contrast, limited control efforts in Saskatchewan and inconsistent efforts in Montana appeared to allow rabies to increase in prevalence and spread (Pybus 1988).

Total extirpation of host species from an area can be extremely difficult because, as populations are reduced, the effort required for further reduction increases substantially. Therefore, eliminating the last few individuals becomes very difficult. The Brucellosis and Tuberculosis Eradication Campaign in Australia significantly reduced populations of feral water buffalo (Freeland and Boulton 1990). On a 389 square km area, the buffalo population was reduced to less than 1 % of its initial size by a combination of helicopter roundup and ground and aerial shooting (Ridpath and Waithman 1988). However, as buffalo density decreased, the time required to remove an animal by helicopter shooting increased substantially, in part due to behavioral changes (hiding and reduced diurnal activity) of buffalo subjected to aerial gunning over extended periods. Ridpath and Waithman (1988) concluded that eradication of buffalo from their entire range was an unrealistic objective. The time required to kill feral pigs in control programs in Australia increased exponentially as aerial shooting reduced population density (Choquenot et al. 1999). Saunders and Bryant (1988) felt that complete eradication of feral pigs during a disease outbreak might be unachievable. However, complete eradication of the host species may not be necessary to eliminate the disease. Disease elimination can be achieved if the host population is reduced below the transmission threshold.

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## Current CWD Management Plans

Options for management of CWD are limited because no vaccine is available to prevent infection in susceptible animals and there are no known treatments for infected individuals. The long incubation period, possible environmental contamination with a persistent pathogen, and an incomplete understanding of the routes of transmission limits options for control of CWD (Williams et al. 2002a).

Management plans for CWD should be viewed as experimental and adaptive. Management plans should integrate research, management, and surveillance programs. They should be flexible and be altered using new

knowledge gained from surveillance testing, research, and monitoring the effectiveness of the management program.

Management options for captive cervids are currently limited to quarantine or depopulation. Attempts to eradicate CWD from captive cervid farms by depopulation are currently underway in Colorado, South Dakota, and Wisconsin, however, it is too early to know if these efforts will be successful. Efforts to eradicate CWD from two captive research facilities in Colorado and Wyoming during the 1980s were unsuccessful. The reasons for these failures are not known, but a possible explanation may be contamination of the facilities with the pathogen and subsequent infection of reintroduced animals (Miller et al. 1998, Williams and Young 1992).

Management of CWD in free-ranging deer and elk populations will be considerably more difficult than in captive herds. Active surveillance programs to detect CWD in new areas, determine the spatial extent of CWD, to monitor changes in the prevalence of CWD over time, and to assess the effects of management actions are essential for successful management (Williams et al. 2002a).

The following section includes examples of proposed actions to control CWD that were developed by a national CWD management team for the country and by states and provinces where the disease has been found.

**National CWD Management Plan**

During summer 2002, a National CWD Task Force developed a "Plan for Assisting States, Federal Agencies, and Tribes in Managing CWD in Wild and Captive Cervids". The task force was formed to ensure that federal and state agencies cooperate in the development and implementation of an effective national CWD program. It was composed of representatives from the U. S. Department of Agriculture, U. S. Department of Interior, numerous state wildlife and agricultural agencies, and universities. The task force concluded that there are many aspects of the ecology of this disease about which little is known and as a consequence management of CWD must be experimental and adaptive. Management must integrate research, management, and surveillance programs to enhance the capability to control this disease. The best available scientific information should be used to plan management actions, and these programs must include methods for assessing the effectiveness of each aspect of the management plan. As new information becomes available, and as results of intervention activities are assessed, management techniques should be adjusted or replaced accordingly. The effectiveness of management can only be assessed based on changes in distribution and prevalence of the disease. For this reason, rigorous ongoing surveillance must be an integral part of any CWD management plan.

The task force developed action plans in six areas: public communications, dissemination of scientific and technical information, diagnostics, disease management, research, and surveillance. The goal of the task force that developed the disease management action plan was to identify alternative practices for herd management that can help prevent the introduction of CWD into new areas, to eliminate CWD where it presently occurs, and to reduce the impact of CWD on wild cervids by reducing disease prevalence.

The Disease Management Working Group concluded that elimination of CWD is most feasible in captive populations, and the USDA and states have proposed a program to accomplish that goal. The Working Group felt that CWD elimination in the wild is most feasible with early detection of new disease areas. With new areas, there may be time to prevent significant disease transmission, reduce movement of infected animals, and minimize environmental contamination. The Working Group recommended that if CWD elimination is not possible, the management goal should be to control and limit spread of the disease. Control and limitation of the disease's spread is most appropriate in endemic areas where the disease has maintained itself for many years over a large area.

The Working Group believed the key to the management of this disease is the development of coordinated, science-based CWD plans tailored individually to the specific situation. The Working Group recognized that CWD management plans will vary depending upon such factors as length of time the disease has been present, affected species, population density, location, resources, and human dynamics.

The Disease Management Working Group identified a number of potential actions that could be components of a comprehensive management plan. These actions included disease prevention, disease and population

management, captive cervid management, carcass disposal, monitoring and adaptive management, environmental decontamination, and population restoration.

In areas where CWD has been identified, the Disease Management Working Group recognized that there are a variety of management techniques to eliminate, contain, or control CWD. Outbreak surveillance establishes the prevalence, incidence, and distribution of the disease, and allows the evaluation of management actions. Population reduction can be used for farmed cervids, or for free-ranging cervids in limited geographical areas. Reduction in population density can be used where CWD is already present or as a preventative measure. Hunting provides one of the most effective strategies for reducing population densities for CWD management and surveillance activities. Targeted removal can reduce a specific subset of an affected population (such as yearling males that are naturally dispersing from a CWD area). Testing and removal of CWD affected animals from a population would likely be appropriate only in limited situations. Vaccines and treatments for infected animals are not currently available. Restrictions on feeding or baiting of free-ranging cervids and regulations for the farmed cervid industry were examples of regulations of human behavior that may be used to control CWD. Habitat modifications that limit animal use of areas might be useful in dealing with environmental contamination and reducing the spread of disease to new areas. Federal and State agricultural and wildlife agency regulations that limit captive animal and carcass movements may help prevent the spread of CWD.

**Other State and Provincial Management Actions**

CWD is considered endemic in an area of approximately 16,000 square miles in northeastern Colorado and southeastern Wyoming (Miller et al. 2000). Both states have recently adopted policies and plans for management of the disease. In addition, the disease has been found in free-ranging cervids outside the endemic area in Colorado, and in South Dakota, Nebraska, New Mexico, Saskatchewan, Illinois, and Wisconsin (Figure 1). Below are summaries of CWD management plans and policies that these states and provinces have adopted.

**Multi-State Plan**. A number of states, including Colorado, Wyoming, Nebraska, and South Dakota, that either have CWD or border states with CWD have been working to develop a comprehensive multi-state CWD management plan. The plan would serve as a guideline for development of state-specific plans but would not be binding on any signatory agency. The goals of the draft multi-state plan are to: 1) minimize the potential for CWD to spread; 2) manage infection rates within existing endemic areas according to each state's objectives; 3) eliminate the disease to the extent practicable when outbreaks occur in new areas; 4) support and conduct applied research that will expand knowledge of CWD; and 5) provide timely, complete, and accurate information about CWD to agency personnel and the public.

The plan recognizes that a more thorough understanding of CWD is needed for effective management of the disease and encourages states to participate in ongoing and future research.

The draft plan encourages states to develop detailed management plans for CWD-affected populations of deer and elk and recommends that artificial feeding and baiting should be banned or discouraged in affected areas.

The plan recognizes the importance of public hunting for managing deer and elk populations to reduce disease prevalence but stresses that disease management should take precedence over recreational hunting opportunities if they are in conflict. The plan further recognizes that it may be necessary for agency personnel or agents to cull animals for disease management and/or research and encourages states to establish the authority needed for such actions.

Because of potential health risks associated with consumption of deer and elk meat, the plan encourages state wildlife agencies to continue to work cooperatively with their public health agencies to monitor the health risks associated with CWD and to develop strategies for sharing current information about CWD with hunters in affected areas.

The plan recommends that states conduct surveillance to monitor the occurrence, distribution, and prevalence of CWD and the response to management. However, the plan recognizes differences between surveillance testing and food safety testing and recommends that state wildlife agencies not assume responsibility for food safety assurance. Rather states are encouraged to work cooperatively with public and private testing facilities to

provide public hunters with information about available testing opportunities and costs to minimize the risk of consuming deer and elk with CWD.

The plan recommends that live free-ranging deer and elk not be translocated from CWD-affected areas except for research purposes and encourages states to exercise caution when considering translocation of deer and elk from areas not known to be affected.

The plan encourages state wildlife agencies to work cooperatively with their respective agriculture agencies to regulate the movement of captive deer and elk. The plan recommends that captive herds be monitored for at least 60 months before movements are authorized. Monitoring includes individual animal identification, annual reporting of herd additions and subtractions, and testing and reporting of all mortalities for CWD. The plan encourages states to develop uniform and consistent recommendations and regulations restricting the movement and disposal of carcasses of animals harvested in CWD-affected areas.

The plan also encourages states to provide ongoing training to all staff involved with CWD and to communicate with other state and federal agencies frequently to ensure coordination of actions. Lastly, the plan recommends that states continue to maintain effective communication with the general public, constituent groups, and the media about all facets of CWD.

**Colorado** The policy approved by the Colorado Wildlife Commission (CWC) in 2002 recognizes CWD as a threat to the health of deer and elk populations throughout Colorado. Disease management objectives are to: 1) minimize the potential for disease spread beyond the current endemic area; 2) reduce levels of prevalence in the endemic area; 3) reduce the impact of disease on wild cervid populations; and 4) eliminate the disease from new areas outside of the endemic area (Colorado Division of Wildlife 2002). Colorado is preparing management plans for specific herd management areas. It is the policy of the CWC that, where conflicts occur, disease management will take priority over recreational hunting opportunity in these plans. The stated disease management objectives in these plans are to limit the distribution of CWD and to reduce prevalence to less than one percent in each Data Analysis Unit, and to less than two percent in each Game Management Unit (GMU). The rationale for these prevalence levels is based on predictive models. These plans call for expanded use of aggressive harvest and selective removal to achieve specific management objectives for disease containment and prevalence reductions. The feasibility of these objectives is unknown, but preliminary research findings suggest that targeted removal around CWD "hotspots" may be an effective management strategy (Ver Steeg 2002). The degree of population reduction required to reduce transmission of CWD is unknown. Current plans are to stabilize mule deer populations in endemic areas except in GMU 9, where the goal is to reduce the population to 50% of previous density and maintain it at that level to assess the effect of deer population reduction on prevalence rates. Public hunting will be the primary management tool for population control, but Wildlife Division staff is authorized to kill deer and elk for disease management and research, including the use of helicopters and fixed-wing aircraft.

Colorado's CWD management policy gives a priority to research to expand the knowledge of CWD. The policy recognizes that it is critical to provide hunters with the best scientific information available about CWD. The policy directs the Wildlife Division to work cooperatively with the Department of Agriculture to develop regulations to restrict the movements of captive cervids between commercial facilities. In addition, the Wildlife Division was directed to promulgate regulations to restrict the movement and disposal of carcasses and portions of carcasses harvested in GMUs where CWD is known to exist. Furthermore, the Wildlife Division was directed to continue to conduct CWD surveillance to monitor the occurrence and distribution of CWD based on an assessment of risk and available resources.

Artificial feeding of cervids has been banned in the endemic area of Colorado to lessen the probability of transmission (Williams et al. 2002a). Based on the high levels of infection observed in captive facilities, Williams and Young (1980) suggest that concentrations of deer and elk at artificial feeding and watering stations may facilitate transmission.

Colorado Division of Wildlife formed an international panel of experts to review their CWD management activities. This external panel generally agreed with Colorado's approach to management of CWD, but further

recommended written plans for GMUs in the endemic area including methods to assess the effectiveness of CWD management objectives, more precise locational data from surveillance efforts, and continued research to understand CWD in free-ranging cervid populations.

**Wyoming** Wyoming's management plan for CWD has three goals: 1) disease management; 2) applied research; and 3) public information (Wyoming Game and Fish Department 2002). Based on the current understanding of CWD in Wyoming's free-ranging deer and elk, the Game and Fish Department feels that eradication is not currently a realistic disease management objective within Wyoming's endemic area.

Wyoming is working to prevent the spread of CWD and, if possible, reduce the prevalence of the disease in its endemic area. The Game and Fish Department is conducting surveillance to determine spatial distribution and prevalence of CWD, and is conducting CWD research in cooperation with other state and federal agencies. The DNR plans to use all available communication tools to provide timely, complete, and accurate information about CWD to the public. The Game and Fish Department plans to continue to work cooperatively with the Wyoming Department of Public Health to evaluate human health risks of CWD.

Wyoming has chosen an adaptive management approach to allow flexibility in conducting disease management activities depending on the results of future research. The Game and Fish Department is preparing site-specific plans to assess the feasibility of using localized population reductions to reduce the risk of spread of CWD beyond the current endemic area. Surveillance will be conducted outside of the endemic area to promptly identify new disease areas. If a new focus area is detected, sufficient deer or elk will be killed by hunters or agency personnel to determine the extent of the infection and to attempt to eradicate CWD in the new focus area. Pending the results of research in Colorado and elsewhere, Wyoming will consider management actions to reduce or stabilize the prevalence in the endemic area. Other management strategies proposed to address their disease management goal include: 1) educating hunters about appropriate carcass movement and disposal to reduce the risk of spread; 2) restricting the translocation of live free-ranging or captive deer or elk; 3) discouraging private feeding of deer and elk within the CWD zone; and 4) maintaining the ban on captive deer and elk facilities.

**Nebraska** Nebraska began surveillance for CWD in 1997. Since then, over 2,900 wild deer and 150 wild elk have been tested. Five mule deer and 10 white-tailed deer from four counties have tested positive (Morrison 2002). Game and Parks Commission policy for areas with CWD is to give priority to disease control over recreation. The management goal is to prevent the spread of CWD and eventually to eradicate it. Hunting regulations have been liberalized for areas where CWD has been found which allows hunters to assist with the control of the disease. Population management objectives are to reduce deer herds in these area by at least 50% (Bruce Morrison, Nebraska Game and Parks Commission, pers. comm.). Removal operations will continue to be conducted in areas where CWD positive animals are found. The Commission has banned hunting over bait and the transplantation of wild cervids within Nebraska. Commission policy is for CWD research to receive priority for funding and for full and complete public disclosure of all information and data.

**South Dakota** CWD has been confirmed in two free-ranging white-tailed deer and one free-ranging elk in South Dakota (Fowler 2002a, VerSteeg 2002). Surveillance efforts have intensified, and population management goals for units at risk for CWD were changed from encouraging maximum deer populations within landowner tolerance to reducing deer density (Fowler 2002b). Harvest permits have increased significantly in these units (Chuck Schluteter, South Dakota Game, Fish and Parks, pers. comm.).

**Saskatchewan** CWD has been confirmed in seven wild mule deer in Saskatchewan since 2000. Disease eradication is the stated management goal and population reduction efforts have begun in a 400 square mile area with the goal of reducing deer populations by 60% (Adam P. Schmidt, Saskatchewan Environment and Resource Management, pers. comm.). Quotas for mule deer permits in these areas have increased significantly. In addition, removal activities by agency staff have been conducted within four miles of the known positive deer.

**New Mexico** New Mexico has been conducting surveillance for CWD for a number of years. A mule deer collected from the White Sands Missile Range in southcentral New Mexico tested positive for CWD in 2002 (New Mexico Department of Game and Fish 2002). In response, New Mexico closed its borders to the import of cervids

and is continuing to sample hunter-harvested deer and elk to determine the distribution and prevalence rate of CWD in the state

**Illinois** Illinois has confirmed seven cases of CWD disease in Illinois. Illinois expanded surveillance efforts regarding CWD in 2002 and created a joint task force with the Departments of Natural Resources and Agriculture following the CWD outbreak in southern Wisconsin. About 4,000 samples of hunter-harvested deer were taken in 36 counties around Illinois during the 2002 firearm deer season Nov. 22-24 and Dec.5-8. Tests have been completed on about 1,450 samples, with seven positive results to date.

In response to CWD, Illinois has limited the importation of hunter-harvested deer or elk, restricted the importation of live animals, and banned feeding of wild deer. Illinois is waiting for completion of testing their remaining samples before further formulating their management response to CWD.

Thirty-one states are currently in the process of developing new and/or additional CWD regulations in response to these CWD management goals. Forty-six states conduct CWD testing of wild deer and elk, and two additional states are in the process of developing surveillance programs. In addition, at least 26 states and two Canadian provinces do not allow baiting of deer and elk. At least three states have enacted restrictions or are in the process of developing rules to restrict or ban baiting. At least 12 states do not allow the feeding of deer or elk, or restrict the use of feed. Nine states and one Canadian province have put restrictions on the importation of hunter-harvested deer and elk parts and six states are discussing similar bans.

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## Federal Environmental Assessments

The United States Department of Agriculture–Animal and Plant Health Inspection Service (USDA – APHIS) developed an Environmental Assessment (EA) in the Summer of 2002. The EA outlined the role of the Federal Government in CWD management. The EA reported that the primary Federal role in the CWD program would be to provide coordination and assistance with research, surveillance, disease management, diagnostic testing, technology, communications, information dissemination, education, and funding for the State CWD Program. In addition to this more general plan for CWD management, the Wildlife Services branch of USDA-APHIS is drafting an EA outlining plans to reduce cervid damage in Wisconsin and the role that agency may play in assisting the DNR with CWD management in Wisconsin.

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## History of CWD in Wisconsin

The Wisconsin Department of Natural Resources (DNR) began active CWD surveillance of hunter-harvested deer in 1999. Through 2001 approximately 1,100 deer were sampled throughout the state. In February 2002, the DNR was notified that three male deer harvested from Deer Management Unit 70A in western Dane County tested positive for CWD. In response, an interagency team was formed consisting of the DNR, Agriculture, Trade, and Consumer Protection (DATCP), and Health and Family Services (DHFS). A 12-mile radius surveillance area was designated that was centered on the three index cases. During March and April, 516 deer were collected from within the surveillance area of which 15 (2.9%) tested positive for CWD using immunohistochemistry (IHC) assays of brain stem and lymph node tissues. However, prevalence was not uniformly distributed in the surveillance area.

The Wisconsin DATCP began a voluntary CWD monitoring program for farm-raised deer in 1998. Until 2002 there were approximately 40 captive herds enrolled in the program, the majority of which were elk herds. The emergency rule adopted by DATCP in April 2002 greatly increased CWD testing and monitoring. The emergency rule required monitoring all captive herds for CWD by farmers that moved live deer or elk off a farm. The emergency rule also required testing of all deer and elk carcasses removed from farms. By December 2002, there had been over 1700 CWD tests done on farmed deer in Wisconsin and there were 260 herds fully enrolled in the state's CWD monitoring program.

A male white-tailed deer from a deer farm in Portage County tested positive for CWD in September of 2002 when it was sampled in compliance with the rule requiring testing of all carcasses if any part of the carcass is to leave the farm. This finding triggered an investigation which resulted in identifying a CWD positive female white-tailed deer on a Walworth County farm that same month. Another deer, assumed to have escaped from the same Walworth County farm in April 2002, was shot near the farm and tested positive for CWD in October 2002. All of the deer in the Walworth County herd were killed and tested for CWD in December 2002 and four additional CWD infected deer were identified. The CWD positive deer on both of these farms appear to have originated on a second Walworth County farm. All three farms were quarantined in September 2002 and the two remaining farms will stay under quarantine until they are depopulated.

As of January 31, 2003 36% of the statewide tests results had been returned that were collected during the 2002 and early 2003 statewide CWD surveillance testing. A total of 38,764 total samples were taken (11,434 in the eradication zone, 5,808 in the Management Zone, and 21,470 in the remainder of the state; two were from unknown origins). Thus far, five white-tailed deer from the western part of the current CWD Management Zone have tested positive for the disease outside the current eradication zone. Until the discovery of these positives, all previous positive wild samples (53) have been contained within the current eradication zone.

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## Actions Taken by the Wisconsin DNR to Control CWD

Based on the results of the spring 2002 surveillance sampling, Wisconsin developed and implemented an aggressive disease management program via emergency rule in an attempt to eradicate CWD from the state. The goal of the management program was to minimize the negative impact of CWD on wild and captive cervid populations, the state's economy, hunters, landowners, and other people dependent upon healthy wild and farmed populations of deer and elk. Management program objectives include:

- define the extent and severity of infection,
- investigate the possible origin of the disease in the state,
- minimize the potential spread within and between states,
- eradicate the disease in the affected areas,
- use the best available scientific information to guide management, and
- provide the public with timely, complete, and accurate information.

Management strategies to address these goals include:

- extensive testing to precisely determine the geographic distribution of CWD,
- depopulation of deer in areas known to be infected with CWD,
- reducing deer populations in surrounding areas to minimize risk of dispersing deer establishing new disease areas,
- banning the use of bait for deer hunting and the artificial feeding of deer to reduce the probability of CWD transmission, except for landowners allowed to bait by permit in an EZ, and
- conducting research to increase understanding of the disease and the effect of deer behavior on disease transmission.

### Legislation

In May 2002 a special session of the legislature was held to address CWD. The legislature passed Wisconsin Act 108 (Appendix A) that authorized the DNR to regulate the feeding of wildlife, authorized DNR staff to shoot from

vehicles and to use aircraft, authorized the extension of emergency rules, and approved a supplemental appropriation to address CWD.

**Figure 3.** Original CWD management zones identified by the 2002 emergency rule.

**Emergency Rules**

In June 2002, the Natural Resources Board approved a package of emergency rules that were needed to implement several of the CWD management plan strategies. The rule package was designed to facilitate 1) the depopulation of deer in the known affected area, 2) the population reduction in areas surrounding the affected area to minimize risk of disease spread, and 3) reducing the rate of CWD transmission by banning deer baiting and feeding. The rule package defined three management zones: the CWD EZ, an IHZ, and the CWD Management Zone. The EZ was defined to extend 9 ½ miles from the center of the known CWD positive deer and 4½ miles out from any additional positive deer. The deer population goal for the EZ was set to zero. The IHZ was slightly larger than the EZ with borders defined on state and county roads. The deer hunting season for the IHZ in 2002 was extended to a 4½ -month archery season and a gun season that ran from late October through January. The CWD Management Zone extended out from the center of the EZ approximately 40 miles. Population goals in the Management Zone were established at 10 deer per square mile of deer habitat. The gun season in the Management Zone consisted of three segments: one in late October, one from late November through mid-December, and one during the Christmas-New Years period. The 2002 archery season ran from mid-September to early January. An unlimited number of earn-a-buck (must harvest an antlerless deer prior to harvesting an antlered deer) permits were offered for both the IHZ and the Management Zone in 2002.

The emergency rule specified the conditions under which DNR staff can shoot deer from vehicles and aircraft. The rule identified deer within the EZ to be causing a nuisance and authorizes the DNR to issue permits to landowners and their permitees to shoot deer during periods defined by the DNR throughout the year. In addition, the emergency rule prohibited the use of bait for deer hunting and the artificial feeding of deer to reduce the probability of CWD transmission (see section on Baiting and Feeding). The rule also expanded firearm options and deer seasons in state parks, and authorized the issuance of replacement permits if hunters shoot diseased deer. The rule further specified transportation, registration, and disease sampling requirements for harvested deer.

These regulations were developed following discussion with the public and many organizations at meetings across the state and following review of public input on alternatives presented in a questionnaire at meetings and on the internet (Appendix D). Over 3,000 questionnaires were completed and returned. Focus groups were held with landowners and hunters from the affected area to get additional public input. DNR recommendations followed this input with a few modifications based on experience with deer herd reduction regulations. Conflicts with other land uses were considered; however, control of CWD through herd reduction was given a higher priority than conflicts with other recreational uses.

During the 2002 CWD Management Zone hunts approximately 41,000 deer were harvested. As of January 24, 2003 approximately 11,000 deer have been killed, but the seasons in the IHZ were still in progress.

Wisconsin Act 56, as of January 1, 2003, moved the authority to regulate deer farms from the DNR to the DATCP, however deer farm fencing inspection authority still rested with the DNR. Therefore, new fencing standards were created with an emergency rule until a permanent rule could replace it. While incorporating many of the deer farm fence standards from ch. NR 16, Wis. Adm. Code, the rule increased the required height of new fences from 8-10 feet. It also phased in a requirement that deer farms be double fenced unless the deer farm is

enrolled in the CWD herd monitoring or herd surveillance program.

**Summer 2002 Deer Removal**

Landowners within the EZ were issued permits for shooting deer during four one-week periods in June-September 2002. Landowners and agency shooters collected over 1,500 deer during these summer shooting periods. Thirty-one deer collected during June – September tested positive for CWD.

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## Actions Taken by Other Wisconsin State Agencies to Control CWD

**DATCP Captive Cervid Regulations**

Currently in Wisconsin there are 575 white-tailed deer farms, 272 elk farms, and 100 farms that have deer species such as red deer, fallow deer, sika deer, and reindeer registered with the Wisconsin DATCP (Figure 4). These farms represent about 35,000 cervids. They are widely scattered throughout the state. Shortly after the discovery of CWD in free-ranging white-tailed deer in Wisconsin in spring 2002, DATCP wrote emergency rules to restrict importation of cervids. These rules required that only cervids from herds that had enrolled in a state-sponsored CWD monitoring program or the equivalent for five years may enter the state. Herds must have never had any signs of CWD, must have had no connection to any CWD infected herds. In addition, owners must have kept accurate records of all transactions, deaths, and causes of death in the herd for the last five years.

The emergency rules require all cervid farms that move live animals off the farm to be enrolled in the CWD monitoring program. Monitoring for CWD in captive herds relies on testing animals that die, are harvested, or otherwise removed from the herds over several years. Provisions of the CWD monitoring program are:

- All cervids one-year old and older must have individual official identification.
- The owner must submit an annual herd census, records of animals moved off the farm or added to the farm, records of all deaths, and the CWD test results of those deaths, to account for all of the animals in the herd from year to year.
- All cervids that die or are killed for any reason and are at least 16 months old must be tested for CWD.
- A veterinarian must provide an annual letter about the CWD status of the herd.

Those herds that do not move any live animals off the farm are required to test any animals that are 16 months or older that die for any reason if the carcass or parts of the carcass leave the farm. This includes CWD testing of animals harvested by hunting if any part of the animal will leave the farm (including antlers or hides). It also includes any animals harvested where any meat will leave the farm. If the carcass must be removed from the property for disposal (e.g., burial) the animal must be tested for CWD.

In fall 2002, CWD was detected on two game farms, one in Portage County and one in Walworth County. These farms plus several others who traded deer with the affected farms were placed under quarantine. At this time, work is progressing to depopulate three captive farms.

In December 2002, DATCP Board approved a set of permanent rules that were similar to the emergency rules adopted in the spring. The permanent rules were strengthened by requiring owners of farm-raised deer to report all escapes within 48 hours and to notify a certified veterinarian within 24 hours of observing any signs or symptoms of CWD. The permanent rules further required that every farm-raised deer over 16 months of age that dies on the herd premises be tested for CWD.

**Figure 4.** Location of all Licensed Captive Cervid Facilities in 2000.

**DHFS Human Health Monitoring**

Currently, there is no scientific evidence that CWD poses a risk to human health. However, there are aspects of prion transmission that remain unknown, and no one can guarantee that absolutely no risk exists regarding human consumption of animals that have CWD. The Department of Health and Family Services (DHFS) has been working closely with the DNR to help provide hunters and venison consumers with information about potential human risks and ways to minimize those risks that is accurate, current and understandable so that prospective hunters may make informed decisions.

The DHFS is implementing a surveillance program for Creutzfeldt-Jakob Disease (CJD) in humans. CJD is a prion disease in humans caused by a prion distinct from the one that causes CWD. Clinical criteria are being developed for detecting and reporting cases of human prion disease. Funding has been obtained through a grant from the U.S. Centers for Disease Control to ensure that Wisconsin has the capacity to perform autopsies on people suspected of being infected with prion disease, to educate physicians, hospitals, and laboratories on the need to report cases of prion disease, and to investigate unusual clusters or occurrences of illnesses that could suggest some novel source for the acquisition of CJD or CJD-like illnesses.

**University Involvement**

The Wisconsin Veterinary Diagnostic Lab (WVDL) made facilities available for sample collection during the spring surveillance period and began the certification process in spring 2002 to obtain United States Department of Agriculture (USDA) authorization to run the immunohistochemistry (IHC) tests and rapid assays for CWD detection in Wisconsin. Currently, the WVDL is processing over 34,000 brain and lymph node samples collected from deer around the state. These data are being added to the DNR database weekly.

The University of Wisconsin (UW) provided resources to assist with peer review of CWD management plans, computer modeling, CWD genetics, and deer movement and behavior research, and public outreach and education activities. They assembled a panel of UW experts to review the CWD management plans that were being proposed. An individual-based, spatially explicit model was developed at the UW that predicted the likely results from using different management approaches to control and eradicate CWD. This model was used as one of the tools to assist in the selection of a strategy for controlling the disease. Currently, UW research projects investigating genetic disease resistance and genetic strain typing of CWD prions and dispersal and social behavior of deer are ongoing. UW staff facilitated town meetings with the public and provided numerous educational activities regarding CWD.

**Figure 5.** Ceded territories (shaded) of Wisconsin.

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## Tribal Issues and Involvement

In 1983, the 7th Circuit Court of Appeals determined that the Wisconsin Bands of Ojibwa Indians (referred to hereafter as Chippewa Tribes) retained their rights to hunt, fish, and gather living natural resources, including the

right to hunt deer, by the Treaties of 1837 and 1842. These rights apply to public lands within the ceded territories of northern Wisconsin, and include all or parts of 63 deer management units MUs) within all deer management regions except the southern portion of the state (Figure 5). In 1990, Judge Barbara Crabb ruled that the system the tribes use to monitor and limit harvest was adequate to protect the resource and the tribes were determined to be self-regulatory.

Among the rulings of the Court was that "the tribal allocation of treaty resources is a maximum of 50% of the resource available for harvest" (Great Lakes Indian Fish and Wildlife Commission 1991). For a discussion of tribal harvest allocation and deer seasons see Appendix F. The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) is an inter-tribal, natural resource management organization that acts under delegated authority from its member tribes in the implementation and protection of treaty rights in the ceded territories. GLIFWC biologists participate with the Wisconsin DNR in setting the deer harvest quota each spring. In addition, GLIFWC assisted with the statewide CWD surveillance effort in fall 2002.

None of the ceded territory falls in the southern portion of the state where the current eradication and herd reduction zones are located. The DNR would seek joint tribal participation if CWD is discovered in the ceded territories and would require the implementation of CWD control measures.

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# WISCONSIN CWD MANAGEMENT PLAN



A CWD Management Plan was developed in response to the discovery of CWD in Wisconsin. The goal for CWD management in Wisconsin is to minimize the negative impact of CWD on wild and captive cervid populations, the state's economy, hunters, landowners, and other people dependent upon healthy wild and farmed populations of deer and elk. This goal will be accomplished by five major actions: 1) surveillance, 2) human health protection, 3) CWD research, 4) communications, and 5) disease control.

## CWD Surveillance

Disease surveillance is key to the implementation of the management plan. Intensive surveillance sampling was conducted during fall 2002, but continuing surveillance will be a critical part of the CWD management program in the future. Surveillance strategies were developed for three distinct regions in Wisconsin: the current EZ/IHZ, the current CWD management zone, and the rest of the state. Surveillance sampling relied on hunter-killed deer for most samples. In some areas of the state, hunter-killed deer were supplemented by deer killed under deer damage shooting permits or collections of car-killed deer. In addition, DNR staff responded to any report of sick deer in the state and any CWD suspect deer are tested for the disease.

Disease surveillance was conducted in the CWD affected area (EZ and IHZ) to determine the prevalence of disease. Tissue samples were collected from every deer killed in the EZ. Sample collection during the fall hunting seasons began on September 14, 2002 with the beginning of the bow deer season and continued until the end of the bow and gun seasons on January 31. The number of samples collected depended upon hunter success. In addition, efforts were made to collect and test any deer exhibiting clinical signs of CWD (targeted surveillance). Estimates of CWD prevalence over time and geographic extent of the infection are needed to evaluate the effectiveness of disease control activities. This information is also critical for targeting control activities to areas with the highest level of prevalence. Disease surveillance also supports research investigations to help identify transmission mechanisms and to model disease spread on the landscape.

Sampling for CWD in the CWD Management Zone was designed to achieve a comprehensive spatial sample of deer and to reach a high probability (e.g., 99%) that CWD will be detected during early stages of a disease outbreak. To reach these goals several years of surveillance efforts and evaluation will likely be required. In the CWD Management Zone 500 or more deer were sampled from each Deer Management Unit in 2002. In these units the DNR limited sample collections to deer that were at least 1½-years old. Sample collection took place during the October 24-27 early gun deer season and again on the opening weekend of the regular gun deer

season (November 23-24). All samples were submitted for testing as soon as they were processed.

In the rest of the state, the primary objective for surveillance was early detection of CWD new areas. Surveillance was designed to achieve a systematic random spatial sample of deer and to reach a high probability (e.g., 99%) that CWD will be detected during early stages of a disease outbreak. A sample of 500 deer was the goal for each county. In some areas of the state, where the deer population is small or the deer kill is insufficient to get a statistically reliable sample, several counties were grouped into a single sampling unit. Sample collection occurred during October 24-27 in those counties with a Zone-T season. Sampling also occurred on the opening weekend of the gun deer season (November 23-24). Both targeted surveillance of suspect deer and collections of deer heads from hunter harvested deer were used. In these units the DNR limited sample collections to deer that were at least 1½-years old. All samples were submitted for testing as soon as they could be processed. Early detection is important for timely response to new disease affected areas.

Sample collection sites for all three areas of the state have been selected based upon the volume of deer processed at these sites in previous deer seasons (Figure 6.). At all collection sites, the head of the deer were removed and tagged with an identification number and a data collection form was completed for each deer sampled. Deer heads were transported to one of five regional processing centers where tissue samples were extracted and data entry of all collection data occurred. The regional processing centers were located in Park Falls, Green Bay, Eagle, Black River Falls, and Black Earth. The processing centers, with the exception of Black Earth, were operational only during the days that sample collection occurred. Black Earth served as the statewide tissue-staging site before shipping the samples for testing. The Black Earth site is operational for a longer period of time to handle the continuous submission of deer heads from the EZ during September 14 - January 31.

**Figure 6.** Location of CWD Sample Collection Sites (.) and Regional Processing Centers (●) during October 2002 surveillance testing.

The Wisconsin Veterinary Diagnostics Lab (WVDL) processed most of Wisconsin's surveillance samples. Any samples in excess of WVDL's capacity were sent to USDA's National Veterinary Services Lab in Ames, IA for processing through their national system of CWD testing labs.

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## Human Health Protection

Human health protection will primarily be conducted by the Department of Health and Family Services by monitoring cases of CJD in an effort to determine if there is any relationship with CWD and providing information to hunters and venison eaters on the safety of eating venison.

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## CWD Research

The DNR, in cooperation with the University of Wisconsin and the USGS-National Wildlife Health Center, is implementing a large research program to expand the scientific information needed for managing CWD in Wisconsin and to evaluate the effectiveness of the CWD management program. This research program incorporates studies on disease dynamics, deer ecology, and human dimensions. The disease dynamics study will determine the geographic distribution and prevalence of the disease, estimate transmission routes and methods of spread, and evaluate age/sex and genetic relationships and genetic resistance to CWD. The deer

ecology study will focus on population dynamics, movements and behavior of deer and will evaluate the effectiveness of the CWD management program. The human dimensions study will investigate perceptions of human risk, explore attitudes of hunters, landowners, and the public about CWD management, and estimate the economic effects of CWD.

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## Communications

Since the discovery of CWD in Wisconsin, the DNR has attempted to provide timely, complete, and accurate communication with the citizens of the state a priority component of its management plan. The DNR has used all available communication tools in this effort including news releases, television appearances, radio interviews, brochures, handouts, public meetings, and the Internet. A web site has been established that is updated weekly with new information and test results from samples submitted by hunters.

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## Disease Control

At the present time, Wisconsin's CWD Management Plan assumes that the disease is limited to southwest Wisconsin. As outlined in the National CWD plan, the best management strategies for this situation is to: 1) depopulate the deer herd in the known affected area; 2) reduce deer populations around the affected area to establish a barrier to prevent the spread of CWD outside the affected area; and 3) ban baiting and feeding to limit the transmission of the disease.

In the rest of Wisconsin, the spread of CWD is minimized by: 1) Zone-T seasons where deer populations are above established goals; 2) prohibition of baiting and feeding of deer; and 3) educational efforts on the proper disposal of deer carcasses.

The following three sections assess the effects of these disease control actions proposed in the rule package: depopulation of deer in an EZ, herd reduction in a HRZ, and a statewide ban on baiting and feeding deer. Each section assesses the need for this action and then evaluates the tools proposed to accomplish the action.

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# DEPOPULATION



## Background

Based on the science presented in this document and consultation with CWD experts across the country, the best strategy to eradicate CWD from an affected area is to reduce the deer herd in the affected area to near zero. This prevents transmission of the disease both within and outside of the affected area, lowers the population of susceptible animals below the threshold that the disease can persist, and prevents the infectious agent from being shed into the environment. Although the population level below which the disease can persist is not known, the disease has persisted in Colorado with densities as low as five to six deer per square mile (equal to 10 deer per square mile of deer habitat in Wisconsin). Therefore a goal of near zero is expected to be beneath the population level that the disease can persist.

The basis for a population goal of zero deer to eradicate disease is that models of CWD epidemiology (Gross and Miller 2001) and current understanding of the disease (Williams et al. 2002a) suggest that CWD is a uniquely difficult disease to manage. Epidemiological models of CWD in mule deer suggest that stable equilibria of CWD prevalence within infected populations of mule deer are unlikely (Gross and Miller 2001). These models suggest the prevalence of CWD in infected mule deer populations will either increase and exterminate the deer population, or at very low prevalence and low transmission rates, will decline and disappear. Similarly, the Wisconsin model of CWD dynamics in white-tailed deer suggests high prevalence and dramatic population declines if CWD is allowed to spread unchecked for 20 years (John Cary, Univ. of Wisconsin, pers comm.). Long incubation, subtle early clinical signs, absence of a practical live test, an extremely resistant infectious agent, possible environmental contamination, and incomplete understanding of transmission constrain options for controlling or eradicating CWD (Williams et al. 2002a). Selective removal of clinical suspects in Colorado and Wyoming has failed to reduce prevalence. Localized population reduction is being tried for areas where infection is thought to be relatively recent, but the effectiveness of this technique remains unknown (Williams et al. 2002a). Models suggest that early, aggressive interaction via selective removal or more generalized population reduction show the greatest promise in preventing new endemic areas from being established (Gross and Miller 2001).

The length of time that an affected area would need to be kept free of deer to insure local eradication of CWD is unknown. The anecdotal evidence of CWD infection from contaminated environments (Williams et al. 2002a) and the unknown importance of environmental infection in maintaining CWD epidemics (Miller et al. 2000) drive the issue. A distinctive property of abnormal prions is resistance to many disinfectants and inactivation procedures typically used to destroy infectious agents. Also, multiple strains of TSE agents have been identified, even within a particular disease group and some strains are more resistant to inactivation than others. With respect to CWD, it is unknown whether there are multiple strains and what relative degree of resistance to inactivation CWD has

with respect to some of the better known TSEs. Moreover, the issue of the amount of infected material an animal must consume or be exposed to become infected with CWD or any other TSE is not known. Neither is it known if repeated small doses can result in infection. In experimental settings, low-dose inoculations have decreased probability of infection and prolonged incubation periods. In some animal experiments, the incubation period extended beyond the natural life span of the animal; that is, at the time of death due to "natural causes," the animal was infected with the TSE agent but was not symptomatic (Dickinson 1977; Thackray et al., 2002). Although this is true for some TSEs, it is not known whether this is true for CWD. Fortunately a model of CWD epidemiology calibrated to field data (Gross and Miller et al. 2001) and observations indicates that prolonged exposure to highly contaminated environments (more characteristic of captive situations) seems necessary for transmission. Williams et al. (2002) suggest that in the absence of practices that replicate captive conditions, infection from contaminated environments is relatively unimportant to sustaining CWD epidemics in the wild.

A closely related issue is what criteria can be used for removal of an area from depopulation status. These criteria have not yet been established. But, for captive herds, a minimum of five years of complete surveillance of all juvenile and adult mortalities is emerging as a standard for demonstrating CWD-free status. The five year standard accounts for uncertain incubation and variation in the clinical presentation and course of CWD (Williams et al. 2002a). Surveillance in wild deer is much more difficult, and two scenarios for an affected area are possible depending on the success achieved in getting to a goal of zero deer per square mile. If the deer herd is depopulated, then the only issue is environmental contamination.

Risk analysis would depend on research into prion persistence and the risk of infection from environmental sources that presumably degrade over time. If deer are not eradicated, risk analysis must account for trends in prevalence among the residual deer population in addition to environmental contamination. In the latter case, active surveillance of the residual deer population would be needed. With current technology, surveillance may require a sustained effort over many years because common surveillance techniques (targeted surveillance of clinical deer, and random surveillance of hunter-killed deer) rely on assays that do not identify animals in the early stages of CWD infection (Miller et al. 2000, Williams et al. 2002a).

Hunting seasons have been the primary tool of deer herd management throughout Wisconsin's history (Dahlberg and Guettinger 1956). Typically, over 700,000 hunters pursue deer each year in this state. In the past, hunters have had the capability of controlling the deer herd at or near population goals established for each management unit. Traditionally, hunting seasons and antlerless deer permit systems had been conservative to protect deer populations and allow them to grow to levels consistent with habitat carrying capacity and human tolerance. Recently, however, hunting harvests have not kept pace with herd growth, and deer herds have not been kept at overwinter population goals (McCaffery 2001). Hunters have been reluctant to support liberalizing hunting seasons and permit systems as they enjoy seeing higher numbers of deer. Yet, October and December four-day antlerless only seasons (Zone T) with free antlerless deer permits have been employed to increase harvest of deer in units where normal hunting seasons and permit systems are not expected to get deer populations to within 20% of overwinter goals. The Deer 2000 citizen participation process also developed an earn-a-buck regulation that will be used when two years of Zone T have not reduced the population to within 20% of goals and a third year of Zone T is not expect to work (Wisconsin Conservation Congress 2001). Unfortunately, even these liberal regulations are not expected to be enough to get hunting harvests to the levels needed to control CWD. Therefore, in addition to liberal hunting seasons within this zone, the DNR is issuing permits to landowners to remove deer outside of the scheduled hunting seasons. DNR staff and staff from other cooperating agencies have supplemented landowner removal efforts by shooting deer on lands for landowners that have authorized access to their land.

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## Depopulation Program

Below is an assessment of the depopulation program and other alternatives considered. The second half of this section is an assessment of the tools proposed to accomplish the depopulation as well as the alternative tools considered.

**Proposed Actions**

Because there is no treatment for infected animals and no vaccine, depopulation as discussed earlier is currently the best available strategy for managing CWD in Wisconsin's deer herd. This would be accomplished using a combination of liberal hunting seasons, permits issued to landowners, and shooting deer by agency personnel. The effects of the specific methods are discussed later in this section.

To accomplish depopulation, different CWD management zones are proposed. The deer population objective for an affected area is to lower the population as close to zero as possible. An eradication zone (EZ), for the purpose of the proposed rule, is defined as those one square mile sections of land contained within or intersected by a 4½ mile radius drawn from the center of a section of land found to have contained an animal that tested positive for CWD. The biological basis for the 4½ mile radius is an attempt to balance the dispersal likelihood of potentially infected deer against the logistical difficulty of depopulating deer over a large area.

Simulation modeling (John Cary, Univ. of Wisconsin, pers comm.) and review of current literature on whitetailed deer life history and CWD dynamics suggest that CWD is most likely to spread across the landscape through the movements of infected live deer. A common, and likely the largest, movement is the dispersal of yearling bucks. In late spring or summer, yearling bucks leave their natal home ranges and disperse to new home ranges that are normally spatially distinct from their natal ranges and often can be some distance away (Nelson 1993). In the Midwest, these dispersal distances can be as long as 130 miles (Kernohan et al. 1994), although analysis of dispersal distance distributions (Nelson 1993) suggests that long-distance movements (greater than 30 miles) are quite rare, and that median dispersal distances are more likely in the 5-10 mile range (Nelson 1993). Mean distances from deer movement studies in southern Wisconsin (O'Brien 1976) were 3.1 miles, although the samples from this study were small and it is not clear whether or not dispersal was being measured. Thus, defining an EZ required a judgment about the importance of rare but long distance movements to designate a meaningful distance from which to infer possible disease spread from known CWD detections. It also required balancing the use of large areas to encompass as much likely dispersal as possible with the practical difficulty of depopulating deer from large areas (Saunders and Bryant 1988, Choquenot et al. 1999, Van Deelen and Etter, in press).

New EZs may be established under the proposed rule. The special hunting seasons and landowner and DNR authorities discussed in this document may then be applied to the newly discovered affected areas to eradicate the disease.

An Intensive Harvest Zone (IHZ) would be established under this proposed rule. It would encompass an EZ but would be extended to roadways easily recognized by hunters. The population goal of an IHZ is to reduce the deer herd as low as possible (less than 10 deer per square mile) to prevent transmission of the disease outside the EZ. The proposed density goal of 10 deer per square mile of deer habitat (approximately four deer per square mile land area) is comparable to the deer density in the CWD endemic area of Colorado (approximately five to six deer per square mile of land area; Vieira 2001, Vieira and George 2001). The purpose of an IHZ is to define a boundary that is identifiable to hunters, so that special regulations and more liberal hunting seasons can be attributed to this zone in order to achieve the maximum possible reduction of the deer population. In this rule an IHZ would be established around the current affected area in southwestern Wisconsin. This IHZ extends beyond the boundaries of the current EZ to identifiable road boundaries. New IHZs may be established by additional rule orders.

Currently there is one EZ and adjoining IHZ in southwestern Wisconsin. As of January 22, 2003, this EZ is 411 mi2 but could expand if any positive samples for CWD are found at the edge of the current EZ based on the criteria above. Increased surveillance should detect if CWD occurs elsewhere in the state.

**Effects**

**Deer population.** The obvious effect of depopulation on the deer herd within an EZ and IHZ would be a greatly reduced number of deer. During the first year of the depopulation program, the deer herd would be reduced, and in subsequent years, the herd may be lowered close to zero. In addition to fewer deer on the landscape, it is

anticipated that the behavior of deer would change becoming much more secretive as well as becoming more active at night during prolonged hunting seasons.

The rapid population reduction planned for an EZ and IHZ zone would require changes to deer herd monitoring procedures because the traditional sex-age-kill method is dependent on fairly stable hunting season frameworks and harvest rates. Deer populations in an EZ and IHZ would be monitored using helicopter or fixed-wing aerial surveys.

**Disease control**. Assuming that diseased areas are located and designated as EZs, depopulation of the deer in these zones would facilitate disease control by: 1) removing infectious animals; 2) reduce the density of deer to near zero; and 3) reducing the accumulation of CWD prions (either shed by infectious deer or leached from the carcasses of infected deer) in the environment. Even though depopulation to control CWD must be considered experimental, there appears to be no practical alternative (Williams et al. 2002a).

It is difficult to predict how successful Wisconsin's management program would be in its goal of eradicating CWD from the state. The success of the proposed disease control program would depend on a number of factors including the current geographic distribution of CWD, landowner willingness to allow hunters and agency shooters access to their land, hunter willingness to hunt in the affected area and shoot more deer than they normally would, and available agency resources for CWD control. Simulation modeling using a large-scale, spatially-explicit, individual-based model of CWD dynamics suggest that disease eradication may be achieved given high levels of surveillance testing and high levels of landowner and hunter participation with deer removal (John Cary, University of Wisconsin, pers. comm.). However, if CWD is already substantially more widespread than the currently known area near Mount Horeb, then eliminating CWD from Wisconsin may be extremely difficult. If a substantial number of landowners in the affected area do not allow access to their land, and if hunters are not willing to shoot additional deer in the affected area, then eliminating CWD would be extremely difficult. Close cooperation would be needed between the DNR, landowners, and hunters to avoid creating refuges for CWD-infected deer and assure the successful elimination of this disease.

Because of the size of the deer population in the current EZ (estimated to be 25,000 in fall 2002), it is expected that depopulation would involve a multi-year effort. Model simulations that resulted in successful disease eradication required 5-6 years or longer (John Cary, University of Wisconsin, pers. comm.). It would be critically important to closely monitor the progress of the management program during this period to maintain public support for the program and to be able to assess effectiveness of management strategies and to make timely adjustments if needed. Although the depopulation effort is expected to require several years to complete, it is important to initiate it promptly to improve the likelihood of success. Delays in starting the depopulation would likely allow for greater transmission, increasing the number of infected individuals, the geographic distribution of infection, and the level of potential environmental contamination. Failing to act rapidly could result in CWD becoming endemic in southwestern Wisconsin, precluding the possibility of CWD eradication.

**Ecological effects.** The specific ecological effects of reduced deer population size in an EZ would vary depending on the location of the zone. Currently, the EZ defined by the 2002 emergency rule covers a 411 square mile area in southwestern Wisconsin. If CWD is confined to southwestern Wisconsin, the ecological effects of deer depopulation would be more limited than if a much larger EZ is defined in response to the discovery of CWD in other regions of the state.

Few studies have directly measured deer density and its effects on the entire ecosystem. Short and longterm ecosystem effects are situation-specific, but documented negative effects of deer on ecosystems are virtually always a function of overabundance (reviews in VanderZouwen and Warnke 1995, Waller and Alverson 1997, McShea et al. 1997). The recent Environmental Assessment done to evaluate effects of altering deer management unit boundaries and population goals (VanderZouwen and Warnke 1995) contains an exhaustive review of the scientific literature on deer density effects on ecosystems at that time. The following paragraphs are summaries of that effort for discrete ecosystem components. Literature citations are not repeated here but can be found in the Environmental Assessment, which can be obtained by contacting the DNR through their website at http://www.dnr.state.wi.us.

***Herbaceous Vegetation***. Reducing the deer herd to zero could have an effect on herbaceous plants. Deer eat a wide variety of herbaceous plants during the growing season (species from 70 genera and/or families in the north and 53 in the south). Characteristics of herbaceous plant species that could benefit by very low deer populations include rare species, species found in restricted habitats, short-lived species, species that produce only single stems, and species highly preferred by deer. Species that are common and well distributed are unlikely to be greatly affected unless they are highly selected by deer. Prairie forbs selected by deer tend to have a relatively low abundance compared to the other more abundant prairie species; therefore, lower deer populations could have a significant benefit on the reproductive output of these species. Forest species that could benefit are bluebead lily and Canada mayflower. In southern fragmented woodlands, large-leaved trillium could benefit at deer densities less than 15 deer per square mile. The literature provides few deer density estimates when impacts become significant for a given species. Although there are few data to base judgments on what deer densities affect herbaceous vegetation, deer densities at low levels may likely benefit some rare species, some forbs in native prairies, some spring ephemeral in southern woodlands, and some forest floor species in the north, especially those found in restricted habitats.

***Woody Vegetation***. Since deer browse woody vegetation during winter, regeneration, abundance, and vigor of trees and shrubs could benefit from reduced deer numbers. Information is inadequate to scientifically determine the overall impacts of deer densities on the vegetation in the state. There have been studies documenting extreme high levels of deer herbivory but few carefully designed studies assessing the effects of different deer densities on vegetation. Generally, the published literature reports moderately heavy browse impacts occur to the most preferred trees and shrubs at deer densities of 20 per square mile. Heavy impacts were noted in many states at greater than 25 deer per square mile. These studies were conducted in regions of the country where forests have higher productivity (carrying capacity) than Wisconsin. Based on these studies and productivity of Wisconsin forests, moderately heavy browse impacts could occur at 15-20 deer per square mile and heavy browse impacts could occur at more than 20 deer per square mile in Wisconsin. These preferred tree and shrub species could benefit from lower deer numbers. Impacts by deer on woody vegetation in northern Wisconsin during winter can be significant if deer are concentrated within an area for thermal cover and mobility during times of deep snow. Preferred conifers sensitive to browsing (e.g., white cedar, hemlock, Canada yew, and white pine under some conditions) may benefit at low deer densities in these local wintering areas. The overall extent of this impact is unknown and would depend on how much and how often deer are concentrated. At low deer densities in the north, preferred deciduous trees sensitive to browsing (e.g., yellow birch, basswood, oaks, and white ash) and shrubs may also benefit. Oak species and other preferred shrub species in the southern regions might benefit from low deer population densities. Deer impact on conifers in summer is negligible since they seldom use them in that season. Impacts on deciduous trees and shrubs by browsing leaves and new shoots can be substantial. Lower deer levels concentrating in the northern region around a summer food source (e.g., regenerating clearcut or forest opening) could benefit preferred deciduous species that are sensitive to browsing (yellow birch, basswood, and white ash). In southern regions, lower deer densities could benefit preferred species such as the oaks, basswood, and white ash.

***Invertebrates***. Some species could benefit from lower deer densities by indirect effects on vegetation. There are no data suggesting how invertebrates are affected by different deer densities. Inference from knowledge about invertebrates would suggest that the increase of a plant species that supports a hostspecific invertebrate population, due to reduced deer browsing, would cause that invertebrate population to increase. Some invertebrates would benefit more than others because of reduced deer herbivory. Invertebrates requiring a single plant species to complete its life cycle would likely benefit from lower deer numbers. Invertebrate species that use only the flowering part of one plant to complete its life cycle that is highly preferred by deer would benefit even more from lower deer numbers. A detailed analysis of the impacts of deer browsing on invertebrates and host-specific plants needed to complete their life cycle is needed to understand the effects of deer herbivory on invertebrates. It is possible that a reduced deer herd could result in fewer deer ticks and a possible reduction in cases of Lyme disease and Erhlichiosis.

***Herptiles*** (reptiles and amphibians). Reduced deer numbers could indirectly benefit or harm herptile species. There are no data on deer effects on herptiles. Indirect effects by deer changing habitats are the only way to assess deer impacts on herptiles at this time. Deer could modify the habitat structure needed by specific herptiles

or change the food base (invertebrates) for herptile species. Thirty-eight herptiles (14 rare) occur in the same habitats as deer and could potentially be affected by deer herbivory. Although no data exists for analysis, the following suggestions are inferred from what is known about herptiles and their habitats. All of the state's insectivorous herptiles are believed to be generalists, and it is unlikely deer are causing a general decline in invertebrate biomass and reducing the food base for herptiles. It is more likely that deer could alter habitats and indirectly affect herptiles. Of the 14 rare herptile species, five need open habitats (i.e. wood turtle, Blanding's turtle, ornate box turtle, western worm snake, and prairie ringneck snake) and are suffering from advancing woody plant species succession. Reduced deer densities and browsing might harm these herptile species by reducing more open habitat. Four herptile species need moderate levels of brush and open habitats (western slender glass lizard, bull snake, eastern massasauga rattlesnake, and timber rattlesnake). These species could be positively or negatively affected depending on the intensity of browsing. The remaining five rare herptiles would be unaffected by deer density (four-toed salamander, northern ringneck snake, black rat snake, Butller's garter snake, and the western ribbonsnake). The density of deer needed to bring about these habitat changes is unknown.

***Small mammals***. No direct relationship between deer and small mammals was found. Deer, however, may impact small mammals by altering their habitat (e.g., litter layer) and food base (e.g., seeds) by changing plant composition. Reduced deer densities could therefore benefit or harm certain small mammal species depending on the species' habitat needs.

***Birds***. Bird species could indirectly benefit or be harmed by changes in vegetation caused by deer foraging. Three studies discuss impacts of differing deer densities on birds in the eastern United States. Ground and canopy nesting birds do not seem to be greatly affected by deer browsing. Shrub nesting species were most impacted by deer browsing if the shrub layer is reduced. Bird species least likely to be affected by deer browsing in are ground or canopy nesting species. However, long-term impacts on forest species composition by deer browsing (shift toward conifers in canopy) could benefit canopy-nesting birds preferring conifers (e.g., hemlock and white cedar) in northern Wisconsin. Deer densities in northern Wisconsin are close to the level where negative impacts on shrub nesting birds were documented in other states. It is unclear where significant impacts of deer browsing on birds begin, but it is believed to be between 15-30 deer per square mile. When deer densities reached 35 deer per square mile there were documented negative impacts on some bird species in the eastern U.S. These studies were conducted in regions of the country where forests have higher productivity (carrying capacity) than Wisconsin. For forests in Wisconsin, lower deer densities than those reported above could affect bird species. In the northern region, species like black-throated blue warblers, Canada warblers, and Swainson's thrush would likely benefit from lower deer densities. If the developing canopy does include conifers, then species like blackburnian warbler, golden-crowned kinglet, and northern parula may benefit in the future. Some deer densities in the south are at or very close to the deer densities that significantly impacted birds in eastern studies. Species that may benefit most from lower deer densities in southern Wisconsin are chestnut-sided warblers, worm eating warblers, mourning warbler, Kentucky warbler, and hooded warbler. The wood thrush might also benefit because it nests primarily in shrubs or saplings in Wisconsin. Other species that might be affected by less deer browsing in southern Wisconsin are the veery and white-eyed, Bell's, and red-eyed vireos. It is not expected that lower deer densities would have a significant impact on turkey densities.

***Moose and Elk***. Both populations of moose and elk are extremely small in Wisconsin at this point in time. Interspecific competition between elk, moose, and deer does not seem likely except in severe winters when both elk and deer may occupy conifer yards. Due to the extremely small populations of moose and elk in Wisconsin, competition among these three species seems insignificant. Deer act as a reservoir for the parasite Parelaphostrongylus tenuis. Mortality does occur from P. tenuis in elk but at levels too low to affect robust elk populations. Moose are extremely susceptible to P. tenuis and are not likely to persist if deer populations are above 15 per square mile; however, 90% of low deer density habitat surveyed in Wisconsin was judged as not suitable for moose. Moose and elk are likely to benefit from reduced deer density in northern Wisconsin.

Wisconsin has one wild elk herd that is located near Clam Lake in the northwestern part of the state. This herd was established in 1995 when 25 animals were transplanted from Michigan. The population has grown to an estimated 120 animals during the past seven years. The Natural Resources Board (NRB) has approved establishment of a second wild elk herd in Jackson County. This project is currently on hold to await completion

of CWD surveillance within the central forest region. In addition, the NRB gave their approval contingent that elk be added to the wildlife damage program, which is dependent upon DNR promulgation of rules to establish an elk hunting season. The Jackson County introduction would need to meet all applicable regulations regarding the importation of cervids into Wisconsin, as well as all health testing and monitoring requirements.

Because elk are susceptible to CWD, the presence of CWD in Wisconsin poses a threat to their restoration in the state. Both the existing Clam Lake elk population and the proposed Jackson County population are outside of the CWD eradication and management zones. Failure to control CWD in the current EZ, however, could result in its spread throughout Wisconsin's deer herd, which would threaten the proposed Jackson County elk population and eventually could threaten the Clam Lake herd.

***Large Carnivores or Scavengers***. The gray wolf is the only large carnivore species that depends heavily on deer as a food source in Wisconsin. The Wisconsin DNR reclassified wolves from endangered to threatened in 1999, and the U. S. Fish and Wildlife Service started the process to reclassify them in 2000, and should complete the process in 2003. Deer are the primary food source for wolves in Wisconsin. Currently, the CWD management zones are in Wolf Management Zone 4. This zone includes 28 counties in southern and eastern Wisconsin that appear to have limited potential for wolves. Currently, no wolf packs are known to occur in this zone and no wolf depredations have occurred in the zone (Wydeven and Wiedenhoeft 2002). During July 2001-June 2002 wolf observations were reported from seven counties in the zone but these may include misidentifications. An adult male wolf was killed by a vehicle on the westside of Madison in April 2002; however the presence of this wolf is not likely indicative of a resident population. Because the areas currently included in the CWD EZs and IHZs are outside of the northern and central forest wolf range, the proposed deer population reductions are not expected to have an impact on the recovery of Wisconsin's wolf population. If new EZs were established in the northern wolf range, it is unlikely that deer depopulation would have population-level effects on wolves given the unprecedented high deer populations in northern Wisconsin (Wisconsin DNR 2001) unless CWD was found to be widely distributed in the north.

Several other carnivore and omnivore species - black bear, coyote, and bobcat - prey on deer fawns when available. In addition, several species of birds use road-killed deer as a source of carrion - common raven, American crow, turkey vulture, and the bald eagle - are among these. These predator/carrion species are generalists and would not be expected to be greatly affected by changing deer densities.

***Ecological Function and Productivity***. Deer may have indirect impacts on other taxa within the ecosystem (e.g., birds, small mammals, herptiles, invertebrates, etc.) or on ecological function or productivity due to their effect on vegetation. Direct impacts to ecological function and productivity by deer seems unlikely because vertebrates contribute very little directly to nutrient cycling and energy flux. However, deer browsing might alter the composition and structure of vegetation used by species in other taxa as habitat. Negative effects on native ecosystems associated with too few white-tailed deer have not been described or demonstrated in the scientific literature.

The depopulation proposed for a CWD EZ and IHZ would likely reduce many of the adverse ecological impacts that high deer densities in Wisconsin may have caused during recent years. If a large proportion of hunters decide not to hunt in the future because of human health concerns, deer harvests in the region may actually decline resulting in further growth of the deer population and subsequent greater adverse impacts on regional plant communities and dependent animal species. Eventually, an infected population would collapse from CWD and impacts from deer on the ecosystem would be lessened.

**Carcass Disposal.** Although the proposed rule does not establish specific methods for deer carcass disposal, depopulation of the deer herd in EZs and IHZs would likely result in additional unwanted deer carcasses requiring disposal. EZ and IHZ hunters may not want deer for fear of human health concerns or they may have more meat than they can use.

Questions have been raised regarding the safty of disposing potentially contaminated deer carcasses in landfills. Specifically, landfills are dependent upon wastewater treatment plants accepting the landfill's leachate (contaminated liquids collected at the base of the landfill). Treatment plants are in turn dependent on farmers

accepting the sludge or bio-solids from the treatment plant for use as a fertilizer on their fields. The question was raised whether the prion could conceivably travel with the leachate to the leachate collection system, go through the wastewater treatment process and be spread on fields with the bio-solids.

The DNR, in conjunction with representatives of the Wisconsin Department of Health and Family Services, the Wisconsin Veterinary Diagnostic Lab, and the Department of Agriculture, Trade and Consumer Protection, reviewed the available information and concluded that landfills provided reasonable containment of the prion. A detailed risk assessment was prepared. The risk assessment concluded "that landfilling of CWD-infected deer does not pose a significant risk to human health" and "the risk of spreading CWD among Wisconsin's deer population by landfill disposal of infected carcasses is quite small."

Although technical staff for both landfills and wastewater treatment plants generally agreed with the DNR's conclusion on the safety of landfilling the deer, there remained a fear of the public perception that landfilling presented a risk to both human health and the spread of the disease to other deer. Treatment plant operators were fearful that farmers would not accept their bio-solids, leaving them with a disposal problem. Landfill operators in turn were fearful that the treatment plants would no longer accept their leachate, leaving them with the choice of closing down or establishing their own treatment systems at an extremely high cost. Based on this fear, landfill operators were unwilling to accept deer carcasses from the 2002 summer hunts. Based on experience gained in 2002, CWD management of carcasses was designed to address both the actual risks associated with disposal of CWD-positive tissues and additional perceived risks on the part of stakeholders.

In 2002, disposal containers were provided at each deer registration station in the current EZ. All deer harvested in the EZ were tested for CWD and carcasses were placed in cold storage until their test results were available. Carcasses that tested negative were disposed in engineered landfills while those that tested positive were incinerated. See Appendix C for a discussion of the alternative disposal methods.

**Socio-economic Effects.**

The deer depopulation proposed for the CWD EZ and IHZ would likely result in short-term loss of hunting recreation, hunting associated industries, and wildlife viewing opportunities. At the same time, the deer population reductions may be expected to result in less damage to agricultural crops and timber resources and fewer deer-vehicle accidents. These impacts would be expected to last for the duration of disease control efforts (currently estimated at five years) and subsequent repopulation of the area.

The Wisconsin Chippewa tribes are entitled to harvest up to 50% of deer available for harvest in deer management units that fall within the ceded territories. None of the ceded territory falls in the southern portion of the state where the current eradication and herd reduction zones are located. Tribal deer harvest occurs primarily in the northern deer management units, while limited harvest occurs in all other portions of the state except the south. If CWD is discovered in the ceded territories, depopulation of the deer herd could have an impact on the Chippewa tribes and the overall tribal deer harvest, depending on the extent and location of the disease. The depopulation of the deer herd may impact tribal customs, venison availability, and recreational opportunities.

Deer and deer hunting are integral parts of Wisconsin's socio-economic fabric. On opening day of the traditional 9-day gun deer season, nearly 700,000 hunters pursue white-tailed deer. During the past decade, hunters have harvested an average of more than 400,000 deer a year. An estimated seven million hunter-days of recreation are provided annually during the archery and gun hunting seasons. Economically, deer hunting supports thousands of jobs in Wisconsin and it is estimated that it contributes close to $1 billion to the state's economy (IAFWA 2001). It is anticipated that the increased hunting opportunities in an IHZ would result in an initial period of increased hunter participation, followed by a decline in hunter numbers and effort as the deer population decreases. Hunter numbers and hunting opportunities would be expected to be low for the duration of the disease control effort and increase with subsequent repopulation of the area by deer. In addition to hunting, an estimated 2.4 million people participated in wildlife watching activities in 2001 contributing approximately $1.3 billion to Wisconsin's economy (IAFWA 2001).

Changes in property values are another possible effect of deer depopulation in an EZ. Whether this would be an

effect or whether the effect would be a positive or negative change in a property's value may be largely dependent on the type of land, landuse, and the motivation of the parties involved. The magnitude of any effect would likely depend on the extent and location of an EZ and the types of property involved (e.g. recreational, agricultural or rural/urban).

High deer densities can result in significant damage to agricultural crops. An additional benefit of depopulation of deer would likely be an elimination of agricultural deer damage in an EZ for the period of time that the deer population is near zero. For instance, in the current EZ, deer densities may be as high as 75 deer per square mile. Deer crop losses in this 411-square mile zone would be reduced to near zero. The extent of this benefit would depend on the extent and location of an EZ in relation to the types of crops and the amount of agriculture in the area. As an EZ is repopulated deer agricultural damage would likely increase. Appendix G presents a discussion of current deer crop damage.

High deer densities may result in damage to the forest products industry. High deer densities are a concern of county foresters and industrial forest landowners, especially when deer populations exceeded 20-25 deer per square mile of habitat (Zastrow 1995). An additional benefit of depopulation of deer would likely be an elimination of forest deer damage in an EZ for the period of time that the deer population is near zero. The extent of this benefit would depend on the extent and location of an EZ in relation to the forest types and the acreage of forests in the area. As an EZ is repopulated deer damage to forests would likely increase. Appendix H presents a discussion of the economic impacts of deer on forests.

Deer-vehicle accidents are a significant problem in Wisconsin. The number of accidents are related to both the number of miles driven by motorists and the number of deer. In some counties, deer collisions are one of the most prevalent causes of vehicle accidents, accounting for up 64% of all vehicle accidents (average of 16%). Deer collisions account for over 30% of vehicle crashes in twenty counties. In 2001, there were 801 people injured and nine killed in deer-vehicle collisions. It has been estimated that there were over 40,000 deer-vehicle collisions each of the last several years in Wisconsin. Annual vehicle repair costs total approximately $100 million. Appendix I presents a discussion of deer-vehicle accidents. An additional benefit of depopulation of deer would likely be an elimination of deer-vehicle collisions in an EZ for the period of time that the deer population is near zero. The extent of this benefit would depend on the extent and location of an EZ in relation to the miles of major roads and the human population in the area. As an EZ is repopulated deer-vehicle collisions would likely increase.

Currently there is no evidence that CWD can be transmitted to humans or livestock (see Susceptibility in the Background section:). No cases of human prion disease have been associated with CWD (Williams et al. 2002a). In 2002, a report surfaced regarding three patients from northwest Wisconsin who died of neural disorders and who reportedly consumed venison. Upon investigation of this report by the Centers for Disease Control, no association with CWD was found (DHFS 2002). However, because CWD is a TSE and the transmission of BSE to people in England, there remains concern about the perceived risk of CWD transmission to humans and cattle. The deer depopulation planned for an EZ is believed to be the most effective strategy for eliminating CWD from the state and minimizing any potential risk for humans and livestock.

The tradition of hunting, which is one of the cornerstones of the state's outdoor recreational heritage, would also be effected by deer depopulation. For over a century, deer hunting has taken place in the northern and central Wisconsin, and since the mid-1900's, in southern Wisconsin. The effect of depopulation on this fall activity is difficult to measure, but the removal of a tradition that is so deeply ingrained in a human culture cannot be overlooked. On opening day of the traditional 9-day gun deer season, over 700,000 hunters pursue white-tailed deer. For these hunters hunting is an opportunity for camaraderie, recreation, food, and to take part in a tradition handed down from one generation to another. However, depopulation creates problems for these hunters. First, these hunters are now being asked to assist with the elimination of the animal that is the source of their tradition. Secondly, hunters are being asked to harvest more deer than they can use. Depopulation, while crucial for eradication of the disease, remains a personal dilemma for hunters and resource managers.

**Analysis of Alternatives to Depopulation.**

**No Action.** Under the "no action" alternative there would be no effort to reduce the deer population in either an EZ or IHZ below the currently established population goals. Hunting season frameworks would not change.

***Disease Control***. Based on the information known at this time, current science and the experiences of other states, no intervention would likely result in increased prevalence and geographic spread of the disease. For example, research in Colorado provides preliminary evidence of decreased adult survival in areas where CWD is established and of increasing prevalence in endemic areas over time. These findings support model predictions that the disease would increase in frequency of occurrence and would significantly impact deer populations in Wisconsin.

At present, the best available evidence from Colorado and Wyoming indicates that in the absence of management intervention, CWD would likely increase in prevalence and distribution among susceptible cervids. There is evidence that CWD is expanding its geographic range within North America and that humans have facilitated this process. Also, wild cervids live in a highly manipulated environment in which some natural processes may not operate. The significance of the disease as a factor driving cervid population dynamics is unclear. Regardless of these factors, the disease is of significance because of public concerns about TSEs in general and perceived risks to humans and domestic animals. It is difficult to determine circumstances under which CWD might "burn itself out", because there are no documented instances in which the disease was introduced but failed to establish and maintain itself. There is no evidence at present of genetic resistance to CWD within mule and white-tailed deer, although this has not been studied extensively. If it exists, genetic resistance might spare individuals in wild populations, but it is unclear that it would have a significant protective value at the population level, at least in the short-term.

The potential advantages of genetic resistance may be limited by the chronic nature of the disease, generally low prevalence in deer populations, and high productivity of white-tailed deer. Animals that die of CWD are adults, and most have reproduced one or more times prior to death. Thus, because of the age structure of these populations, susceptible genes would be passed to future generations before the animals could become clinically ill and die from CWD. This situation in wild cervids stands in contrast to scrapie in domestic sheep, where farmers have the option to manipulate the genetic structure of the herd by removing both the infected adults and their offspring.

Because of the many scientific uncertainties regarding the basic biology and ecology of CWD, management must be considered experimental. This cannot, however, be taken as an argument for waiting for new research or for doing nothing. Because CWD behaves in a manner similar to other infectious diseases, it is reasonable to expect that management techniques used for chronic, late-onset infectious diseases might be appropriate, in the absence of direct information. Evidence from endemic areas of Colorado and Wyoming indicates that the result of no intervention is increased prevalence and distribution of the disease.

There is no known antibody response to the CWD agent. There is some evidence of host response to TSE infections. Glial activation occurs in the brain with many TSEs (Hadlow 1996), and an acute phase response has been observed in mice experimentally infected with scrapie (Coe et al. 2001, Williams et al. 2002a) Animals that develop clinical symptoms invariably die (Williams et al. 2002a).

A specific genotype (PNRP) plays a major role in development of natural and experimental scrapie in sheep and mice (Hunter et al. 1992, Bruce et al. 1994, O'Rourke et al. 1997). It is not yet known if particular genotypes confer resistance or increase susceptibility to CWD. A specific amino acid (Codon 132 methionine) was over-represented among free-ranging and captive CWD-affected elk when compared to unaffected elk (O'Rourke et al. 1999), suggesting potential for differential susceptibility. Resistance associated with PNRP genotype has not been recognized in deer, but is being investigated. Prion gene sequence analysis of CWD-positive and CWD-negative deer from Wisconsin's current EZ suggests that at least 88-98% of the deer in this region would be genetically susceptible to CWD (Johnson et al. in prep.). Since no resistance is known in deer for CWD, there is no reason to expect CWD will not greatly impact the deer herd.

Gross and Miller (2001) developed a computer simulation model of the dynamics of CWD in mule deer populations. The model projected disease dynamics, changes in deer population size, and effects of control

strategies. The simulated changes in CWD prevalence were sensitive to estimates of transmission rates. If transmission rates were low CWD was not sustained in projected populations; however, using realistic estimates of transmission rates resulted in population extinction. Simulated infections reduced adult survival and population size relative to uninfected populations. Once prevalence increased to about 2%, the proportion of infectious individuals in the population increased and populations consistently declined. Their model forecasted two to four-fold increases in CWD prevalence during a 20-30 year time frame. The majority of simulated populations collapsed to extinction in 60-100 years. John Cary at the University of Wisconsin developed a large-scale, spatially-explicit, individual-based model of CWD dynamics that was an extension of the Gross and Miller (2001) model (Cary 2002). This model simulates the spread of CWD across landscapes for white-tailed deer. Model simulations suggest that, without management intervention, CWD prevalence may increase rapidly over the next 10-15 years resulting in a substantial decline of local deer populations. The model further suggests that, without active management, the area affected with CWD could increase more than 10-fold to over 5,000 square miles during the next decade.

If contamination of the environment from saliva, urine, feces, or carcasses is an important factor in the transmission of CWD, then the increase in the number of infected deer under this alternative could substantially increase the transmission rate among deer. Under the no action alternative, contamination of the environment would likely occur, resulting in a greater rate of increase in prevalence, more rapid spread of CWD, and more rapid population collapse.

***Ecological and Socio-economic Effects***. Under the no action alternative, deer populations throughout southwestern Wisconsin would be managed for the current population goals. Current deer population goals represent an attempt to balance public demands for the positive benefits of deer (consumptive and non-consumptive) with the public's willingness to accept the economic and ecological effects of deer. Maintaining deer populations at the established goals during the next few years can be expected to meet the public's demand for deer hunting, recreation, and wildlife viewing opportunities and tribal harvest allocations, but would maintain current levels of negative impact on plant and animal communities, deer damage to agricultural crops, and high numbers of deer-vehicle accidents.

It is difficult to predict the long-term consequences of failing to contain and control CWD in Wisconsin given current knowledge of this disease. However, it would likely have serious long-term ecological and socio-economic consequences. Initially, public concerns about the safety of venison consumption may reduce hunter pressure and harvests in the CWD affected area resulting in substantial growth of the local deer population. The resulting browsing pressure may adversely impact the local natural plant community and animal species that are dependent on native plants. Higher deer populations could also increase the rate of CWD transmission making it more difficult to control the disease. Failure to control CWD could eventually lead to the collapse of the local deer population and the spread of the disease to other regions within Wisconsin and surrounding states. This eventual collapse of the deer herd would likely result in ecological and socio-economic effects similar to those experienced under the proposed action. High levels of environmental contamination could preclude the repopulation of deer in the affected areas. Widespread declines in the deer population would have major impact on deer hunters and wildlife watchers along with wildlife dependent businesses. The spread of CWD throughout Wisconsin's wild deer population could increase the potential risk to farmed cervids and potentially the risk of transmission to cattle and humans.

Spread of CWD throughout the state could place Wisconsin's newly restored elk population at risk. A potential decline of the Central and Northern Forest deer populations could adversely impact gray wolves.

If CWD is discovered in the ceded territories and the deer herd collapses, with little possibility for repopulation, there would be long-term impacts on the Chippewa tribes and the overall tribal deer harvest. The deer herd collapse would impact tribal customs, venison availability, and recreational opportunities.

**Deer Population Reduction and Research.** Under this alternative an effort would be made to reduce the high deer population in the current CWD affected area through the use of hunting to a goal of 10 deer per square mile. Hunting season frameworks would be altered to facilitate this population reduction but out-of season shooting permits would not be issued to landowners and agency sharpshooters would likely not participate in

removal activities. Hunter harvested deer would be sampled and tested for CWD to determine the distribution of the disease and research on disease transmission would be conducted.

***Disease Control***. The reduction in deer population density in the affected area, together with the ban on baiting and feeding of deer, may slow the rate of increase in prevalence of CWD and the rate of spread. However, these actions alone likely would not reduce prevalence or lead to the elimination of CWD from the state. Rather, this alternative would likely lead to a slowly increasing prevalence and continued spread of CWD. Depending on how long it takes before research results are available, prevalence and geographic spread could reach a point where it may no longer be possible to control or eliminate the disease. Moreover, experience with quota setting in the affected DMUs, recent experience with CWD-related removal effort (Wisconsin DNR unpubl. data), and efficiency studies of Midwestern deer hunters (Van Deelen and Etter, in press) indicate that achieving a goal density of 10 deer per square mile is unlikely without the use of out-of-season permits, special landowner permits, or professional sharpshooters.

Field data from Colorado and Wyoming demonstrate that CWD can persist, increase in prevalence, and spread to new areas in mule and white-tailed deer populations that occur at densities that are much lower (approximately five to six deer per square mile) than those in southwestern Wisconsin (Miller et al. 2000, Vieira 2001, Vieira and George 2001). Miller et al. (2000) suggests that prevalence of CWD in deer at densities of 5-6 deer per square mile in Colorado and Wyoming may have increased 0.5 to 0.7% annually during the 1980s and 1990s. If deer populations were reduced to 10 deer per square mile of deer habitat in the EZ, it would equate to 5-6 deer per square mile of total land area as measured in Colorado. Colorado field data suggests that at 10 deer per square mile habitat in the EZ, CWD prevalence would likely increase and CWD may spread to new areas. Because infected deer would remain in the affected area under this alternative, the level of environmental contamination could also increase.

An epidemiological model of the dynamics of CWD in mule deer populations was developed by Gross and Miller (2001). Gross and Miller (2001) report that as CWD prevalence increases, the time and effort required to eliminate the disease from an infected population also increases. Prevalence of CWD may reach a point where it may be difficult or impossible to control or eradicate the disease.

Experience from other states, CWD management plans from Colorado and Wyoming, the multi-state CWD Management Plan, and the National CWD Management Plan all recommend that depopulation may be the best alternative to eradicate the disease from areas with new outbreaks of CWD before it becomes endemic.

Currently, CWD prevalence in the EZ and IHZ is estimated to be 2.1%. Statistically reliable research results from wildlife populations typically takes two to three years or longer because of the annual variability due to weather and other factors. Current technology does not allow quick detection of the presence of the CWD. Therefore, research on transmission routes and rates can takes up to 15 months or more before even knowing if the disease has been transmitted. Waiting until research results become available before intervening could allow CWD prevalence to increase to the point where it will be extremely difficult, if not impossible, to control and eradicate the disease from the infected population.

Rather than reduce deer density and wait for research results to become available, a safer approach which will keep more options open for future management when research findings do become available, may be to depopulate the deer herd eliminating as many of the infected deer as possible now. When new research results become available, CWD management can then be altered to be consistent with the best science and strategies for controlling and eradicating the disease available at that time.

***Ecological and Socio-economic Effects***. This alternative may slow the rate of increase in CWD prevalence and the rate of spread, but likely would not reduce its prevalence or prevent CWD from spreading. Therefore, the ecological and socio-economic consequences would likely be similar to the no action alternative but may be delayed.

**Live Trap, Test and Euthanize Diseased Animals.** This alternative would involve live trapping deer in the affected area, testing them to determine if they are infected with CWD, and euthanizing any positive individuals.

This alternative would require the existence of a reliable and practical CWD test for live animals and extensive time and effort devoted to trapping and sampling live deer.

***Disease Control***. Test-and-euthanize programs are only appropriate for disease situations where: 1) the entire population can be examined, 2) infected individuals can be identified, 3) infected individuals can be readily captured, 4) individuals known to be free of the disease can be isolated from the untested portion of the population, and 5) removal of a portion of the population is acceptable (Wobeser 2002). The primary limitation of this alternative is the need to capture, handle, and hold individual animals. The impracticability of capturing over 3,000 bison and the difficulty of holding test-negative animals so that they would not be exposed to infected individuals were major reasons that test-and-euthanize was rejected for elimination of brucellosis and tuberculosis from a free-ranging population of bison in Wood Buffalo National Park, Canada (Wobeser 1994).

Recent research has evaluated the use of IHC on biopsies of tonsillar tissue for mule deer (Wolfe 2002). Wolfe et al. (2002) report that CWD prevalence estimate from IHC testing of tonsillar biopsies of live captured mule deer in two areas of Colorado were comparable to prevalence estimates from tonsillar tissues from hunter harvested deer. The biopsy procedure requires the capture of the animal, anesthesia, specialized equipment, and specific technique to obtain tissue samples that are usable for testing. The requirement for IHC testing precludes the use of the procedure for on-site testing (i.e. results of the test are not available for at least several days). Wolfe et al. (2002) suggested that tonsillar biopsy may be useful to conduct or augment surveillance testing in areas where harvest or removal may not be feasible (e.g., urban or rural residential areas or National Parks).

Simulation modeling by Gross and Miller (2001) suggests that to be effective in eliminating CWD from a population of mule deer, a test and euthanize program would require the testing of a large proportion of the population (30-70%) over an extended period of time (10-50 years). These simulations further showed that the effectiveness of a test and euthanize program declines rapidly as prevalence increases. Wolfe et al. (2002) suggest that selective removal of test-positive individuals may help reduce the prevalence rate in endemic areas, but they acknowledge the practical limitations of this approach. Broad implementation of a testing and euthanize approach is limited by the need to capture, anesthetize, precisely sample, and hold or radio-collar individual deer until test results are available. Tonsillar biopsies may be most useful as a tool for regulatory management of farmed cervids.

The DNR is planning to take tonsillar biopsies from deer captured for the deer ecology component of the CWD research program. Because these research animals will be radio-collared it will be possible to euthanize any individuals that test positive. However, numerous logistical constraints preclude the use of this alternative for controlling the current CWD outbreak. Foremost among these is the difficulty of capturing the 25,000 to 30,000 deer that are estimated to be within the current 411 $mi^2$ EZ and potentially exposed to CWD. Due to the stress of capture and handling, some deer may be injured or would die of capture related stress during the capture attempt and subsequent confinement. Because deer in early stages of infection may not have detectable levels of CWD prions and could test negative (false negatives), it would be necessary to hold test-negative deer and retest them over an extended period of time.

***Ecological and Socio-economic Effects***. Because this alternative would likely be ineffective in preventing the spread of CWD or reducing its prevalence in the affected area the ecological and socio-economic consequences are likely to be similar to the no action alternative. Economically, however, this alternative would be much more costly than the no action alternative due to the large amount of time and effort required to trap and test deer.

**Selective Removal of Individual Animals.** This alternative would involve the removal of selected individual animals without prior testing. Individual deer could be selected based on various criteria. Possible criteria include the appearance of clinical symptoms of CWD (see Pathobiology section) or an identifiable subset of the population that may have a higher prevalence or a greater potential to spread the disease (e.g., dispersing yearling males).

***Disease Control***. Selective removal of individual animals exhibiting clinical symptoms of CWD has been practiced in the endemic areas of Colorado and Wyoming for a number of years but has not been successful in

reducing prevalence in affected populations (Williams et al. 2002a). The effectiveness of this technique may be limited by the long period of time between when an animal is infected and when it begins to exhibit clinical symptoms (15 months or more), during which it may be able to infect other susceptible individuals. Furthermore, early stages of clinical CWD may be subtle and unrecognizable on casual observation (Williams et al. 2002a). The small number of clinical cases detected in portions of Colorado and Wyoming where prevalence rates were high illustrates the inefficiency of this approach for disease control (Miller et al. 2000).

Although targeted removal of clinical animals would likely be ineffective for control of CWD, it may be useful for detecting new CWD areas (Miller et al. 2000). The emergency rule adopted by the Natural Resources Board does allow the DNR to issue replacement permits to hunters who shoot a deer believed to be diseased. This provision is designed to encourage hunters to shoot potentially sick deer and submit them for testing. Encouraging hunters to shoot and surrender suspect animals is an important component of the DNR's statewide surveillance effort.

Currently little information is available about possible differences in prevalence among sex and age classes of white-tailed deer that might be used to design a selective removal program. This is one of the questions being addressed in the disease dynamics portion of Wisconsin CWD research program.

***Ecological and Socio-economic Effects***. Because this alternative would likely be ineffective in preventing the spread of CWD or reducing its prevalence in the affected area the ecological and socio-economic consequences are likely to be similar to the no action alternative.

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## Depopulation Program Tools

These proposed tools were developed following discussion with the public and many organizations at meetings across the state and following review of public input on alternatives presented in a questionnaire at meetings and on the Internet (Appendix D). Over 3,000 questionnaires were completed and returned. Focus groups were held with landowners and hunters from the current affected area to get additional public input. DNR recommendations followed this input with a few modifications based on experience with deer herd reduction regulations. Conflicts with other land uses were considered; however, control of CWD through herd reduction was given a higher priority than conflicts with other recreational uses. The following section provides an assessment of the proposed tools to accomplish depopulation as well as an assessment of alternative tools considered.

**Proposed Actions.**

A combination of tools would be necessary to achieve depopulation. No one tool is expected to achieve depopulation by itself.

***Extended Season*.** The rule proposes that the hunting season in an EZ and IHZ begin on the Thursday before the last Friday in October, same as the Zone T season, and last through January 31. An IHZ archery season would start on the Saturday nearest September 15 and run through January 31.

***Unlimited Tags*.** The rule proposes that hunters not be limited on the number of "earn-a-buck" tags they can acquire. By policy, the DNR has limited tag issuance to four per hunter per day. These tags can be used on antlerless deer in an EZ and IHZ and HRZ. They can also be used on bucks if an antlerless deer is shot and tagged first and the antlerless deer is transported along with the buck to the registration station. Tags issued with the archery and gun deer licenses and Zone T antlerless deer tags can be used in the same manner as the "earn-a-buck tags". Offering unlimited and free tags is expected to increase harvest of deer. Hunters have suggested that free tags would increase their willingness to harvest deer.

***Earn-a-Buck Regulation***. The rule proposes an earn-a-buck regulation (i.e. antlerless deer must be tagged by a hunter before that hunter can shoot a buck) in an IHZ. This rule applies to archery hunting, gun hunting, muzzleloader hunting, and hunting under authority of a landowner permit in the archery or gun seasons. Hunters can earn buck tags with antlerless deer killed in the archery season and gun deer season, as well as those killed

under authority of an agricultural damage shooting permit or CWD landowner permit. There is no limit to the number of bucks that may be killed by a hunter provided that an antlerless deer is also killed for each buck. Buck tags can be used during all archery and gun seasons in an IHZ. Hunters without a buck tag can harvest a buck if they first harvest an antlerless deer and the antlerless deer is transported along with the buck to the registration station, in this case, a Zone T tag, license carcass tag, or earn-a-buck tag can be placed on the buck.

***Either-Sex Regulation***. The rule proposes that the hunting season framework change from earn-a-buck to either-sex when the overwinter deer population is reduced to five or less deer per square mile of deer habitat in an IHZ.

***State Park Seasons and Refuges*.** For parks in an IHZ, the gun and archery hunting seasons would run from the Zone T opening date in late October to the 3rd Sunday after the Thanksgiving Holiday. Parks in urban areas and parks that are primarily designated use areas would not have hunting seasons; government shooters would be used instead. Waterfowl refuges in an IHZ would be open to deer hunting during the gun and archery seasons. Opening of state parks and other DNR properties normally closed to deer hunting is expected to increase deer harvest and prevent refuge situations where deer and CWD would otherwise be protected.

***Firearm restrictions***. The rule proposes that rifles be allowed in all areas of an IHZ. Rifles are more accurate at longer distances, so deer harvest is expected to increase per unit of effort in an IHZ where rifles may not have been allowed.

***Landowner Permits***. Landowners and their guests hunting under authority of landowner permits would be exempted from the hunting license requirement and from regular deer hunting season date restrictions only for the land and the time period, for which the permit is issued. Exempting landowners and their guests from the licensing requirement, if they have a permit for their property, would be expected to increase hunter numbers and therefore harvest. Exemption from the regular deer hunting seasons would allow for increased opportunities to harvest deer throughout the year. The DNR may authorize landowners and their agents to shoot over bait by permit in an EZ. These permits would allow landowners to be cooperators with the DNR in winter removal operations. Permit conditions would ensure that baiting only be done in controlled situations and with performance expectations.

***Registration and Transportation*.** The rule further proposes that any deer harvested in an EZ and IHZ would have to be registered at a deer registration station designated by the DNR within these zones no later than 5:00 p.m. on the day after it was killed.

***Agency Shooters*.** Agency shooters would assist with the depopulation of deer by shooting over bait, at night, and from motor vehicles. Shooting would take place on DNR-owned lands, and on private lands where the landowner grants permission.

***Aircraft Use*.** This rule would establish the conditions under which aircraft may be used for shooting deer (December 1 – April 15). Aircraft could be used to spot, rally or drive deer. Deer could be harvested from an aircraft only on properties where the DNR has received landowner approval. Aircraft may be used for other purposes any time of the year. This special authorization would expire June 30, 2004.

**Effects.**

***Deer herd reduction and hunter behavior*.** Public hunting is believed to be the most effective method of herd reductions due the large numbers of hunters and their access to both public and private lands in an IHZ. The long seasons are offered to give hunters every opportunity to reduce the deer herd as much as possible. The proposed IHZ gun season would begin about the time of leaf fall for safety purposes and would end mid-winter to allow maximum days for hunter participation.

The earn-a-buck regulation is believed to be the most effective regulation for herd reduction (DNR, unpubl. data). It allows those who are willing to shoot both bucks and antlerless deer to continue to do so. Most importantly, however, it requires those who prefer to shoot only bucks to shoot antlerless deer as well. In the current EZ area, unit 70A had an earn-a-buck regulation in 1996. In that year, the registered harvest was 46 deer per square mile,

far higher than any other year under any other regulation. In 1999, 2000, and 2001 Zone T regulations only resulted in 23, 31, and 19 deer harvested per square mile of deer habitat respectively in unit 70A. The ratio of antlerless deer to bucks harvested during the 1996 earn-a-buck season went from about 1:1 to 4:1 (DNR, unpubl. data). The difference between the proposed rule and 1996 is that hunters would be allowed to earn an unlimited number of bucks rather than just one buck for each license held, as long as they shoot an antlerless deer for each buck. The ability to earn multiple bucks is expected to increase the buck harvest as well as the antlerless harvest. Questionnaire results showed 45% supported and 55% opposed this controversial regulation (Appendix D).

Although all of these regulations have the potential to result in successful herd reduction, success would ultimately depend on hunter participation and willingness to shoot more deer than ever before. This may be difficult for hunters when they may not desire additional venison. During the fall 2003-2003, deer seasons in the EZ and IHZ established in the CWD Emergency Rule, 30 deer per square mile of deer habitat were harvested, which is lower than the 1996 harvest in 70A, when 46 deer per square mile of deer habitat were harvested utilizing the earn-a-buck regulations. However, until data from the 2002 CWD deer hunter survey are analyzed (Petchenik, in prep.), it is not certain whether concerns about CWD was a factor limiting participation and harvest.

***Public safety***. Some landowners and recreationists have expressed concern about safety for them, their family, their livestock, and their pets during the long gun season. Having a more than three month gun season logically adds risk to that provided by a nine-day gun season. The degree of added risk is impossible to predict. However, there would likely be fewer deer hunters in the woods on any given day than during the intense nine-day gun season. Landowners can control who and how many hunters are on their land. Most hunting accidents involve self-inflicted injuries or hunters accidentally shooting their partners (Wisconsin Deer Harvest Report 1990 to 2001). It is an extremely rare event for non-hunters, livestock or pets to be shot by a deer hunter, even when over 700,000 hunters are in the woods on the traditional opening weekend. The late October Zone T season has been used annually as a herd management tool from 1996 to the present without hunters shooting other hunters or non-hunters. During the 2002 IHZ hunting seasons there were no fatal accidents.

The rifle allowance in an IHZ would only be new for those counties not located in an area of the state where the use of rifles is prohibited. Hunting accident records over the past decade show that rifles are not involved in more hunting accidents than shotguns (Wisconsin Deer harvest Report 1990 to 2001). Currently, counties that have rifle restrictions are located in the more highly populated southern part of the state and in a highly populated area in Pepin County.

Agency shooters would receive specialized training in marksmanship and safety procedures. A shooting plan would be developed for each property where permission from the landowner was granted, and would include an on-site visit and mapping of the property. Scouting to assure safe shooting lanes would also take place prior to shooting.

***Trespass*.** Hunters are still required to get permission from landowners to hunt on their lands in the CWD zones. Trespass laws still apply. It is possible that some hunters would perceive the mission of CWD as over-riding this law and rationalize trespass. On the other hand, many would not see deer in this area as valuable as in the past and may not to take the risk of trespassing. In 2002, during the EZ and IHZ hunts there were fewer instances of trespass in the Iowa County portion of the current IHZ than in previous years, and no increase in trespass complaints in the Dane County portion (Dane and Iowa County Sheriff Departments, pers. comm.)

***Recreational and Land Use Conflicts***. There is potential for many recreational conflicts to be caused by the proposed hunting regulations. Hunters that normally are not required to wear blaze orange would be required to do so during the longer gun deer season. It is unclear what effect the blaze orange requirement had on fall turkey hunter success in the portion of turkey management zone 4 that was located in the current IHZ (the eastern half of the turkey management zone 4 was located in the current IHZ), however, preliminary 2002 fall turkey harvest data shows that the percent hunter success for the entire turkey management zone 4 was unchanged from last years success rate. Some hunters may decide not to hunt with a dog for fear of another hunter mistaking their dog for a deer. Waterfowl hunters would not be required to wear blaze orange, but they may choose not to hunt because of concern for not being seen by a gun deer hunter. Bowhunters are used to hunting the rut by

themselves without sharing the woods with gun hunters. Muzzleloaders would not have their own season separate from the gun season. Hikers, bicyclists, and skiers may choose not to recreate in the longer gun season because of concerns for safety. Snowmobilers may have trouble getting access to trails for maintenance before the ground is frozen. In addition, snowmobile clubs may not be able to open trails, as some landowners may wish to prohibit snowmobiling while a deer season is open. Some local residents may choose not to take walks on their lands or on area roads due to concerns about safety. Some people may choose not to use parks in an IHZ while the gun seasons are in place. Landowners may grow weary of hunters asking permission to hunt on their lands or of trying to manage potential conflicts between hunters and their farm operations. Hunters may be more likely to damage some standing crops that have not yet been harvested during the early part of the hunting season. Landowners may perceive the need to keep livestock off their pastures for longer periods of time to ensure their safety. However, considering the low densities of hunters that are predicted to be in the woods at any one time over the course of the season, many who initially think they would not recreate or use their lands in certain ways may choose to do so.

***Enforcement*.** The regulations proposed in this rule would be enforceable based on past experience. However, the longer seasons and complexity of regulations in an EZ and IHZ would place a significantly greater workload on enforcement personnel through responding to questions and tips and field checks of hunters.

***DNR Revenue*.** The proposed rules and policies would reduce DNR revenue as landowners and their guests hunting under the authority of a landowner permit in an EZ would not need to buy a license. It is not known how many licenses would not be bought as a result of this policy. IHZ hunters would not need to apply for Hunter's Choice/bonus permits, thereby resulting in a loss of application fees. In addition, IHZ hunters would receive free permits so they would not need to purchase bonus tags to harvest additional antlerless deer. Bonus tag revenue would decline for the affected deer management units (Appendix E). Bonus tag revenue is ear-marked for the wildlife crop damage compensation and abatement program. It is possible that revenue would not be sufficient to pay for abatement and compensation. However, with a greatly reduced deer herd in an IHZ, damage claims may also decrease substantially.

***DNR Staffing and Expenditures***. Long gun seasons would increase staffing needs and expenditures as a result of registration station staffing needs, particularly in an IHZ where staff would attempt to collect the head of every deer harvested. The free tags, earn-a-buck rule, and long seasons would produce more deer to be registered, however, once the population goals are neared or reached, annual harvests and registrations would decrease along with associated costs for sampling and registration. Staff time and expenditures would increase due to issuing landowner permits and use of agency shooters. Customer service, wildlife management, licensing, and law enforcement staff would have to spend more of their time answering questions or giving presentations to groups on the new hunting regulations.

***Local Commerce*.** It is unknown to what degree this rule would impact local economies in an EZ and IHZ. Hunting and other types of outdoor recreation contribute significantly to local economies (Vander Zouwen, 1998). Lengthened hunting seasons may result in increased expenditures in local communities if hunter numbers remain unchanged or increase and hunters increase their number of days in the field. On the other hand, other types of recreation and associated expenditures may decrease if recreationists do not spend time outdoors in an IHZ due to concerns about safety or other conflicts with deer hunting.

**Analysis of Alternative Depopulation Tools.**

***Traditional Seasons or Modest Season Extension***. Traditional seasons have not kept deer populations at established overwinter population goals in many units during many years in the last decade (R. Rolley, pers. comm.). Traditional seasons, even with October and December Zone T seasons, will certainly not encourage or allow adequate harvest to meet CWD control goals in an IHZ (approximately 100% herd reduction). Similarly, a somewhat longer season is not expected to generate enough harvest. It is believed that hunting through the rut period, through the Christmas holiday week when many are on vacation and through much of the snow period when deer are more vulnerable is needed to achieve the harvest necessary for an IHZ. However, a shorter season would be less costly to administer and enforce and result in less recreational and land use conflicts.

***Require Licenses of All Hunters*.** Requiring licenses of all hunters in an EZ would keep license revenues as high as possible. In 2002 there was a 10% reduction in the sale of deer gun licenses (M. Davis, pers. comm.). DNR costs for controlling CWD are increasing (L. Freitag, pers. comm.). However, the DNR's primary goal is to eradicate CWD. The DNR believes that more people would pursue deer in an EZ if a license is not required on lands where a landowner has a DNR permit, and this would result in more deer harvested. Moreover, people are more likely to be a willing participant in the task of herd reduction, if they are not asked to pay for the "privilege".

***Unlimited Either-Sex Tags*.** The unlimited either-sex deer hunting regulation would likely be the easiest to understand, administer, and enforce. In addition, it was the most preferred alternative of respondents to the CWD control questionnaire. It would also intuitively be the regulation of choice because all deer seen by hunters could be shot without passing up any bucks and without limit. However, the DNR believes that the earn-a-buck regulation would result in more deer harvested and more effective population control, which are the most important performance measures for any regulation in control of CWD. With hunter perceptions of the safety of venison and experience with very low numbers of hunters keeping their deer in the summer hunts, it is expected that many hunters would only shoot bucks and pass on the does and fawns, particularly if they had not accepted the depopulation goal. Also, with hunter expectations that many of the deer would be gone at the end of the winter, the DNR expects that many hunters would want to take as many bucks as possible before they are gone. An earn-a-buck regulation ensures that a doe or fawn is shot for each buck harvested, which would not likely occur in an unlimited either-sex hunting regulation. At focus groups with EZ landowners conducted in April 2002, many supported the either-sex tag option as they said they would shoot any deer they saw. Many also suggested, however, that their guests would probably need the earn-a-buck regulation to get them to shoot does and fawns as well as bucks in this situation (J. Petchenik, unpubl. data). Similarly, a local deer hunting guide, a local hunting shop owner, and a number of local hunters who attended the public meetings have suggested that the earn-a-buck regulation would be needed to get hunters to shoot significantly more antlerless deer.

***Earn-a-buck with Multiple Antlerless Deer*.** Some hunters and landowners in current EZ focus groups suggested that hunters be required to shoot two or more antlerless deer for each buck they shoot (J. Petchenik, unpubl. data). These individuals felt that if the goal is to reduce the herd as quickly as possible, it made sense to require hunters to shoot two antlerless deer prior to shooting a buck. This alternative was considered by the DNR both for the 1996 earn-a-buck regulation and the CWD control regulation. It was not adopted because the DNR believes that shooting two antlerless deer per buck would be perceived by hunters as too much of an obstacle, causing them to give up hunting or hunt elsewhere. This regulation would also likely reduce buck harvest. Buck harvest is particularly important due to the greater dispersal tendency of young bucks. This regulation would be more difficult to administer due to the required record keeping on numbers of antlerless deer shot by each hunter.

***Use Smaller or Larger Area to Define the Eradication Zone*.** By adjusting an EZ either smaller or larger, smaller or larger areas would have to be depopulated. A larger zone would be more inclusive of deer movements and would increase the probability of including infected deer that were dispersing. To be completely inclusive, an extreme approach might be taken and the radius used to designate EZs might be based on the longest known dispersal for Midwestern deer (132 mi, Kernohan et al. 1994). A 132-mile radius centered on the present EZ would encompass all of southern Wisconsin and adjacent portions of Minnesota, Iowa, and Illinois. Depopulation of an area this large would be difficult for many reasons. Smaller EZs are more easily depopulated and probably more palatable to stakeholders. If we had perfect knowledge of the location of each infected deer, we could make EZs small enough to include only the discrete home ranges of infected deer (approximately one square mile). Unfortunately, we don't know the locations of all infected deer and the technology needed to make that determination (e.g., reliable live tests, tests that detect infection very early in the disease process) is unavailable (Williams et al. 2002a), apart from the insurmountable logistical difficulty in capturing and sampling free-ranging deer. As described earlier, the spatial extent (size) of an EZ would be defined on the basis of deer movements and behavior. Scientists on the Interagency Science and Health team, in making a judgment about the appropriate size of the current EZ, had to balance the arguments for making the EZ larger with arguments for making the EZ smaller.

The 4½ mile radius around locations of infected deer is based on an examination of deer movement studies in the Midwest and a judgment that median dispersal distances in southwestern Wisconsin deer are roughly 4½

mile. EZs of this size are thus likely to include most recently dispersed deer. Smaller size risks failure to reduce the spread of CWD by not including dispersing infectious deer. Larger size risks failure to reduce the spread of CWD because depopulation over larger areas is more difficult, expensive, and unpalatable. Recently begun research on the movement and behavior of southern Wisconsin deer is intended to generate movement data for the CWD-infected populations. Ongoing population modeling is analyzing the effective size of an area for eradication of the disease. In addition, ongoing epidemiological research is using test results from the current EZ to characterize the spatial extent of the CWD outbreak. This information may be useful in an adaptive management approach for changing the size or shape of EZs.

Either larger or smaller areas would likely have ecological effects similar to those associated with the proposed rule, but at a different spatial extent. For example, if the current EZ included a larger area, the effects of depopulation would be spread over a wider area, possibly impacting a larger number of species and habitats.

Either larger or smaller areas would likely have socio-economic effects similar to those associated with the proposed rule, but like the ecological effects, at a different spatial extent. If an EZ were expanded to include a larger area, the social and economic effects would expand to affect a larger area and the people and business located in the depopulation area.

***Contraception as a Depopulation Method*.** Immunocontraception is one of several types of contraception that has been proposed as a technique for managing deer at reduced population levels where lethal control is unacceptable. There are, however, currently no cost-effective tools available for the widescale implementation of a contraception plan.

Immunocontraception uses the body's own immune response to disrupt reproductive function. The most widely tested immunocontraceptive vaccine for wild species is based on developing antibodies to the zona pellucida which surrounds the mammalian egg cell. This vaccine causes infertility in some individual females but may require multiple treatments. In addition, vaccine adjuvants differ in their abilities to provoke an immune response and prevent pregnancy. Enhancement of the immune response and efficiency of vaccine delivery are needed, because current technology precludes control at the population level in most free-ranging populations. Moreover, contraceptive treatment may alter the health and behavior of wildlife populations, and thus effects must be monitored closely (Muller et al. 1997, Miller et al. 1998, Walter et al. 2002).

Hobbs et al. (2000) used modeling to analyze the feasibility of using fertility control (i.e. contraception) to regulate the size of an ungulate population. They paid special attention to the problems of variation in the duration of fertility control agents and to inefficiencies associated with knowing the fertility status of animals in the population. They offer five predictions: 1) more than 50% of fertile females need to be maintained as infertile to achieve meaningful population reduction, even when reproductive rates are low; 2) the relationship between the proportion of females maintained infertile and population abundance is highly non-linear such that small errors in estimating fertility can lead to large errors in achieved population density and a broad range of contraceptive delivery rates may differ little in their ability to alter population growth; 3) the effectiveness of fertility control as a management technique depends strongly on the persistence of the effect of the fertility control agent and on the ability of managers to recognize previously treated animals; 4) fertility control using long-lived agents in long-lived animals may be more efficient (in terms of animals treated) than killing in regulating ungulate populations; and 5) treating small populations with permanent fertility control agents increases the risk of extirpation.

Hobbs et al.'s (2002) predictions 1-4 are relevant to analysis of contraception as an alternate depopulation technique in the CWD EZ and IHZ. The pre-hunt population of 25,000 deer in the current EZ may consist of more than 10,000 adult does and more than 5,000 fawn does. If half of the fawns are reproductively mature, there may be more than 12,500 reproductively fertile females - more than 6,000 of which would need to be captured, treated with a contraceptive agent, and monitored to achieve negative population growth. Even if all fertile females could be treated with a contraceptive agent each year, the rate of reduction in the population would simply revert to the background mortality rate (15-40% for farmland does [Nixon et al. 1991]). Moreover, failure to mark and monitor treated females in a population of this size introduces inefficiency associated with re-dosing individuals such that the number of contraceptive doses administered randomly in order to achieve a needed level of infertility will exceed the population size (Hobbs et al. 2002). Finally, long-duration contraceptives are not

yet available. Given real-world logistical constraints, and considering efficiency as the amount of time required to bring an ungulate population to an acceptable lower density, Hobbs et al. (2002) conclude that, "There is no question that removal is more efficient than fertility control". Given the costs associated with trapping, treating, and monitoring large numbers of deer over several years, depopulation through contraception cannot be cost-effective.

Given the logistical difficulty of contraception as a depopulation technique (Hobbs et al. 2002), it is unlikely that depopulation can occur using contraception alone. Hence, there would be none of the disease-control benefits associated with depopulation . Even if full contraception of all fertile females were possible, the deer population would still take many years to reach zero. Presumably, CWD would continue to infect the residual deer and possibly spread. Under this scenario, shedding by additional clinical animals and unrecovered carcasses would provide a source for environmental contamination by the CWD infectious agent - possibly to the point that eventual restoration of the deer herd is precluded (Williams et al. 2001).

A potential effect that is unique to some contraception alternatives is the presence of the contraceptive chemicals in the environment. Contraceptive agents and their metabolites are likely to be endocrine disrupters – chemicals that can mimic hormones in that they can interfere with cellular function at extremely low concentration. Contraceptive agents and their metabolites could enter the environment from unconsumed bait (if bait were a contraceptive delivery technique) or through metabolites shed in the urine or feces of deer. Human birth-control chemicals in sewage effluent have been implicated in the feminization of fish (Jobling and Sumpter 1994), demonstrating that cross-species effects are possible and community-wide effects are difficult to predict. Although the potential for effects due to very low concentrations of these chemicals in the environment are controversial, the scale at which contraceptive chemicals would need to be used to depopulate an EZ deer herd (above) suggests that a formal risk assessment should be done if contraception were attempted (W. W. Bowerman, Dept. of Environmental Toxicology, Clemson University, pers. comm.).

Where contraception has been used in attempts to reduce populations of urban white tailed deer, it has proved enormously controversial (Kirkpatrick and Turner 1997). Stakeholders who oppose killing deer often hold unrealistic expectations for the effectiveness of contraception and are disappointed or angry when their expectations are not met. Hunters often view contraception as a technique that displaces them from recreational hunting and from their role as cooperators in agency efforts to reduce deer populations. Finally, agency administrators find that the costs of treating deer, re-treating and monitoring deer, and monitoring the population response are prohibitive. Kirkpatrick and Turner (1997) suggested that, while the absolute costs of the scientific effort were small ($50 per deer), associated costs in dealing with logistical problems and social controversy can be much higher (thousands of dollars/deer).

***Depopulation Using Only Public Hunting*.** The Wisconsin DNR and most other state agencies rely on public hunting to manage deer populations over large regions. Yet, despite hunting season frameworks designed to foster a more aggressive harvest (e.g. T-zones, earn-a-buck), recreational hunters have been unable to achieve population goals in most units and the region itself has had post-hunt deer populations significantly higher than goal since 1990 (Wisconsin Dwpartment of Natural Resources 2001). In Wisconsin's southern farmland region (the region surrounding the current EZ and IHZ), the ecological carrying capacity may be very high (greater than 150 deer per square mile) due to mild winters and abundant agricultural food. Population goals range from 10-30 deer per square mile.

The principle limitations in achieving complete depopulation are the presence of refuge areas for deer and the increasing effort associated with harvesting an individual deer from a low density population (Ridpath and Waithman 1988, Saunders and Bryant 1988, Hone 1990, Choquenot et al. 1999). Analysis of Midwestern data on the interaction between white-tailed deer and deer hunters suggests that the effort required to harvest an individual deer becomes asymptotic at 10-15 deer per square mile (Van Deelen and Etter, in press). Recreational hunting is inefficient because of spatial refuges for deer created by landowners who are unwilling to allow hunting and by terrain that may be inaccessible or unsafe to hunt (i.e. a small woodlot with a house). In addition, recreational hunters do not hunt systematically (Broseth and Pederson 2000). Some areas are hunted heavily while others are avoided either intentionally or by accident, creating additional refuge areas for deer. Given these conditions, although hunting is a crucial tool in the depopulation of the deer herd, it's unlikely that recreational

hunting by itself would achieve densities below 10 - 15 deer per square mile.

In 1972, the DNR used public hunting to depopulate the DNR Sandhill Wildlife Area deer herd in 30 days. This occurred under the following conditions: 1) fenced area of 9,000 acres of deer habitat; 2) excellent public access with no private land; 3) very liberal hunting regulations (i.e. all deer were legal game and considered "bonus" deer); 4) hunters were extremely persistent in trying to bag a deer; 5) each day brought a new group of hunters; and 6) hunting pressure was continuous, averaging 138 hunters per day (11 hunters per square mile). Even under the best possible conditions, it took continuous hunter pressure of 11 hunters per square mile to depopulate a deer herd in an enclosed public area (Kubisiak et al. 2001).

CWD in free-ranging cervids in Wyoming and Colorado continues to persist at roughly 3% prevalence despite cervid densities in affected populations that are roughly five animals per square mile (Miller et al. 2000). Since recreational hunting is unlikely to achieve depopulation and may not achieve sufficient deer population reduction, recreational hunting by itself is unlikely to facilitate complete disease control.

The economic effect of public hunting is likely to be positive because a high percentage of the material and services needed to support public hunting would likely be purchased locally (e.g., ammunition, fuel, restaurants, hotels). Moreover, expanded public hunting received considerable support from local residents at recent (Nov. 15-16) public meetings (Wisconsin DNR, unpubl. data). On the other hand, some local residents seek relief from deer hunting and hunting related activities because of unwanted disturbance on the landscape and perceived safety threats.

***Depopulation Using Only Landowner Shooting*.** Successful depopulation by landowner shooting is subject to the same constraints relative to refuges and hunter effort as was discussed under the previous "public hunting" alternative . While landowners may enjoy complete access to their or their neighbor's land, they likely would have the same difficulty accessing other private land as do public hunters. In addition, there are lands that would not be hunted because of absentee landowners, landowners who do not hunt, and landowners who disagree with the management goals and techniques of the CWD eradication plan. Thus, it is unlikely that landowner shooting by itself would accomplish depopulation.

Since March 6, 2002 (the earliest response to Wisconsin's CWD outbreak) the Wisconsin DNR has issued special permits to cooperating landowners in the current EZ. These permits were offered free and have been critical in achieving both meaningful samples of deer tissues for surveillance and for achieving general deer population reduction. Continued reliance on landowner shooting could continue as is, or offering a financial incentive could enhance shooting by landowners.

The social effects of relying on landowner cooperation for all or part of the depopulation are likely to be substantially positive. Landowner-based herd reduction strategies were clearly the preferred options at public meetings held in the current EZ and IHZ. Apart from providing financial incentives to landowners, economic impact would presumably be positive as well because goods and services purchased to support landowner shooting would likely be purchased locally. Presumably, some businesses such as restaurants and motels would receive fewer benefits than they would under the public hunting alternative.

***Landowner Incentives*.** The use of landowner incentives would generate many unique socio-economic effects (A. Nelson, DNR unpubl. memo, November 12, 2002). The idea of providing cash payments to landowners to remove deer from their property arose soon after the decision to remove all deer from the current EZ was made. While most EZ landowners are cooperating with disease control efforts, support is less than unanimous. Many landowners (or their designees) would stop short of killing every deer on their property for one reason or another. The DNR must anticipate that some landowners would not participate at all, providing refugia for deer and the disease.

Currently, the DNR does not have the legislative authority to establish landowner payments for removing deer. In addition, a funding source would need to be identified that would be able to support not only payments in the current EZ, but over larger areas should new zones be established. This may also set a precedent that participants in DNR wildlife damage programs would expect payment for routine deer control.

Submission of animals from outside the target area, misrepresentation of non-target animals or parts, and other frauds have historically plagued efforts to reduce wildlife populations through the use of financial incentives. Verifying deer kills with landowners and making payments only to them may reduce opportunities for fraud by hunters, who would need direct cooperation of an EZ landowner to profit, although this places additional burdens on DNR staff workloads.

Besides fraud, past efforts to use financial incentives often failed because individual payments and annual budgets were inadequate to ensure that annual harvest exceeded annual population increases, resulting in no net progress in population reductions from year to year. Regular annual programs also gave hunters and trappers an incentive to save breeding stock for next year to keep money coming. Similarly, there is some legitimate concern that payments would cause landowners and their hunters to compete for the opportunity to kill deer that reside on multiple properties.

Finally, it may not be possible to completely indemnify the DNR from liability for injuries resulting from landowner compensated deer removal, unless legislation is passed that would free the DNR of liability under certain circumstances. This legislation would eliminate DNR liability and could require a landowner to accept responsibility for any hunters he or she utilized to take deer off their land as a condition of payment.

***Depopulation Using Only Agency or Contract Shooting*.** Although most studies of non-traditional methods for deer herd reductions have taken place in urban settings, these reports clearly demonstrate that, aside from public hunting, shooting over baited sites is the most cost-effective, efficient, and safe method for removing large numbers of deer. Because of these attributes, the Southeast Wisconsin Urban Deer Task Force (Urban Deer Task Force. 1994) ranked shooting highest among all other options for herd reductions. Non-traditional methods proposed by the DNR to assist depopulation efforts include: 1) shooting from fixed positions, 2) using aircraft or trailing hounds to drive deer to ground-based shooters, 3) shooting from aircraft and vehicles, and 4) live-capture (i.e. snares, box traps, rocket nets) and euthanasia. Each of these methods have been used, under various management applications or research protocols, for deer herd reductions. The relative cost and efficiency of many of these methods have been documented in the literature (Palmer et al. 1980, Ishmael and Rongstad 1984, Ishmael et al. 1995, Jordan et al. 1995, DeNicola et al. 1997, DeNicola et al. 2000).

During the past 20 years, shooting over baited sites has become a commonly-used approach for reducing urban deer populations in the midwestern and northeastern states due to it's recognition as a safe, efficient and cost-effective method. During the winter of 2001-02, 12 Wisconsin municipalities or institutions used shooting over baited sites to remove deer. Contractors providing shooting services to these municipalities report removing as many as 46 deer in one four-hour nighttime period using four sharpshooters with sound suppressed firearms (Urban Wildlife Services, Inc. report to City of Altoona 2000) and as many as 23 deer from one baited site over a three-hour shooting session (B. Ellarson pers. comm.). Contractors in Iowa City, IA removed 382 deer in 10 days with three shooters. Removal of greater than 10 deer per bait site per evening shooting session is common. Sharpshooters may average 12.75 deer per day per shooter. The efficiency of bait and shoot operations tends to decline as deer numbers are reduced and the remaining deer become wary of baited sites. Jones and Witham (1995) reported removal rates via shooting of 62.5 minutes per deer during the first year but 108.1 minutes per deer during the third year of deer removal on Chicago metro forest preserves. However, infrequent or short-duration shooting sessions (i.e. one to two consecutive nights/week) allow remaining deer to become re-accustomed to bait sites and, therefore, are more cost-effective than more frequent shooting sessions per bait site. Recent deer shooting programs demonstrate that high numbers of deer can be removed with relative efficiency but it is likely that relatively small numbers of residual deer would still need to be removed by more intensive (and expensive) methods.

The effectiveness of agency shooting is limited by refugia created by landowners who are not supportive of CWD management techniques. There is also a point of diminishing return that is reached when deer populations are low. Agency shooters would have to spend increasing amounts of time to shoot deer as populations are reduced. Also, the number of agency shooters with appropriate training is limited, thus the effort needed to facilitate full depopulation would be difficult. Agency shooting, unless used in conjunction with other techniques, would be unlikely to achieve depopulation within 4-5 years.

The current EZ in southwest Wisconsin has abrupt topography, limited road access, scattered residential development, and is predominantly agricultural land posing geographic and logistical limitations to aerial gunning, shooting from vehicles, and live-capture/euthanasia. Aerial gunning, although used successfully on mule deer in the more open and lightly-developed range lands of western states, may prove to be relatively expensive and ineffective at removing large numbers of deer due, primarily, to gaining the consent of local landowners, public perception regarding the safety of shooting near rural residents and stress and safety to livestock, and limitations of vehicle access to retrieve downed deer on remote, steep, snow-covered, and wooded terrain. However, even with these limitations, use of aircraft may be needed should other alternatives prove unsuccessful in depopulation of deer in an EZ.

Spotlighting and shooting from vehicles can be a relatively safe and efficient method for herd reductions or sample collections near CWD affected areas. These methods are effective in leaf-off conditions, especially with snow cover when deer are more visible. These methods also work well when deer are feeding in agricultural fields. However, deer become sensitive to spotlighting and learn to run when shined. Deer also tend to avoid fields at certain times of the night if spotlighting is done during the same time period each night. Agency shooting over bait is cost-effective relative to other methods involving aircraft charter, large numbers of personnel for drives or carcass removal, or single-deer capture/euthanasia methods.

Nonetheless, the costs of a multi-year program relying solely on agency shooters to achieve complete depopulation would be prohibitive for agencies providing the shooters. In addition, many of the positive benefits of public hunting and landowner shooting (discussed earlier) would be precluded.

Social impacts of agency shooting are more difficult to predict. Some stakeholders would perceive agency shooting to be a safer alternative to public hunting or landowner shooting because of the specialized training required of agency shooters. Others would be unhappy with the loss of hunting opportunity and the emphasis on government-driven actions. The use of aircraft to drive deer would be highly visible and would likely generate considerable controversy and criticism from area residents and farmers with pastured livestock. The potential for public visibility and community disturbance seems relatively low because shooting over bait usually takes place during nighttime or early morning hours during winter months when outdoor human activity is at a minimum. Bait/shooting sites can be established at locations that are not visible from public roadways yet are close enough to allow for easy removal of carcasses. Shooters would work alone (radio or cell phone contact with DNR staff) and would be stationary in elevated stands at the bait site. With adequate snow cover and lighted-reticle telescopic sights, nighttime shooting can be done safely.

**Depopulation Using Live Capture and Euthanasia.** Another alternative method of depopulation is using live capture and euthanasia. In practice, euthanasia following live capture has rarely been used for depopulation or population reduction in deer. Live capture and euthanasia is an inefficient way to kill deer, because deer trapping is very labor intensive. Trap sites need to be pre-baited up to a week before trap placement to begin attracting deer. The attractiveness to deer of a baited trap depends to some extent on the availability of alternative food nearby. Consequently, successful deer trapping generally occurs during the late winter and spring when natural food is relatively scarce and deer are likely to be food-stressed (Rongstad and McCabe 1984). The current EZ and IHZ of southern Wisconsin is a mosaic of forest patches and agriculture. The ready availability of waste and unharvested grain, apples, alfalfa, and other agricultural food makes it difficult to entice local deer into commonly used deer traps. This is already a serious obstacle for CWD-related telemetry research in the current EZ and IHZ (T. Van Deelen, pers. observ.).

Even when deer are entering traps, traps must be checked daily, must be maintained and re-baited as needed, and must be removed when trapping success declines to the point that captures stop. In the cases of net-gunning, dart-gunning, and drop-netting, a great deal of personnel time must be spent waiting for deer to arrive at a bait site and position themselves for effective capture. All of these activities must occur during a relatively narrow temporal window (late winter – early spring) when baiting is effective. Moreover, deer differ in their propensity for capture, some readily enter traps sites while others are more cautious (Rongstad and McCabe 1984, Schemnitz 1996). Thus, when trap success for a site drops to zero it is likely that not all the local deer have been captured.

Given these inefficiencies and related expenses, it is unlikely that depopulation could be achieved through live capture and euthanasia alone. Live capture and euthanasia may be a useful technique where deer populations are small and insular and agency shooting or public hunting are not an option (e.g. small urban parks).

Some stakeholders concerned with humane treatment of deer consider live-trapping and euthanasia to be a more humane alternative to shooting. Simple confinement can be a source of stress for wild deer and can result in injury and death (3-15%) if deer struggle against immobile traps (Rongstad and McCabe 1984).

Similarly, snares or cable restraints can be constructed and used in a manner to reduce or avoid strangulation or injury. These techniques can be relatively selective for a target species and could be used in areas that would minimize non-target captures. However, the use of these tools is likely to be controversial because of the perception that it is inhumane or non-selective. Cable restraint and euthanasia was not a preferred option by participants at a public meeting on CWD herd reduction strategies.

The largest impact of a trapping and euthanasia program would be cost. Trap construction or purchase, bait, euthanasia agents, and personnel costs are likely to be a poor use of funds considering the modest deer population reduction achieved.

***Depopulation Using Toxicants*.** The final depopulation alternative assessed is the use of environmental toxicants or poison. In the U.S., use of chemical toxicants to control or depopulate populations of nuisance wildlife is commonly used for rodent pests of agriculture and less commonly used for other applications. In Australia and New Zealand, toxicants have been used to control a large number of feral vertebrates (Veitch 2000).

This technique is rarely used on large mammals and currently there are no EPA-registered toxicants available for use on white-tailed deer. Some toxicants (e.g. Compound 1080, strychnine) have wide applicability for vertebrates and the EPA does allow their use for emergency applications but approval may still be unlikely (R. Schmidt, Utah State Univ., pers. comm.). A major barrier to the use of toxicants is the inability to selectively deliver the toxic agent to deer without impacting non-target species. Research on this question has been driven by the desire to deliver oral contraceptives using treated bait. A variety of treated foods and mineral supplements have been tried to deliver pharmaceuticals and biomarkers to deer (Mason et al. 1997, Linhardt et al. 1997), though most are equally attractive to other herbivores.

In theory, large numbers of deer could be killed cost-effectively using toxicants, although practical use of this technique is precluded by the risks that toxicant-loaded baits pose to domestic animals, humans, and non-target wildlife. Secondary poisoning can occur if predators and scavengers ingest contaminated tissues from a poisoned herbivore.

Use of toxicants is likely to be relatively inexpensive because it is less labor-intensive. That said, risks to non-target animals, possible contamination of the environment (uneaten treated baits, unrecovered contaminated carcasses, and toxicant metabolites), and perceptions that poisoning is inhumane suggest that widespread use of toxicants would be highly controversial. Uncertain delivery and dosage control suggests that sublethal dosages may occur in deer as well as non-target animals thereby raising additional animal welfare concerns. Application of toxicants requires the cooperation of private landowners and, given the potential for controversy and unintended effects, not all landowners can be expected to cooperate. Hence, one could expect the creation of refuge areas resulting in inefficient disease control.

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***Environmental Impact Statement***
***on Rules to Eradicate Chronic Wasting Disease***
***in Wisconsin's Free-Ranging White-tailed Deer Herd***

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# HERD REDUCTION



## Background.

Very high prevalence (50-90%) of CWD in some captive facilities suggests that transmission of CWD may be positively density dependent; questions, however, remain about the mechanism of CWD transmission. Research is currently being conducted in Colorado to test the relationship between population density and CWD prevalence. Host population reduction has been frequently used to control diseases in wildlife as discussed in the Background section. Population reduction is based on the premise that infectious disease is a density-dependent process. Host population density is one factor affecting the rate of transmission of contagious diseases. Population reductions, in advance of spreading disease, have been used successfully to limit the spread of rabies in foxes, skunks, and vampire bats (Wobeser 1994). Dispersing deer are a likely avenue for the spread of CWD across landscapes (see the Background section for a review of deer dispersal).

In addition to posing a risk of disease spread, dispersing deer may also affect the effectiveness of efforts to depopulate deer in the affected area. Immigration from surrounding uncontrolled regions is a frequently cited problem in disease control depopulation programs (MacDonald and Voigt 1985, Freeland and Boulton 1990). Ingress from surrounding areas was an important factor limiting the effectiveness of a removal program for feral water buffalo in Australia to control bovine tuberculosis (Ridpath and Waithman 1988).

An example of an area where population reduction is being implemented to control the spread of disease is the current CWD Management Zone in southwestern Wisconsin, created by the DNR's emergency rule in 2002. The CWD Management Zone was centered on the known positive CWD cases and extended outward approximately 40 miles. The CWD Management Zone did not include the CWD IHZ that immediately surrounds the EZ. The CWD Management Zone included all of deer management units 70, 70A, 70B, 70E, 73E, 75A, 75C, 75D, 76, 76M except for those parts of 70, 70A, 75A, 75C, 76, and 76M that were included in the IHZ (Figure 3 in Background section). The CWD Management Zone also includes parts split off of five deer management units: 54B, 70G, 71, 73B, and 77A. Boundaries of the CWD Management Zone were numbered or lettered federal, state, or county highways. The emergency rule reduced the overwinter goal for units in the CWD Management Zone to 10 deer per square mile of deer habitat. The 2002 emergency rule extended the dates of the archery and gun seasons in the CWD Management Zone and specified the issuance of an unlimited number of earn-a-

buck permits in 2002 to reduce populations quickly to the lower goal level.

Hunting seasons have been the primary tool of deer herd management throughout Wisconsin's history (Wisconsin DNR 2001). Typically, over 700,000 hunters pursue deer each year in this state. In the past, hunters have had the capability of controlling the deer herd at or near population goals established for each management unit. Traditionally, hunting seasons and antlerless deer permit systems had been conservative to protect deer populations and allow them to grow to levels consistent with habitat carrying capacity and human tolerance. Recently, however, hunting harvests have not kept pace with herd growth, and deer herds have not been kept at overwinter population goals (R. Rolley, pers. comm.). Hunters have been reluctant to support liberalizing hunting seasons and permit systems as they enjoy seeing the higher numbers of deer. Yet, October and December four-day antlerless only seasons (Zone T) with free antlerless deer permits have been employed to increase harvest of deer in units where normal hunting seasons and permit systems are not expected to get deer populations to within 20% of overwinter goals. The Deer 2000 citizen participation process also developed an earn-a-buck regulation. Earn-a-buck will be used when two years of Zone T have not reduced the population to within 20% of deer management unit population goals (Wisconsin Conservation Congress 2001). Unfortunately, even these liberal regulations are not expected to be enough to get hunting harvests to the levels needed to control CWD. Therefore, even more liberal seasons and regulations have been proposed.

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## Herd Reduction Program.

**Proposed Action.**

The proposed rule would grant the DNR authority to establish a herd reduction zone (HRZ) by rule around areas where CWD positive animals have been identified in free ranging cervids. Units or portions of units located within the boundaries of a HRZ would be managed for an overwinter population goal of 10 deer per $mi^2$ of deer habitat. A HRZ shall be bounded by readily identifiable features of the landscape such as roads and rivers. The intent of creating this zone is to establish a buffer zone of low deer density around the area where CWD has been identified in an effort to slow or prevent the spread into unaffected areas. In addition, intensive surveillance would be conducted in a HRZ to determine if CWD has already spread beyond an EZ and, if so, in which direction it may have spread.

In this rule a HRZ would be established around the current affected area in southwestern Wisconsin. This HRZ would extend approximately 40 miles out from the current known positives. Based on disease prevalence, deer dispersal and the possibility of several dispersal events occurring since CWD has been in the state, the 40-mile radius was established. Following statewide surveillance, the radius of the current HRZ or future HRZs may be modified in response to this new information regarding presence of the disease and research findings regarding deer dispersal. It is likely that reducing the size of the current HRZ would reduce its effectiveness in minimizing the risk of disease spread from the current EZ. Maximum dispersal distances reported in four southern Wisconsin studies were 12 miles or less. Much longer dispersal movements (greater than 100 miles), however, have been observed in the Midwest. Therefore, it is possible that dispersing affected deer could move through the smaller buffer area and establish new areas outside of a HRZ. If these new areas were in an area with 20-30 deer per square mile of deer habitat, CWD may spread more rapidly and be more difficult to control.

Intensive surveillance for CWD would be conducted in a HRZ to determine if CWD may have already spread from the associated EZ and, if so, to determine the distribution, prevalence, and direction of spread. Because a HRZ is most at risk of infection due to its proximity to an EZ, a higher level of surveillance testing is proposed for a HRZ than for the rest of the state. A goal of testing 500 deer/deer management unit was set for fall 2002, for a total of 7,000 deer. Plans for future surveillance would depend on the results of the fall 2002 testing, but it is likely that intensive surveillance in a HRZ would need to continue for several years until there is a better understanding of the distribution and dynamics of CWD in Wisconsin.

The length of time that an area would need to be in a HRZ would depend on the results of surveillance testing within the zone and progress in depopulation within the associated EZ.

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## Effects.

**Deer Population.** The specific effects on deer population size of an HRZ would depend on the actual boundaries of the zone that would be delineated in annual rules. Deer population goals within the state range from 10 – 30 deer/ $mi^2$. Depending on the location of a HRZ, the change in deer population goals could range from no change to a reduction of 67%. The proposed density goal of 10 deer per square mile of deer habitat (approximately four deer per square mile land area) is comparable to the deer density in the CWD endemic area of Colorado (approximately 5 -6 deer per square mile of land area; Vieira 2001, Vieira and George 2001).

Since a majority of deer management units are above population goals, the actual number of deer that need to be removed is significantly more than the goal would predict. For example, the CWD Management Zone created by emergency rule in 2002 had an estimated population of approximately 60,000 deer, as opposed to 50,000 deer if the units were at goal. To reach the overwinter density goal of 10 deer per square mile of deer habitat there would be 22,000 deer in this zone. Therefore, approximately 38,000 deer, or 63% of the current deer population, would need to be removed. Whereas only 28,000 deer, or 56% of the current deer population, would need to be removed if these units were at goal.

***Disease Control*.** The deer population reduction planned for a HRZ is designed to reduce the risk that CWD would spread from an EZ. However, it is difficult to predict the consequences of the proposed density reduction on disease spread because there remains uncertainty about the mechanism of transmission and the effect of host density on transmission. If CWD transmission rates are density-dependent, then the reduction in the deer population of a HRZ could be expected to reduce the rate of spread should new affected areas become established by deer dispersing from an EZ. This would allow time for new disease areas to be discovered through the intense surveillance that would be conducted in a HRZ. The proposed post-hunt density for a HRZ is similar to the deer density in Colorado's endemic area where CWD has persisted with slow increases in prevalence (Miller et al. 2000).

The reductions of deer populations in a HRZ are designed to limit ingress of deer into the associated EZ, thereby facilitating the eradication of CWD from the affected area. However, successful herd reduction would ultimately depend on hunter participation and willingness to shoot more deer than ever before. This may be difficult for hunters when they may not desire additional venison.

***Ecological Effects*.** The specific ecological effects of reduced deer population size in a HRZ would vary depending on the location of the zone. Currently, the CWD Management Zone defined by the 2002 emergency rule covers much of southwestern Wisconsin. If CWD is confined to this region, the ecological effects of reduced deer density would likely be more limited than if a broader HRZ is defined in response to the discovery of CWD in other regions of the state.

In 1995, the DNR prepared an environmental assessment on deer population goals and harvest management (Vander Zouwen and Warnke 1995). The environmental assessment focused on effects of alternative overwinter deer population goals and deer management unit boundaries. The assessment described known or potential ecological effects of various deer population densities. These potential effects are discussed in detail in the Depopulation section and are briefly summarized below.

The deer population environmental assessment concluded that different deer population densities cause different effects on other members of the communities they live in. These effects differ depending on the community type and the region of the state along with habitat carrying capacity and the severity of winter weather. Although research linking known deer population densities to specific effects on natural communities is limited, a number of probable effects of lower deer population densities can be suggested. Low deer densities can affect plant community composition. These changes may be more pronounced with deer population densities below 20-25 deer per square mile of deer habitat. Favored plant species may increase and less palatable plant species may decrease in abundance. The resulting changes in plant species composition can affect other taxa, ecological function, and productivity of an ecosystem (Bartelt and Mladenoff 1995). Many herbaceous plants can

benefit from low numbers of deer (Martin 1995). Damage to plants takes the form of lost foliage, reduced reproduction, and reduced energy reserves. Tree and shrub species consumed by deer are likely to increase when overwinter deer population densities are reduced below 15-20 deer per square mile of deer habitat (Mladenoff 1995). Low levels of deer browsing on some plant species, for which some invertebrates have obligatory relationships, may affect these hostspecific invertebrates (Henderson 1995). Small mammal species can benefit from low deer populations through changes in habitat structure (Edwards 1995). Low deer population densities can benefit some bird species due to changes in habitat structure, particularly the abundance of shrubs and some herbaceous plants, as well as long-term effects on forest species composition and canopy (Hoffman 1995). Bird species most likely benefiting from low deer densities are shrub-nesting species. In addition, it is not expected that turkeys would be affected from a decrease in deer densities.

The deer population reductions proposed for a HRZ likely would reduce many of the adverse ecological effects that high deer densities may have caused during recent years. However, it is uncertain how landowners and hunters would react to the proposed population reductions, especially considering the public concerns about the potential human health risks associated with consuming venison from deer that may be infected with CWD. If a large proportion of hunters decide not to hunt in the future because of human health concerns, deer harvests in the region may actually decline resulting in further growth of the deer population and subsequent greater adverse impacts on regional plant communities and dependent animal species.

The gray wolf is the only large carnivore in Wisconsin that is heavily dependent on deer as a food source. The Wisconsin DNR reclassified wolves from endangered to threatened in 1999. The U. S. Fish and Wildlife Service started the process to reclassify in 2000 and should complete the process in 2003. The current CWD management zones are in Wolf Management Zone 4. This zone includes 28 counties in southern and eastern Wisconsin that appear to have limited potential for wolves. Currently no wolf packs are known to occur in this zone and no wolf depredations have occurred in the zone (Wydeven and Wiedenhoeft 2002). During July 2001-June 2002, wolf observations were reported from seven counties in the zone but these may include misidentifications. An adult male wolf was killed by a vehicle on the west side of Madison in April 2002. The presence of this wolf, however, is not likely indicative of a resident population. Because the area included in the current CWD management zone is outside of the northern and central forest wolf range, the proposed deer population reductions are not expected to have an impact on the recovery of Wisconsin's wolf population. However, if a substantially larger HRZ were to be created in response to a wider distribution of CWD in the state, it is possible that wolf recovery could be adversely affected.

Several other carnivore and omnivore species including black bear, coyote, and bobcat prey on deer fawns when available. In addition, several species of birds use road-killed deer as a source of carrion. These include common raven, American crow, turkey vulture, and the bald eagle. These species are generalists and would not be expected to be greatly affected by changing deer densities.

Wisconsin has one wild elk herd that is located near Clam Lake in the northwestern part of the state. This herd was established in 1995 when 25 animals were transplanted from Michigan. The population has grown to an estimated 120 animals during the past seven years. The Natural Resources Board has approved establishment of a second wild elk herd in Jackson County. This project is currently on hold to await completion of CWD surveillance within the central forest region. The Jackson County introduction would need to meet all applicable regulations regarding the importation of cervids into Wisconsin, as well as all health testing and monitoring requirements.

Because elk are susceptible to CWD, the presence of CWD in Wisconsin poses a threat to their restoration in the state. Both the existing Clam Lake elk population and the proposed Jackson County population are outside of the current CWD management zone. If CWD occurs across a broader area it could potentially threaten the proposed Jackson County elk population and the Clam Lake herd. In the event that CWD is discovered in northwestern Wisconsin and a deer HRZ is defined that includes the Clam Lake elk population, the reduced deer densities could potentially reduce interspecific competition with elk. Such competition would likely be limited to severe winters when both elk and deer may occupy conifer yards.

***Socio-economic Effects*.** The socio-economic effects of various deer population goals were analyzed in the

environmental assessment on deer population goals and harvest management (Vander Zouwen and Warnke 1995). Socio-economic effects of deer herd reduction are discussed in detail below.

The deer herd reduction proposed for a HRZ would likely result in short-term loss of hunting recreation, hunting associated industries, and wildlife viewing opportunities. Research to address some of these issues is currently being conducted which should provide information on hunter behavior and attitudes. Deer population reductions can be expected to result in less damage to agricultural crops and timber resources and fewer deer-vehicle accidents. These impacts would be expected to last for the duration of disease control efforts and subsequent repopulation of the area.

The Wisconsin Chippewa tribes are entitled to harvest up to 50% of deer available for harvest in deer management units that fall within the ceded territories. None of the ceded territory falls in the southern portion of the state where the current HRZ is located. Tribal deer harvest occurs primarily in the northern deer management units, while limited harvest occurs in all other portions of the state except the south. If CWD is discovered in the ceded territories and a HRZ is established, the deer herd reduction could have an impact on the Chippewa tribes and the overall tribal deer harvest, depending on the extent and location of the disease. Management of the deer herd at 10 deer per square mile in a HRZ may impact tribal customs, venison availability, and recreational opportunities. These impacts, however, would be less than those experienced in an EZ where the goal is depopulation.

Deer and deer hunting are integral parts of Wisconsin's socio-economic fabric. Nearly 700,000 hunters pursue white-tailed deer on opening day of the traditional 9-day gun deer season. During the past decade, hunters have harvested an average of more than 400,000 deer a year. An estimated seven million hunterdays of recreation are provided annually during the archery and gun hunting seasons. Economically, deer hunting supports thousands of jobs in Wisconsin and it is estimated that it contributes close to $1 billion to the state's economy (IAFWA 1997). An estimated 2.3 million state residents observed, fed, or photographed wildlife during 1996 and deer were among the most popular species for wildlife viewing. It is anticipated that the increased hunting opportunities in a HRZ would result in an initial period of increased hunter participation, followed by a decline in hunter numbers and effort as the deer population decreases. Hunter numbers and hunting opportunities would be expected to be low for the duration of the disease control effort and increase with subsequent repopulation of the area by deer.

Changes in property values are another possible effect of deer herd reduction in a HRZ. Whether this effect would be a positive or negative change in a property's value may be largely dependent on the type of land, land use, and the motivation of the parties involved. The magnitude of any effect would likely depend on the extent and location of an HRZ and the types of property involved (e.g., recreational, agricultural, or rural/urban). However, any effect on property values in a HRZ would likely be less than those experienced in an EZ where the goal is depopulation.

High deer densities can result in significant damage to agricultural crops. An additional benefit of a reduction of deer would likely be a reduction of agricultural deer damage in a HRZ for the period of time that the deer population in a HRZ is reduced. The extent of this benefit would depend on the extent and location of a HRZ in relation to the types of crops and the amount of agriculture in the area. As the deer density in a HRZ is restored, deer agricultural damage would likely increase. Appendix G presents a discussion of current deer crop damage.

High deer densities may result in damage to the forest products industry. High deer densities are a concern of county foresters and industrial forest landowners, especially when deer populations exceeded 20-25 deer per square mile of habitat (Zastrow 1995). An additional benefit of a reduced deer herd would likely be a reduction in forest deer damage in a HRZ for the period of time that the deer population was reduced. The extent of this benefit would depend on the extent and location of a HRZ in relation to the forest types and the acreage of forests in the area. As the deer herd in a HRZ is restored, deer forest deer damage would likely increase. Appendix H presents a discussion of the economic impacts of deer on forests.

Deer-vehicle accidents are a significant problem in Wisconsin. The number of accidents is related to both the number of miles driven by motorists and the number of deer. In some counties, deer collisions are one of the

most prevalent causes of vehicle accidents, accounting for up 64% of all vehicle accidents (average of 16%). Deer collisions account for over 30% of vehicle crashes in twenty counties. In 2001, there were 801 people injured and nine killed in deer-vehicle collisions. It has been estimated that there have been over 40,000 deer-vehicle collisions each of the last several years in Wisconsin. Annual vehicle repair costs total approximately $100 million. Appendix I presents a discussion of deer-vehicle accidents. An additional benefit of a reduction of deer would likely be a reduction of deer-vehicle collisions in a HRZ for the period of time that the deer population in a HRZ is reduced. The extent of this benefit would depend on the extent and location of a HRZ in relation to the miles of major roads and the human population in the area. As the deer herd in a HRZ is restored, deer-vehicle collisions would likely increase.

Currently there is no evidence that CWD can be transmitted to humans or livestock (see Susceptibility in the Background section). No cases of human prion disease have been associated with CWD (Williams et al. 2002a). In 2002, a report surfaced regarding three patients from northwest Wisconsin who died of neural disorders and who reportedly consumed venison. Upon investigation of this report by the Centers for Disease Control, no association with CWD was found (DHFS 2002). However, because CWD is a TSE and the transmission of BSE to people in England, there remains concern about the perceived risk of CWD transmission to humans and cattle. The deer reduction planned for a HRZ is believed to be the most effective strategy for preventing the spread of CWD across the state and minimizing any potential risk for humans and livestock.

The rapid population reduction planned for a HRZ would require changes to deer herd monitoring procedures because the traditional sex-age-kill method is dependent on fairly stable hunting season frameworks and harvest rates. Deer populations in a HRZ would be monitored using a combination of helicopter or fixed-wing aerial surveys and population modeling.

The tradition of hunting, which is one of the cornerstones of the state's outdoor recreational heritage, would likely also be affected by deer herd reduction. For over a century, deer hunting has taken place in northern and central Wisconsin, and since the mid-1900's, in southern Wisconsin. The effect of deer herd reduction on this fall activity is difficult to measure, but the effect on a tradition that is so deeply ingrained in a human culture cannot be overlooked. On opening day of the traditional 9-day gun deer season, over 700,000 hunters pursue white-tailed deer. For these hunters hunting is an opportunity for camaraderie, recreation, food, and to take part in a tradition handed down from one generation to another. However, herd reduction creates problems for these hunters. First, these hunters are now being asked to assist with the population reduction of the animal that is the source of their tradition. Secondly, hunters are being asked to harvest more deer than they can use. Herd reduction, while crucial for the containing the disease, remains a personal dilemma for hunters and resource managers.

These effects would be expected to last for the duration of disease control efforts and subsequent repopulation of the area. Because the deer population reduction proposed for a HRZ is less than for an EZ, the magnitude of the socio-economic effects would likely be less than those described in the Depopulation section.

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## Analysis of Alternatives to Herd Reduction.

***No Action*.** Under this alternative no effort would be made to reduce the deer population below current goal levels (10 to 30 deer per square mile of deer habitat) in the area surrounding an EZ. Hunting season frameworks would not change. Zone T season structures could be used in selected deer management units if overwinter populations were above 20% of goal and a regular nine-day gun season was determined to be insufficient to reduce the deer herd. Surveillance testing would be conducted at the same level of intensity as in the rest of the state, approximately 500 deer tested/county.

The deer population goals in most of the state are greater than those in Colorado's endemic area. These higher deer densities may facilitate more rapid spread of CWD than has occurred in Colorado making it more difficult to contain and eradicate the disease should deer dispersing from an EZ establish new disease areas outside an EZ. Higher deer densities in the area surrounding an EZ would likely also result in immigration into an EZ making it more difficult to eradicate CWD from the affected area.

The CWD surveillance-sampling goal of 500 deer per county is designed to be able to detect a CWD positive deer with 99% certainty if prevalence in the management zone or county is as low as one percent. However, this level of testing around an EZ may not be as efficient as the proposed action that is designed to detect new disease areas in the earliest stage when it would be easiest to control the disease.

Under the no action alternative, deer populations throughout southwestern Wisconsin would be managed for the current population goals. Current deer population goals represent an attempt to balance public demands for the positive benefits of deer (consumptive and non-consumptive) with the public's willingness to accept the economic and ecological effects of deer. Maintaining deer populations at the established goals during the next few years can be expected to meet the public's demand for deer hunting, recreation, and wildlife viewing opportunities, and tribal harvest allocations, but would likely maintain current levels of negative impact on plant and animal communities, deer damage to agricultural crops, and high numbers of deer-vehicle accidents.

It is difficult to predict the long-term consequences of failing to contain and control CWD in Wisconsin given current knowledge of this disease. However, it would likely have serious long-term ecological and socio-economic consequences. Initially, public concerns about the safety of venison consumption may reduce hunter pressure and harvests in the CWD affected area resulting in substantial growth of the local deer population. The resulting browsing pressure may adversely impact the local natural plant community and animal species that are dependent on native plants. Higher deer populations could also increase the rate of CWD transmission making it more difficult to control the disease. Failure to control CWD could eventually lead to the collapse of the local deer population and the spread of the disease to other regions within Wisconsin and surrounding states. This eventual collapse of the deer herd would likely result in ecological and socio-economic effects similar to those experienced under the proposed action. High levels of environmental contamination could preclude the repopulation of deer in the affected areas. Widespread declines in the deer population would likely have major impact on deer hunters and wildlife watchers along with wildlife dependent businesses. The spread of CWD throughout Wisconsin's wild deer population could increase the risk to farmed cervids and potentially the risk of transmission to cattle and humans.

Spread of CWD throughout the state could place Wisconsin's newly restored elk population at risk. The potential decline of the Central and Northern Forest deer populations could adversely impact gray wolves.

If CWD is discovered in the ceded territories and the deer herd collapses, there would be little possibility for repopulation of the herd. This would have long-term impacts on the Chippewa tribes and the overall tribal deer harvest. The deer herd collapse would impact tribal customs, venison availability, and recreational opportunities.

Because hunting season frameworks would not be altered under this alternative, the traditional sex-age-kill method could continue to be used to monitor changes in deer population size.

***Intensive Surveillance*.** Under this alternative, no effort would be made to reduce the deer population in the area surrounding an EZ until intensive surveillance was conducted. The intensity of sampling for CWD surveillance under this alternative would be the same as the proposed action - testing 500 deer/deer management unit. Therefore, it is possible that several years may elapse before new disease areas are discovered and any action is taken to contain the disease. Hunting season frameworks would not change.

Because deer population goals in a majority of the state are greater than in Colorado's endemic area, CWD may spread more rapidly than in Colorado. Rapid spread from a newly affected area would substantially increase the difficulty of containing and eradicating the disease from new disease areas.

Maintaining higher deer densities in the area surrounding an EZ would likely result in immigration of deer into the EZ making it more difficult to eradicate CWD from the affected area.

Deer population goals would not change under this alternative so the short-term ecological and socioeconomic effects of deer population changes would be similar to the no action alternative. The more intensive surveillance would likely increase the likelihood of detecting new affected areas. With the establishment of new EZs, the risk of rapid CWD spread from new affected areas would be decreased. Therefore, the risk of significant long-term adverse ecological and socio-economic effects would likely be less than under the no action alternative, but

greater than under the proposed action.

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## Herd Reduction Tools.

The following sections provide an assessment of the proposed tools to accomplish herd reduction in a HRZ and an assessment of alternative tools considered.

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## Proposed Actions.

A combination of tools would be necessary to achieve herd reduction. No one tool is expected to achieve herd reduction by itself. The proposed rule specifies Special Disease Control Hunts for the archery and gun seasons in the deer management units or portions of units included in a HRZ. The rule would also create special CWD deer permits that authorize the harvesting of deer within a HRZ. The rule further requires that any deer harvested in a HRZ must be registered at a deer registration station designated by the DNR within a HRZ no later than 5:00 p.m. on the day after it was killed. However, deer may be transported outside of a HRZ prior to registration as long as they are registered within an HRZ by 5:00 p.m. the day after kill.

***Extended Season*.** A HRZ gun season would run for four days concurrent with Zone T in late October (a proven herd reduction hunt) and from the Saturday prior to Thanksgiving through January 3 (when many are on vacation and available to hunt). A HRZ archery season would run from the Saturday nearest September 15 through January 3.

***Unlimited Tags*.** The rule proposes that hunters not be limited on the number of "earn-a-buck" tags they can acquire. By policy, the DNR has limited tag issuance to four tags per hunter per day. These tags can be used on antlerless deer in an IHZ and HRZ. They can also be used on bucks if an antlerless deer is shot and tagged first and the antlerless deer is transported along with the buck to the registration station. Tags issued with the archery and gun deer licenses and Zone T antlerless deer tags can be used in the same manner as the "earn-a-buck tags". Offering unlimited and free tags is expected to increase harvest of deer. Hunters have suggested that free tags would increase their willingness to harvest deer.

***Earn-a-Buck Regulation*.** The rule proposes an earn-a-buck regulation (i.e. antlerless deer must be tagged by a hunter before that hunter can shoot an antlered buck in a HRZ). This rule applies to archery hunting, gun hunting, and muzzleloader hunting. Hunters can earn buck tags with antlerless deer killed in the archery season and gun deer season, as well as, those killed under authority of an agricultural damage shooting permit. There is no limit to the number of bucks that may be killed by a hunter. Buck tags can be used during all archery and gun seasons in a HRZ. Hunters without a buck tag can harvest a buck if they first harvest an antlerless deer and the antlerless deer is transported along with the buck to the registration station. In this case, a Zone T tag, license carcass tag, or earn-a-buck tag can be placed on the buck.

***Modification of Herd Reduction Zone Hunting Regulations*.** HRZs would change from long hunting seasons and earn-a-buck regulations to standard seasons and regulations in a deer management unit within a HRZ when the deer herd in that unit is reduced to 15 deer per square mile of deer habitat. Standard and Zone T seasons and regulations would then be used to keep the deer population near the goal of 10 deer per square mile.

**State Park and Refuge Seasons**. For most parks in a HRZ, the season is proposed to run from the Saturday prior to Thanksgiving to the third Sunday following Thanksgiving. In addition, there would be a four-day October season that would run concurrent with the Zone T dates, with hunting hours closing at noon each day. Parks in urban areas and parks that primarily consist of designated use areas would not have hunting seasons. Government shooters would be used instead. Park archery seasons in a HRZ would run concurrent with gun seasons and extend to January 3 only in those parks which have had late archery seasons. Waterfowl refuges in a HRZ would be open to deer hunting during the gun and archery seasons. Opening of state parks and waterfowl refuges to deer hunting is expected to increase deer harvest and prevent refuge situations where deer

and CWD would otherwise be protected.

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## Effects.

***Deer Herd Reduction and Hunter Behavior***. Public hunting is believed to be the most effective method of herd reduction due to the large number of hunters and their access to both public and private lands in a HRZ. The long seasons are offered to give hunters every chance to reduce the deer herd quickly to the lower goal. In a HRZ, the gun season is substantially longer than the current nine-day gun season, but there are fewer season days in November. The season ends earlier than in an IHZ to give consideration for landowners and other recreationists as the herd density goals are higher in a HRZ.

The earn-a-buck regulation is believed to be the most effective regulation for herd reduction (Wisconsin DNR, unpubl. data). It allows those who are willing to shoot both bucks and antlerless deer to continue to do so. But, most importantly, it requires those who prefer to shoot only bucks to shoot antlerless deer as well.

The actual percentage harvest increase, and therefore success in meeting CWD control goals, is impossible to predict as none of these regulations have been used before in the same way or in a CWD situation in Wisconsin. Although all of these regulations have the potential to result in successful herd reduction, success would ultimately depend on hunter participation and willingness to shoot more deer than they ever have before, when they may not want the meat.

***Public Safety*.** Some landowners and recreationists have expressed concern about safety for themselves, their family, their livestock and their pets during the long gun season. Having more than a one month gun season logically adds risk to that provided by a nine-day gun season. The degree of added risk is impossible to predict. However, there would be much lower densities of deer hunters in the woods on any given day than during the intense nine-day gun season. Also, landowners have control over who hunts on their land and can limit the dates and times that hunters are present. Most hunting accidents involve selfinflicted injuries or hunters accidentally shooting their partners (T. Lawhern, pers. comm.). It is an extremely rare event for non-hunters, livestock, or pets to be shot by a deer hunter, even when there are over 600,000 hunters in the woods on the traditional opening weekend. The late October Zone T season has been used annually as a herd management tool from 1996 to present without hunters shooting other hunters or non-hunters. The first four days of the 2002 CWD hunt in the current IHZ and CWD Management Zone resulted in no fatal hunting accidents.

***Trespass*.** Hunters are still required to get permission from landowners to hunt on their lands in the CWD zones. Trespass laws still apply. It is possible that some hunters would perceive the mission of CWD as over-riding this law and rationalize trespass. On the other hand, many would not see deer in this area as valuable as in the past and may choose not to risk trespassing. During the 2002 hunts in the current IHZ, there were fewer instances of trespass in Iowa County and no increase in trespass complaints in Dane County compared to previous years (Dane and Iowa County Sheriff Departments, pers. comm .). It is anticipated that the remaining counties in the current CWD management zone had similar experiences.

***Recreational and Land Use Conflict*.** There is the potential for many recreational conflicts to be caused by the proposed hunting regulations. Hunters that normally are not required to wear blaze orange would be required to during the longer gun deer season. Some hunters may decide not to hunt with a dog for fear of another hunter mistaking their dog for a deer. Waterfowl hunters would not be required to wear blaze orange, but they may choose not to hunt because of concern for not being seen by a gun deer hunter. Muzzeloaders would not have their own season separate from the gun season. Hikers, bicyclists, and skiers may choose not to recreate in the longer gun season because of concerns for safety. Snowmobilers may have trouble getting access for trail maintenance before the ground is frozen, and they may not be able to open trails, as some landowners may wish to prohibit snowmobiling while a deer season is open. Some local residents may choose not to take walks on their lands or on area roads due to safety concerns. Some people may choose not to use parks in a HRZ while the gun seasons are in place. Landowners may grow weary of hunters asking permission to hunt on their lands or of trying to manage potential conflicts between hunters and their farm operations. Hunters may be more likely to damage some standing crops which have not yet been harvested during the early part of the hunting season.

Landowners may perceive the need to keep livestock off their pastures for longer periods of time to ensure their safety. However, considering the low densities of hunters that are predicted to be in the woods at any one time over the course of the season, many who initially think they would not recreate or use their lands in certain ways may choose to do so. It is not known to what degree recreational and land use conflicts would develop and how many people would be affected. A HRZ gun season is proposed to be substantially shorter than an IHZ season in consideration of these recreational conflicts and the lesser need for herd reduction.

***Enforcement***. The regulations proposed in this rule are enforceable based on past experience. However, the longer seasons and complexity of regulations in a HRZ would place a significantly greater workload on enforcement personnel through responding to questions and tips and field checks of hunters.

***DNR Revenue***. HRZ hunters would not need to pay for hunters choice and bonus permit applications, but the $3 fee does not provide much revenue beyond the cost of processing the permits. In addition, IHZ hunters would receive free permits, so they would not need to purchase bonus tags to harvest additional antlerless deer. Bonus tag revenue would decline for the affected deer management units (Appendix E). Bonus tag revenue is ear-marked for the Wildlife Damage Abatement and Claims Program. It is possible, however, that revenue would not be sufficient to pay for abatement and compensation as a result. With a greatly reduced deer herd in a HRZ and IHZ, damage claims may also decrease substantially.

***DNR Staffing and Expenditures*.** The free tags, earn-a-buck rule, and longer seasons would produce more deer to be registered in the short-term and therefore higher costs as registration stations are paid $0.35 per deer registered. However, once the population goals are neared or reached, annual harvests and registrations would decrease, as would registration fee costs. Customer service, wildlife management, licensing, and law enforcement staff would have to spend more of their time answering questions or giving presentations to groups on the new hunting regulations.

***Local Commerce*.** It is unknown to what degree this rule would impact local economies in a HRZ. Hunting and other types of outdoor recreation contribute significantly to local economies (Vander Zouwen 1998). Lengthened hunting seasons may result in increased expenditures in local communities if hunter numbers remain unchanged or increase and hunters increase their number of days in the field. On the other hand, other types of recreation and associated expenditures may decrease if recreationists do not spend time outdoors in a HRZ due to concerns about safety or other conflicts with deer hunting.

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## Analysis of Alternative Herd Reduction Techniques.

***Traditional Seasons or Modest Season Extension*.** Traditional seasons have not kept deer populations at established overwinter population goals in many units during most years in the last decade (R. Rolley, pers. comm.). Traditional seasons, even with October and December Zone T seasons, would certainly not encourage or allow adequate harvest to meet CWD control goals in a HRZ (approximately 50% herd reduction goal). Similarly, a somewhat longer season is not expected to generate enough harvest. It is believed that hunting through the Christmas holiday week when many are on vacation is needed to generate the harvest necessary for a HRZ. However, a shorter season would be less costly to administer and enforce and result in less recreational and land use conflicts.

***Unlimited Either-Sex Tags***. The unlimited either-sex deer hunting regulation was the most preferred alternative of respondents to a questionnaire on CWD control options distributed at public meetings in May 2002 (Appendix D). This regulation would be the easiest to administer by DNR staff, license vendors, and registration stations. It would be the easiest regulation to enforce and it would be the easiest regulation for hunters to understand. It would also intuitively be the regulation of choice because all deer seen by hunters could be shot without passing up any bucks and without limit. However, the DNR believes that the earn-a-buck regulation would likely result in more deer being harvested by the end of the season, which is the most important performance measure for any regulation in control of CWD. With hunter perceptions of the safety of venison, it is expected that many hunters would only shoot bucks and pass on does and fawns, particularly if they had not accepted the herd reduction goal. An earn-a-buck regulation ensures that a doe or fawn is shot for each buck harvested, which would not

likely occur in an unlimited either-sex hunting regulation.

***Earn-a-buck with Multiple Antlerless Deer.*** Some hunters and landowners in focus groups conducted in the current EZ during April 2002 suggested that hunters be required to shoot two or more antlerless deer for each buck they shoot (J. Petchenik, unpubl. data.). The obvious goal is to reduce the herd as quickly as possible, with the reasoning that hunters would shoot two antlerless deer to shoot their buck. This alternative was considered by the DNR both for the 1996 earn-a-buck regulation and the CWD control regulation. It was not adopted because the DNR believes that shooting two antlerless deer per buck would likely be perceived by hunters as too much of an obstacle, causing them to give up hunting or hunt elsewhere. This regulation would also likely reduce buck harvest, and buck harvest is particularly important due to the greater dispersal tendency of young bucks. This regulation would also be more difficult to administer due to the required record keeping on numbers of antlerless deer shot by each hunter.

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***Environmental Impact Statement***
***on Rules to Eradicate Chronic Wasting Disease***
***in Wisconsin's Free-Ranging White-tailed Deer Herd***

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# BAITING AND FEEDING



## Background.

Deer baiting is the deliberate placement of food for the purpose of attracting or habituating deer to a location for hunting. Deer feeding activity includes recreational, supplemental, and emergency feeding. Feeding does not include the placement of food and attractants for the purpose of hunting deer. Recreational feeding is done mainly for viewing deer. Supplemental feeding normally involves placing larger quantities of food or mineral to augment naturally occurring foods. The purpose may be to attract, concentrate, and hold deer on specific parcels of land or to increase local antler development and carrying capacity for deer. Emergency feeding is the deliberate placement of food during unusually severe winters, mainly to mitigate winter losses of deer. References to feeding in this document refer to all forms of feeding unless specified otherwise.

Baiting of deer for hunting had been legal in Wisconsin until 2002. But, historic prohibitions on using bait for waterfowl and use of salt for attracting deer may have fostered widespread belief that baiting of deer was illegal. Despite this, low levels of baiting existed in northern areas that had very low deer densities. Growing awareness that baiting was legal led to a rather sudden and widespread increase in baiting during the 1980s and 1990s. Prior to the discovery of CWD in Wisconsin, feeding of deer by the public had not been regulated in the state. Some rural resorts, restaurants, taverns, and residents have had a long tradition of putting food outside of windows to provide opportunities for close viewing of deer. The proportion of Wisconsin's rural residents that feed deer is unknown. Renewed concern for disease transmission in the upper Midwest requires re-examination of deer baiting and feeding.

The cumulative amount of artificial energy provided through public feeding and baiting has not been quantified in Wisconsin. However, studies in Michigan (Winterstein 1992) and testimony in Wisconsin (Bob Ohlson, WICORN, Racine, NRB meeting, August 2002) suggest that the energy impact could be significant. A questionnaire survey of landowners (greater than 10 acres) in southern Michigan found that nearly one in five provided some form of feed for deer (Nelson and Schomaker 1996). There is no reason to assume a smaller proportion of rural residents feed deer in Wisconsin. Over 450,000 bushels of bait were estimated to have been used in northern Wisconsin during the 2001 deer seasons, based on the number of Wisconsin archery and gun hunters who used bait (Wisconsin DNR 2002). This equates to approximately eight bushels of bait used per northern deer hunter

that baited in 2001. However, this may be a minimum estimate (see Appendix K).

Baiting and feeding deer artificially concentrates deer and their activity (Garner 2001). This facilitates both increased animal-to-animal contact and exposure to potentially disease contaminated sites (Garner 2001). A consequence of increased contacts is an increased risk of transmission of infectious disease among deer (McCarty and Miller 1998, Gross and Miller 2001). This concern is heightened by the recent discovery of CWD in Wisconsin's wild deer herd. Baiting and feeding of deer have become increasingly popular throughout the state, but must be considered a risk factor in disease transmission (Schmitt et al. 1997, Garner 2001, Obrien et al. 2002, Williams et al. 2002a).

Researchers who have studied CWD epidemics in both captive and free-ranging deer populations have determined that CWD is both contagious and self-sustaining (meaning that new infections occur fast enough for CWD to persist or increase over time despite the more rapid deaths of the diseased individuals; Miller et al. 1998, 2000). Supporting evidence comes from observational data (Williams and Young 1992; Miller et al. 1998, 2000) experimental data, and epidemiological models fit to observed prevalences in free-living deer (Miller et al. 2000, Gross and Miller 2001, M. W. Miller unpubl.cited in Williams et al. 2002a).

Recent discovery of TB in free-ranging deer in Michigan and CWD in Wisconsin has refocused discussions about baiting and feeding of deer. Specific research on the health effects of baiting and feeding is limited because baiting of deer is illegal in most states (Marshall 1999). Baiting and feeding are variably practiced in different states, and until recently, they have not been widely viewed as management issues (Dawson 1988). However, current ongoing studies in Michigan (Garner 2001) and elsewhere indicate that density and congregation of animals caused by baiting and feeding increase disease transmission. The national CWD disease management workgroup recommended the cessation of feeding and baiting of deer as a control strategy for containing and eradicating CWD (National CWD Plan Implementation Committee 2002).

Experimental and epidemiologic evidence suggests infected deer and elk may transmit CWD through animal-to-animal contact or contamination of food or water sources with saliva, urine, or feces (Williams et al. 2002a, Williams and Young 1980, Miller, et al. 1998, Sigurdson et al. 1999). The World Health Organization (WHO) concluded that the epidemic dynamics of CWD most closely resemble those of scrapie in sheep, another TSE where transmission between animals through close contact is important (WHO 1999). The highest CWD infection rates documented (20%-90%) occurred in captive cervid populations housed in farm or research settings (Williams et al. 2002a). However, CWD prevalence of 15%-20% has also been found in wild deer populations in Colorado, specifically in dense populations associated with artificial (illegal) feeding (M. Miller, pers.comm.). Consequently, CWD researchers conclude that prohibiting feeding and baiting of deer and elk should be included in strategies to prevent, control, and eradicate CWD (Gross and Miller 2001). Disease modeling and recommendations from the National CWD Management Plan suggest that measures to reduce transmission rates are important in reducing disease persistence and spread (McCarty and Miller 1998, Gross and Miller 2001, Miller et al. 2000).

Reduction of contact through a ban on baiting and feeding is very important to eradicating or containing a CWD outbreak. Epidemiological models fit to real-world data on CWD outbreaks in mule deer predict that local extinction of infected deer populations is likely (Gross and Miller 2001). The predicted outcomes of these models are highly sensitive to the amount of contact between infected and susceptible deer. This means that small reductions in contact rates can dramatically reduce the rate at which prevalence changes during an epidemic (Gross and Miller 2001). Garner (2001) demonstrated that baiting and feeding was associated with deer concentration, extensive face-to-face contacts, and increasing overlap of deer home ranges. White-tailed deer have social contacts apart from contact over baiting and feeding sites (Marchinton and Hirth 1984), but social groups tend to be small relative to other deer species and both their physiology and behavior are adapted to selective foraging on nutritious plants (Putman 1988). Moreover, social groups tend to exclude one another (Mathews 1989), thus eliminating the additional direct and indirect contact that occur between groups using baiting and feeding sites (Garner 2001) eliminates a large amount of group-to-group contact that would otherwise occur.

Eliminating these contacts has added significance because CWD is a uniquely difficult disease to manage. There

is no treatment and no vaccine. Moreover, CWD is difficult to track in a population because of long incubation periods, subtle early clinical sign, a resistant infectious agent, potential for environmental contamination, and incomplete understanding of transmission mechanisms. These characteristics make prevention critically important (Williams et al. 2002a). Hence, an international panel reviewing CWD management in Colorado emphasized that, "Regulations preventing… feeding and baiting of cervids should be continued" (Peterson et al. 2002).

Discovery of CWD in Wisconsin's free-ranging deer in late February 2002 has intensified a debate about how deer baiting and feeding may increase risk of infectious disease establishment and transmission in Wisconsin's deer population. CWD is both transmissible and infectious and the infectious agent may be shed through the alimentary tract (SCWDS 2002). "Residual environmental contamination (as might be deposited by feces or saliva) also appears to be important in sustaining epidemics" (Williams et al. 2002a). Oral transmission of CWD was demonstrated when mule-deer fawns were fed contaminated material (Sigurdson et al. 1999). "Concentrating deer and elk in captivity or by artificial feeding probably increases the likelihood of direct and indirect transmission" (Williams et al. 2002a, SCWDS 2002). The highest prevalence rates of CWD in Colorado have been found in wild and captive situations where deer densities were high and there was frequent congregation over artificially provided food sources such as in dense populations (M. Miller, pers. comm.).

Though current concern is focused on managing deer baiting and feeding as part of the state's efforts to eradicate CWD, it is important to remember that state-wide baiting and feeding continue to put wild deer at higher risk for other serious diseases and parasites, such as anthrax, brucellosis, epizootic hemorrhagic disease (recently identified in southwestern Wisconsin), vesicular stomatitis, leptospirosis, listeriosis, bovine tuberculosis, tularemia, anaplasmosis, and brain worm (Hurley 1995). Johne's disease also is considered by many veterinarians as rather endemic among domestic cattle and is known to be infectious and fatal to deer.

Any of these diseases, all of which have been found in free-ranging white-tailed deer in North America, could be spread more readily in situations where deer are artificially concentrated and deer-to-deer contacts, as well as contact with urine, feces, and saliva are increased (Hurley 1995). Deer may also be poisoned by biotoxins such as aflatoxin, commonly found in grains sold as wildlife food (Schweitzer et al. 2001).

For additional information regarding baiting and feeding and disease transmission see Appendix J.

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## Proposed Action.

The proposed rule would prohibit baiting and feeding of deer statewide to reduce the chance that disease would become established and spread in local deer herds. This rule would not prohibit bird and small mammal feeding where the feed is inaccessible to deer. The rule would also continue to allow feeding of wildlife by people attending the feed so long as they removed the feed when they left the site. Gravity feeders and devices that are designed to broadcast feed to the ground would be prohibited when accessible by deer. Foods produced as a result of normal agricultural or forestry practices, standing crops, food plots, and natural vegetation would not be considered bait in the proposed regulation.

Past analysis of deer baiting and feeding by the Wisconsin Conservation Congress Deer Management for 2000 and Beyond project and special Natural Resources Board Committee on Baiting and Feeding have separated the two issues due to social differences. However, biologically and from a disease control aspect, baiting and feeding are not separate issues. Both practices artificially concentrate deer by repeatedly providing food for consumption to a location thereby likely increasing the risk of disease transmission. Therefore, for the purpose of this analysis these two activities have not been separated.

An exemption would be granted for baiting bear if bait is placed such that the bait is not available to deer. Bear baiting is one of two techniques available to bear hunters. The elimination of bear baiting would greatly reduce the effectiveness of bear hunters and would impair control of the bear population in Wisconsin. Strict regulations on placement of bear baits eliminates much of the concern about deer accessing these baits and reduces risk of transmission of CWD among deer.

Permits to authorize limited site-specific baiting would be allowed to facilitate trapping or removing nuisance wild animals, including deer and geese in urban, park, or airport situations. There may be other non-hunting purposes where baiting might be authorized such as when capturing research animals or removing potentially diseased animals.

It should be noted that prohibiting baiting and feeding is part of a comprehensive strategy, not a stand-alone solution to controlling CWD.

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## Effects.

A ban on baiting and feeding could have both ecological and socio-economic effects. Ecologically there could be reduction of disease transmission rates, smaller deer populations, and secondary environment effects. Socio-economically there could be effects on businesses that sell deer feed, public safety, tourism, license sales, and hunter satisfaction.

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## Deer Population.

An elimination of deer baiting and feeding may reduce the deer herd by making deer survive the winter on naturally available food. In some cases, baiting and feeding appear to enable the environment to support more deer throughout the year than might otherwise be possible. This "artificial" energy is believed to affect natural processes including winter mortality (Baker and Hobbs 1985) which is part of the natural process for deer living close to the northern limit of their range. Placement of feed may alter natural movements and timing of yarding by deer (Ozoga and Verme 1982, Lewis 1990, Garner 2001). In the absence of baiting and feeding, deer populations may respond to natural processes of productivity and survival.

A prohibition on baiting and feeding may help restore deer populations to established goals but would not cause the deer population to crash. Goals in the forested regions reflect carrying capacity of the natural environment. The preferred method to achieve herd reductions is by hunter harvest. But, prohibition of feeding and baiting of deer may also help reduce the over-abundant northern deer population as the herd density responds to the natural carrying capacity of the land. Herd responses do not necessarily imply massive starvation. Subtle changes in productivity ( e.g., production of fewer fawns per year and reduced breeding among fawns) are likely to be long-term mechanisms, although periodic increases in malnutrition-related mortality could accompany severe winters. Throughout the southern two-thirds of Wisconsin, the nutritional availability for deer would not likely change in response to a baiting and feeding ban because of the high availability of agricultural food.

Another effect of the proposed ban may be an improvement in the DNR's ability to manage the state deer herd. Baiting and feeding of deer may have confounded the State's ability to maintain deer numbers at established population goals mandated by state law. Natural constraints of habitat and weather have played a role (along with prescribed antlerless harvests since 1964) in maintaining northern deer populations near established goals (McCaffery 1995). With the addition of food to the environment, natural constraints of habitat and weather may have been relaxed, allowing herds to grow to densities exceeding natural carrying capacity and hunter demand for harvest. Thus, deer populations have rather consistently exceeded goals since 1987. Despite very liberal hunting regulations, the statewide post-hunt deer population in 2001 was 32% above goal and in the northern forest the population was 40% above goal (Rolley 2002). Baiting and feeding may also change deer behavior and distribution impairing hunter ability to harvest deer. Deer populations may orient towards artificial food sources found in residential clusters and on private lands, where access is restricted or firearm discharge is unwelcome. A prohibition of baiting and feeding would be expected to allow deer behavior and distribution to respond to natural processes, potentially improving harvest opportunity. In addition, deer productivity and survival would likely respond to the natural environmental influences, allowing northern herds to be more effectively managed at established population levels.

A concern associated with the proposed ban on baiting and feeding is a potential reduction in the efficiency of

hunters to harvest deer, resulting in a lower deer harvest. Studies to date have suggested small and inconsistent differences in success between hunters that use bait and those that do not. Langenau et al. (1985) found that Michigan hunters that used bait were only slightly more efficient in harvesting deer (2.4 deer/100 days for bait users vs. 2.2 for non-bait users). Winterstein (1992) also surveyed Michigan deer hunters and reported on the relative efficiency of bait users versus non-bait users. In general, bait users killed more deer per 100 hours of hunting in each of four seasons: early archery, late archery, firearm, and muzzleloader. In total, 3.8 deer were killed per 100 hours over bait versus 3.1 killed without bait. However, non-bait users spent more hours in the field. Thus, the overall success rate with bait was only marginally better for Michigan bait users. In contrast, Petchenik (1994) found that non-bait users in Wisconsin had higher success while gun hunting than bait users, but that archers using bait experienced "slightly higher" success rates than non-bait users. A more recent Michigan study by Frawley (2002) found similar results. Archers using bait took fewer days to harvest a deer than non-bait users but for gun hunters the improvement in efficiency was "relatively small." Individual success rates appeared significantly higher for archers that used bait.

An analysis using Wisconsin data suggests that a prohibition on baiting may not significantly affect firearm harvest of antlerless deer, but might depress archery harvest. However, the effect on total antlerless harvest would likely be small. If there were no compensatory increase in firearm harvest as a result of a reduced archery harvest, the net effect on total harvest could be about 4% in northern Wisconsin (Wisconsin DNR 2002).

It is unclear whether bait users may discontinue hunting if the method is prohibited. Frawley (2002) found that some hunters would hunt fewer hours or, in the case in Michigan, move their hunt to a county without a prohibition on baiting. He did not report that bait-hunters would quit hunting deer. Experience suggests that, all else being equal, the reasons harvests might stay the same in the absence of baiting is because:

1) hunters may be more likely to move about and thereby cause deer to move; 2) deer may be less likely attracted and held on private lands where they are inaccessible to other hunters; and 3) deer may resume normal foraging behavior that could increase their movement during daylight hours (Garner 2001). There is evidence that artificial provision of foods through baiting causes deer to become more nocturnal in their behavior (Ozoga and Verme 1982, Wegner 1993), confounding harvest opportunity by hunters.

During the 2002 Wisconsin deer seasons, there was a 19% reduction in the number of archery licenses and a 10% decrease in gun deer licenses sold from 2001 license sales. In addition, the preliminary analysis of the deer harvest data shows a 36% reduction in the archery harvest and a 13% reduction in the deer gun harvest. Until data from the 2002 CWD deer hunter survey are analyzed (Petchenik, in prep.), it is not certain whether this reduction was due in part to the elimination of baiting as a hunting method or whether concerns about CWD were the factors limiting participation and harvest.

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## Disease Control.

A ban on deer baiting and feeding would likely reduce risk of transmitting CWD and other diseases in Wisconsin's deer population. A primary biological consideration of baiting and feeding deer is the increased potential for disease transmission whenever animals are concentrated (Leopold 1933). Spread of disease relates directly to deer density, stress, and animal contact (Davidson 1981). CWD is one of many disease risks associated with feeding and baiting. The proposed action is anticipated to reduce the transmission of CWD between healthy and infected deer by: 1) reducing close contact among individual deer; 2) eliminating potentially contaminated food sites; 3) reducing contact between discrete social groups of deer; and 4) reducing deer herd density.

Animal visitation and contact typical at baiting and feeding sites may exacerbate transmission of CWD if an outbreak occurs. Accumulation of the presumed CWD agent in gut-associated lymphoid tissue ( e.g., tonsil, Peyer's patches, and mesenteric lymph nodes; Sigurdson et al. 1999, Miller and Williams 2002, Spraker et al. 2002) suggests that shedding through the alimentary tract (feces and saliva) may occur. Oral transmission of CWD has been demonstrated for mule-deer fawns (Sigurdson et al. 1999). Transmission via contact between susceptible and infectious individuals probably requires exchange of bodily fluids rather than just transient

exposure (Williams et al. 2002a). Concentrating deer and elk in captivity or by artificial feeding probably increases the likelihood of direct transmission between individuals. Studies by Garner (2001) and Kilpatrick and Stober (2002) indicate that the provision of food increases animal contact by focusing their activity.

Provision of artificial food sources may encourage unnatural congregation of animals, thereby increasing contact and enhancing the transmission of infectious agents (Barlow 1996). As part of the evaluation of the TB eradication process in Michigan, research was conducted to determine the effects of feeding and baiting on deer movement, migratory patterns, behavior, and disease transmission. Garner (2001) documented extensive overlap of the locations of a TB-infected deer and 15 other radio-collared deer home ranges surrounding a network of feeding stations at one of his study areas. Core areas of activity shifted toward bait sites (Kilpatrick and Stober 2002) causing likely overlap and the potential for deer-to-deer contact. Scientists, biologists, epidemiologists, and veterinarians who have studied this situation have concluded that the most logical explanation for the establishment of self-sustaining bovine TB in free-ranging Michigan deer was high deer densities and the focal concentration of deer caused by baiting and feeding (Schmitt et al. 1997, O'Brien et al. 2002).

Because TSE agents are extremely resistant in the environment (Brown and Gajdusek 1991), transmission may be both direct and indirect. Repeated placement of bait and feed in the same locations may amplify these concerns as sites and food may become infected with CWD prions. Epidemiological analysis indicated that the prevalence of TB in Michigan deer declined by half when herds were reduced and bans and restrictions on baiting and feeding were implemented (O'Brien et al. 2002).

Supplemental feeding may raise deer populations above levels that the natural environment will support (Ozoga and Verme 1982). Very high prevalence (50%-90%) of CWD in some captive facilities suggests that transmission of CWD may be positively density dependent. Questions remain, however, about the mechanism of CWD transmission. Research is currently being conducted in Colorado to test the relationship between population density and CWD prevalence. An elimination of deer baiting and feeding may reduce deer population density and restore the balance between the deer population and the natural availability of food in the north. A deer herd within the carry capacity of the land should have adequate natural food resources, with less stress and competition for food, and should be less susceptible to starvation in winter and disease.

Another hypothesis is that feeding is beneficial as it tends to keep deer dispersed in winter and deters concentration of deer in yard situations in the north. Artificial feeding does tend to interfere with the natural process of yarding, and to the extent it does, it is undesirable (Ozoga and Verme 1982). A ban on baiting and feeding may allow deer to return to natural yarding behaviors in severe winters in northern Wisconsin. Disease transmission risks in deer yards are likely less than at artificial feeding sites because foraging behavior under natural conditions is fundamentally different than when deer are supplementally fed.

In deer yards, deer eat a variety of woody browse plants and arboreal lichens (Blouch 1984) scattered across a large area. In terms of biomass and nutrition, the best source of browse and lichens may be litter-fall rather than live plant material growing in the understory (Ditchkof and Servello 1998). The spatial distribution of understory plants and litter-fall is dramatically different from that of a feeding station. In a deer yard, deer may be concentrated (compared to summer distribution) but the potential for face to face contact over food or the consumption of food contaminated by feces and saliva is minimal. Food sources in yards (litter and understory plants) are widely distributed over a large area and they are not replaced. Moreover, browse is typically held aloft on the plant stem such that fecal contamination is less likely. Foraging of wintering deer is probably an optimization process. Gains associated with eating need to be balanced against energy costs associated with travel and exposure (Moen 1976). The fact that yarded deer with little or no access to supplemental food maintain relatively large overlapping home ranges ( e.g., 1700 – 4400 acres; Van Deelen et al. 1998) suggests that foraging widely on a diffuse food source is normal.

In contrast, artificial feeding results in feed being concentrated and replaced (often on the ground). A Texas study found that home range sizes of fed deer were half that of naturally foraging deer (Brown 2000). Garner (2001) in Michigan monitored over 160 radio-collared deer and observed free ranging deer at fall/winter feeding sites for two fall/winter periods (1996-1998) when baiting and feeding was allowed and one period (1999) when baiting

and feeding was restricted. He reported that relative to natural conditions and regardless of the feed or feeding techniques, fall baiting and winter feeding of deer fostered higher amounts of face to face contacts among deer as well as higher local deer densities.

Long latency between CWD infection and clinical signs could cause any infection of deer at feeding sites to be spread over a broad area before symptoms were detected. This would greatly impair efforts to identify, contain and eradicate the disease (Maine DIFW 2002). An international panel reviewing CWD management in Colorado emphasized that, "Regulations preventing… feeding and baiting of cervids should be continued" (Peterson et al. 2002).

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## Ecological Effects.

There are two potential ecological effects associated with the ban on baiting and feeding: 1) it is anticipated that a smaller deer herd would result, with less overall deer browsing and secondary ecological effects, although the relationship between deer population densities and the addition of artificial food on the landscape is unclear in this state; and 2) the pattern of deer browsing would be more evenly distributed across the landscape (see preceeding Population section). Supplemental feed may have the effect of raising deer populations above levels that the natural environment will support (Ozoga and Verme 1982). Artificial feed (baiting and feeding) may increase the density of deer and may focus their browsing activity to the extent that other resources are damaged (Doenier et al. 1997, Waller and Alverson 1997). The proposed ban on baiting and feeding would likely have the greatest impact in northern forested environments. Populations in Wisconsin southern farmland are maintained well below maximum biological carrying capacity (KCC as defined by McCullough 1979). Thus, artificial energy from baiting and feeding may have minor effects on population dynamics and smaller effects on the environment in the southern farmland.

In 1995, the DNR prepared an environmental assessment on deer population goals and harvest management (Vander Zouwen and Warnke 1995). The environmental assessment focused on effects of alternative overwinter deer population goals and deer management unit boundaries. The assessment described known or potential ecological effects of various deer population densities.

The deer population environmental assessment concluded that different deer population densities cause different effects on other members of the communities they live in. These effects differ depending on the community type and the region of the state together with habitat carrying capacity and the severity of winter weather. Although research linking known deer population densities to specific effects on natural communities is limited, a number of probable effects of lower deer population densities can be suggested. Low deer densities can affect plant community composition. These changes may be more pronounced with deer population densities below 20-25 deer per square mile of deer habitat. Favored plant species may increase and less palatable plant species may decrease in abundance. The resulting changes in plant species composition can affect other taxa, ecological function, and productivity of an ecosystem (Bartelt and Mladenoff 1995). Many herbaceous plants can benefit from low numbers of deer (Martin 1995). Damage to plants takes the form of lost foliage, reduced reproduction, and reduced energy reserves. Tree and shrub species consumed by deer are likely to increase when overwinter deer population densities are reduced below 15-20 deer per square mile of deer habitat (Mladenoff 1995). Low levels of deer browsing on some plant species, for which some invertebrates have obligatory relationships, may affect these host-specific invertebrates (Henderson 1995). Small mammal species can benefit from low deer populations through changes in habitat structure (Edwards 1995). Low deer population densities can benefit some bird species due to changes in habitat structure, particularly the abundance of shrubs and some herbaceous plants, as well as long-term effects on forest species composition and canopy (Hoffman 1995). Bird species most likely benefiting from low deer densities are shrub-nesting species. Also, to the extent that this "artificial" energy elevates deer densities, it clearly effects the distribution and abundance of other plant and animal members in the environment (Doenier et al. 1997, Brown 2000).

In addition, it is not expected that turkeys would be affected from a decrease in deer densities. However, it is likely that in portions of the state that experience more severe winters, wild turkeys have benefitted from deer

baiting and feeding. Turkey range is likely artificially extended northward by these practices. . . . . This range expansion may also have occurred as a result of the long period of relatively infrequent severe winters since 1987. However, it is reasonable to expect that wild turkey range may shrink southward with "normal" winters in the absence of deer baiting and feeding. Another concern relates to disease transmission among wild turkeys at feeding sites. In Mississippi, transmission of turkey diseases at deer feeding sites may have caused regional collapse of wild turkey population (Marshall 1999).

The anticipated deer population reductions resulting from a ban on baiting and feeding would likely reduce many of the adverse ecological effects that high deer densities may have caused during recent years. If a large proportion of hunters decide not to hunt in the future because they cannot use bait, deer harvests in the region may actually decline resulting in further growth of the deer population and subsequent greater adverse impacts on regional plant communities and dependent animal species. For a detailed discussion of the effects of a baiting ban on hunter harvest, see the preceeding section on Deer Population.

The gray wolf is the only large carnivore in Wisconsin that is heavily dependent on deer as a food source. If the deer herd in northern Wisconsin is reduced, carrying capacity for wolves in this state may also be reduced. Several other carnivore and omnivore species, like black bear, coyote, and bobcat, prey on deer fawns when available. In addition, several species of birds use road-killed deer as a source of carrion. These include common raven, American crow, turkey vulture, and the bald eagle. These species are generalists and would not be greatly affected by changing deer densities.

In addition, the proposed ban on baiting and feeding would likely result in more evenly distribution patterns of deer browsing across the landscape by eliminating the concentration of deer around baiting and feeding sites. The hypothesis that artificial food buffers the natural environment from deer damage by providing alternate food for deer is not supported. Intuitively, it seems that the placement of feed would buffer deer browsing effects elsewhere. While this may be true in the short-term, the longer-term effects may be manifested in artificially elevated carrying capacity, higher numbers of deer, and more browsing damage everywhere. In any case, "having less damage away from feeders does not compensate for vegetation change/damage near feeders" (Tim Ginnett, Uvaldi Texas, pers. comm.).

Donier et al. (1997) found localized forest damage in the vicinity of artificial food sources in Minnesota. Kilpatrick and Stober (2002) found that core areas of deer activity shifted toward temporary bait sites. Brown (2000) warns of negative impacts of supplementally-fed deer on forest and range vegetation and cites a Texas study that found browsing impacts were seven times as great near feeding sites as found away from such sites.

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## Socio-economic Effects.

Businesses that sell bait and feed would be negatively affected by a ban on baiting and feeding. The total estimated economic impact of both baiting and feeding in Michigan exceeds $50 million (Whitcomb 1999). A similar estimate is not available for Wisconsin. But, a spokesperson for Wisconsin Corn (Bob Ohlson, WICORN, NRB meeting. Racine, June 2002) indicated that the prohibition of baiting and feeding would have the effect of forcing export from Wisconsin of three million bushels of corn annually with a profitability loss of $0.50/bu. Many small businesses ( e.g., Gleason, Butternut, Iron River) are highly dependent on sales of corn and other supplements to those that bait and feed deer. The latter businesses would certainly experience economic losses with any prohibition of baiting and feeding. Despite their strong economic interest in the alternative market that deer feeding provides for agricultural products (cull potatoes, carrots, apples, sugar beets, etc.), the Farm Bureaus in both Michigan (in 1999 and 2002) and Wisconsin (in 2002) have endorsed prohibitions on deer feeding. Their primary concern is protecting the health of agricultural animals from deer-borne diseases.

In accordance with Wisconsin state statutes, the DNR has considered the possible implications of these rules on small businesses, however under legislative authority, the DNR has determined that any modification to the baiting and feeding ban would undermine the effectiveness of the rule. The DNR has considered alternatives, but these alternatives would be contrary to the statutory objective of disease control and eradication.

The overall impact on tourism is expected to be minor as deer would still be plentiful and readily observed in more natural settings. Deer are one of the favorite wild animals in Wisconsin. In addition to hunting, an estimated 2.4 million people participated in wildlife watching activities in Wisconsin in 2001 contributing approximately $1.3 billion to the state's economy (IAFWA 2001). A separate estimate of economic impact specific to out-state tourists was not made. A prohibition of feeding may reduce the frequency of deer sightings as northern deer herds decrease in response to carrying capacity and as tourist establishments no longer habituate deer to food near their businesses.

There is little evidence that prohibiting baiting would result in significant reductions in license sales. The regional ban on baiting in Michigan did cause some changes in hunter effort and choice of hunting area, but there was no mention of hunters not hunting (Frawley 2002). During the 2002 Wisconsin deer seasons, there was a 19% reduction in the number of archery licenses and a 10% decrease in gun deer licenses sold. Until data from the 2002 CWD deer hunter survey is analyzed (Petchenik, in prep.), it is not certain whether this reduction was due in part to the elimination of baiting as a hunting method or whether concerns about CWD were the factors limiting license sales.

A ban on feeding of deer would likely result in a decrease in the opportunities to view deer around homes and businesses. The prohibition of deer feeding would not cause all deer to disappear from the vicinity of human housing and other developments. It may put a higher value on seeing those deer that remain. The removal of an attraction and energy source may simplify management of urban deer. A statewide prohibition on feeding would likely assist municipalities that are considering ordinances designed to mitigate urban deer problems.

A prohibition on deer feeding may add to public safety. Most rural housing is close to roads. Feeding by rural residents may have increased the risk of of car-deer crashes, especially in winter. In winter, deer withdraw to areas of thermal protection away from roads. The increase in public feeding, however, has resulted in holding deer in the vicinity of feed sources which often coincide with roadways (e.g., two drivers were killed near Rhinelander as a result of residential deer feeding – Oneida County Sheriff's report 12-11-96).

One concern is that a prohibition of deer baiting would result in hunters driving deer as the primary hunting alternative with some associated trespass and safety concerns. Hunting alternatives involve a mix of strategies that have proven successful for the vast majority of Wisconsin hunters who currently hunt deer without using bait. These strategies include stalking, still hunting, and stand hunting. Most alternative strategies involve applying scouting skills and knowledge of deer behavior in order to locate areas with active deer sign.

DNR Law Enforcement reported numerous violations related to baiting and feeding (Harelson 2001). Seemingly the practice of baiting delays deer foraging until the end of shooting hours (Wegner 1993) tempting hunters to violate this hunting safety rule. Conservation wardens have found it difficult to enforce the bait quantity limit as resources are strained during the fall hunting seasons. Finally, there is a fine distinction between baiting and feeding near rural residences and cabins where there often is a light fixed on the food source. "Cabin shooting" (shooting deer from a dwelling, day or night) has become a growing illegal practice. The prohibition of baiting and feeding would eliminate any ambiguity regarding placement of foods for attracting deer and reduce cabin shooting.

There is concern for how the DNR would enforce a feeding ban with so much backyard wildlife feeding. As with any new rule, an educational effort should run parallel with enforcement. An explanation of the rule should make it clear that the rule is reasonable and necessary and would be enforced. The rule should establish a normative standard for the vast majority of well-meaning, law-abiding citizens. Peer pressure should help compliance, especially where deer are creating a hazard or are a nuisance. Enforcement of feeding restrictions in the northeast Lower Peninsula of Michigan was possible by Michigan State Police, as most feeding sites were visible from the air. Even if feed is concealed, the deer trails leading to the site were readily seen from airplanes.

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## Analysis of Alternatives to Ban Baiting and Feeding.

**No action.**

If no action were taken and a 10-gallon limit per site were to continue for baiting deer and no restrictions applied to feeding deer, the risks associated with baiting and feeding and disease transmission would not be addressed. Disease transmission risk would likely remain elevated when deer are artificially concentrated around food sources that are repeatedly replaced and become progressively more contaminated with feces, saliva, urine, and infectious material, and promote more face-to-face contacts with deer. A segment of deer hunters would be allowed to use bait, and recreational and supplemental feeding of deer would continue. Businesses that sell feed would also continue their economic activity. However, the many negative effects on the deer population, disease control, the environment, public safety, and enforcement would likely continue.

Carrying capacity for deer may remain artificially elevated in forested zones increasing transmission rates of density-dependent diseases and causing undesirable browsing impacts on the plant environment. Deer distribution may remain skewed toward areas of food supplementation confounding harvest management efforts by reducing hunter access to deer and undermining efforts to impose adequate harvest quotas. Deer behavioral patterns may be altered as normal foraging would be changed by availability of supplemented foods, timely yarding would be delayed, and localized deer damage would continue. Local communities would likely be forced to continue to promulgate feeding bans to address growing urban deer problems. Human safety may continue to be threatened by car-deer crash hazards as residents along roads continued to feed, attract, and hold deer. DNR enforcement of baiting rules such as quantity, placement, and hunting hour violations while using bait would continue.

**Apply Ban to a Smaller Geographic Area.**

Under this alternative, the ban would only apply to an area where the disease occurs.

Currently, the disease appears to be contained in southwestern Wisconsin. However, should the disease be detected elsewhere or should the disease be introduced into new areas in the future, allowing these practices to continue may provide the vehicle needed for the disease to establish itself, causing similar effects to those described under the no action alternative. If CWD is introduced into a new area of the state, the disease may spread more rapidly if baiting and feeding were allowed than if these practices were eliminated. The DNR would likely have a better opportunity to react and eradicate the disease, if artificial concentrations of deer are prevented.

A statewide ban on baiting and feeding seems prudent because no one knows where the next disease outbreak will occur (or may have already occurred). Bovine tuberculosis has been confirmed on six captive cervid farms in east central Wisconsin. CWD has been discovered in free-ranging deer in southwestern Wisconsin and in captive deer facilities in central and southeast Wisconsin. There are about 821 captive cervid facilities throughout the state (Figure 4) that potentially could have received CWD-infected animals as there is no live-animal test for screening. In spring 2002, a captive deer escaped from a Walworth County deer farm and remained free until shot in October, at which time it was discovered that the deer was CWD positive. Considering that deer dispersal movements of up to 50 miles have been observed in studies with radio-collared deer in southeastern Minnesota (Simon 1986) it is imperative that the human-controlled activities that could lead to increased transmission be eliminated. Given our current understanding of the occurrence of CWD and its transmission, the risk factors likely occur statewide even if surveillance testing finds no wild deer with CWD.

The conditions that caused CWD to enter southwestern Wisconsin may continue to exist statewide and may continue to exist even with new surveillance and control efforts. Prohibiting baiting and feeding is important to preventing disease establishment and spread, thereby protecting the wild deer herd from CWD, bovine TB, and other significant infectious diseases (Inter-agency Health and Science Team 2002).

**Baiting and Feeding License.**

Recognizing the enormous recreational benefit that humans derive from baiting deer and feeding wildlife in general, some have proposed allowing baiting and feeding on private lands only by licensing. Licensing of baiting and feeding would likely allow the risks associated with disease transmission to continue. It would enable closer regulation, increase accountability, and quantify/control the extent and distribution of these activities. It would

also generate revenue for conservation purposes and for enforcement and education related to baiting and feeding. It would be a means for non-consumptive users of deer and other wildlife to contribute funds toward conservation efforts. However, to the extent that baiting and feeding resumed, the practices would also likely allow all of the adverse effects of baiting and feeding to continue much the same as noted for the no action alternative above.

**Quantity Restrictions.**

It has been suggested that an acceptable compromise to the banning of feeding and baiting would be putting limits on the amount of food that could be fed. Amounts ranging from 2 to 6 to 10 gallons have been suggested and were considered in the analysis of this alternative to the proposed baiting and feeding ban. Quantity restrictions are unlikely to be effective in controlling the spread of disease. Garner (2001) studied this question directly, and there appear to be problems associated with both large and small feed piles. Garner (2001) reported that large piles tended to freeze during winter and he witnessed deer using the warmth from their mouths and nostrils to thaw and consume food. This behavior tended to produce semi-permanent piles of food that were "dented with burrows made from deer noses". He suspected that a deer feeding in this manner "leaves much of its own saliva and nasal droppings in the feed pile at which it's working" (p.64). Thus, disease agents can contaminate large food piles. Paradoxically, restricting baiting to five gallon limits replaced daily resulted in "drastically" higher face-to-face contacts (p.57) because of competition for feed over a smaller area when the five gallons were dumped in one pile. He reported that the five gallon restriction on food pile size was counter productive and "should be reconsidered and abandoned" (p. 53). While large bait piles can carry an increased likelihood that a diseased deer would be among those gathered, the higher rate of contacts over the smaller piles cannot be ignored in developing a disease control strategy (Garner 2001). Anecdotally, 35 different deer (multiple family groups) have been documented to repeatedly visit a two gallon feeding site in northern Wisconsin. While only a few deer might eat the entire supply, the other deer kept coming to inspect and perhaps lick the site (M. Beaufeaux, pers. comm.). Garner (2001) also documented up to 35 different deer visiting a five gallon feed pile within an hour.

Food replacement is a key issue whether dealing with 2, 6 or 10 gallons, because of the possible contamination of a feed site. Other foods whether agricultural crops or mast from a tree (e.g., acorns), are not replaced until the following year or perhaps less frequently. The intent of baiting and feeding is to condition deer to repeatedly return to a specific location through the replenishment of a food source. When food is replaced in the same location, whether it is 2, 6, or 10 gallons, it focuses deer activity. Not only the food but the site itself can become contaminated with a disease agent and increase the risk of transmission of a disease such as TB or CWD.

Allowing smaller food quantities would likely not address other effects of feeding and baiting such as the cumulative energy impact on herd population dynamics, distribution, and behavior. If only two gallons of shelled corn were placed daily during the period of snow cover (~150 days), the quantity would total more than a ton. Multiply this by any reasonable estimate of residents that are feeding and the quantity becomes significant.

The infectious agent for bovine TB ( Mycobacterium bovis) will live in a frozen condition for as long as 16 weeks outside of the animal (Whipple and Palmer 2000). The infectious agent causing CWD is believed to be more persistent than TB bacteria in the environment as the infectious agent is resistant to normal environmental degradation like UV radiation, desiccation, and temperature extremes (Brown and Gajdusek 1991). Thus, the potential for enhanced disease transmission at baiting and feeding stations is expected (Garner 2001).

**Placement Restrictions.**

A final alternative considered was limiting the placement ( e.g., number of bait-sites per acre of land, distance from roads) and methods of placing food (e.g., broadcasting vs. piles). Restrictions on the placement (location) of bait and feed for deer would liekly have little effect on disease transmission rates or on herd dynamics, distribution, behavior, and manageability. The purpose of baiting and feeding, as discussed in the previous section, is to habituate deer to a location, with the intent to increase harvest and viewing opportunities. Food replacement and the resulting focused activity of deer are likely the principal mechanisms that contribute to increased disease transmission rates.

Placement concerns also relate to human safety such that feeding can attract and hold deer in proximity to roads. A recommendation from Deer 2000 that feeding not take place within a 100-yard buffer from major roads was discussed by the Natural Resources Board as being potentially inadequate to prevent car-deer collisions and not practical to enforce (Thiede 2001).

Deer 2000 recommended limiting the numbers of bait sites that hunters could maintain, but the special Natural Resources Board committee on Baiting and Feeding agreed that it would not be practical to enforce this recommendation, especially on public lands (Thiede 2001:23). The Deer 2000 recommendation was to limit hunters to three, six–gallon bait sites per 40 acres (for a discussion on quantities see the preceeding section). The DNR Bureau of Law Enforcement concurred with the Natural Resources Board committee and they reported that such a recommendation would not be practical to enforce on both public and private lands.

An additional method of feeding relating to the placement of bait/feed is the use of devices, which spread the food over an area or to spread the feed by hand. The Deer 2000 process also developed a recommendation that feed be spread over a 10-foot by 10-foot area to reduce the risk of disease transmission. This was initially used in Michigan in hope of reducing nose-to-nose contact prior to learning that TB can be transmitted on food. However, Garner (2001) reported that the use of mechanical spreaders resulted in relatively fewer face to face contacts but did not prevent contacts over supplemental food. Scattering feed also does not address the matter of environmental contamination as deer activity is still concentrated and repeated. Replacement is the mechanism for allowing substantial ingestion of food or material from the site that might be contaminated by saliva or feces. Repeated replacement may also result in the artificial concentration and habituation of deer to an area that increases potential for disease transmission by animal contact.

In addition to disease concerns, scattering feed or bait would create enforcement difficulties. The DNR Bureau of Law Enforcement has stated that it is not practical or possible to enforce a quantity regulation when the feed is scattered, because it is nearly impossible to locate or quantify the food being used under these conditions. Therefore, since the regulation is not practical to enforce, it would be very difficult to assure that illegal amounts of bait or illegal feed sites were not being used.

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***Environmental Impact Statement***
***on Rules to Eradicate Chronic Wasting Disease***
***in Wisconsin's Free-Ranging White-tailed Deer Herd***

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# APPENDIX A

**ACT 108 – Special CWD Legislation**

**Act 108**
**May 2002 Special Session**
**Senate Bill 1**

**Date of enactment: May 18, 2002**
**Date of publication*: May 20, 2002**

**2001 WISCONSIN ACT 108**

AN ACT to repeal 29.181 (3) and 29.559 (1r) (b); to renumber 29.307 and 29.559 (1r) (a); to amend 20.370 (5) (fq), 29.971 (7), 29.971 (11), 95.32 (1) and 167.31 (2) (d); and to create 20.370 (5) (fs), 20.370 (5) (fv), 29.063, 29.307 (2), 29.307 (3), 29.335, 95.23 (1m), 167.31 (1) (bg), 167.31 (1) (bn), 167.31 (1) (dm) and 167.31 (4) (bg) of the statutes; relating to: chronic wasting disease, hunting or shooting animals from aircraft, vehicles, and boats, feeding of wild animals for purposes other than hunting, shooting a firearm or arrow from or across a highway, shooting by certain persons from a tractor or implement of husbandry, requiring a lapse to the general fund, authorizing the extension of emergency rules, requiring the exercise of rule-making authority, and making appropriations. The people of the state of Wisconsin, represented in senate and assembly, do enact as follows:

01 Wis. Act 108, s. 1

Section 1. 20.005 (3) (schedule) of the statutes: at the appropriate place, insert the following amounts for the purposes indicated:

2001-02 2002-03

20.370 Natural resources, Department of
(5) Conservation aids

| | | | | | |
|---|---|---|---|---|---|
| (fs) Chronic wasting disease management | | SEG | A | -0- | 2,000,100 |
| (fv) Chronic wasting disease management | -- supplemental funds | SEG | A | -0- | -0- |

01 Wis. Act 108, s. 2
Section 2. 20.370 (5) (fq) of the statutes is amended to read:
20.370 (5) (fq) Wildlife damage claims and abatement. All moneys received under ss. 29.181 (3), 29.559 (1r) (b), and 29.563 (13) and not appropriated under par. pars. (fr), (fs), and (fv) and sub. (1) (Ls) to provide state

aid for the wildlife damage abatement program under s. 29.889 (5) (c) and the wildlife damage claim program under s. 29.889 (7) (d), for county administration costs under s. 29.889 (2) (d), and for payments under s. 29.89.

01 Wis. Act 108, s. 3
Section 3. 20.370 (5) (fs) of the statutes is created to read:
20.370 (5) (fs) Chronic wasting disease management. From the moneys received under ss. 29.181, 29.559 (1r), and 29.563 (13), the amounts in the schedule for the management of, and testing for, chronic wasting disease under s. 29.063 (1).

01 Wis. Act 108, s. 4
Section 4. 20.370 (5) (fv) of the statutes is created to read:
20.370 (5) (fv) Chronic wasting disease management -- supplemental funds. The amounts in the schedule for the management of, and testing for, chronic wasting disease under s. 29.063 (1).

01 Wis. Act 108, s. 5
Section 5. 29.063 of the statutes is created to read:
29.063 Management of chronic wasting disease. (1) The Department may manage, and provide funding to conduct testing for, chronic wasting disease in cervids.
(2) If the Department designates an area as a chronic wasting disease Eradication Zone, the Department shall provide notice and information to the public that is adequate to inform the public prior to the commencement of hunting that hunting of cervids to control the spread of the disease will occur in that zone.

01 Wis. Act 108, s. 6
Section 6. 29.181 (3) of the statutes is repealed.

01 Wis. Act 108, s. 7
Section 7. 29.307 of the statutes is renumbered 29.307 (1).

01 Wis. Act 108, s. 8
Section 8. 29.307 (2) of the statutes is created to read:
29.307 (2) (a) Notwithstanding sub. (1), a state employee or agent or a federal employee or agent acting within the scope of his or her employment or agency may hunt an animal in the wild with the aid of an aircraft if all of the following apply:
1. The employee or agent is authorized by the Department to take the animal for the purpose of controlling the spread of disease in animals.
2. The employee or agent is hunting in an area designated by the Department as a chronic wasting disease Eradication Zone.
3. The employee or agent is in compliance with all of the rules promulgated under par. (b).
(b) The Department shall promulgate rules specifying the conditions under which aircraft may be used for surveillance of animals, for herding animals, and for shooting animals in order to control the spread of disease in animals. The rules may authorize shooting animals only if the Department considers all other alternatives to shooting animals from aircraft and determines that the shooting is necessary in order to control the spread of disease in animals.

01 Wis. Act 108, s. 9
Section 9. 29.307 (3) of the statutes is created to read:
29.307 (3) Subsection (2) and the rules promulgated under sub. (2) do not apply after June 30, 2004.

01 Wis. Act 108, s. 10
Section 10. 29.335 of the statutes is created to read:
29.335 Feeding wild animals for nonhunting purposes. The Department shall promulgate rules to regulate the recreational and supplemental feeding of wild animals for purposes other than hunting. The rules promulgated under this section do not apply after June 30, 2004.

01 Wis. Act 108, s. 11
Section 11. 29.559 (1r) (a) of the statutes is renumbered 29.559 (1r).

01 Wis. Act 108, s. 12
Section 12. 29.559 (1r) (b) of the statutes is repealed.

01 Wis. Act 108, s. 13
Section 13. 29.971 (7) of the statutes is amended to read:
29.971 (7) For the violation of s. 29.307 (1), by a fine of not more than $1,000 for the first violation and not more than $2,000 for subsequent violations or imprisonment for not more than 90 days, or both, and by a mandatory 3-year revocation of all hunting, fishing, and trapping approvals. An aircraft used in the violation is a public nuisance.

01 Wis. Act 108, s. 14
Section 14. 29.971 (11) of the statutes is amended to read:
29.971 (11) For hunting deer without the required approval, during the closed season, with the aid of artificial light or with the aid of an aircraft, except as provided in s. 29.307 (2), for the snaring of or setting snares for deer, or for the possession or control of a deer carcass in violation of s. 29.055 or 29.347, by a fine of not less than $1,000 nor more than $2,000 or by imprisonment for not more than 6 months or both. In addition, the court shall order the revocation of all approvals issued to the person under this chapter and shall prohibit the issuance of any new approval under this chapter to the person for three years.

01 Wis. Act 108, s. 15
Section 15. 95.23 (1m) of the statutes is created to read:
95.23 (1m) (a) The Department may conduct surveillance testing to determine whether animals have chronic wasting disease, if the Department has reason to believe that the animals have been exposed to chronic wasting disease.
(b) The Department shall indemnify the owner of an animal that must be killed in order to conduct testing under par. (a), if funds are available from the appropriation under s. 20.115 (2) (m) or (8) (ks) to pay the indemnity, in an amount equal to two-thirds of the difference between the net salvage value and the appraised value of the animal but not more than $1,500 for one animal.

01 Wis. Act 108, s. 16
Section 16. 95.32 (1) of the statutes is amended to read:
95.32 (1) The Department shall determine the appraised value of an animal that is destroyed under s. 95.21 (4) (b), 95.23 (1m), 95.25, 95.26, 95.27 or 95.31 (3) or (4) if the animal's owner is eligible for an indemnity.

01 Wis. Act 108, s. 16c
Section 16c. 167.31 (1) (bg) of the statutes is created to read:
167.31 (1) (bg) "Family member of the landowner" means a person who is related to the landowner as a parent, child, spouse, or sibling.

01 Wis. Act 108, s. 16f
Section 16f. 167.31 (1) (bn) of the statutes is created to read:
167.31 (1) (bn) "Farm tractor" has the meaning given in s. 340.01 (16).

01 Wis. Act 108, s. 16j
Section 16j. 167.31 (1) (dm) of the statutes is created to read:
167.31 (1) (dm) "Implement of husbandry" has the meaning given in s. 340.01 (24).

01 Wis. Act 108, s. 17
Section 17. 167.31 (2) (d) of the statutes, as affected by 2001 Wisconsin Act 8, is amended to read:
167.31 (2) (d) Except as provided in sub. (4) (a), (bg), (cg), (e), and (g), no person may discharge a firearm or shoot a bolt or an arrow from a bow or crossbow from or across a highway or within 50 feet of the center of a roadway.

01 Wis. Act 108, s. 18
Section 18. 167.31 (4) (bg) of the statutes is created to read:

167.31 (4) (bg) 1. Subsection (2) (a), (b), (c), and (d) does not apply to a state employee or agent, or to a federal employee or agent, who is acting within the scope of his or her employment or agency, who is authorized by the Department of natural resources to take animals in the wild for the purpose of controlling the spread of disease in animals and who is hunting in an area designated by the Department of natural resources as a chronic wasting disease Eradication Zone, except that this subdivision does not authorize the discharge of a firearm or the shooting of a bolt or arrow from a bow or crossbow across a state trunk highway, county trunk highway, or paved town highway.
1g. Subsection (2) (b) and (c) does not apply to a landowner, a family member of the landowner, or an employee of the landowner who is using a firearm, bow, or crossbow to shoot wild animals from a farm tractor or an implement of husbandry on the landowner's land that is located in an area designated by the Department of natural resources as a chronic wasting disease Eradication Zone.
1m. Subsection (3) (a) and (b) does not apply to a state employee or agent or a federal employee or agent hunting an animal in the wild as authorized under s. 29.307 (2).
2. This paragraph does not apply after June 30, 2004.

01 Wis. Act 108, s. 19
Section 19. Nonstatutory provisions.
(1) PLAN. If the Department of natural resources determines that there are insufficient funds available under section 20.370 (5) (fs) of the statutes, as created by this act, for the management of, and testing for, chronic wasting disease in cervids during fiscal year 2002-03, the Department may develop a plan, for submission to the joint committee on finance for review, detailing the means by which the Department shall manage, and test for, chronic wasting disease in cervids. If the Department develops a plan under this subsection, the Department shall recommend funding sources and expenditures for implementing the plan. In making these recommendations, the Department may not do any of the following:
(a) Recommend the expenditure of funds from the general fund.
(b) Recommend the expenditure of more than $2,000,000.
(c) Recommend the expenditure of more than $1,000,000 from moneys received under sections 29.181, 29.559 (1r), and 29.563 (13) of the statutes.
(2) JOINT COMMITTEE ON FINANCE REVIEW.
(a) If the cochairpersons of the joint committee on finance do not notify the Department of natural resources within 14 working days after the date of the submittal of the plan under subsection (1) that the committee has scheduled a meeting for the purpose of reviewing the plan, all of the following shall apply:
1. The Department shall implement the plan.
2. If the plan specifies the expenditure of funds from a segregated fund other than the conservation fund, the funds are transferred to the conservation fund.
3. The appropriation under section 20.370 (5) (fv) of the statutes, as created by this act, is supplemented from the appropriation under section 20.865 (4) (u) of the statutes by the amount specified under the plan. (b) If, within 14 working days after the date of the submittal by the Department of natural resources, the cochairpersons of the joint committee on finance notify the Department that the committee has scheduled a meeting to review the plan, the Department may not implement the plan without approval of the committee. The committee may disapprove or modify the plan. If the committee modifies the plan, the committee may transfer funds to the conservation fund from another segregated fund as is necessary to implement the plan. Notwithstanding section 13.101 (3) (a) of the statutes, no finding is required to be made that an emergency exists before transferring the funds under this paragraph.
(3) DEPARTMENT OF NATURAL RESOURCES POSITIONS. The authorized FTE positions for the Department of natural resources are increased by 3.0 SEG project positions, to be funded from the appropriation under section 20.370 (5) (fs) of the statutes, as created by this act, for the purpose of managing and testing for chronic wasting disease.
(4) EMERGENCY RULES RELATING TO CHRONIC WASTING DISEASE IN CERVIDS.
(a) Notwithstanding section 227.24 (2) (a) of the statutes, the joint committee for review of administrative rules may extend the effective period of emergency rules promulgated by the Department of agriculture, trade and consumer protection relating to chronic wasting disease in cervids that took effect on April 9, 2002, for periods specified by the committee and may grant any number of extensions, except that the committee may not extend the effective period of the rules beyond September 1, 2003.

(b) The Department of agriculture, trade and consumer protection may amend the emergency rules described in paragraph (a), while those rules are in effect, using the procedure in section 227.24 of the statutes, and any amendment remains in effect for the period provided under paragraph (a).
(c) Notwithstanding section 227.24 (2) (a) of the statutes, the joint committee for review of administrative rules may extend the effective period of any emergency rules promulgated by the Department of natural resources that relate to the management of chronic wasting disease for periods specified by the committee and may grant any number of extensions, except that the committee may not extend the effective period of the rules beyond September 1, 2003.
(d) The Department of natural resources may amend the emergency rules described in paragraph (c), while those rules are in effect, using the procedure in section 227.24 of the statutes, and any amendment remains in effect for the period provided under paragraph (c).
(5) VETERINARY DIAGNOSTIC LABORATORY.
(a) The Department of natural resources shall expend, in fiscal year 2002-03, a total of $901,600 from the appropriations under section 20.370 (5) (fs) and (fv) of the statutes, as created by this act, for the purpose of testing cervids for chronic wasting disease by the veterinary diagnostic laboratory.
(b) The authorized FTE positions for the board of regents of the University of Wisconsin System are increased by 6.0 PR positions, to be funded from the appropriation under section 20.285 (1) (kg) of the statutes, for the purpose of testing cervids for chronic wasting disease by the veterinary diagnostic laboratory.

01 Wis. Act 108, s. 20
Section 20. Appropriation changes.
(1) VETERINARY DIAGNOSTIC LABORATORY LAPSE. Notwithstanding section 20.001 (3) (c) of the statutes, on June 30, 2002, there is lapsed to the general fund $800,700 from the appropriation account of the board of regents of the University of Wisconsin System under section 20.285 (1) (je) of the statutes, as affected by the acts of 2001.

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# APPENDIX B

## Chronic Wasting Disease Rule Proposals (WM-05-03 and WM-09-3)

## ORDER OF THE STATE OF WISCONSIN NATURAL RESOURCES BOARD REPEALING, RENUMBERING, AMENDING, AND CREATING RULES

The Wisconsin Natural Resources Board proposes an order to renumber NR 10.001(1m), (6m) and (23m); amend NR 10.01(3)(e)1. (intro.), 3.a., 6.(intro.) and 6.a., (em)1. and 3., (es)1., (ev), 10.06(8)(a), 10.07(1)(a), 10.09(1)(a)2. and (c)3. and (2)(intro.), 10.27 (1), and 12.10(3)(c); and to create NR 10.001 (1n), (6h), (6p), (6t), (11), (19e), (23m) and (24m), 10.01(3)(et) and (ez)4., 10.07 (3), 10.104(11), (12) and (13), 10.105(3) and (4), 10.106(2)(f), 10.27(10), 10.28(3), 10.41, 10.42, 12.06, and NR 45.09(9) relating to the control and management of chronic wasting disease.

WM-05-03

### Analysis Prepared by Department of Natural Resources

Statutory Authority: § 29.014 , 29.033, 29.307, 29.335, 29.885, 227.11 and 227.24, Stats.
Statutes Interpreted: § 29.033, 29.177, 29.307, 29.335 and 29.361, Stats.

**Sections 1 and 2.** Defines an archery hunt as it relates to the special chronic wasting disease (CWD) control and management hunts.

**Section 3.** Defines CWD.

**Section 4 and 5.** Defines the CWD eradication zone.

**Section 6.** Defines the CWD intensive harvest zone.

**Section 7.** Defines the herd reduction zone.

**Section 8.** Defines adequate public notice and information as it relates to defining a new CWD eradication zone.

**Section 9 and 10.** Defines a section of land.

**Section 11.** Defines a shotgun hunt as it relates to the special CWD control and management hunts.

**Section 12 and 14.** Defines all of the metro deer management units as Zone "M" and eliminates deer management unit 76M from the list of metro units which have a standard deer season framework and harvest limits.

**Sections 13 and 29.** Eliminates Blue Mounds State Park from the list of parks with muzzleloader deer seasons.

**Section 15.** Updates exceptions to the regular deer archery season.

**Section 16.** Updates exceptions to the muzzleloader season.

**Section 17.** Creates the special disease control hunts for the gun and archery hunts in the deer management units, portions of deer management units and state parks that are included in the herd reduction and CWD intensive harvest zones.

**Sections 18 and 19.** Exempts units that are participating in the special CWD herd reduction hunts from the one-day youth antlerless deer hunt and the special herd control hunts.

**Section 20.** Modifies hunting hours for the CWD archery seasons.

**Section 21.** Authorizes the use of aircraft by the department to harvest, spot, rally and drive deer to help with the depopulation of deer within the eradication zone after all other control measures have been considered and also authorizes the use of buckshot from or with the aid of aircraft.

**Section 22.** Requires participants in the CWD herd reduction hunts to comply with blaze orange clothing requirements.

**Section 23.** Prohibits the possession of "buck shot" during the special CWD control hunts.

**Section 24.** Clarifies the prohibition of rifles in shotgun only areas during deer seasons and hunts.

**Section 25.** Allows hunting the day prior to the opening of a special gun deer hunt.

**Section 26.** Creates special CWD deer permits that authorize the harvesting of deer within the CWD management zones and creates a permit that will be issued to hunters to replace their carcass tag should they shoot a deer that appears to be diseased while hunting and defines the conditions for their use.

**Section 27.** Develops transportation and sampling guidelines for deer harvested within and outside of the CWD management zones.

**Section 28.** Develops registration guidelines for deer harvested within the CWD management zones.

**Section 30.** Establishes a deer season and weapon restrictions for Blue Mounds State Park.

**Section 31.** Creates a map that identifies the CWD herd reduction zone and the CWD intensive harvest zone.

**Section 32.** Creates a section regarding natural resources board guidance as it pertains to the management of chronic wasting disease by the department.

**Section 33.** Provides the department with the authority to utilize additional measures when necessary, within their legislative authority, to control the spread of CWD in the state.

**Section 34 and 35.** Identifies deer within the CWD eradication zone as causing a nuisances and authorizes the department to issue permits to landowners and their permitees to harvest deer during periods defined by the department throughout the year and defines the parameters of their issuance and guidelines for their use.

**Section 36.** Creates a free state park hunting access permit that is required to hunt in the state parks participating in the special CWD control hunts.

---

**Section 1. NR 10.001(1m) is renumbered NR 10.001(1t).**

**Section 2. NR 10.001(1n) is created to read.**

NR 10.001(1n) "Archery hunt" means a hunting period for hunting deer with bow and arrow or crossbow as authorized by s. 29.171(2) and (2m), Stats., in the zones described in s. NR 10.28(3).

**Section 3. NR 10.001(6h) is created to read.**

NR 10.001(6h) "CWD" means chronic wasting disease.

**Section 4. NR 10.001(6m) is renumbered NR 10.001(6d)**

**Section 5. NR 10.001(6p) is created to read.**

NR 10.001(6p) The "CWD eradication zone" is the area established by the department where the depopulation of the wild deer herd is required to eradicate chronic wasting disease and consists of all sections of land contained within or intersected by a 4 ½ mile radius circle drawn from the center of the section of land found to have contained a deer or elk that has tested positive for chronic wasting disease.

**Section 6. NR 10.001(6t) is created to read.**

NR 10.001(6t) The "CWD intensive harvest zone" means a zone established in s. NR 10.28(3).

**Section 7. NR 10.001(11) is created to read.**

NR 10.001(11) The "herd reduction zone " means a zone established in s. NR 10.28(3) excluding the CWD intensive harvest zone described in s. NR 10.28(3).

**Section 8. NR 10.001(19e) is created to read.**

NR 10.001(19e) "Notice and information to the public that is adequate" under s. 29.063, Stats., means a department press release to the local news media and the official state newspaper and may also include the following: public meetings, telephone contacts, internet postings, brochure distribution, first class mailings and meetings with landowners in the eradication zone.

**Section 9. NR 10.001(23m) is renumbered NR 10.001(23s)**

**Section 10. NR 10.001(23m) is created to read.**

NR 10.001(23m) "Section of land" means a numbered one square mile section of platted land within a township.

**Section 11. NR 10.001(24m) is created to read.**

NR 10.001(24m) "Shotgun hunt" means a hunting period for hunting deer with those firearms and ammunition defined in sub. (24).

| Kind of animal and locality | Open season (all dates inclusive) | Limit |
|---|---|---|
| **Section 12. NR 10.01(3)(e)1. (intro.) is amended to read.** | | |
| 1. Zone "A" | | |
| All that part of the state not otherwise listed in season zones "B" through ~~"F"~~ "M " or in those zones described in s. NR 10.28(3). | | |
| **Section 13. NR 10.01(3)(e)3.a., is amended to read.** | | |
| a. Governor Dodge (unit 70C), ~~Blue Mound (unit 70D),~~ Perrot (unit 61A) and Peninsula (unit 80C) state parks. | Muzzle loading firearm season beginning on the Saturday immediately preceding the Thanksgiving holiday and | One deer as authorized by hunter's choice and antlerless deer permits issued under s. NR 10.104. |

| | | |
|---|---|---|
| | continuing for up to 9 consecutive days as indicated on the permit. | |
| **Section 14. NR 10.01(3)(e)6. (intro.) and a. are amended to read.** | | |
| 6. Zone "M" | | |
| a. Deer management units 59M, 60M, 64M, ~~76M~~ and 77M. | Shotgun season beginning on the Saturday immediately preceding the Thanksgiving holiday and continuing for 9 consecutive days. | One buck deer or as authorized by hunter's choice and antlerless deer permits issued under s. NR 10.104. |
| | Shotgun season beginning on the day immediately following the season described above and continuing through the second Sunday in December. | One antlerless deer per hunter's choice or antlerless deer permit issued under s. NR 10.104. |
| **Section 15. NR 10.01(3)(em)1. and 3. are amended to read.** | | |
| (em) *Deer bow season* | | |
| 1. Statewide except as established under s. NR 10.01(3)(em)2., ~~and~~ 3. and (et). | Beginning on the Saturday nearest September 15 and continuing through the ~~2nd day~~ Thursday immediately prior to the opening of the deer gun season described in par. (e). | One deer of either sex and one antlerless deer per hunter's choice and per bonus permit issued under s. NR 10.104. |
| | Reopening on the day immediately after the deer gun season described in par. (e) and continuing through January 3. | One deer of either sex and one antlerless deer per hunter's choice and per bonus permit issued under s. NR 10.104. |
| 3. ~~M, M-1, M-2, M-3~~ Deer management units 1M, 59M, 60M, 64M, ~~76M~~ and 77M. | Beginning on the Saturday nearest September 15 and continuing through the Thursday immediately prior to the opening of the deer gun season and reopening on the Saturday immediately preceding the Thanksgiving holiday and continuing through January 31. | One deer of either sex and one antlerless deer per hunter's choice and bonus permit issued under s. NR 10.104. |
| **Section 16. NR 10.01(3)(es)1. is amended to read.** | | |
| (es) *Muzzleloader deer season* | | |
| 1. Entire state, except for the areas described in subd. 2. and par. (et). | Beginning on the Monday immediately following the Thanksgiving holiday and continuing for 10 consecutive days. | One buck deer or as authorized by hunter's choice and antlerless deer permits issued under s. NR 10.104. |
| **Section 17. NR 10.01(3)(et) is created to read.** | | |
| **Kind of animal and locality** | **Open season (all dates inclusive)** | **Limit** |
| (et) Special disease control hunts. | | |
| 1.a. In the portions of deer management units included in the herd reduction zone established in s. NR 10.28(3) except as established in subdivision paragraph | Archery hunt beginning on the Saturday nearest September 15 and continuing through January 3rd. | One antlerless deer per archery deer carcass tag or antlerless permit. In addition, buck deer may be taken pursuant to s. NR 10.104(11). Hunter's choice and bonus antlerless |

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| b. and excluding units listed in subdivision paragraph c. | | deer permits issued under s. NR 10.104 are not valid in these zones. |
| | A firearm hunt beginning on the Thursday nearest October 27 and continuing for 4 consecutive days. Allowable types of firearms are those authorized on the first day of the regular gun deer season under s. NR 10.01(3)(e). | One antlerless deer per gun deer carcass tag or antlerless permit. In addition, buck deer may be taken pursuant to s. NR 10.104(11). Hunter's choice and bonus antlerless deer permits issued under s. NR 10.104 are not valid in these zones. |
| | A firearm hunt beginning on the Saturday immediately preceding the Thanksgiving holiday and continuing through January 3 rd . Allowable types of guns are those authorized on the first day of the regular gun deer season under s. NR 10.01(3)(e). | One antlerless deer per gun deer carcass tag or antlerless permit. In addition, buck deer may be taken pursuant to s. NR 10.104(11). Hunter's choice and bonus antlerless deer permits issued under s. NR 10.104 are not valid in these zones. |
| b. In the portions of deer management units included in the herd reduction zone established in s. NR 10.28(3) where the overwinter population of deer, determined by the department pursuant to s. NR 10.41(4)(b), is 15 or less deer per $mi^2$ of deer range. | Archery season beginning on the Saturday nearest September 15 and continuing through the Thursday immediately prior to the Thanksgiving holiday. | One deer of either sex and one antlerless deer per hunter's choice and per bonus permit issued under s. NR 10.104. |
| | Archery season reopening on the Monday following the Thanksgiving holiday and continuing through January 3. | One deer of either sex and one antlerless deer per hunter's choice and per bonus permit issued under s. NR 10.104. |
| | Firearm season beginning on the Saturday immediately preceding the Thanksgiving holiday and continuing for 9 consecutive days. Allowable types of firearms are those authorized on the first day of the regular gun deer season under s. NR 10.01(3)(e). | One buck deer or as authorized by hunter's choice and bonus antlerless deer permits issued under s. NR 10.104. |
| | Muzzleloader season beginning on the Monday immediately following the Thanksgiving holiday and continuing for 10 consecutive days. | One buck deer or as authorized by hunter's choice and bonus antlerless deer permits issued under s. NR 10.104. |
| c. State parks in the herd reduction zone established in s. NR 10.28(3), except those state parks that are | A firearm hunt beginning on the Thursday nearest October 27 and continuing for 4 consecutive days. | A firearm hunt beginning on the Thursday nearest October 27 and continuing for 4 consecutive days. |

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| located in units or portions of units subject to subdivision paragraph b., which will return to the seasons authorized under s. NR 10.27. | Allowable types of firearms are those authorized on the first day of the regular gun deer season under s. NR 10.01(3)(e). Legal hunting hours are the same as those established in s. NR 10.06(5) except that hunting hours shall close at 12:00 p.m. daily. | Allowable types of firearms are those authorized on the first day of the regular gun deer season under s. NR 10.01(3)(e). Legal hunting hours are the same as those established in s. NR 10.06(5) except that hunting hours shall close at 12:00 p.m. daily. |
| | An archery and firearm hunt beginning on the Saturday prior to the Thanksgiving holiday and continuing through the 3 rd Sunday following the Thanksgiving holiday. Allowable types of guns are those authorized on the first day of the regular gun deer season under s. NR 10.01(3)(e). | One antlerless deer per gun deer carcass tag and one antlerless deer per archery deer carcass tag or antlerless permit issued under s. NR 10.104(11). In addition, buck deer may be taken pursuant to s. NR 10.104(11). Hunter's choice and antlerless deer permits issued under s. NR 10.104 are not valid in this zone. |
| d. If the department finds that it is unlikely that the deer population in the unit or portion of unit located within the herd reduction zone established in s. NR 10.28(3) will be reduced to within 20% of the overwinter population goal established in s. NR 10.41(4)(b) under the season described in subdivision paragraph b., the season framework established in subdivision paragraphs (ez)1.a. to c. will be implemented within that unit or portion of unit. | | |
| 2. a. In the CWD intensive harvest zone as described in s. NR 10.28(3) except as established in subdivision paragraph b. and excluding units listed in subd. 3. | Archery hunt beginning on the Saturday nearest September 15 and continuing through January 31st. | One antlerless deer per archery deer carcass tag or antlerless permit issued under s. NR 10.104(11). In addition, buck deer may be taken pursuant to s. NR 10.104(11). Hunter's choice and antlerless deer permits issued under s. NR 10.104 are not valid in this zone. |
| | A firearm hunt beginning on the Thursday nearest October 27 and continuing through January 31. | One antlerless deer per gun deer carcass tag or antlerless permit issued under s. NR 10.104(11). In addition, buck deer may be taken pursuant to s. NR 10.104(11). Hunter's choice and antlerless deer permits issued under s. NR 10.104 are not valid in this zone. |
| b. In the CWD intensive harvest zone established in s. NR 10.28(3) where the overwinter population of deer, determined by the department pursuant to s. NR 10.41(4)(a), is 5 or less deer per mi 2 of deer range. | Archery hunt beginning on the Saturday nearest September 15 and continuing through January 3rd. | One deer of either sex per archery deer carcass tag, special antlerless permit issued under s. NR 10.01(3)(ez) or a permit issued under s. NR 10.104(13). Hunter's choice and antlerless deer permits issued under s. NR 10.104 are not valid in this zone. |
| | A firearm hunt beginning on the Thursday nearest October 27 and continuing through January 3rd. | One deer of either sex per gun deer carcass tag, special antlerless permit issued under s. NR 10.01(3)(ez) or a permit issued under s. NR 10.104(13). Hunter's choice and |

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| | | antlerless deer permits issued under s. NR 10.104 are not valid in this zone. |
| 3.a. State parks in the CWD intensive harvest zone established in s. NR 10.28(3), except as established in subdivision paragraph b. | An archery and firearm hunt beginning on the Thursday nearest October 27 and continuing for 4 consecutive days. Legal hunting hours are the same as those established in s. NR 10.06(5) except that hunting hours will close at 12:00 p.m. daily. | One antlerless deer per gun deer carcass tag and one antlerless deer per archery deer carcass tag or antlerless permit issued under s. NR 10.104(11). In addition, buck deer may be taken pursuant to s. NR 10.104(11). Hunter's choice and antlerless deer permits issued under s. NR 10.104 are not valid in this zone. |
| | An archery and firearm hunt beginning on the day immediately following the hunt described above and continuing through the 3 rd Sunday following the Thanksgiving holiday. | One antlerless deer per gun deer carcass tag and one antlerless deer per archery deer carcass tag or antlerless permit issued under s. NR 10.104(11). In addition, buck deer may be taken pursuant to s. NR 10.104(11). Hunter's choice and antlerless deer permits issued under s. NR 10.104 are not valid in this zone. |
| b. If the overwinter population of deer in the intensive harvest zone, determined by the department pursuant to s. NR 10.41(4)(a), is 5 or less deer per mi 2 of deer range. | An archery and firearm hunt beginning on the Thursday nearest October 27 and continuing for 4 consecutive days. Legal hunting hours are the same as those established in s. NR 10.06(5) except that hunting hours will close at 12:00 p.m. daily. | One deer of either sex per special antlerless permit issued under s. NR 10.01(3)(ez), a permit issued under s. NR 10.104(13), gun deer carcass tag or archery deer carcass tag. Hunter's choice and antlerless deer permits issued under s. NR 10.104 are not valid in this zone. |
| | An archery and firearm hunt beginning on the day immediately following the hunt described above and continuing through the 3 rd Sunday following the Thanksgiving holiday. | One deer of either sex per special antlerless permit issued under s. NR 10.01(3)(ez), a permit issued under s. NR 10.104(13), gun deer carcass tag or archery deer carcass tag. Hunter's choice and antlerless deer permits issued under s. NR 10.104 are not valid in this zone. |

**Section 18. NR 10.01(3)(ev) is amended to read.**

| **Kind of animal and locality** | **Open season (all dates inclusive)** | **Limit** |
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| (ev) Special youth antlerless deer hunt event. | | |
| Persons 12 years of age or older but under the age of 16 years of age who possess a certificate of accomplishment under s. 29.591, Stats., or its equivalent from another state or province, may hunt antlerless deer with a ~~gun~~ firearm on the Saturday of a herd control hunt defined under s. NR 10.01 (3) (ez) 1. a. in deer management units, except state park units and units not included in a deer herd control firearm hunt under s. NR 10.01 (3) (ez) or (et) on the same day. Allowable types of ~~guns~~ firearms are those authorized on the first day of the regular gun deer season under s. NR 10.01 (3) (e). The bag limit is one antlerless deer per hunter's choice or antlerless deer permit issued under s. NR 10.104. Youth who are first time graduates of the hunter education program may use their certificates of accomplishment in place of a hunter's choice permit issued under s. 29.177, Stats., to take an antlerless deer. Hunters shall be accompanied by an adult 18 years of age or | | |

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| older. One adult may not accompany more than 2 hunters and all other hunting regulations apply. Blaze orange requirements under s. 29.301 (2), Stats., apply to all hunters on this day except waterfowl hunters. | | |
| **Section 19. NR 10.01(3)(ez) 4. is created to read.** | | |
| (ez) Special deer herd control hunt. | | |
| 4. Areas specified under this paragraph exclude areas described in par. (et)1.a. and 2.a. and b. | | |

**Section 20. NR 10.06(8)(a) is amended to read.**

NR 10.06(8)(a) *Bow bear and deer season*s. Hunting hours established in sub. (5) shall apply to archers pursuing any species during the bow bear season established in s. NR 10.01(3) (g), ~~and~~ during the bow deer season established in s. NR 10.01 (3) (em), and the archery hunts established in s. NR 10.01(3)(et)1., 2. and 3.

**Section 21. NR 10.07(1)(a) is amended to read.**

NR 10.07(1)(a) *Aircraf*t. Hunt with the aid of an ~~airplane~~ aircraft, including the use of an ~~airplane~~ aircraft to spot, rally or drive wild animals for hunters on the ground, except as authorized by the department within the CWD eradication zone defined in s. NR 10.001(6p) when other alternatives to shooting and driving animals from aircraft have been considered and the department determines that the use of aircraft is necessary in order to control the spread of disease in animals as follows:

1. Deer may be shot from aircraft only between December 1 and the following April 15.
2. Aircraft may be used to spot, rally or drive deer for harvest or other control purposes as authorized by the department.
3. Deer may be harvested from an aircraft only on properties where the department has received landowner approval.
4. Deer driven with an aircraft may be harvested by ground shooters.
5. All ground shooters participating in control of deer with the aid of an aircraft shall wear blaze orange clothing as described in s. 29.310(2), Stats.
6. Notwithstanding s. NR 10.09(1)(a)2., any person authorized by the department to shoot deer from or with the aid of an aircraft pursuant to this paragraph, may use shotshells loaded with shot larger than no. BB to shoot deer.

**Section 22. NR 10.07(3) is created to read.**

NR 10.07(3) CWD BLAZE ORANGE REQUIREMENTS. The blaze orange requirements described in s. 29.301(2), Stats., apply to CWD deer herd reduction and eradication hunts under s. NR 10.01(3)(et).

**Section 23. NR 10.09(1)(a)2. is amended to read.**

NR 10.09(1)(a)2. 'Size.' Possess or have in control while hunting, shells containing shot larger than no. BB during the period commencing on June 1 and ending 48 hours following ~~gun~~ any deer season or hunt established in s. NR 10.01 (3) (e), (es), (et) or (ez), whichever season is later, except during the open season established in s. NR 10.01 (1) (b), (c), (d) and (g) when nontoxic shot size BBB and T may be used for hunting migratory game birds.

**Section 24. NR 10.09(1)(c)3. is amended to read.**

NR 10.09(1)(c)3. *'Possession.'* ~~Possess~~ Except as provided in subdivision paragraph 4. , possess any rifle larger than .22 rim-fire in areas wherein there is an open season or hunt specified in s. NR 10.01(3) for hunting deer with shotgun only unless ~~such~~ the rifle is unloaded and enclosed within a carrying case.

**Section 25. NR 10.09(2) (intro.) is amended to read.**

NR 10.09(2) SPECIAL ONE-DAY RESTRICTION. (intro.) During the 24-hour period prior to the opening date for

hunting deer with guns, no person shall may possess a gun wherein there is an open season for deer with guns specified in s. NR 10.01(3)(e), unless the gun is unloaded and enclosed within a carrying case. Exceptions:

**Section 26. NR 10.104(11), (12) and (13) are created to read.**

NR 10.104(11) CHRONIC WASTING DISEASE SPECIAL PERMITS. In the CWD herd reduction and intensive harvest zones as described in s. NR 10.28(3), a valid gun or archery deer license and carcass tag or a special antlerless permit issued under s. NR 10.01(3)(ez), 12.06, 12.15 or 19.11 are all valid for tagging an antlerless deer or a buck deer pursuant to the procedure described in par. (a)3. In addition, the following carcass tags are valid for the taking and tagging of additional deer:
(a) *Special CWD earn-a-buck permit*s. This special permit issued under s. 29.177, Stats., is valid for the taking of an antlerless deer in the units or portions of deer management units included in the CWD herd reduction and intensive harvest zones as described in s. NR 10.28(3). These special permits: 1. Will be issued free of charge at a rate of up to 4 permits per day per hunter.
2. Can be used during the hunts described in s. NR 10.01(3)(et)1.a., 2.a. and 3.a.
3. Can be used to tag a buck deer if:
a. An antlerless deer has been legally harvested and tagged prior to the harvest of the buck deer, and
b. The antlerless deer accompanies the buck deer until each is registered.
4. Are not valid if all the required information is not completed on the permit.
(b) *Special CWD buck deer permits.* A special CWD buck permit, issued under s. 29.177, Stats., is valid for the taking of a buck deer in units or portions of deer management units included in the CWD herd reduction and intensive harvest zones as described in s. NR 10.28(3). A buck deer permit may only be issued to an individual for each antlerless deer they register in the zone described in s. NR 10.28(3) that are not used for credit on a previous buck deer. No person may use or attempt to use an antlerless deer to receive more than one special CWD buck deer permit. A buck deer may be killed and tagged with a buck permit without it being accompanied by an antlerless deer. These permits are:
1. Valid during the hunts described in s. NR 10.01(3)(et)1.a., 2.a. and 3.a.
2. Valid only for the hunter who registers the antlerless deer to secure authorization for that hunter to tag one buck deer in the CWD herd reduction or intensive harvest zones.
3. Issued free of charge upon registering an antlerless deer in accordance with this subdivision.
4. Not valid if all the required information is not completed on the permit.
(12) SPECIAL DISEASED DEER REPLACEMENT PERMIT*S.* The department may provide free replacement permits issued under s. 29.177, Stats., to hunters who harvest deer that are suspected of being diseased, provided that the entire deer is surrendered to the department or is disposed of as directed by the department. Each special permit shall be:
(a) Issued by a department employee or a designated agent.
(b) Issued to the hunter harvesting and tagging the suspect deer.
(c) Issued for the type of deer authorized on the permit or license used to harvest and tag the suspect deer.
(13) SPECIAL CWD EITHER-SEX PERMITS. This special permit issued under s. 29.177, Stats., is valid for the taking of a deer of either-sex in the units or portions of deer management units included in the intensive harvest zone described in s. NR 10.28(3). These special permits:
(a) Will be issued free of charge at a rate of up to 4 permits per day per hunter.
(b) Are not valid if all the required information is not completed on the permit.

**Section 27. NR 10.105(3) and (4) are created to read.**

NR 10.105(3) CWD ZONE CARCASS TRANSPORTATION. In the CWD herd reduction and intensive harvest zones during the seasons established in s. NR 10.01(3)(et)1.a., 2.a. and 3.a., no person may:
(a) Transport or possess a buck deer from the time it is killed to the time it is registered under s. NR 10.106(2)(e) unless tagged with a special CWD buck permit described in s. NR 10.104(11)(b) or accompanied by the antlerless deer that authorized the buck deer and each is tagged in the CWD herd reduction or intensive harvest zones and tagged with a special CWD earn-a-buck permit, gun or bow carcass tag, or other antlerless permit authorized in s. NR 10.104(11). (4) DISEASE SAMPLING. Notwithstanding s. 29.347, Stats., any part of any animal harvested under s. NR 10.01(3) may be collected or sampled by the department for disease testing purposes prior to registration.

**Section 28. NR 10.106(2) (f) is created to read.**

NR 10.106(2)(f) *CWD intensive harvest and special herd reduction zones.* Any deer harvested in the CWD intensive harvest zone or special herd reduction zone shall be registered at registration stations designated by the department within the CWD zone in which it was killed no later than 5:00 p.m. on the day after it was killed, unless otherwise authorized by the department.

**Section 29. NR 10.27(1) is amended to read.**

NR 10.27(1) MUZZLELOADER SEASON. Deer hunting by muzzleloader is allowed in ~~Blue Mound~~, Governor Dodge, Harrington Beach, Peninsula, Wildcat Mountain and Perrot state parks during the seasons specified in s. NR 10.01 (3) (e) 3.

**Section 30. NR 10.27(10) is created to read.**

NR 10.27 (10) FIREARM, EARLY AND LATE BOW SEASONS. Deer hunting by firearm is established in Blue Mounds state park during the seasons specified in s. NR 10.01(3)(et)1. and by bow and arrow for the seasons described in s. NR 10.01(3)(et)3.

**Section 31. NR 10.28(3) is created to read.**

NR 10.28(3) CWD HERD REDUCTION AND INTENSIVE HARVEST ZONES.

**Section 32. NR 10.41 is created to read.**

NR 10.41 **Wildlife disease management.**
(1) PURPOSE. Pursuant to s. 29.063(1), Stats., the natural resources board establishes this section to provide guidelines for the department to manage chronic disease in wild cervids in this state.
(2) STATE PARKS AND OTHER CLOSED AREAS. State parks, refuges and closed areas identified in chs. NR 11, 15 and 45 may be opened to hunting by rule order to assist in the control of CWD.
(3) CWD ERADICATION ZONE. The department may establish an eradication zone, pursuant to the criteria established in s. NR 10.001(6p) (a) *Overwinter goal.* The eradication zone shall have an overwinter deer population goal of 0 deer per mi 2 of deer range. (b) *Population estimation.* The department shall annually calculate an estimate of the overwinter deer population for this zone with information obtained by surveys which may include registration data and aerial surveys.
(4) CWD MANAGEMENT ZONES. Under the authority of s. 227.24, Stats., the department may establish special CWD management zones through emergency rule around areas where CWD positive cervids have been identified. (a) *CWD intensive harvest zone.* 1. Units or portions of units located within the boundaries of the CWD intensive harvest zone established in s. NR 10.28(3) will be managed at a goal of less than 10 deer per mi 2 of deer range. 2. This zone shall be identified by readily identifiable features of the landscape such as roads and rivers. When road boundaries are used, the department shall give priority to use of numbered and lettered highways, close to or near the eradication zone boundaries. 3. The department shall annually calculate an estimate of the overwinter deer population in this zone with information obtained by surveys which may include registration data and aerial surveys. (b) Herd reduction zone. 1. Units or portions of units located within the boundaries of the herd reduction zone established in s. NR 10.28(3) will be managed at a goal of 10 deer per mi2 of deer range. 2. This zone shall be identified by readily identifiable features of the landscape such as roads and rivers. When road boundaries are used, the department shall give priority to use of numbered and lettered highways. 3. The department shall annually calculate an estimate of the overwinter deer population for each deer

management unit or portions of unit located within this zone with information obtained by surveys which may include registration data and aerial surveys. 4. The department may combine units or portions of units within the herd reduction zone into broad areas that have the same season framework under s. NR 10.01(3)(et)1.a., b. or d. to help simplify the deer hunts within the herd reduction zone.

**Section 33. NR 10.42 is created to read.**

NR 10.42 **Official state duties.** Nothing in this chapter shall prohibit or hinder the department and its employees, duly authorized agents, or contractors from performing their official duties.

**Section 34. NR 12.06 is created to read.**

NR 12.06 **CWD eradication zone deer removal permits.** (1) FINDINGS. Pursuant to s. 29.885(4), Stats., the natural resources board finds that deer within any CWD eradication zone cause a nuisance and that the shooting of deer with nuisance permits is necessary within any CWD eradication zone defined in s. NR 10.001(6p) in order to reduce the spread of disease within the CWD eradication zone and to reduce the risk of disease spreading outside any CWD eradication zone.
(2) PERMITS. Landowners, lessees, occupants or their duly authorized agents within the eradication zone may, under a department issued permit, remove deer from lands under their ownership or control in accordance with this section.
(a) Both antlerless and buck deer may be harvested unless otherwise restricted as a condition of the permit.
(3) PARTICIPATION BY OTHERS. Persons other than the permittee may assist as a participant in the removal of deer in accordance with this section on the land for which the permit is valid.
(a) *Number and selection of participant*s. All participants shall be selected by the permittee and shall record their name, address, phone number and date of birth in a logbook provided by the department to the permittee.
(*b) Age and safety trainin*g. All participants, including the permittee shall meet the requirements of ss. 29.304 and 29.593, Stats., pertaining to hunter safety and age.
(c) *Approva*l. All participants shall possess written approval obtained from the permittee and the appropriate, valid hunting license unless exempted under sub.
(4)(a) when carrying on removal activities. Written approval may include: name, address and phone number of landowner; name, address, phone number and DNR customer identification number, if applicable, of the person removing wild animals; property location and removal activities, authorized period of removal, signature of the permittee, or other form of approval authorized by the department.
(d) *No fee*s. The permittee may not charge any form of fee to a participant.
(4) LICENSES, STAMPS AND PERMITS. (a) The permittee and participants are not required to possess the appropriate state hunting license or backtag for deer, unless otherwise required as a condition of the permit.
(b) Antlerless deer harvested under the authority of this section may be used to earn a CWD buck permit issued under s. NR 10.104(11) for the authority to harvest a buck deer during the seasons listed in s. NR 10.01(3)(et) within the CWD herd reduction and intensive harvest zones identified in s. NR 10.28(3).
(5) CARCASS DISPOSITION. Unless otherwise directed by the department, carcasses shall be disposed of in accordance with the procedures outlined on the permit issued by the department. Any part of any deer harvested under this section may be collected by the department for disease testing purposes.
(6) HARVEST PERIODS. Permits issued to landowners under this section are valid only for the periods specified by the department on the permit.
(7) SHOOTING HOURS. Permittees and participants shall comply with shooting hours described in s. NR 10.06 (5), unless exempted by the department.
(8) FIREARM USE. The following conditions shall apply to the use of firearms, bows or crossbows on deer shooting permits:
(a) Permittees and participants shall comply at all times when hunting with the blaze orange clothing regulations of s. 29.301 (2), Stats., unless exempted by the department. Exemptions may be granted where local ordinances prohibit the discharge of firearms and bow hunting or a trained sharpshooter during the closed deer gun season are the only methods available to remove deer.
(b) Except as provided under par. (c), and unless otherwise directed by the department, the weapons designated by the department on the permit shall be valid to harvest deer under the authority of the permit identified in sub. (2).

(c) In counties with deer shotgun seasons, a permittee and participants that have been authorized by the permittee may use a rifle that is not otherwise prohibited by s. NR 10.09(1)(c)2.
(9) REGISTRATION. Permittees and participants shall register deer taken under this section in accordance with the procedures designated by the department on the permit.
(10) VALIDATION. Any person who kills a deer or if s. 29.234, Stats., applies, the person providing the carcass tag shall immediately validate and attach the carcass tag as designated by the department.
(11) BAITING. The use of bait to attract or hunt deer for removal purposes by the permittee and participants is not allowed unless specifically authorized by the department and under the conditions specified in the permit.

**Section 35. NR 12.10(3)(c) is amended to read.**

NR 12.10(3)(c) ~~All~~ Except as authorized in s. NR 12.06 (3)(c), all participants and persons assisting participants shall possess written approval from the permittee and the appropriate, valid hunting or trapping license when carrying on removal activities. Written approval shall include: name, address and phone number of landowner; name, address and phone number of the person removing wild animals; property location and removal activities, authorized period of removal, species of animals authorized for removal, signature of the landowner or lessee, and date.

**Section 36. NR 45.09(9) is created to read.**

NR 45.09(9) CWD STATE PARK DEER HUNTING ACCESS PERMIT. (a) Unless authorized by the department, no person may hunt deer in accordance with the hunts described in s. NR 10.01(3)(et) without obtaining and possessing while hunting a free state park deer hunting permit and a property map identifying those areas closed to deer hunting within the park properties.
(b) The number of access permits issued will not be limited in number.
Note: Permits will be available at the state park office and other locations designated by the department.

SECTION 37. INITIAL APPLICABILITY. The state legislature has delegated to the department rule-making authority in 2001 Wisconsin Act 108 to control the spread of Chronic Wasting Disease (CWD) in Wisconsin. CWD poses a risk to the health of the state's deer herd and citizens and is a threat to the economic infrastructure of the department, the state, it's citizens and businesses.

SECTION 38. EFFECTIVE DATE. The rules shall take effect on the first day of the month following publication in the Wisconsin administrative register as provided in s. 227.22(2)(intro.), Stats.

SECTION 39. BOARD ADOPTION. The foregoing rules were approved and adopted by the State of Wisconsin Natural Resources
Board on _____.

Dated at Madison, Wisconsin _____

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

By

_____
Scott Hassett, Secretary

(SEAL)

**ORDER OF THE STATE OF WISCONSIN NATURAL RESOURCES BOARD**
**REPEALING, AMENDING AND CREATING RULES**

The Wisconsin Natural Resources Board proposes an order to repeal NR 10.07(1)(g); amend NR 10.001(2) and (14); and to create NR 10.001 (7e), (23e), 10.07(2), 19.001(4) and (15m), and 19.60 relating to the regulation of baiting and feeding to control and manage chronic wasting disease.

WM-09-03

**Analysis Prepared by Department of Natural Resources**

Statutory Authority: § 29.014 , 29.033, 29.335, and 227.11, Stats.
Statutes Interpreted: § 29.033 and 29.335, Stats.

**Sections 1** Amends the definition of bait.

**Section 2.** Defines decoy.

**Section 3.** Amends the definition of liquid scent.

**Section 4.** Defines scent.

**Sections 5 and 6.** Prohibits the use of bait statewide for hunting and provides exceptions for landowners in the eradication zone and for bear hunting by imposing bait site, permit and date restrictions, and also allows the use of liquid scents for deer hunting.

**Section 7.** Defines bird feeding devices and structures.

**Section 8.** Defines small mammals.

**Section 9.** Prohibits feeding of wildlife and outlines exceptions for birds and small mammals.

---

**Section 1. NR 10.001(2) is amended to read.**

NR 10.001(2) For the purposes of this chapter, "bait" means ~~honey and any solid or nonliquid~~ any material ~~attractive~~ used to attract wildlife including liquid scent.

**Section 2. NR 10.001(7e) is created to read.**

NR 10.001(7e) "Decoy" means the replica of an animal used to attract wild animals for the purpose of hunting, but may not include any food materials that can be consumed by any wild animal.

**Section 3. NR 10.001(14) is amended to read.**

NR 10.001(14) "Liquid scent" means any ~~nonsolid~~ liquid material except honey, used to attract wild animals solely by its odor.

**Section 4. NR 10.001(23e) is created to read.**

NR 10.001(23e) "Scent" means any material except honey, used to attract wild animals solely by its odor.

**Section 5. NR 10.07(1)(g) is repealed.**

**Section 6. NR 10.07(2) is created to read.**

NR 10.07(2) BAITING. (a) *General prohibitio*n. Except as provided in par. (b) or as authorized by a permit issued under s. NR 12.06(11), no person may hunt with the aid of bait, place or use bait for the purpose of hunting wild animals or training dogs.
(b) *Exception*s. 1. Bait may be placed in compliance with par. (c) between April 15 and the close of the bear season, for hunting bear or training bear dogs during the open season's for these activities, provided when the bait is placed and when the bait site is checked or re-baited, that the bait is totally enclosed in a hollow log, a hole in the ground or stump which is capped with logs, rocks or other naturally occurring and unprocessed substances which prevents deer from accessing the material.
2. Liquid scent used for hunting of bear or training bear dogs from April 15 to the end of bear season does not

need to be enclosed in a hollow log, a hole in the ground or stump.
3. This subsection does not prohibit hunting with the aid of material deposited by natural vegetation or material found solely as a result of normal agricultural or gardening practices.
4. Baiting for purposes of trapping is regulated by ss. NR 10.13(1)(b), 19.27, 19.275 and this section.
5. Baiting for waterfowl is regulated by s. NR 10.12(1)(h) and not this section.
6. This subsection does not prohibit hunting over crops planted and left standing as wildlife food plots.
7. Scent may be used for hunting deer or elk provided the scent is not placed or deposited in a manner that it is accessible for consumption by deer or elk and non-liquid scents shall be removed daily at the end of hunting hours for deer established in s. NR 10.06(5). Two ounces or less of liquid scent may be placed or deposited in any manner for hunting game animals.
8. This subsection does not prohibit hunting in accordance with s. 29.337, Stats., with the aid of feed material placed in compliance with s. NR 19.60.
9. This subsection does not prohibit hunting with the use of decoys except as already prohibited under ss. NR 10.12(1)(f) and (g) and 10.25(4)(d).
(c) *Additional prohibitions for bear hunting and bear dog training*. No person may:
1. Place, use or hunt with the aid of bait material, in excess of 10 gallons for attracting wild animals or containing honey, bones, fish, meat, solid animal fat or parts of animal carcasses.
2. Except as allowed by par. (b) 1. and 6., place, use or hunt with the aid of bait material, other than scent, which is contained within or containing metal, paper, plastic, glass, wood or other similar processed materials.
3. Place, use or hunt with the aid of bait material, within 50 yards of any trail, road or a campsite used by the public.
4. Hunt with the aid of bait material, other than scent, without possessing a valid unused bear harvest permit.

5. Hunt or pursue animals in an area baited in violation of this subsection or in violation of the feeding prohibitions

of s. NR 19.60, unless the area is completely free of bait or feed material for at least 10 consecutive days prior to

hunting, pursuing animals or dog training.

Note: Removal of unlawfully placed bait or other feeding material does not preclude the issuance of a citation for

the original placement of the unlawful baiting or feeding material.

**Section 7. NR 19.001(4) is created to read.**

NR 19.001(4) "Bird feeding devices and structures" means any device or structure that has the primary purpose of

attracting or feeding birds or small mammals.

**Section 8. NR 19.001(15m) is created to read.**

NR 19.001(15m) "Small mammals" mean all mammals other than bear, deer and elk.

**Section 9. NR 19.60 is created to read.**

NR 19.60 **Feeding of wild animals.** (1) PROHIBITIONS.
(a) Except as provided in this section or by permit issued under s. NR 12.06(11), no person may place, deposit or allow the placement of any material to feed or attract wild animals.
(b) Any person placing material or feed to attract wild animals in violation of this section shall remove all food or other material illegally placed or deposited when ordered by the department to do so.
(c) Landowners, lessees or occupants of any property where feeding in violation of this section occurs shall remove all food or other material illegally placed or deposited upon notification by the department of the illegal activity.
Note: Elevated feeders that are designed to deposit food on the ground are prohibited.
(2) EXCEPTIONS. This paragraph does not prohibit:

(a) Material placed solely for the purpose of attracting and feeding wild birds and small mammals when placed in bird feeding devices and structures at a sufficient height or design to prevent access by deer and only when the structures and devices are no further than 50 yards from a dwelling devoted to human occupancy. If the department determines that wild deer are utilizing bird feeding devices or structures, the devices or structures shall be enclosed or elevated higher to prevent access by deer.
(b) Feeding of wild animals, other than deer, elk or bear, by hand is allowed if:
1. Feed is placed not more than 30 feet away from the person feeding.
2. The person feeding makes all reasonable attempts to clean up the unconsumed food before moving a distance greater than 30 feet from the deposited food.
(c) Food deposited by natural vegetation or found solely as a result of normal agricultural or gardening practices.
(d) Standing crops planted and left standing as wildlife food plots that may be used by wild animals.
(e) Food material placed for bear hunting or bear dog training as specified in s. NR 10.07(2).
(f) Food material placed for trapping as specified in s. NR 10.13.
(g) The use of decoys for non-hunting purposes.
(h) The placement of plain water for drinking or for bird baths.
(i) The use of scents provided the material is not accessible for consumption by deer or elk.
(j) Food or bait material placed or used for fish, reptiles, amphibians or arthropods provided the material is not accessible to bear, deer or elk.
Note: These feeding rules do not apply to captive wild animals held and licensed under ch. 169, Stats.

SECTION 10. INITIAL APPLICABILITY. The state legislature has delegated to the department rule-making authority in 2001 Wisconsin Act 108 to control the spread of Chronic Wasting Disease (CWD) in Wisconsin. CWD poses a risk to the health of the state's deer herd and citizens and is a threat to the economic infrastructure of the department, the state, it's citizens and businesses.

SECTION 11. EFFECTIVE DATE. The rules shall take effect on the first day of the month following publication in the Wisconsin administrative register as provided in s. 227.22(2)(intro.), Stats.

SECTION 12. BOARD ADOPTION. The foregoing rules were approved and adopted by the State of Wisconsin Natural Resources Board on _____.

Dated at Madison, Wisconsin _____

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

By _____
Scott Hassett, Secretary

(SEAL)

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***Environmental Impact Statement***
***on Rules to Eradicate Chronic Wasting Disease***
***in Wisconsin's Free-Ranging White-tailed Deer Herd***

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# APPENDIX C

**Carcass Disposal Options and Activities During the 2002 CWD Management Efforts.**

Deer carcasses or their butchered remains have been disposed of in Wisconsin since deer were first hunted. Since the advent of environmental regulations in the 1970's, the most common disposal methods have been landfills (both municipal waste landfills and deer disposal pits), rendering plants, and decomposition in the natural environment. Because the hunter ethic in Wisconsin stresses using the meat of animals that are taken during a hunt, the most common forms of material requiring disposal are butcher waste (head, bones, internal organs, hide) and car killed deer. Butcher waste has traditionally gone to rendering plants or is sent to the local landfill along with other trash (internal organs or "gut piles" have traditionally been removed from the deer in the field and left for scavengers). Car killed deer have traditionally been picked up by DNR contractors and taken to rendering plants or to local landfills. Although deer disposal pits were widely used in the 1970s and 1980s, their use is extremely limited today.

After CWD positive test results were received in February of 2002 for three deer in the Mt. Horeb area (Deer Management Unit 70A), the Department organized a hunt in an area immediately surrounding (within a 12 mile radius) the location of the CWD infected animals to determine the degree and extent of the disease. Over 500 animals were shot and collected for sampling purposes. Prior to the beginning of this hunt, arrangements had been made with Dane County and Sauk County for disposal of the carcasses in their landfills. For logistical reasons, only the Dane County landfill was ultimately used.

Subsequent to the disposal of these carcasses in the landfill and receiving test results showing that an additional 15 deer tested positive, questions were raised regarding the safety of landfills for containing the disease. Specifically, landfills are dependent upon wastewater treatment plants accepting the landfill's leachate (contaminated liquids collected at the base of the landfill). Treatment plants are in turn dependent on farmers accepting the sludge (or bio-solids) from the treatment plant for use as a fertilizer on their fields. The question was raised whether the prion could conceivably travel with the leachate to the leachate collection system, go through the wastewater treatment process and be spread on fields with the bio-solids.

The DNR, in conjunction with representatives of the Wisconsin Department of Health and Family Services, the Wisconsin Veterinary Diagnostic Lab, and the Department of Agriculture, Trade and Consumer Protection, reviewed the available information and concluded that landfills provided reasonable containment of the prion. A detailed risk assessment was prepared. The risk assessment concluded "that landfilling of CWD-infected deer does not pose a significant risk to human health" and "the risk of spreading CWD among Wisconsin's deer population by landfill disposal of infected carcasses is quite small".

Although technical staff for both landfills and wastewater treatment plants generally agreed with the DNR's conclusion on the safety of landfilling the deer, there remained a fear of the public perception that landfilling presented a risk to both human health and the spread of the disease to other deer. Treatment plant operators

were fearful that farmers would not accept their bio-solids, leaving them with a disposal problem. Landfill operators in turn were fearful that the treatment plants would no longer accept their leachate, leaving them with the choice of closing down or establishing their own treatment systems at an extremely high cost. Based on this fear, landfill operators were unwilling to accept deer carcasses from the 2002 summer hunts. Based on experience gained in 2002, CWD management of carcasses was designed to address both the actual risks associated with disposal of CWD-positive tissues and additional perceived risks on the part of stakeholders.

The DNR then contracted with an existing animal crematorium to incinerate the deer at temperatures sufficiently high to result in the destruction of any prions that might be present. However, due to the low throughput at the crematorium and the relatively high cost of cremation, the DNR established a Carcass Disposal Team to explore the availability of safe and environmentally acceptable alternatives.

The Carcass Disposal Team was composed of scientists, engineers and health professionals from a number of State agencies, representing expertise in a wide variety of disciplines related to disease control and disposal issues. The team reviewed and rejected consideration of uncontrolled burial (deer pits) and uncontrolled burning (pyres) as environmentally and socially unacceptable, and ineffective at providing containment or destruction of the disease causing agent (prion). The team identified four viable alternatives for environmentally sound disposal of the carcasses. These are 1) landfilling in a site which meets modern sanitary landfill standards such as engineered liners, caps and leachate and gas collection systems; 2) rendering plants with disposal of the final products (oil and meal); 3) incineration in a controlled system at temperatures sufficiently high to destroy the prion; and 4) tissue digestion with a strong base such as sodium hydroxide (lye). There are a number of sub-options within each category.

**Landfilling.**

In general, landfilling is the most cost effective of the four major alternatives for disposing of deer suspected of having CWD. It also has the advantages of being able to handle large numbers of animals, and the infrastructure for transportation and disposal is already well understood and in-place. One disadvantage to landfilling is that although it is very effective at containing the prions, this method of disposal does not immediately destroy the prion. It is expected that the prions in the landfill will degrade over time, but it is not known how long it would take to completely inactivate all prions. The major disadvantage of this option is the public perception that the prions will escape from the landfill and cause the spread of the disease to humans and deer.

There are three different approaches to landfilling. The first is to use an existing modern sanitary landfill. This alternative is the simplest and least expensive to implement. However, as noted above, there is a perception that prions could escape the landfill through the leachate extraction and treatment systems. Therefore, existing landfills have been reluctant to accept deer from the Intensive Harvest Zone. The second method is to use an existing sanitary landfill but restrict the area used for deer disposal so that any leachate collected from this area can be handled separately. This reduces the concern that prions could escape through the leachate extraction and wastewater treatment system. However, it increases the cost and introduces a number of operational concerns that could be counter productive to the containment of the prions. The third method is to build a landfill dedicated to deer carcasses. Unlike a deer disposal pit, this landfill would be fully engineered with all the environmental safeguards required of modern sanitary landfills (liner, leachate collection system, etc.). The extracted leachate would be low in volume and could be solidified on-site and reintroduced into the landfill, creating a closed loop system. This alternative could be designed for the number of carcasses expected and expanded as future needs dictate.

**Rendering.**

Rendering is a process in which animal tissues are cooked at specific temperatures for set time periods. The final products of rendering are water, tallow (fats portion) and meat & bone meal (protein portion). Generally when deer and deer tissues are rendered a ratio of four parts of other animal material to one part deer tissue is required. For the type of rendering conditions found in Wisconsin it is estimated that a 10 to 100 fold reduction of infectivity might be achieved. Studies of scrapie and BSE have demonstrated that both of these TSE agents can, to some degree, survive a variety of rendering processes. Because the tallow and bone meal could contain

prions, they would need to be disposed of rather than marketed in animal feed or as a fertilizer. No studies have examined the water portion, however based on current knowledge about prions, it could be expected that prions might be found in the water portion if there was protein to which they could "stick". Filtering solids from the wastewater prior to discharge to a wastewater treatment plant would greatly reduce the potential for prions to escape the process.

**Incineration and Heat Inactivation.**

Incineration is a proven technology for disposing of TSE-infected animal carcasses. It has been used in North America as well as in Europe. The scientific studies examining the temperatures at which incineration eliminates infectivity are, unfortunately, highly variable. Two studies demonstrate this point. Taylor et al. (1996) using the ME7 strain (mouse adapted scrapie) brain macerates found that infectivity could not be recovered after one hour at 200$^{o}$C.

In contrast, Brown et al. (2000) using brain tissues from hamsters inoculated with the 263K strain of scrapie (a very high titer, resistant strain) found that exposure to 1000$^{o}$C (dry heat) was necessary to eliminate transmissions. For direct incineration of carcasses the European Union recommends a temperature of 850$^{o}$C or above for at least two seconds.

There are two sub-options for incinerating carcasses. The first is to use a controlled furnace which is equipped with a primary and secondary combustion chamber. This includes pathological incinerators and animal crematories. These units are generally expensive and have a limited throughput (making it difficult to handle large numbers of animals), but are able to effectively meet the temperature criteria listed above. The second method is to use an "air curtain destructor". This is a combustion unit consisting of an open topped pit or combustion box with a fan mounted along the length of the box. The unit is fueled with wood and the fan serves to provide oxygen as well as provide a curtain of air over the open top of the box to prevent the escape of smoke and unburned particulates. This method has been used in a number of other states for burning CWD carcasses as well as animals with other diseases. The drawback to this method is that it is extremely difficult to operate reliably since wind, rain and loading operations will disrupt the curtain and allow smoke to escape. It is also very difficult to maintain consistently high temperatures throughout the combustion box, and there is no secondary chamber to burn organics escaping with the flue gas.

**Tissue Digestor.**

Although commonly called a digestor this method of carcass disposal is based on alkaline hydrolysis. The basis of this technology is the use of sodium or potassium hydroxide solutions under pressure and at elevated temperatures (~150$^{o}$C) to hydrolyze proteins into peptides and amino acids. As TSEs are caused by a protein, the prion protein, this technology is ideally suited for inactivation and disposal of infected animals and tissues derived from them. USDA APHIS and Health Canada have purchased units for use in inactivation of prion-contaminated biological materials. USDA used the unit to destroy the "Vermont sheep" (sheep imported from Belgium infected with a TSE of unknown foreign origin), but is holding the output until the results of a UK government sponsored study become available. Another unit has been purchased by Colorado State University for use at the veterinary diagnostic laboratory.

The limitations of this technology are its relatively high cost and limited through put. In addition, the digested material is extremely high in BOD and requires dilution when introduced to a wastewater treatment plant. The digestor's best attribute is that it is a proven destroyer of prions.

**Current Activities.**

The DNR's first choice for disposal of deer was at existing landfills, based on their low risk of spreading the disease and their low relative cost. However, because none of the existing landfills were willing to accept deer from the intensive harvest zone, the crematorium continues to be used. This is a safe, but relatively more expensive option. Existing landfills are willing to accept carcasses that test negative for CWD, so storage until the test results are available will allow the DNR to utilize its primary choice of alternatives for the majority of the

carcasses. Existing landfills will be utilized for all areas outside of the intensive harvest zone.

***Intensive Harvest Zone*.** All deer killed (both hunter kills and car killed deer) in the intensive harvest zone during the summer of 2002 were collected by DNR at the three registration stations within the zone and transported to the Midwest Crematorium Services, Inc facility for incineration. Because this facility does not have adequate throughput to handle the number of deer expected during the fall hunt, the DNR contracted with Wiebke Fur Co. of LaCrosse to transport and cold store the carcasses. The hides will be removed for tanning and the carcasses will be tagged, wrapped in plastic, flash frozen and stored until test results from the sampling program are received. Those deer that test positive for CWD will be sent to the crematorium and those that test negative will be sent to an existing sanitary landfill for disposal. Car killed deer, deer heads from the sampling program and butcher waste will continue to be sent directly to the crematorium.

**Management Zone.** DNR will establish a number of collection sites (approximately one per county) within the zone for hunters to drop off unwanted carcasses and butcher waste. All carcasses collected within the management zone (car killed deer, carcasses from hunters who choose not to keep their deer, butcher waste, and deer heads from sampling by DNR) will be contracted for transport and disposal at a sanitary landfill. Carcasses may also be disposed of by individuals at landfills or on their own property.

**Remainder of the State.** DNR will not be collecting any carcasses outside the two zones except for car killed deer and deer heads from the sampling program. These will be disposed of through contracts at sanitary landfills. Individuals will dispose of their butcher waste either through a local waste hauler to a sanitary landfill or on their own property. Meat processing facilities which previously sent their scraps to a rendering facility (the rendering companies in Wisconsin have not been willing to accept deer since CWD was discovered) will likely switch to a sanitary landfill.

**Proposed Future Activities.**

The DNR proposes a three pronged approach to carcass disposal after the end of the winter hunting season (January 31, 2003).

- All visibly sick deer will be disposed of by incineration in a unit with a primary and secondary combustion chamber capable of maintaining temperature and flue gas retention time sufficient to destroy any prions which may be present in the deer. Although the risk assessment for landfilling prepared by DNR and DHFS predicted a very low risk for landfilling carcasses with CWD, the carcasses of animals in the later stages of the disease will have the greatest prion loading and their removal to an incinerator will significantly reduce the already low risk of landfilling carcasses.
- The primary disposal option for deer that do not exhibit visible signs of the disease will be at existing sanitary landfills. Landfilling the deer is a very low risk and is the least expensive and simplest alternative. Operational guidelines (immediate covering, placement that maximizes the travel distance to the leachate collection system) can be established to further reduce any risk associated with landfilling.
- A number of locations around state should be established for dedicated animal carcass disposal purposes. The sites would be designed and the siting process completed, but not constructed until the sites were needed. These sites would provide a back up option in those cases (as occurred with the initial CWD outbreak) where existing landfill operators are unwilling to accept the carcasses. The sites would also provide a means of addressing other emergency animal disease situations such as foot and mouth disease, where swift action is necessary once the disease is identified.

**Risks.**

The risks of using existing landfills and incinerators for the disposal of carcasses would be very limited. These disposal methods have been used for many years for general animal carcass disposal and will continue to be used for the foreseeable future. No adverse impacts have been identified. The fact of now having carcasses that may be infected with CWD does not significantly change the situation. The risk assessment performed by DNR and DHFS concluded that landfilling of CWD-infected deer does not pose a significant risk to human health and that the risk of spreading CWD among Wisconsin's deer population by landfill disposal of infected carcasses is

quite small. The greatest impact of using existing landfills is the public perception that they may not adequately contain the disease causing agent. A public education and outreach effort is the best method of correcting this misperception.

The effects of establishing dedicated animal carcass landfills for emergency disposal purposes will have a somewhat greater impact for those who are in the direct vicinity of their location. However, these dedicated landfills would be required to follow the landfill siting process that provides for significant public input and technical review. From a statewide perspective, these sites would be expected to be few in number and extremely small in size compared to existing sanitary landfills, and would not be constructed unless necessary to address a disease outbreak. The positive effect of preparing ahead for a disease outbreak is that it will allow an environmentally safe alternative to be implemented quickly, in situations where time is critical.

**Literature Cited.**

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***Environmental Impact Statement***
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# APPENDIX D

# Chronic Wasting Disease Management Questionnaire

3097 Total Responses Entered

Chronic Wasting Disease (CWD) is an infectious disease that was recently discovered in western Dane County and eastern Iowa County. It threatens deer and deer hunting in Wisconsin. Hunters will be asked to play a major role in controlling this disease. Special hunting regulations in the CWD management area will be brought to the public for input at various meetings. The Natural Resources Board will be asked to adopt an emergency rule on CWD hunting regulations at their June meeting. Your feedback on this form will be helpful to the DNR and Natural Resources Board as they make tough decisions about controlling CWD.

**Return this questionnaire at the meeting you are attending, or send it to: Bill Vander Zouwen, WM/4, Box 7921,**

**Madison, WI 53707.** (See map of CWD Core/Surveillance Area and CWD Management Zone to answer this questionnaire)

**1. Survey Source:** Please check where you obtained this questionnaire (CHECK ONE):

| | | | |
|---|---|---|---|
| 558 | Mount Horeb meeting | 961 | Waukesha meeting |
| 144 | EauClaire meeting | 385 | DNR website: *www.dnr.state.wi.us/org/land/wildlife/whealth/issues/CWD/* |
| 206 | Rhinelander meeting | 501 | Other_____ |
| 342 | Green Bay meeting | | |

**2. CWD Management Philosophy:**

(a) Do you consider CWD a serious threat to deer and deer hunting in Wisconsin?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2890 | Yes | 140 | No | 48 | No opinion | 19 | No Response |

(b) Do you believe that CWD must be managed aggressively?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2758 | Yes | 184 | No | 100 | No opinion | 55 | No Response |

**3. CWD Core Area and Management Zone Deer Herd Reduction Strategy:**

(a) **Core Area (see map):** To reduce transmission and spread of CWD, do you believe it is reasonable to try to quickly reduce the deer herd by at least 90% near locations where CWD-positive deer were found?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2518 | Yes | 369 | No | 146 | No opinion | 64 | No Response |

(b) **Management Zone:** To reduce the chance of spread of CWD to other areas of the state, do you believe that it is reasonable to try to quickly reduce the deer herd 50% below current levels in deer management units within 30-40 miles of the CWD-positive deer (it is not uncommon for young bucks to disperse 10 miles or more in a year)? (Note: this larger buffer zone would be called the CWD Management Zone and is proposed to include deer management units 54B, 70, 70A, 70B, 70G, 71, 73E, 75A, 75C, 75D, 76, 76M, and 77A)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2263 | Yes | 494 | No | 260 | No opinion | 80 | No Response |

**4. Baiting and Feeding Restrictions:**

(a) Do you believe that baiting for hunting purposes should be banned in the CWD Management Zone to try to reduce contacts among deer and spread of CWD?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2577 | Yes | 375 | No | 123 | No opinion | 22 | No Response |

(b) Do you believe that deer feeding should be banned in the CWD Management Zone to try to reduce contacts among deer and spread of CWD?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2647 | Yes | 295 | No | 117 | No opinion | 38 | No Response |

**5. Carcass Disposal:**

(a) Do you believe there should be a rule requiring all unused parts of deer (excluding guts) killed in the CWD Management Zone to be land-filled or rendered?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2265 | Yes | 397 | No | 359 | No opinion | 76 | No Response |

(b) Do you believe there should be a rule requiring that only antlers, hides, and venison could be removed from the CWD Management Zone?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1973 | Yes | 611 | No | 427 | No opinion | 86 | No Response |

**6. Gun Hunting Season Length:** To maximize hunter opportunities to shoot deer, do you think there should be a long gun deer hunting season such as the proposed October 24 to January 31 in the CWD Management Zone (note: archery equipment and muzzleloaders could be used during this period; blaze orange would be required for all hunters except waterfowlers)?

2301 Yes 594 No 165 No opinion 37 No Response

**7. Firearm Restrictions:** Do you think hunters should be able to use rifles anywhere within the CWD Management Zone to maximize deer shooting opportunities?

1752 Yes 1046 No 278 No opinion 21 No Response

**8. Landowner Shooting Permits:** Do you think that DNR should issue permits to landowners, similar to the agricultural damage shooting permits, allowing landowners and hunters who have their permission to shoot deer year round in the core area?

2553 Yes 386 No 113 No opinion 45 No Response

**9. Permit System:** Which of the following do you support for encouraging hunters to shoot more deer than normal in the CWD Management Zone?

(a) Unlimited either-sex deer permits

2001 Yes 524 No 162 No opinion 410 No Response

(b) Either sex 1st tag plus unlimited antlerless only tags and additional buck tags for each antlerless deer shot by a hunter?

1055 Yes 681 No 289 No opinion 1072 No Response

(c) Unlimited antlerless deer tags and hunter can earn a buck tag for each antlerless deer shot

981 Yes 800 No 279 No opinion 1037 No Response

(d) Unlimited antlerless deer tags and hunter can earn buck tags by shooting multiple antlerless deer

959 Yes 811 No 286 No opinion 1041 No Response

**10. Recreation Conflict Resolution:** Do you believe that DNR's policy on conflicts between deer hunting and other types of recreation in the CWD Management Zone should be to resolve these conflicts in favor of deer herd control for disease management?

2453 Yes 301 No 232 No opinion 111 No Response

**11. What unit have you done most of your deer hunting in recently? Unit _____**

(skip this question if you don't hunt deer in Wisconsin)

**12. Do you own 10 acres or more of land in the:**

(a) Core Area (near CWD positive-deer locations)

201 Yes 2735 No 161 No Response

(b) 13 deer management unit CWD Management Zone

404 Yes 2492 No 201 No Response

**13. Your intentions for the 2002 Hunting Season:**

(a) If you are a hunter who normally hunts near (within 10 miles) the CWD positive deer locations (see map), will you help control CWD by trying to shoot more deer than usual in this area?

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 573 | Yes | 133 | No | 222 | Not sure yet | 2072 | Not applicable to me | 97 | No Response |

(b) If you are a hunter who normally hunts in the larger proposed CWD Management Zone, but outside the Core Area, will you help control the spread of CWD by trying to shoot more deer than usual in this Zone?

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 770 | Yes | 144 | No | 337 | Not sure yet | 1685 | Not applicable to me | 161 | No Response |

**14. Testing for CWD in hunter-killed deer:**

(a) Testing capability is expected to be limited compared to demand due to limited lab capacity, limited numbers of qualified pathologists, and limited funds. Actual test cost may exceed $100.00 per deer, but some of the costs may be subsidized. Would you be willing to pay a lab fee to have your deer tested?

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1261 | Yes | 632 | No | 753 | Not sure yet | 370 | Not applicable to me | 81 | No Response |

(b) What is the most you would pay to have a deer tested? Average~ $30

**15. Control Measures Beyond Hunting:**

(a) Hunting alone is not expected to reduce the Core Area population low enough to stop the spread of CWD. To help control the spread of CWD, do you support using control measures beyond hunting seasons and permits to reduce the herd in the Core Area (for example, DNR or USDA sharpshooters with permission of landowners)?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2497 | Yes | 350 | No | 189 | No opinion | 61 | No Response |

(b) Do you support efforts to control deer numbers as soon as possible and prior to the hunting season in the Core Area (for example, landowner permits and DNR/USDA sharpshooters)?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2535 | Yes | 349 | No | 152 | No opinion | 61 | No Response |

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# APPENDIX E

**CWD Rule Fiscal Estimate.**

**Fiscal Estimate - 2001 Session**

## WM-05-03 Fiscal Estimate: Assumptions used in arriving at the fiscal estimate

This fiscal estimate is created based on the department's current knowledge of the distribution of CWD positive deer in the state. These estimates could change significantly if new positives are found in other parts of the state.

## Increased Costs Details



## 1. Carcass Disposal:

Based on the figures for the 2002 deer season statewide and in the CWD zones, we anticipate similar numbers to be generated for the 2003 seasons.

**Anticipated Herd Reduction Zone and Outstate Disposal Costs**

| | Number of Carcesses | Cost |
|---|---|---|
| Carcasses directly landfilled | 2,000 | $20,000.00 |
| Carcasses picked up at off times | 4,000 | $80,000.00 |
| carcesses disposed of in dumpsters | 10,000 | $150,000.00 |

| | | |
|---|---|---|
| Outstate head disposal costs | 28,000 | $35,000.00 |
| **Total** | | $285,000.00 |

| **Anticipated Intensive Harvest Zone and Eradiscation Zone Disposal Costs based on 10,000 deer** | |
|---|---|
| Shipping Cost | $314,050.00 |
| Storage Cos | $440,000.00 |
| Cremation Cost | $29,700.00 |
| Landfill Cost | $26,675.00 |
| Misc. Disposal Cost 1 | $433,500.00 |
| Other Misc. Costs 2 | $65,000.00 |
| **Total** | $1,308,925.00 |

**Anticipated grand total for statewide carcass disposal $1,593,925**

---

## 2. Aerial Operations:

The costs associated with supplies, staff and flight time if the department contracts with USDA -wildlife services to conduct aerial shooting and herding of deer in the eradication zone and the cost associated with the aerial surveys to estimate remaining deer populations in the CWD zones.

| **Aerail Gunning and Herding:** | |
|---|---|
| APHIS Staff: | $206,774 |
| Aircraft (20 hours/week for 12 weeks x 2 helicopters x $700 / hr.): | $336,000 |
| Materials and supplies: | $254,548 |
| **Total:** | $797,322 |

| **Aerial Surveys:** | |
|---|---|
| DNR Staff (6 FTE's x $21.63/hour x 3 weeks) | $15,574 |
| Aircraft (35 hours/week for 3 weeks x $600/hr.) | $63,000 |
| Materials: | $10,000 |
| **Total:** | $88,574 |

**Anticipated totals for aerial operations:**
**Salary and Fringe: $15,575**
**Materials and Expenses: $870,322**

---

## 3. CWD Deer Hunts:

The costs associated with the implementation of the expanded deer hunt in the CWD intensive harvest and herd reduction zones assuming only the current zones are affected and new zones are not created:

**Law Enforcement**: The additional hunts will require 8 additional hours per pay period for each of the 26 wardens in the South Central Region. Added to this would be any necessary meals, miles, etc.

With an average salary of about $25, with an additional $10 for benefits and fringe, this works out as follows:

26 Wardens x 8 hours/pay period = 208 hrs/pay period x 10 pay periods = 2080/hrs x $35/hr salary and fringe = **$72,800** salary and fringe. In addition, there will be the added cost of approximately **$8,840** meals and **$9,486** in mileage (meals and miles based upon previous cost estimates for CWD efforts).

**Wildlife Management**: The costs associated with the implementation of the new CWD deer herd control hunts including the testing and permit issuance during the extended season at registration stations will result in an additional staff time including the use of an LTE's, as well as mileage and other equipment expenses.

10 LTE's x 20 hours/week = 200 hours x 10 pay periods = 2000 hours x $10/hour = **$20,000**

10 hours of overtime / pay period x 75 (50% of the wildlife staff) = 750 hours x 10 pay periods = 7, 500 hours x $28/hour (salary and fringe) = **$210,000**

Meals, mileage and other 1614 appropriations based on the first 14 weeks of CWD operation expenditures (~ $12,000 / wk): 20 weeks x $12,000 = **$240,000**

An additional cost will be the production of a regulation pamphlet to explain the CWD special hunt framework regulations and requirements.

Regulation Pamphlet 550,000 x $ .02 = **$11,000**

**Customer Service and Licensing**: The production of special permits associated with the implementation of the special CWD hunts.

| **Est # Special Carcass Tags** | |
|---|---|
| (200k EAB, 100k Antlered, 15k Disease Replacement) | 315,000 |
| Cost per form | $0.075 |
| | **$23,625** |

An additional cost will be the time required by staff to answer CWD related questions and issue the special permits.

| | |
|---|---|
| Equivalent FTE positions | 10.1 |
| (Assuming SCR&CO staff @15% and NOR,WCR,NER,SER staff @ 5%) | |
| Average Annual CS Salary (not including benefits) | $29,200.00 |
| | **$294,920.00** |

**Parks and Recreation**: Signage and maps will need to be produced for the 8 state park properties where expanded herd control measures will be in effect.

Supplies and Services: Printing or updating Maps, Signs, Permits and Instructions:
$500.00 for 8 other parks which have previously been open to deer hunting ($500x 8) = **$4,000**

Supplies and Services: Vehicle Maintenance and Expenses for Increased Patrol
$1,000 per park x 8 = **$8,000**

Salaries and Fringes - $30 per hour: Determination of Hunting Boundaries, Preparing/Revising Maps and Signs, Posting Signs 16 hours 8 parks which have previously been open to deer hunting (16 x 8 x $30) = **$3,840**

Salaries and Fringes - $30 per hour: Distributing Permits, Law Enforcement, Admitting Hunters to Park and/or Documenting Permits 4 hours per park per day x $30 per hour x 8 x 38 days (based on the average number of days all 8 parks will be open to hunting) = **$36,480**

**Anticipated grand total for hunting season implementation**
**Salary and Fringe: $637,240**
**Materials and Expences: $304,951**

---

## 4. Eradication Zone Efforts:

The printing and issuance of permits, sharp shooting, carcass collection and registration are all areas where staff time and resources will be required.

Permit issuance and landowner contacts = 10 perm. employees x 10 additional hours/pay period x 4 pay periods = 400 x $28 / hour = **$11,200** salary and fringe.

Sharp shooting = 12 perm. employees x 20 additional hours/pay period x 14 pay periods = 3,360 x $28 / hour = **$94,080** salary and fringe.

Carcass pick-up crews = 8 perm. employees x 20 additional hours/pay period x 4 pay periods = 640 x $28 / hour = **$17,920** salary and fringe.

**Baiting crews =**

| | |
|---|---|
| 180 tons of bait @ $200/ton | **$36,000** |
| Vehicle Mileage - 100,000 miles @ $0.30/mile | **$30,000** |
| Salary and Fringe - 20 FTEs x $21.63/hr. in salary and fringe x 8 weeks | **$138,432** |

Registration Stations = 16 perm. employees x 20 additional hours/pay period x 4 pay periods = 1,280 x $28 / hour = **$35,840** salary and fringe.

Meals, mileage and other 1614 appropriations based on the first 14 weeks of CWD operation expenditures (~ $12,000 / wk): 11 weeks x $12,000 = **$132,000**

Baiting and Feeding Enforcement: Respond to and investigate violations pertaining to the statewide ban on baiting and feeding. The new regulations will require approximately 8 FTE worth of effort statewide for Law Enforcement wardens.

2080 hours (1 FTE) x 8 x $35/ hour (salary and fringe): **$582,400**

Miscellaneous materials including ammunition, office supplies and field equipment: **$40,000**

**Anticipated grand total for eradication zone activities**
**Salary and Fringe: $879,872**
**Materials and Expenses: $238,000**

---

## 5. Decreased Revenue Details:

There will be a loss in revenue stemming from the absence of bonus permit sales in the CWD zones.

Est # of OTC Bonus Sales lost (assumed 50% loss in

| | |
|---|---|
| split units) | 24,048 |
| Dollar figure assumes 4:1 ratio of Resident: Non-resident sales | $13.60 |
| | **$327,052.80** |
| Est # of Bonus Sales lost thru mail (assumed 50% loss in split units) | 22,570 |
| Dollar figure assumes 4:1 ratio of Resident: Non-resident sales | $13.60 |
| | **$306,952.00** |

We assume that the loss in hunters was a product of some apprehension on behalf of our hunters who chose to sit out the year until statewide test results are returned. If CWD is confined to the south central part of the state we can assume that license sales will return to pre CWD levels. Even if we do not recover the lost hunters, we do anticipate the loss to stabilize and the hunters that purchased a license in 2002 will again purchase licenses into the future.

**Anticipated total loss in revenue $634,004.80**

**Fiscal Estimate Worksheet - 2001 Session**

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# APPENDIX F

**Tribal Harvest Allocations and Seasons.**

In 1983, the 7th Circuit Court of Appeals determined that the Wisconsin Bands of Ojibwa Indians (referred to hereafter as Chippewa Tribes) retained their rights to hunt, fish, and gather living natural resources, including the right to hunt deer, under the Treaties of 1837 and 1842. These rights apply to public lands within the ceded territories of northern Wisconsin, and include all or parts of 63 Deer Management Units (DMUs) within all deer management regions except the southern portion of the state. In 1990, Judge Barbara Crabb ruled that the system the tribes use to monitor and limit harvest was adequate to protect the resource and the tribes were determined to be self-regulatory.

Among the rulings of the Court was that "the tribal allocation of treaty resources is a maximum of 50% of the resource available for harvest" (Great Lakes Indian Fish and Wildlife Commission 1991). The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) is an inter-tribal, natural resource management organization that acts under delegated authority from its member tribes in the implementation and protection of treaty rights in the ceded territories. GLIFWC biologists participate with Wisconsin Department of Natural Resources (Wisconsin DNR) in the deer harvest quota setting process each spring. Tribal harvest declarations for each DMU in the ceded territory are issued by the Voigt Intertribal Task Force by June 15 each year. These declarations are based on the number of antlerless deer available for harvest and the tribal assessment of their need for deer. The number of deer available for harvest is the combination of the biological firearms quota plus the predicted non-tribal bow antlerless deer harvest for the coming season. The Wisconsin DNR adjusts the state antlerless deer quota available for each DMU in the ceded territory by deducting the number of antlerless deer anticipated to be harvested by the tribes.

The off-reservation deer hunting season occurs from the day after Labor Day through December 31st. Both firearms and archery seasons occur simultaneously, and all deer harvested are required to be tagged and registered. Antlerless deer harvest is controlled through a permit system which can close individual DMUs to tribal harvest when the quota has been achieved.

During the fall of 1990, the first post-Court ruling off-reservation deer hunting season took place, although not all Chippewa bands participated. The first fully-implemented off-reservation tribal deer season took place in 1991.

Tribal hunting has little overall impact on the statewide deer resource. Hunting takes place only in the ceded territories of northern Wisconsin. Within this area, deer harvest is scattered and minimal when compared to that of non-tribal hunters. Furthermore, tribal hunters rarely kill their declared harvest objectives. The reason is that when 75% of a DMU's antlerless quota is achieved, it becomes increasingly difficult to administer the program. Remaining below 75% of the declared harvest allows easier access to permits and eliminates the need to call for DMU closures. To avoid this situation, the tribes often make declaration for more deer than they wish to harvest.

The six tribal bands within Wisconsin have declared an average of 6,165 antlerless deer per year since 1997, resulting in an average antlerless harvest of 1,777 antlerless deer (3,286 antler and antlerless). On a local basis, the tribes have rarely achieved their annual harvest declaration in any one specific DMU. The tribal antlerless harvest has averaged 29% of their declared harvest objectives during the 1997-2001 seasons. None of the ceded territory falls within the southern portion of the state where the current eradication and herd reduction zones are located.

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# APPENDIX G

**Wisconsin Agricultural Deer Damage.**

Wisconsin is an agricultural state with nearly half of its 35.8 million acres, 16.9 million acres under cultivation (WLAB 1993, DATCP 1995). State growers produce about $5.4 billion in commodities each year, making Wisconsin the tenth most productive agricultural state in the nation (DATCP 1995). High populations of deer are responsible for 90% of the wildlife crop damage reported in Wisconsin (Wisconsin DNR 1994a). The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) estimated agricultural damage caused by deer in 1983 (prior to the current damage abatement program) at $37 million (DATCP 1984). Wisconsin's deer population is even higher now. In 1993 the U.S. Department of Agriculture (USDA) conducted random damage appraisals in 10 eastern states to determine wildlife damage to corn crops. Wisconsin was found to have the most severe damage among the states sampled, along with the most severe deer damage (Wywialowski 1994). In Deer Management Units (DMU) where overwinter goals are 30 to 35 deer per square mile of deer range, we have been seeing high demands for deer-damage shooting permits and damage losses from deer approaching $150,000 per year per DMU. From 1988 through 1994, 2,469 shooting permits were issued by DNR and 20,718 deer were killed under these permits. Areas of Wisconsin with the highest appraised damage to agricultural crops are in the southwestern, east central, and west central portions of the state where overwinter deer populations have exceeded 25-30 deer per square mile of deer habitat (Stowell 1995).

## Wildlife Damage Abatement and Claims Program, 2001

**By Bryan Woodbury, Laurie Fike, and Andrea Mezera**

**Introduction.**

Each year the Wisconsin Department of Natural Resources (Wisconsin DNR), through the Wildlife Damage Abatement and Claims Program (WDACP), provides damage prevention assistance and partial compensation to farmers when wild deer, bear, geese and turkeys damage their agricultural crops. The program covers damage to the following: commercial seedings and crops grown on agricultural land, crops that have been harvested for sale or further use but have not been removed from the agricultural land, orchard trees, nursery stock, apiaries, and livestock.

Wisconsin has had a wildlife damage program since 1931. The current WDACP was created in 1983 by the legislature, in response to concerns from the agricultural community and with input from farmers, hunters, landowners, and wildlife damage specialists. In 2001, 69 of the 72 counties in Wisconsin participated in the WDACP. Kenosha, Lafayette, and Menominee counties did not participate in the program.

**Methods.**

Abatement assistance and claims appraisal investigations for the WDACP are conducted in accordance with

State Statute 29.889 and Wisconsin Administrative Code NR 19, using methods documented in the WDACP Technical Manual (a copy of this manual can be obtained by writing to: Wildlife Damage Specialist, Bureau of Wildlife Management, WM/4, Wisconsin Department of Natural Resources, PO Box 7921, Madison, WI 53707-7921). County government is responsible for local implementation of the program. During 2001, 43 counties subcontracted 'on farm' services to Wildlife Services, a branch of the U.S. Department of Agriculture—Animal and Plant Health Inspection Service (USDA-APHIS-WS).

**Results.**

Tentatively, Wisconsin DNR will pay 570 wildlife damage claims for damage that occurred during 2001, reflecting $1,853,732 in appraised losses, with $1,565,580 eligible for payment (Table 1). The number of claims filed decreased slightly and appraised losses increased slightly from 2000 (one percent decrease and four percent increase, respectively). In general, the number of claims filed and appraised losses have increased each year since 1993, with the exception of the sharp decline observed between 1997 and 1998 which corresponded with implementation of improved regulations for enforcement of hunting access requirements in 1998 (Figure 1, Table 2). Above average growing and harvest seasons and lower crop prices may have also contributed to the lower numbers observed since 1997. Despite increases observed in each of the last two years, the number of claims filed and total appraised losses in 2001 are still only slightly over 50% of 1997 claims and losses.

Wildlife damage claims were filed in 64 of the 69 counties enrolled in the program in 2001 (Table 1). On average, 8.3 claims were filed (range 0 - 34) and $26,907 in damage was appraised (range $0 - $217,052) in each county enrolled in the program. Both figures are slightly higher than in 2000. Marquette, Columbia, Outagamie, and Marinette counties had the greatest appraised losses from wildlife damage (>$90,000 each) and Marinette, Marquette and Price counties had the most acreage damaged by wildlife (>1000 acres each). Assessed damage in 2001 increased from 2000 levels in 28 counties, and decreased in 37 counties. The largest increases in assessed damage (> $30,000) occurred in Marinette ($125,591 increase), and Door ($49,336 increase) counties.

Assessed damage decreased by more than $30,000 from 2000 to 2001 in Burnett ($30,135) and Marquette ($48,977) counties. The largest numbers of claims (25 or more) were filed in Burnett, Columbia, and Marinette counties. The number of claims filed increased substantially (> 5 claims) from 2000 to 2001 in Door, Marinette, and Trempealeau, counties, and decreased by more than 5 claims in Barron, Bayfield, and Wood counties. Deer damage represented 90% of appraised losses statewide, bear damage six percent, goose damage three percent, and turkey damageone percent. Total deer damage recorded statewide increased four percent from 2000 to 2001 (compared to only a nine percent increase from 1999 to 2000). Statewide goose and turkey damage decrease substantially, by 25% and 21%, respectively. Statewide bear damage increased by eight percent from 2000 to 2001.

Appraised losses from deer damage exceeded $100,000 in Columbia, Marinette, and Marquette counties (Table 1). Deer damage units with very high losses (more than $60,000) were 51A, 63A, 67A, and 67B (Table 3). In these deer management units, the primary crops damaged were corn and soybeans. Statewide, the primary crop damaged by deer was corn (appraised loss $602,485), followed by soybeans, forage crops, other fruits and vegetables, potatoes and orchards (Table 4, Figure 2).

Appraised damage losses from bear were highest in Sawyer county ($58,083), with damage occurring primarily to corn. Appraised losses from geese were highest in Brown ($19,254) county with geese damaging primarily snap beans and forage crops (Table 1). Turkey damage occurred in six counties, and was highest in Marathon county where turkeys caused substantial damage to ginseng (Table 1).

State abatement costs for the program totaled $458,320 in 2001. In 2001, the WDACP built 9, 8ft, high tensile, woven wire fences in seven counties, which collectively measured 6.6 miles in length and cost the program $82,685 (Table 5). An additional $56,018 was spent for temporary fences, $7,787 for repellents, $41,055 for bear fences, and $13,956 for scare devices. The most commonly used abatement measure was deer damage shooting permits. In 2001, we issued 534 deer damage shooting permits across the state under which 4,345 deer were removed (see Agricultural Deer Damage Shooting Permits, 2001). USDA-APHIS-WS provided assistance to the Department in trapping and relocating 354 bears damagin crops, up from 181 bears trapped

and relocated in 2000. State administration costs for WDACP participant counties totaled $871,384 in 2001. In addition to state expenditures on WDACP administration and abatement, an additional $178,086 in administration costs and $24,285 in abatement costs were contributed by the federal government, USDA-APHIS-WS.

An abatement method used for the first time in 2000 was a venison donation program. State statute 29.89 was passed in the summer of 2000, for the first time authorizing the use of WDACP funds to fund processing of venison for donation to food pantries. Three conditions must be met before venison processing can be funded using WDACP funds in a county in any year. First, the WDACP must have adequate funds to fund administration, abatement, and claims costs for the county WDACP before funds can be allotted to venison processing. Second, the county must be enrolled in the WDACP. Third, the deer processed must have been killed in the county during a deer damage management season. This means that a county must have at least part of its area in a Zone T or metro deer management unit to be eligible to participate. In 2001, 48 of 69 eligible counties chose to participate in Wisconsin Deer Donation 2001. In those counties, hunters donated 3,921 deer, and processors processed approximately 176,000 pounds of venison (Table 6). Counties in which hunters donated the most deer were Dane (314), Sauk (297), and Columbia (203). Food pantries distributed this venison to needy people around the state. The cost of the program in 2001 was approximately $244,549. 86% ($210,937) of program costs were for venison processing fees, and the remaining 14% ($33,612) were advertising and administration costs.

'Deer Management for 2000 and Beyond' is a Conservation Congress-led public participation effort to develop a long-term deer management plan incorporating input from all interested stakeholders. One of the seven major foci of Deer 2000 is agricultural damage. The Agricultural Damage Study Group of Deer 2000, which includes several County damage specialists, farmers, hunters, and staff from the DNR and USDA-Wildlife Services, has developed several recommendations which would significantly change th Wildlife Damage Abatement and Claims Program and the Deer Damage Shooting Permit program. For an update on the most recent status of these recommendations, please visit the Deer 2000 website (http://www.dnr.state.wi.us/org/land/wildlife/hunt/deer/deer2000/ ).

**Figure 1.** Trends in the number of wildlife damage claims filed and appraised losses in the WDACP, 1992-2001. Data source: WDACP database.

**Table 1a.** WDACP 2001 wildlife damage claims characteristics by county.

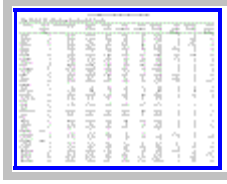

**Table 1b.** WDACP 2001 wildlife damage claims characteristics by county.

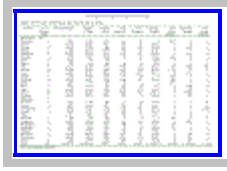

**Table 2a.** WDACP claims filed and appraised damage losses by county, 1995- 2001.

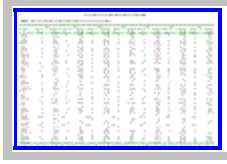

**Table 2b.** WDACP claims filed and appraised damage losses by county, 1995- 2001.

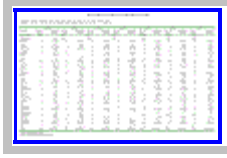

**Table 3a.** 2001 WDACP claims of deer damage, appraised loss from deer damage, and appraised loss by crop from deer damage, by deer management unit. Deer management units not listed had no damage recorded through the WDACP. Because claims sometimes include damage to crops in multiple deer management units, the sum of column two is not equal to the total number of deer damage claims filed in the WDACP in 2001.

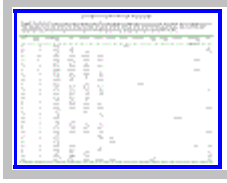

**Table 3b.** 2001 WDACP claims of deer damage, appraised loss from deer damage, and appraised loss by crop from deer damage, by deer management unit. Deer management units not listed had no damage recorded through the WDACP. Because claims sometimes include damage to crops in multiple deer management units, the sum of column two is not equal to the total number of deer damage claims filed in the WDACP in 2001.

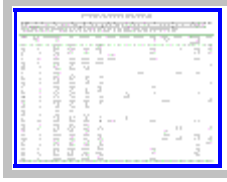

**Table 3c.** 2001 WDACP claims of deer damage, appraised loss from deer damage, and appraised loss by crop from deer damage, by deer management unit. Deer management units not listed had no damage recorded through the WDACP. Because claims sometimes include damage to crops in multiple deer management units, the sum of column two is not equal to the total number of deer damage claims filed in the WDACP in 2001.

**Table 4.** W.D.A.C.P. 2001 statewide deer damage claims summarized by crop category. Note that a claim including deer damage to multiple crops within the same category is counted only once. Because claims often

include damage to crops in multiple categories, the sum of column two is not equal to the total number of deer damage claims filed in the WDACP in 2001.

**Figure 2.** Value of statewide appraised deer damage losses recorded in the WDACP in 2001 by crop category. See Table 4 for a description of the crop categories.

**Table 5.** Eight foot, high tensile, woven wire, deer barrier fence projects installed in 2001. Source: Wisconsin DNR WDACP Database and personal communication with USDA-Wildlife Services and county wildlife damage specialists.

**Table 6.** Numbers of deer and pounds of venison donated through Wisconsin Deer Donation 2001. Numbers of deer are based on phone surveys to participating processors in January 2002. Pounds of venison are estimated, assuming 45 lbs. of venison per deer donated.

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# APPENDIX H

**Economic Impacts of Deer on Forests.**

**Description of Resource.**

Some research has been conducted on the effects that the white-tailed deer can have on forest vegetation. Very little research has been conducted or survey information collected concerning the economic impacts to the forest landowner. The forest landowner may be economically impacted by white-tailed deer, depending upon their goals and objectives for the land. Wisconsin has approximately 14.7 million acres of commercial forest land with an additional 700,000 acres of reserved or non-productive commercial forest land (Spencer et al. 1988). The forest landowners in the state of Wisconsin vary greatly, as do their reasons and responsibilities for owning the land. For the purpose of this section, the discussion and analysis will focus on the potential economic impacts of deer on desirable forest trees for commercial forest landowners. Commercial forest land is defined as forest land producing or capable of producing crops of industrial wood and not dedicated to another use (typically land that is capable of producing 20 cubic feet of wood/acre/year).

**Evidence of Effects.**

Economic impacts of deer on forest vegetation focus primarily on the foraging of plants, although antler rubbing on high value forest "crops" such as Christmas trees can have significant economic impacts (Jones 1984). Significance of forage effects for any landowner would depend upon many variables including their specific land ownership goals and objectives, the forage period (time of year or season), the deer population or concentration foraging the area, and the sensitivity of a plant species to forage including the rarity of the foraged species. It should be noted that although deer forage on seeds (mast) produced by trees, especially in those medium to good oak acorn- producing years (Pils et al. 1981), the impacts of this forage are not known. For example, Hartvigsen (1988) reported in a Connecticut study that consumption of chestnut oak (Quercus prinus) acorns significantly reduced the number of oak seedlings produced at one site, however, this reduction did not appear to influence tree species composition.

There is evidence found in research documenting site specific examples of deer impacts on forest vegetation. In Wisconsin, these impacts may be especially profound where and when deer yarding occurs. For this assessment, site-specific evidence of deer impacts on forest regeneration will be discussed. However, it must be recognized that these site-specific examples do not necessarily reflect an average condition for a larger spatial scale. Research on deer impacts on forest regeneration for individual tree species has been conducted at a larger scale, for example multi-county studies on seedling and sapling development in eastern hemlock (Tsuga canadensis) (Beals and Cottam 1967; Frelich and Lorimer 1985, Alverson et al. 1988; and Anderson and Katz 1992). Trends identified by this research suggest that hemlock regeneration is declining due to deer browse; however, Mladenoff and Stearns (1993) suggest that a combination of landscape level interactions (climate, disturbance, hemlock life history, ecosystem processes, and historic land use) may better describe these forest

regeneration trends. Research quantifying the impacts of deer relative to the various landscape impacts on hemlock or other forest regeneration is not available.

The effects of deer on desirable forest vegetation for a specific site can be detrimental and can create economic losses. Deer can have dramatic effects on vegetation by browsing foliage, terminal and lateral buds and young shoots of trees. Mortality or loss of vigor to trees caused by heavy deer browse can be an economic deterrent to artificial regeneration efforts such as planting trees in certain areas. An example of this impact is in Jackson County (Hess 1991) where economic loss in jack pine (Pinus banksiana) and red pine (Pinus resinosa) plantations has been attributed to deer herbivory. Overwinter deer populations for these areas were targeted and subsequently estimated by the Department of Natural Resources (DNR) at 25-30 deer per square mile. After timber harvest, seedlings planted in 15 plantations between 1987 and 1991 on 1,452 acres in the Jackson County Forest were surveyed for deer browse. Significant losses in 1987-88 in the pine plantations were attributed to drought, but additional losses were correlated to the impact of deer. The report concluded that deer damage accounted for a loss of $23,000 per year within that 5-year tree planting effort totaling $140,470.

Several Pennsylvania studies also discussed concerns over deer herbivory on the natural regeneration of forests. Tilghman (1989) studied the impact of deer at five different population levels at approximately 1, 10, 20, 40, and 80 deer per square mile. Forest regeneration was negatively impacted both in growth and desired diversity with increasing deer populations. Tilghman (1989) recommended that a population of 18 deer per square mile would ensure tree regeneration and desired species composition for these Pennsylvania sites. An earlier regeneration study in 9-22 year-old clearcuts of a variety of hardwoods (Marquis 1981) documented that deer browse resulted in a variety of economic losses including: inadequate tree stocking, a delay in the establishment of natural regeneration, and less valuable tree species composition. This study says that deer populations during the clearcut establishment were approximately 25 deer per square mile ; however, the populations rose to 36-39 deer per square mile during the 1970s suggesting that the higher populations of deer certainly had a negative impact and inferring that populations of 25 deer per square mile may have been detrimental to regeneration at these study sites. Marquis (1981) projected that timber values can be greatly impacted by deer. With a number of stated assumptions, Marquis provided examples where non-fenced stands were projected to lose approximately 50% of their value as compared to the protected, fenced stands.

The statewide impact of white-tailed deer on forest landowners is unknown. Based on the information available, a cumulative approach to assessing the impact of deer on forest landowners and desirable vegetation has not been done.

The next portion of this section will discuss the general forest land ownership using the Statewide Forest Inventory and Analysis (FIA) data and the effects of High, Medium, and Low deer populations on the large forest landowners within the various deer management regions using available research and qualitative information obtained from landowners.

**Northern Forest Region.**

The Northern Forest Region covers 11,530,600 acres or approximately 32% of the state. Forests cover approximately 71% or 8,227,100 acres of this region. This forest acreage represents approximately 54% of the state's total forest land.

Based on the limited information available, the literature cited studied the effects of deer primarily in forested areas. The effects of high deer populations (>20 deer per square mile) may contribute to a decrease of certain species, the mortality of certain valued species, or the loss in vigor and subsequent value of tree species that may be desirable to landowners. This impact can create a potential economic loss to landowners. It must be noted that some of the literature cited may be more applicable to the transitional forest/agriculture matrix found to the south of the Northern Forest.

The Northern Forest has large public ownerships, large industrial ownerships and many private ownerships. Based on discussions with several large landowners and managers, concerns were generally limited for specific sites where the targeted deer population was greater than 25 deer per square mile and a high-valued forest crop

was managed. High-valued crops included plantations and Christmas trees. In areas of deer yarding, many concerns were expressed over natural and artificial regeneration, however, these comments were also very localized. For example, where high-valued Christmas trees were grown, deer damage has been measured by the landowner, and at times these landowners resorted to fencing the land, creating an economic cost.

Medium to Low populations (<20 deer per square mile) of deer in the Northern Forest do not appear to significantly impact desirable commercial forest vegetation and the associated economics for landowners.

**Central Forest, Western Farmland, and Eastern Farmland Regions.**

The analyses for the Central Forest, Western Farmland, and Eastern Farmland Regions are grouped, because this area represents a transitional land use between forest in the north and agriculture to the south. Background information is first being provided followed by the grouped analysis. Analysis are the same concerning how deer may impact the forest landowner although it must be noted that the large forest ownerships decrease in these regions, especially in the Western Farmland.

***Central Forest Region*.** The Central Forest Region covers 2,893,200 acres or approximately eight percent of the state. Forests cover approximately 48% or 1,394,200 acres of this region. This forest acreage represents approximately nine percent of the state's total forest land.

***Western Farmland Region*.** The Western Farmland Region covers 5,580,900 acres or approximately 16% of the state. Forests cover approximately 33% or 1,857,700 acres of this region. This forest acreage represents approximately 12% of the state's total forest land.

***Eastern Farmland Region*.** The Eastern Farmland Region covers 6,215,800 acres or approximately 17% of the state. Forests cover approximately 33% or 2,081,000 acres of this region. This forest acreage represents approximately 14% of the state's total forest land.

Based on the limited information available, the literature cited studied the impacts of deer primarily in forested areas. The effects of High deer populations (>30 deer per square mile), and at times Medium deer populations (16-29 deer per square mile), may contribute to a decrease in value of forest land desirable to landowners. The decrease of these tree species may create a potential economic loss to landowners. The concern over Medium deer populations (25 deer per square mile) was expressed several times by large landowners in these regions, especially where the Eastern and Western Farmland transitioned to the Northern Forest Region. Increased economic losses were discussed in the Eastern and Western Farmland regions with density goals at 25 deer per square mile vs. little reported economic loss in contiguous Northern Forest DMU's with density goals at 20 deer per square mile. Land manager's concerns were usually limited to specific sites where the deer population goal for that DMU was at least 25 deer per square mile and a high-valued forest crop was managed. High-valued crops included forest plantations and Christmas trees. An example of this concern was in Burnett County where 1-3 year old jack pine plantations were heavily browsed (Western Farmland) as compared to similar plantations with less detrimental browse (Northern Forest). The deer population goals were 25 deer per square mile (actual populations estimated at 27.33 deer per square mile) and 20 deer per square mile (actual populations estimated at 23.67 deer per square mile) over the last three years. Landowners didn't express concerns over deer yarding in this region.

Another example of concern associated with a high-value crop in these regions is the planting of red oak seedlings ( Quercus rubra). Where animal herbivory is a concern, including deer browse associated with high populations, the use of plastic tubes over red oak seedlings has been prescribed by foresters for protection against animal browse. Plastic tubes can represent a significant cost.

Low populations (<16 deer per square mile) of deer in these regions do not appear to significantly impact desirable forest vegetation and the associated economics for landowners. One large tribal land manager commented that deer densities estimated between 7-12 deer per square mile had no significant impacts on forest regeneration.

**Southern Farmland Region.**

The Southern Farmland Deer Management Region totals 9,717,300 acres or approximately 27% of the state. Forests cover approximately 18% or 1,791,300 acres of this region. This forest acreage represents approximately 12% of the state's total forest land.

In the Southern Farmland, there is very little information available concerning the impacts of deer on forest landowners. The acreage of forest land greatly decreases in the south as do the large land ownerships. The impacts of deer on forest landowners for any particular forest site may be similar to the relative impacts of High, Medium, and Low deer population densities found elsewhere in Wisconsin, however, the total impact would be much less due to the decreased amounts of forest land.

**All Regions.**

The economic impacts of white-tailed deer to the commercial forest landowner, and more specifically to the forest industry, certainly changes from northern to southern Wisconsin. Part of this change is due to the fact that the amount of forest land in the state decreases steadily from north to south as do the number of landowners. The large public and industrial ownerships found in the north and central portions of the state are not represented in the south, where the ownership is primarily small, private landowners. Because of this ownership pattern, the direct foraging impacts of deer to forested property is greater in the northern, central and western regions.

**Summary.**

Very little research has been conducted or survey information collected concerning the economic effects of deer on the forest landowner. The actual economic impact is not well studied, and additional surveys and research would be necessary to estimate actual values lost due to deer foraging. The forest landowner may be economically impacted by white-tailed deer, depending upon their goals and objectives for the land. Economic impacts of deer on forest vegetation focus primarily on the foraging of high value forest "crops" such as Christmas tree or fiber plantations. There is evidence documenting site-specific examples of negative economic deer impacts on planted forest vegetation. Several Pennsylvania studies also raised concerns over deer herbivory on the natural regeneration of forests. Generally, economic concerns resulted in these research efforts where deer populations exceeded 25 deer per square mile. In personal communication with large public or industrial ownerships, concerns over deer forage were expressed where populations exceeded 25 deer per square mile , and at yarding sites.

Wisconsin has approximately 14.7 million acres of commercial forest land. The potential economic impact of deer for each deer management region relates directly to the amount of commercial forest land in the region. Generally, the potential impact decreases from northern Wisconsin to southern Wisconsin. The acreage and percent forest coverage within each region is as follows: Northern Forest Region - 8,227,100 acres (71%), Central Forest - 1,394,200 acres (48%), Western Farmland - 1,857,700 acres (33%), Eastern Farmland - 2,081,000 acres (33%), and Southern Farmland - 1,791,300 acres (18%).

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# APPENDIX I

**Vehicle-Deer Collisions.**

The data presented in this appendix were provided for a regional analysis of vehicle-deer collisions, the data is based on data gathered in 1994.

**Description Of Resource.**

In some regions of Wisconsin, where habitats can support over 80 deer per square mile, overwinter population goals are primarily determined by human tolerance. Vehicle-deer collisions are a primary factor in determining just how many deer people will accept.

Accurate counts of total vehicle-deer collisions are not possible, because not all deer carcasses are located and removed from the roads. Some deer continue to travel after being struck and later die away from the road. Others cause little property damage and accident reports are not filed to the Department of Transportation. However, the Department of Natural Resources (DNR) records of carcass disposal provides an estimate of the minimum number of deer hit by vehicles and should approximate trends in the number of vehicle-deer collisions.

Since 1985, Wisconsin motorists have reported an average of almost 36,000 vehicle-deer collisions per year (unpublished). Recent studies indicate that actual figures may be more than double reported figures (unpublished). Costs of property damage and personal injury resulting from vehicle-deer collisions in Wisconsin were estimated at $92 million per year (Hall 1991).

**Evidence of Effects.**

Vehicle-deer collisions throughout the state have steadily increased during recent years. A definite trend has emerged, indicating a relationship between both numbers of deer hit and overall deer population, as well as numbers of miles driven. Research has shown that the number of vehicle-deer collisions is dependent on both the deer density and the overall volume of traffic (McCaffery 1973b). As deer densities increase, the number of vehicle-deer collisions will increase as well, even when traffic volume remains constant. Likewise, when traffic volume increases and deer densities remain constant, vehicle-deer collisions will increase. Decreases in deer density will result in fewer deer hit by vehicles, assuming traffic volume remains constant.

Risk of vehicle-deer collisions has not been reduced by whistles, roadside reflectors, or fencing (Ford and Villa 1993; Dalton and Stanger 1990; Romin and Dalton 1992). The only known way to efficiently reduce deer collision hazards, without reducing traffic, is by reducing deer numbers.

Areas with high human populations and travel often have the highest incidence of vehicle-deer collisions. For example, counties surrounding the Madison, Milwaukee, and Green Bay metropolitan areas have some of the highest frequency of vehicle-deer collisions in the state each year (1.0 vehicle-deer collision per square mile).

These areas contain high levels of commuter traffic, which contribute to the high frequency of vehicle-deer collisions, and also have relatively high deer densities (25-35 deer per square mile) result in many deer-vehicle collisions. Wildlife professionals from the Ohio DNR consider deer goal reductions in similar situations when vehicle-deer collisions exceed 0.5 per square mile (Bob Stoll, Research Biologist, Ohio DNR, pers. comm.).

One 11-county area in South-Central Wisconsin makes up a region that has the highest overwinter deer density goals in the state - 30 or 35 deer per square mile of deer habitat. This area is primarily agricultural range with few major human travel corridors, so it has a significantly lower volume of vehicle traffic than the metropolitan areas previously mentioned. However, in terms of number of deer killed per square mile, this area experiences the highest level of vehicle-deer collisions in the state, leading to the conclusion that the high deer population in this area contributes significantly to high rates of vehicle-deer collisions.

Any increase in deer numbers is expected to result in higher numbers of vehicle-deer collisions, particularly considering that traffic volume is not likely to decline. Similarly, decreases in deer numbers would be expected to result in lower levels of vehicle-deer collisions.

**Northern Forest.**

Deer Management Unit (DMU) goals in this region range from 10 to 25 deer per square mile. This area also receives substantially lower levels of vehicle traffic compared to southern Wisconsin. As a result, fewer vehicle-deer collisions occur here when measured per square mile as well as actual numbers of reported accidents. However, low levels of vehicle-deer collisions are the result of low traffic volumes. If traffic volume were to increase in this region, vehicle-deer collisions would be expected to increase as well.

**Central Forest.**

Much of the area within this region typically sees more than 0.5 vehicle-deer collisions per square mile. Although no major human travel areas fall within this region, two of its boundaries are major highways (I 90-94 and Hwy. 51). With deer goals ranging from 25 to 30 deer per square mile, vehicle-deer collisions would be expected to rise with any increase in overall deer numbers.

**Western Farmlands.**

Deer population goals range from 15 to 25 deer per square mile in this region. Most counties average between 0.5 and one vehicle-deer collisions per square mile. This region also contains several major highway systems, and receives high levels of commuter traffic in the counties east of Minneapolis - St. Paul, Minnesota.

**Eastern Farmlands.**

The combination of high deer population goals (ranging from 20 to 30 deer per square mile) and high levels of commuter traffic results in much of this region having a vehicle-deer collisions rate of more than 1.0 per square mile. The entire region experiences a minimum of 0.5 vehicle-deer collisions per square mile.

**Southern Farmlands.**

In this region, DMU goals range from 10 to 35 deer per square mile of range, and vehicle-deer collisions range from less than 0.5 to over 1 per square mile. Western counties have the lowest incidence of vehicle-deer collisions with few major highways and lower human density, and deer goals ranging from 15 to 25 deer per square mile. Central counties, primarily centering around I-90/94 and the Madison metropolitan area, have deer density goals of 30-35 deer per square mile; more than one vehicle-deer collisions per square mile occur. East-central counties have deer densities goals of 10-30 deer per square mile, but have considerably lower volumes of traffic than counties to the east or west, and therefore, vehicle-deer collisions decrease to between 0.5 and 1 per square mile. Finally, the far eastern counties in the Milwaukee metropolitan area, with deer density goals of just 10-20 deer per square mile have a high incidence of vehicle-deer collisions due to high traffic volume.

**Summary.**

Vehicle-deer collisions have negative impacts on motorists in Wisconsin, resulting in millions of dollars in personal and property damage each year. Increases in deer densities, increases in traffic volume, or both will result in more vehicle-deer collisions. Decreasing deer population goals would be expected to result in reductions in vehicle-deer collisions. Areas of high deer population goals and human vehicle traffic typically experience the highest levels of collisions. The only efficient method of reducing vehicle-deer collisions without reducing the number of miles travelled is to reduce deer numbers.

Vehicle-deer collisions per square mile are generally lowest in those DMUs where deer population goals are less than 25 deer per square mile and traffic volume is low. Such areas typically lie in the Northern Forest region, as well as being scattered throughout other areas of the state. Areas of highest concern are primarily in farmland regions where deer goals equal or exceed 25 deer per square mile, and in metropolitan areas with high traffic volumes. Major travel corridors, such as interstate highways, also have high instances of vehicle-deer collisions.

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# APPENDIX J

**Baiting and Feeding Background – DRAFT 2-05-03.**

**Background.**

Deer baiting is the deliberate placement of food items for the purpose of attracting or habituating deer to a location for the purpose of hunting. Deer feeding activity includes recreational, supplemental, and emergency feeding. Feeding does not include the placement of food and attractants for the purpose of hunting deer. Recreational feeding is done mainly for the purpose of viewing deer. Supplemental feeding normally involves placing larger quantities of food or mineral to augment naturally occurring foods. The purpose may be to attract, concentrate, and hold deer on specific parcels of land or to locally increase carrying capacity for deer and/or antler development. Emergency feeding has involved the deliberate placement of food during unusually severe winters, mainly to mitigate winter losses of deer. References to feeding in this document refer to all forms of feeding unless specified otherwise.

**Baiting.**

Baiting of deer for hunting purposes had been legal in Wisconsin until 2002. But, historic prohibitions on using bait for waterfowl and use of salt for attracting deer may have fostered widespread belief that baiting of deer was illegal. Despite this, low levels of baiting existed in northern areas that had very low deer densities. Growing awareness that baiting was legal led to a rather sudden and widespread increase in baiting during the 1980s and 1990s.

Michigan biologists first documented the magnitude of baiting. A 1984 survey found that Michigan hunters placed 3.3 million bushels of bait at a time when most hunters still believed that baiting was illegal (Langenau et al. 1985). Only seven years later, this amount had increased to 13.1 million bushels (Mich. DNR 1992).

Recent surveys of Wisconsin hunters found that relatively few (13%-16%, Borgerding 1993; 16%, Dhuey and McCaffery 1999, Dhuey 2001) firearm hunters reportedly used bait. The proportion of archers using bait continues to increase as about a third (34%) of archers used bait in 1997 (Dhuey 1998). The proportion increased to 40% in 2001 (Dhuey 2002, Wisconsin DNR 2002). A survey in 1992 found that most (53% to 66% depending on issue) hunters recognized some problems with baiting and only 32% were in favor of allowing baiting for both gun and bow hunting. However, fewer than half favored a baiting ban in all hunting seasons (Petchenik 1993). Disease concerns were not addressed in this survey. Hunter concerns focused mainly on deer behavior and hunting ethics.

**Feeding.**

Prior to the discovery of CWD in Wisconsin, feeding of deer by the public had not been regulated in the state. Recreational feeding of deer by some rural resorts, restaurants, taverns and residents have had a long tradition

of putting food outside of windows to provide close-up viewing of deer. The proportion of Wisconsin's rural residents that feed deer has not been determined, but recent concern for disease transmission in the upper Midwest has forced re-examination of these practices.

Both government agencies and private individuals have provided supplemental food to deer. Private individuals have traditionally been mostly landowner-hunters who wished to increase deer numbers on their properties. The number of private supplemental feeders in Wisconsin has only been locally estimated (Wisconsin Department of Natural Resources unpubl. data), but has likely increased as more rural land has been acquired for residential and recreational uses.

The United States Fish and Wildlife Service has long fed elk at the National Elk Refuge in Wyoming. However, the current Refuge manager has built strong arguments against continuing the practice (Smith 2001). Many state resource agencies have a history of supplemental feeding of deer. For the most part, this occurred prior to the establishment of biologically defensible deer population goals. Wisconsin actively fed deer from the mid-1930s to the mid-1950s with a peak effort in 1950-51 when 1,131 tons were provided (Dahlberg and Guettinger 1956:183). Supplemental feeding and emergency feeding became blurred during this period as deer populations were being maintained at very high levels and winter losses were common. Biologists argued against feeding very early in these programs, (Bartlett 1938 in Michigan; Leopold 1943 in Wisconsin). For the most part supplemental feeding by agencies ended with the advent of better scientific data.

In 1961, Congress enacted Public Law 87-152 authorizing use of surplus grains for alleviating emergency conditions for wildlife. However by 1971, Michigan found it necessary to prohibit use of surplus corn for feeding deer based on "serious nutritional problems," deer management factors, and costs (Arnold 1971).

Pubic opinion during the severe winter of 1983-84 urged Wisconsin DNR to undertake emergency feeding. Reasons for not providing emergency feed included: 1) only a proportion of the distressed deer could be accessed for feeding; 2) of those with access, not all would be saved by feeding; and 3) the expected cost would have approached $120 per deer saved (Miller 1986). With a buck-only hunt expected the following year (less than 10% of herd harvested), the cost per deer added to the hunter's bag was expected to be about $1,200. Still higher costs were reported or implied in later years by Baker and Hobbs (1985) in Colorado and Lenarz (1991) in Minnesota. In Minnesota, only three percent more deer survived in the northern forest region during 1989 than if no "emergency" feeding had been done (Minnesota DNR 1989).

Lacking authority to regulate feeding, the Wisconsin DNR recognized the growing interest in private "emergency" feeding of deer during severe winters. A policy was established to provide technical advice on when, what, where, and how to feed deer during severe winters. This policy did not encourage deer feeding but offered guidance to citizens who chose to feed deer. It discouraged use of corn and hay, and was designed to minimize harmful effects of feeding (Wisconsin DNR 1996). This policy, however, did not address disease concerns. There is broad consensus among deer managers in northern states that feeding should not occur except under extreme circumstances. Colorado reported that "feeding has potential to reduce or prevent game damage and reduce winter mortality, but feeding is not a panacea and has potentially dangerous side effects" (Colorado DNR 1984a).

Historically, circumstances that might justify feeding have ranged from a predicted 30% loss of adult female deer (Colorado DNR 1984b) to local extirpation (Goulden 1983). The greatest proportion of deer killed by malnutrition in northern Wisconsin during the past 40+ years was in 1971 when winter mortality may have approached 30% (Kohn 1975). Adult does, which are the productive part of the herd, normally comprise only a small proportion of winter losses (Dahlberg and Guettinger 1956, Kubisiak, et al. 2001; Van Deelen et al. 1997) as adult females carry more stored fat into winter (McCaffery 1988). Furthermore, occasional winter losses are normal and natural near the northern limit of white-tailed deer range.

The Wisconsin DNR was recently authorized by the Legislature to regulate deer feeding beginning in 2002 in response to controlling CWD (Wisconsin Act 108, Appendix A). This authorization expires on June 30, 2004. This legislation resulted in the passing an emergency administrative rule prohibiting baiting and feeding of deer beginning July 2002. The Joint Committee for Review of Administrative Rules authorized the extension of this emergency rule until April 1, 2003. Any rule on deer feeding will expire June 30, 2004 unless current authority is

extended by the Legislature.

**Baiting and Feeding in Relation to Disease.**

Researchers who have studied CWD epidemics in both captive and free-ranging deer populations have determined that CWD is both contagious and self-sustaining (meaning that new infections occur fast enough for CWD to persist or increase over time despite the more rapid deaths of the diseased individuals; Miller et al. 1998, 2000). Supporting evidence comes from observational data (Williams and Young 1992; Miller et al. 1998, 2000) experimental data and epidemiological models fit to observed prevalences in free-living deer (Miller et al. 2000, Gross and Miller 2001, M. W. Miller unpublished cited in Williams et al. 2002).

Research indicated that deer can get CWD by eating something contaminated with the disease prion. (Sigurdson et al. 1999). Other non-familial TSEs (Kuru, transmissible mink encephalopathy, bovine spongiform encephalopathy[BSE]) appear to be transmitted through ingestion of prion-infected tissue as well (Weissmann et al. 2002). In part because of the human health crisis associated with eating BSE-infected beef in Europe, many other researchers working with transmissible spongiform encephalopathies (TSEs) including CWD (Sigurdson et al. 1999, 2001) have traced the movements of infectious prions of orally-infected animals through the lymph tissue embedded in the intestinal mucosa , into nervous tissues communicating with the digestive tract ( e.g. Maignien et al 1999, Beekes and McBride 2000, Heggebo et al. 2000, Huang et al. 2002) and eventually to the brain via the nervous system (Sigurdson et al. 2001, Weissmann et al. 2002). Experimental studies using hamsters have shown that TSE prions can infect through minor wounds in the skin (Taylor et al. 1996). Moreover prion infection of hamsters through minor wounds on the tongue was much more efficient than infection from ingestion (Bartz et al. 2003). These researchers not only demonstrate that an oral route of infection is possible, they are working toward detailed knowledge of the physiological pathways that convey infectious prions into the nervous system and other organs (Weissmann et al. 2002).

Following oral exposure, infectious prions associated with many TSEs (Maignien et al. 1999, Huang et al. 2002) including CWD (Sigurdson et al. 1999, Miller and Williams 2002, Spraker et al. 2002b) both accumulate and replicate in the lymph tissues associated with the gastrointestinal tract -notably, in lymph tissues in contact with the mucosa lining the inner wall of the intestines ( e.g. Peyer's patches, Weismann et al. 2002). In infected deer, CWD prions also accumulate in the pancreas and various glands of the endocrine system (Sigurdson et al. 2001). Experiments with hamsters demonstrated that infectious prions can travel from the brain to the tongue along tongue-associated cranial nerves (Bartz et al. 2003). During digestion, the liver, pancreas, intestinal mucosa, and other glands secrete chemicals needed for digestion (Robbins 1983) and cells lining the inner surface of the intestine continuously die and slough off providing potential physical mechanisms for prion shedding into the intestines (others are likely). This is evidence that infectious prions are shed in the feces and saliva (Sigurdson et al. 1999).

Disease course and symptoms indicate high potential for contamination of food where deer are concentrated. Appearance of CWD symptoms in an infected deer lags initial exposure by a variable time period on the order of roughly12-24 months or more ([E. S. Williams and M. W. Miller unpublished; E. S. Williams, M. W. Miller, and T. J. Kreeger unpubl.] cited in Williams et al. 2002). Once clinical symptoms start, deer enter a symptomatic phase that may last on average 1-4 months before they invariably die (Williams et al. 2002). Symptoms are subtle early on but eventually may include behaviors likely to contaminate a site with bodily fluids ( e.g. excess urination, excess salivation including drooling and slobbering, and uncontrollable regurgitation, Williams et al. 2002). The fact that deposition of feces increases with concentration of deer activity is both obvious and intuitive and pellet group counts have been used as an index of deer density since the 1940's (Bennet et al. 1940). During winter, northern deer defecate about 22 times a day (Rogers 1987). At least one study (Shaked et al. 2001) has reported detection of an altered form of the infectious prion in the urines of hamsters, cattle, and humans with TSEs. This altered form, while not as virulent, was capable of producing sub-clinical or carrier-state prion infections following experimental inoculation. Shedding of infectious prions is likely progressive during the course of disease from infection to death (Williams et al. 2002). Replication and presence of infectious prions in gut-associated lymph tissue early in the incubation (Sigurdson et al. 1999, Weismann et al. 2002) and epidemiological modeling (M. W. Miller unpubl. cited in Williams et al. 2002) suggest that shedding precedes the onset of symptoms in both elk and mule deer.

In this regard, Garner (2001) documented a particularly alarming behavior among deer using frozen feed piles. Deer used the heat from their mouths and nostrils to dislodge food such that frozen feed piles were dented with burrows made from deer noses. He reported that "Throughout the winter multiple numbers of deer were observed working in and around the same feed piles. I suspect that each deer that feeds this way at a frozen feed pile leaves much of its own saliva and nasal droppings in the field pile at which its working"(Garner 2001, p. 46).

In addition to direct lateral transmision, deer can be infected indirectly from contaminated environments and contaminated pastures "appear to have serves as sources in some CWD epidemics (Miller et al. 1998, [M. W. Miller unpublished and E. S. Williams, W. E. Cook, and T. J. Kreeger unpubl.] cited in Williams et al. 2002). The potential for transmission from the environment is likely a function of the degree of contamination and the resistance of disease prions to chemical breakdown (Williams et al. 2001, 2002a). Consequently, the highest prevalances recorded for CWD outbreaks have been in captive situations (Williams and Young 1980, Williams et al. 2002) where because of abnormal concentration, indirect and direct transmission likely occur together (Williams et al. 2002). At high concentration, the persistence of the CWD prion in contaminated environments, may be a serious obstacle to disease eradication (Williams et al. 2002).

People use baiting and feeding is to concentrate deer for enhanced hunter opportunity or viewing. Provision of artificial food sources encourages unnatural congregation of animals, thereby increasing contact and enhancing the transmission of infectious agents (Barlow 1996). In northern deer, seasonal concentration in deeryards is a well-known phenomenon (Blouch 1984). Artificial feeding interferes with the natural process of yarding and to the extent it does, it is undesirable (Ozoga and Verme 1982). A ban on baiting and feeding would allow deer to return to natural yarding behaviors in severe winters. However, the potential for fine scale contact over a feed pile is fundamentally different than the fine scale contact that yarded deer would get while foraging on natural food. In deeryards, deer eat a variety of woody browse plants and arboreal lichens (Blouch 1984) scattered across a large area. In terms of biomass and nutrition, the best source of browse and lichens may be litter-fall rather than live plant material growing in the understory (Ditchkoff and Servello 1998). Food sources in deer yards (litter and understory plants) are widely distributed over a large area and they are not replaced. Moreover, browse is typically held aloft on the plant stem such that fecal contamination is less likely. Foraging by wintering deer is an optimization process. Energy gains associated with eating need to be balanced against energy costs associated with travel and exposure (Moen 1976). Yarded deer with little or no access to supplemental food maintain relatively large overlapping home ranges (e.g. 110 acres in Minnesota [Nelson and Mech 1981], 480 acres in Michigan [Van Deelen 1995], 318 acres in Quebec [Lesage et al. 2000] ) suggesting that foraging widely on a diffuse food source is normal. Garner (2001) monitored 160 radio-collared deer for 2 fall/winter periods in northern Michigan and documented their behavior over feeding sites using both telemetry and direct observations. He demonstrated that, relative to natural forage, supplemental feeding caused reduced home range sizes, increased overlap of home ranges in space and time and dramatic concentrations of activity around feeding sites. Similarly, Kilpatrick and Stober (2002) indicated that the provision of food increased animal contacts by focusing their activity.

Reduction of contact through a ban on baiting and feeding is disproportionately important to eradicating or containing a CWD outbreak. Epidemiological models fit to real-world data on CWD outbreaks in mule deer predict that local extinction of infected deer populations is likely (Gross and Miller 2001). The predicted outcomes of these models are highly sensitive to input estimates of the amount of contact between infected and susceptible deer meaning that small reductions in contact rates can dramatically reduce the rate at which prevalence changes during an epidemic (Gross and Miller 2001). Garner (2001) demonstrated that baiting and feeding was associated with deer concentration, extensive face-to-face contacts, and increasing overlap of deer home ranges. White-tailed deer have social contacts apart from contact over baiting and feeding sites (Marchinton and Hirth 1984) but social groups tend to be small relative to other deer species and both their physiology and behavior are adapted to selective foraging on nutritious plants (Putman 1988). Moreover, social groups tend to exclude one another (Mathews 1989), thus eliminating the additional direct and indirect contact that occur between groups using baiting and feeding sites (Garner 2001) eliminates a large amount of group-to-group contact that would otherwise occur.

Eliminating these contacts has added significance because CWD is a uniquely difficult disease to manage. There is no treatment and no vaccine. Moreover CWD is difficult to track in a population because of long incubation periods, subtle early clinical sign, a resistant infectious agent, potential for environmental contamination and incomplete understanding of transmission mechanisms. These characteristics make prevention critically important (Williams et al. 2002). Hence, An international panel reviewing CWD management in Colorado emphasized that, "Regulations preventing … feeding and baiting of cervids should be continued" (Peterson et al. 2002).

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***Environmental Impact Statement***
***on Rules to Eradicate Chronic Wasting Disease***
***in Wisconsin's Free-Ranging White-tailed Deer Herd***

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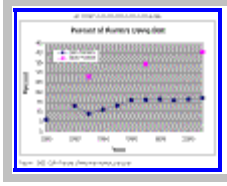
# APPENDIX K

**Potential impacts of a baiting prohibition on Wisconsin hunters.**

***What percentages of Wisconsin hunters use bait?***

Data gathered from the 1990 – 2001 gun deer hunter surveys and the 1993, 1997 and 2001 bow hunter surveys show two differing trends in bait use (Figure 1). Bow hunters exhibited an increasing trend in the number of archers who bait (cur-rently 40%), while gun hunters using bait has held steady at 16% after an increase in bait usage in the early 1990's.

**Figure 1.** 1990 – 2001 Percent of Wisconsin hunters using bait.

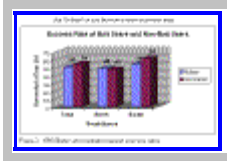


***How does the use of bait affect hunter success?***

Surveys and research conducted in Wisconsin and Michigan are our best sources for answers regarding hunter success relative to using bait.

A survey of hunters conducted in Wisconsin in 1993 found that use of bait did not increase gun hunter's success rates, 50% of bait users bagged a deer compared to 54% of hunters who did not use bait. This pattern was consistent between north and south regions (Figure 2). However, success in bagging a deer during the gun season was affected by the duration of baiting. Hunters who used bait during both gun and bow seasons had somewhat higher success during the gun season (61%) than hunters who did not use bait (55%), or hunters who used bait only during the gun season (43%).

**Figure 2**. 1993 Baiter and nonbaiter harvest success rates.



These results were consistent with a second Wisconsin survey done in 1994 when 7,676 sportspersons were surveyed at the Spring Fish and Wildlife Hearings. Success in harvesting a deer during the gun season was affected by when hunters used bait, earlier and longer baiting improved the hunter's chance of success. Non-bait users had higher success rates (44%) than bait users who baited only during the gun season (35%). However,

52% of hunters who used bait only during the bow season were successful and 47% of hunters who used bait in both the bow and gun seasons were successful.

Surveys during 1998-2001 mailed to 50,000 Wisconsin gun hunters found that use of bait had little effect on success in harvesting bucks or antlerless deer (Table 1). Twenty-nine percent of hunters using bait harvested a buck compared to 26% of hunters who did not use bait. Antlerless harvest success was the same for hunters using bait (33%) as for hunters who did not use bait (33%). In contrast, bait use appeared to affect success of Wisconsin bow hunters. Of the more than 4,700 bow hunters who responded to the 2001 bow hunter survey, 45% of bait users reported killing at least 1 deer compared to 31% of hunters who did not use bait.

Michigan studies conducted over the past 20 years did not show a consistent effect of bait on hunter success. In a 1984 survey, Langenau et al. (1985) discovered that hunters who used bait were only slightly more efficient in harvesting deer (2.4 deer per 100 days) than those who did not use bait (2.2 deer per 100 hunter days). In 1992, Winterstein (1992) reported that hunters using bait were 20 percent more effective in harvesting deer (3.8 deer harvested per 100 days of hunting) than those who did not use bait (3.1 deer per 100 days of hunting). In contrast, a 1999 phone survey conducted by the Michigan DNR reported that in a specific deer management area in northeast Michigan 44 percent were successful using bait, while 52 percent were successful without bait. In the most recent Michigan study, archers who baited were more efficient in harvesting deer (4.9 deer/100 days) than non baiting archers (1.8 deer/100 days), but little difference was seen between baiting (8.3 deer/100 days) and non-baiting (7.4 deer/100 days) firearm hunters.

***What impact would a ban on baiting have on the deer harvest?***

Given the apparent higher success rate of archers who bait, a logical question to ask is will an elimination of bating lead to a major reduction in the antlerless harvest making it more difficult to control deer populations? To answer this question, we can take a look at the antlerless bow kill in the Northern Forest during 2001. Because the differences in success rates for gun hunters who use bait and those who do not is so small and statistically insignificant, it is not necessary to conduct the same calculations for gun hunters (Table 1).

**Table 1.** Responses to Baiting Questions from the Gun Deer Survey 1998-2001.

From the 1997 bow hunter survey, we can estimate that 24% of bow hunters hunted in the Northern Forest. The total number of bow licenses sold in 2001 was 257,571. Assuming a similar distribution of bow hunters as in 1997, we would estimate there were 61,800 Northern Forest bow hunters in 2001.

The 2001 bow hunter survey found that 40% of bow hunters used bait and 60% did not use bait. Assuming that bait use is uniform among regions, we can estimate that there were 24,720 baiters and 37,080 nonbaiters among Northern Forest bow hunters. Also, 23.9% of baiters reported killing at least 1 doe compared to 14.2% of nonbaiters.

Using this information we can calculate that baiters killed 7,169 antlerless deer and that nonbaiters killed 6,304 antlerless deer for a total antlerless bow kill of 13,473. If we assume that the success rate for bow hunters who use bait would drop to the nonbaiter success rate if baiting was banned, then we would estimate that the antlerless bow kill would decrease from 13,473 to 10,506. This would amount to a 22% reduction in the Northern Forest antlerless bow harvest.

While this is a significant reduction in the antlerless bow harvest, it is important to consider this in the perspective of the total antlerless harvest. In 2001, the antlerless bow kill amounted to 17% of the total antlerless harvest in the Northern Forest. Therefore, if there was no compensatory increase in the antlerless gun kill the reduced bow

kill would only result in a 4% reduction in the total antlerless kill in the Northern Forest.

***How much bait is used in Northern Wisconsin?***

This question has never been asked in one of the DNR's surveys, and the issue is open for discussion. However, for the purpose of this document, we will use the information we know about the Wisconsin deer hunter and provide a list of assumptions and information from other states to provided a conservative estimate of the number of bushels used by our hunters.

Based on data from the 2001 deer bow hunter questionnaire we can estimate that there were approximately 24,720 hunters in the Northern Forest who used bait during the archery season and that on average archers hunted 23 days. That equates to 568,560 hunting days for archers that baited in northern Wisconsin.

Using hunter data from the 2001 gun hunter questionnaire we can estimate that there were approximately 208,000 gun hunters who hunted the northern forest in 2001 and that 17% of gun hunters reported using bait, resulting in approximately 35,355 hunters in northern Wisconsin who baited. The gun hunter survey found that gun hunters who baited averaged 6 days in the field. This equates to 212,130 gun hunting days.

If we assume hunters are using one bait site and are only using ten gallons of bait, which we assume will need replenishment every 2nd hunting day, that gives a rough estimate of over 450,000 bushels (~ 4 million gallons) of bait present in northern Wisconsin during the 2001 deer season. This equates to 8 bushels per northern deer hunter that baited in 2001. We consider this a minimum estimate because hunters probably tend more than one bait site and may bait more frequently than every other day. For instance Winterstein (1992) in a survey of Michigan hunters found 40 bushels were being utilized per hunter during the 1990 deer season. If Winterstien's (1992) estimate for Michigan hunters is consistent with Wisconsin hunters who bait, then this would equate to 2,403,000 bushels (over 19 million gallons) of bait placed by hunters in 2001 in northern Wisconsin. However, it is important to note that Michigan hunters were not restricted by a 10-gallon limit, as are hunters in Wisconsin.

For an economic perspective, if we assume on average a bushel of bait costs a deer hunter $3. Based on our conservative estimate that is $1.5 million.

***How might a ban on baiting affect deer behavior?***

Hunters commonly report that access to bait piles causes deer to "go nocturnal", essentially using bait piles during the night and becoming less visible during legal hunting hours. Research on deer behavior in response to supplemental feeding supports this. Garner (2000) studied radio-collared deer with access to several baiting and feeding stations in northern Michigan. He found that all ages and sexes of deer quickly change their behavior in response to large amounts of supplemental food.

Bucks were especially wary and were more likely to switch over to nighttime feeding exclusively. When supplemental food was limited to 5 gallons deposited during the day, deer became habituated to the feeding schedule and the available food was quickly eaten. This created competition and Garner (2000) observed more daytime feeding by bucks.

Garner (2000) reported that relative to natural conditions and regardless of the feed or feeding techniques, fall baiting and winter feeding of deer fostered higher amounts of face-to-face contacts among deer as well as higher local deer densities. He concluded that these conditions would maintain as well as enhance the spread of TB in Michigan. Paradoxically, restricting baiting to 5 gallon limits given daily resulted in "drastically" higher face to face contacts because of competition for feed over a smaller area. Garner (2000) reported that large piles tended to freeze during winter and he witnessed deer using the warmth from their mouths and nostrils to thaw and consume food. This behavior tended to produce semi-permanent piles of food that were "dented with borrows made from deer noses". He suspected that a deer feeding in this manner "leaves much of its own saliva and nasal droppings in the feed pile at which it's working".

Social strife at supplemental feeding sights is commonly reported (Ozoga and Verme 1982, Lewis 1990, Garner 2000). Dominant does typically eat their fill and control access to feed sites for their social groups. Less

dominant individuals and social groups may mill around the periphery of the feeding station waiting their turn at the feed pile (Ozoga and Verme 1982). Consequences of this increased activity at the baiting sight is that natural browse may be more heavily impacted (Doenier et al. 1997) and feeding sites can be fouled by urine and feces (Garner 2000). Dominance hierarchies are established by fighting, sparring, and threat displays.

The presence of supplemental food affects movement behavior of deer in complex ways. Deer may show fidelity to 1 feeding site or may access several feeding sites. In general, does are less likely to travel between several feeding sites, and bucks are more apt to have a network of feeding sites (Ozoga and Verme 1982).

Deer will alter their home ranges slightly to access supplemental food but drastic change in movement behavior is unlikely; the ability of food piles to draw deer from large distances is limited (Ozoga and Verme 1982, Garner 2000).

Research clearly demonstrates that different social groups of deer will establish overlapping home ranges in order to access supplemental food. Moreover, social groups will tolerate each other in very close proximity such that extensive face-to-face contact occurs between individuals of different social groups (Garner 2000).

Changes in short-term movement behaviors (e.g. home ranges) can eventually become long-term changes in deer behaviors such that seasonal migration traditions break down. Local areas in the north that have a long history of baiting and feeding have a higher proportion of deer that do not migrate between distant summer and winter ranges (Lewis 1990). Consequently, a ban may restore natural seasonal movements for Wisconsin deer.

***Take Home Points:***

- The use of bait is greater among Wisconsin bow hunters than among gun hunters.
- The percentage of bow hunters using bait increased throughout the 1990s while the percentage of gun hunters using bait has stabilized during the past 6 years.
- The effect of bait on harvest success differs between bow and gun hunters and is influenced by the duration of baiting.
- Bow hunters who use bait have higher success rates than those who do not use bait.
- While the elimination of baiting may lower bow hunter success, it would have little effect on overall antlerless harvest and the ability to control deer populations.
- A conservative estimate of 487,391 bushels (3,983,450 gallons) of bait was used by deer hunters in northern Wisconsin during the 2001 deer season.
- Elimination of artificial feeding and baiting will reduce face-to-face contacts among family groups and individuals.

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BEFORE THE
DEPARTMENT OF NATURAL RESOURCES

NOTICE OF PUBLIC HEARINGS ON ENVIRONMENTAL IMPACT STATEMENT
AND PROPOSED RULES WM-05-03 AND WM-09-03

NOTICE IS HEREBY GIVEN that pursuant to ss. 29.014, 29.033, 29.307, 29.335, 29.885 and 227.11, Stats., interpreting ss. 29.033, 29.177, 29.307, 29.335 and 29.361, Stats., the Department of Natural Resources will hold public hearings on revisions to chs. NR 10, 19 and 45, Wis. Adm. Code, relating to the control and management of chronic wasting disease. The proposed rules create regulations designed to eradicate chronic wasting disease (CWD) in Wisconsin's wild deer herd. The rules propose reducing deer populations to as close to zero as possible in infected CWD eradication zones and to reduce surrounding deer populations within 40 miles to 10 deer per square mile of deer range. These rules also propose to prohibit practices that may lead to the spread or transfer of the disease.

Natural Resources Board Order No. WM-09-03 proposes elimination of baiting and feeding deer statewide. The Department could authorize landowners and their agents to shoot deer over bait by permit in an eradication zone. Natural Resources Board Order No. WM-05-03 proposes:

1. Criteria for establishment of CWD management zones.
2. Extension of deer seasons within the CWD management zones.
3. Creation of an earn-a-buck deer hunt requirement in the CWD management zones.
4. Codification of the conditions for landowner permits to remove deer within the eradication zone.
5. Creation of a protocol for department use of aircraft to help reduce deer numbers within the eradication zone.

NOTICE IS HEREBY FURTHER GIVEN that pursuant to s. 227.114, Stats., it is not anticipated that the proposed rule will have a significant regulatory impact on small businesses. However, these rules, specifically those relating to the use of food for the feeding and baiting of deer may affect the sale of feeding materials which may have a significant economic impact on wildlife feed stores, feed mills and other sellers of deer feed.

NOTICE IS HEREBY FURTHER GIVEN that pursuant to s. 1.11, Stats., and ch. NR 150, Wis. Adm. Code, the Department has prepared an Environmental Impact Statement (EIS) for this action. The Department will consider comments on the EIS when deciding whether to certify that the EIS meets the requirements of applicable state statutes and codes. The EIS includes:

Section 1. Background (History of the disease, current scientific knowledge regarding the disease, and previous actions taken by Wisconsin and other states to control the disease)
Section 2. Depopulation (Analysis of the proposed action and tools used to depopulate the deer herd and likely effects, and an analysis of all alternatives considered)
Section 3. Herd Reduction (Analysis of the proposed action and tools used to reduce the deer herd and likely effects, and an analysis of all alternatives considered)
Section 4. Baiting and Feeding (Analysis of the proposed baiting and feeding ban, the effects of the ban and an analysis of all alternatives considered)

Copies of the EIS are available for public review at public libraries in Wisconsin, DNR Service Centers and on the Department's website at http://www.dnr.state.wi.us.

Interested persons or their representatives will be given an opportunity to comment on and present their views regarding the proposed rules, the EIS and the environmental review process under s. 1.11, Stats., the Wisconsin Environmental Policy Act (WEPA), at the hearings. Oral presentations may be limited if it appears the hearing will be unduly lengthened by repetition.

NOTICE IS HEREBY FURTHER GIVEN that pursuant to s. NR 2.085(4), Wis. Adm. Code, any person may petition for the opportunity to cross examine the person or persons responsible for a specific portion of the environmental impact statement or to present witnesses or evidence. The opportunity to cross examine or present witnesses or evidence will follow the public hearings if a petition has been properly filed.

A petition to cross examine or present evidence shall include a statement of position on the action or proposal and specific statements and issues on which the person wishes to cross-examine or present evidence or witnesses. Petitions to shall be filed within 20 days after the date on which this notice is published. Failure to file a petition under s. NR 2.085(4), Wis. Adm. Code, shall preclude the opportunity to cross examine.

NOTICE IS HEREBY FURTHER GIVEN that the Department will hold an informational meeting beginning at 6:00 p.m. for one hour prior to each public hearing to present information and answer questions on the proposed rules and Environmental Impact Statement.

NOTICE IS HEREBY FURTHER GIVEN that the hearings on the proposed rules and the Environmental Impact Statement will be held on:

| | |
|---|---|
| March 17, 2003 | Conference Center, WITC, 2100 Beaser Avenue, Ashland |
| Monday | Blackhawk Technical College, 6004 Prairie Road, Beloit |
| 7:00 p.m. | Theisen Middle School, 525 E. Pioneer Road, Fond du Lac |
| | Brown County Central Library, 515 Pine Street, Green Bay |
| | Copper Top Theater, UW-Richland Center, Hwy. 14, Richland Center |
| | Shell Lake Primary School, 601 South 3rd Street, Shell Lake |
| | Gymnasium, Union Grove High School, 3422 S. Colony Ave., Union Grove |
| | Performing Arts Center, Lincoln High School, 180 116th St. S, Wis. Rapids |
| March 18, 2003 | Dodger Bowl, Hwy. 18 West, Dodgeville |
| Tuesday | Auditorium, Onalaska High School, 700 Hilltopper Place, Onalaska |
| 7:00 p.m. | Fitchburg Community Center, 5510 Lacy Road, Fitchburg |
| | Auditorium, James Williams Jr. High School, 915 Acacia Lane, Rhinelander |
| | Country Inn Hotel and Conference Center, 2810 Golf Road, Waukesha |
| | Wausaukee High School, N11941 U.S. Hwy. 141, Wausaukee |
| March 19, 2003 | Auditorium, Eau Claire Memorial High School, Keith Street, Eau Claire |
| Wednesday | Auditorium, Park Falls High School, 400 9th Street North, Park Falls |
| 7:00 p.m. | Northwoods Conf. Center, Stoney Creek Inn, 1100 Imperial Ave., Mosinee |

NOTICE IS HEREBY FURTHER GIVEN that pursuant to the Americans with Disabilities Act, reasonable accommodations, including the provision of informational material in an alternative format, will be provided for qualified individuals with disabilities upon request. Please call the Bureau of Wildlife Management at (608) 266-8204 with specific information on your request at least 10 days before the date of the scheduled hearing.

Written comments on the proposed rule and Environmental Impact Statement may be submitted to Mr. Kurt Thiede, Bureau of Wildlife Management, P.O. Box 7921, Madison, WI 53707 no later than March 31, 2003. Written comments will have the same weight and effect as oral statements presented at the hearings. A copy of the proposed rule, fiscal estimate and Environmental Impact Statement may be obtained from Mr. Thiede.

Dated at Madison, Wisconsin February 12, 03

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

By R. Scott Hassett
Scott Hassett, Secretary

| Hearing Location | Appearance Slips | % |
|---|---|---|
| Ashland | 109 | 8.9% |
| Beloit | 14 | 1.1% |
| Dodgeville | 30 | 2.4% |
| Eau Claire | 84 | 6.9% |
| Fitchburg | 27 | 2.2% |
| Fond du Lac | 45 | 3.7% |
| Green Bay | 83 | 6.8% |
| Mosinee | 105 | 8.6% |
| Onalaska | 23 | 1.9% |
| Park Falls | 156 | 12.7% |
| Rhinelander | 189 | 15.4% |
| Richland Center | 21 | 1.7% |
| Shell Lake | 109 | 8.9% |
| Union Grove | 13 | 1.1% |
| Waukesha | 63 | 5.1% |
| Wausaukee | 41 | 3.3% |
| Wisconsin Rapids | 113 | 9.2% |
| Total | 1225 | |

| Hearing Location | Appearance Slips | % |
|---|---|---|
| **South** (Beloit, Dodgeville, Eau Claire, Fitchburg, Fond du Lac, Green Bay, Mosinee, Onalaska, Richland Center, Union Grove, Waukesha, Wisconsisn Rapids) | 621 | 50.7% |
| **North** (Ashland, Park Falls, Rhinelander, Shell Lake, Wausaukee) | 604 | 49.3% |

| Baiting and Feeding Restrictions | Count | % | North | % | South | % |
|---|---|---|---|---|---|---|
| Information | 89 | 7.8% | 30 | 5.3% | 59 | 10.2% |
| Oppose | 619 | 54.0% | 373 | 65.6% | 246 | 42.6% |
| Support | 439 | 38.3% | 166 | 29.2% | 272 | 47.1% |
| Total | 1147 | | 569 | | 577 | |

| Depopulation | Count | % | North | % | South | % |
|---|---|---|---|---|---|---|
| Information | 231 | 22.7% | 111 | 22.3% | 120 | 23.0% |
| Oppose | 305 | 30.0% | 192 | 38.6% | 113 | 21.7% |
| Support | 482 | 47.3% | 194 | 39.0% | 288 | 55.3% |
| Total | 1018 | | 497 | | 521 | |

| Earn-a-Buck | Count | % | North | % | South | % |
|---|---|---|---|---|---|---|
| Information | 170 | 15.9% | 71 | 13.4% | 99 | 18.5% |
| Oppose | 532 | 49.9% | 310 | 58.4% | 222 | 41.4% |
| Support | 365 | 34.2% | 150 | 28.2% | 215 | 40.1% |
| Total | 1067 | | 531 | | 536 | |

| EIS | Count | % | North | % | South | % |
|---|---|---|---|---|---|---|
| Information | 379 | 40.2% | 168 | 37.0% | 211 | 43.1% |
| Oppose | 211 | 22.4% | 139 | 30.6% | 72 | 14.7% |
| Support | 353 | 37.4% | 147 | 32.4% | 206 | 42.1% |
| Total | 943 | | 454 | | 489 | |

| Extended Seasons | Count | % | North | % | South | % |
|---|---|---|---|---|---|---|
| Information | 209 | 20.3% | 99 | 19.8% | 110 | 20.9% |
| Oppose | 352 | 34.2% | 207 | 41.3% | 145 | 27.5% |
| Support | 467 | 45.4% | 195 | 38.9% | 272 | 51.6% |
| Total | 1028 | | 501 | | 527 | |

| Landowner Permits | Count | % | North | % | South | % |
|---|---|---|---|---|---|---|
| Information | 253 | 25.6% | 123 | 25.5% | 130 | 25.6% |
| Oppose | 219 | 22.1% | 133 | 27.6% | 86 | 17.0% |
| Support | 517 | 52.3% | 226 | 46.9% | 291 | 57.4% |
| Total | 989 | | 482 | | 507 | |

| | | | | |
|---|---|---|---|---|
| **Written Comments: Support for Baiting and Feeding Prohibition (North: 57 South: 52)** | | **109** | 36 Form Letter | |
| 1 | Support Ban on Baiting and Feeding: Makes Deer Nocturnal; Allows return to Natural Movements | 50 | | |
| 2 | Support Ban on Baiting and Feeding: Creates Hunter Conflicts | 14 | | |
| 3 | Support Ban on Baiting and Feeding: CWD and Disease Control | 93 | | |
| 4 | Support Ban on Baiting and Feeding: Experienced a more quality hunt in 2002 | 8 | | |
| 5 | Support Ban on Baiting and Feeding: Environmental Damage (forest, gardens, etc.) | 39 | | |
| 6 | Support Ban on Baiting and Feeding: Health/Welfare of Herd & Deer Population Control | 21 | | |
| 7 | Support Ban on Baiting and Feeding: Increased Car/Deer Collisions | 2 | | |
| 8 | Support Ban on Baiting and Feeding: Ethics (Quality of Hunt, Future of Hunting, Fair Chase) | 62 | | |
| 9 | Support Ban on Baiting and Feeding: Public Land Impacts (ATVs, Tree Stands) | 1 | | |
| 10 | Support Ban on Baiting and Feeding: Enforcement Problems | 4 | | |
| | | | | |
| **Written Comments: Opposition to Baiting and Feeding Prohibition (North: 34 South: 61)** | | **95** | 236 Petition | 865 Form Letter |
| 1 | Oppose Ban on Baiting and Feeding: Enjoy Watching Deer | 11 | | |
| 2 | Oppose Ban on Baiting and Feeding: Unsuccessful in Harvesting Deer without Bait | 47 | | |
| 3 | Oppose Ban on Baiting and Feeding: Deer will Starve | 7 | | |
| 4 | Oppose Ban on Baiting and Feeding: Allows for more Spread out Distribution, More Concentration on Private Lands, Yarding would Increase | 5 | | |
| 5 | Oppose Ban on Baiting and Feeding: No Scientific Link to Controlling CWD with Ban | 40 | | |
| 6 | Oppose Ban on Baiting and Feeding: It does not Exist in the North | 9 | | |
| 7 | Oppose Ban on Baiting and Feeding: Inequity (DNR does it, we should also be allowed) | 13 | | |
| 8 | Oppose Ban on Baiting and Feeding: Do not have the Time, Loose older, disabled and younger hunters | 13 | | |
| 9 | Oppose Ban on Baiting and Feeding: Significant Neg. Economic Impact, Lose hunters | 17 | | |
| 10 | Taking away personal rights | 7 | | |
| 11 | Increase Car/Deer Collisions | 8 | | |
| | | | | |
| **Organizations in Support** | | | | |
| | Wahburn County Forest Administrator - Mike Peterson | | | |
| | Cleveland Fish & Game - Larry Vande Loo | | | |
| | Two Rivers Fish & Game Protection Association - Terry Farr | | | |
| | Viking Bow & Gun Club - Larry Bonde (ALL) | | | |
| | Star Prairie Fish & Game Assoc. - Board of Directors (ALL) | | | |
| | | | | |
| **Organizations in Opposition** | | | | |
| | Voices of Wisconsin (VOW) | | | |
| | Sawyer County Board - Allow feeding from Jan. 1 - Aug. 1 (Resolution) | | | |
| | City of Park Falls | | | |
| | Douglas County Fish and Game League | | | |
| | | | | |
| **Alternatives to Prohibition Proposed** | | | | |
| 1 | Permit with Significant Fee | 2 | | |
| 2 | Only in the Southern Part of the State | 7 | | |
| 3 | More Concentrations Occur with Food Plots | 1 | | |
| 4 | Smaller Amounts (<5 Gallons) | 29 | | |
| 5 | Smaller Amounts (<10 Gallons) | 2 | | |
| 6 | Limit to Late Bow and Gun Seasons | 1 | | |
| 7 | 100 Yards from Dwellings | 1 | | |
| 8 | Just Allow Baiting for Hunting | 2 | | |
| 9 | Just Allow Recreational Feeding to Continue | 3 | | |
| 10 | Prohibition only in the EZ | 7 | | |
| 11 | 5 Gallons until tag filled | 1 | | |
| 12 | Spread it out over a larger area | 5 | | |
| 13 | 1 Site per stand | 1 | | |
| 14 | Seasons (Sept 1 - ??) | 4 | | |
| 15 | Disabled hunters only | 1 | | |
| 16 | Ban Food Plots | 2 | | |
| 17 | Ban Protein Blocks | 2 | | |
| 18 | Allow Elevated Feeders | 1 | | |
| 19 | Ban Lures | 1 | | |
| 20 | Caused by minerals | 1 | | |

| Written Comments: Support (No Reasons) | |
|---|---|
| Earn-a-Buck | 64 |
| EIS | 66 |
| Extended Hunting Seasons | 71 |
| CWD Deer Depopulation | 77 |
| CWD Landowner Permits | 72 |
| Other | 0 |
| | |
| **Written Comments: Opposition (No Reasons)** | |
| Earn-a-Buck | 17 |
| EIS | 11 |
| Extended Hunting Seasons | 10 |
| CWD Deer Depopulation | 6 |
| CWD Landowner Permits | 6 |
| Other | 0 |
| | |
| **Written Comments: Alternatives** | |
| More Aggressive Measures in HRZ | 1 |
| No EZ if only a few positives (specifically Richland County) | 10 |
| EAB is unfair to young hunters | 1 |
| Population goals in the proposed zones | 1 |
| Modify habitat to decrease deer numbers (eliminate deer habitat) | 1 |
| Allow landowners to shoot deer year-round without a license | 1 |
| No Aircrat Use | 1 |

EIS COMMENTS  E = EIS (rational presentee

| Pos_3 | Comments |
|---|---|
| Oppose | Support feeding and baiting if there is a restriction on the amount of bait placed in a certain location. During non-hunting seasons only! Hunters should get unlimited free tags to help reduce population. Don't restrict the choice of the hunter to shoot a |
| Oppose | Written- Enlist hunter into control of CWD, tests for CWD, encourage baiting and feeding. The current plan discourages cooperation among hunters. Oral- DNR should provide test kits. Oppose statewide ban on baiting. |
| Oppose | DNR should take into account natural barriers to deer movement (ex: WI River) when establishing eradication zones. Only 1 deer as of 3/18/03 has been found with the disease in Sauk county (none north of WI River) yet with the current 4.5 mile radius, my p |
| Oppose | See written comments. |
| Oppose | Object rule order process. Other states serve the public and IW DNR is taking rights away, a power grab to reduce the deer to 10/sq mi. Current management reduced the kill. |
| Oppose | Opposed to baiting ban- raise price on tags. |
| Oppose | Opposes baiting ban as it is a way to reduce the herd. Let hunters use bait to reduce the herd, keep deer population from exploding. |
| Oppose | Last Year I attended 2 DNR/Conservation meetings, 1 Eau Claire, 1 Chippewa Falls, all proposals given were registered, why we are discussing this once more? I want a traditional 9-day season! |
| Oppose | We need an infected animal to get CWD in the whole state! We should bait in all other areas, besides the eradication zone. Concerned about DNR encouraging hunters to eat deer. Oppose baiting ban. |
| Oppose | Disagrees w/ DNR policy on baiting/feeding. Complain about bear baiting restrictions, why was EIS done and who paid for it? Also involved in Deer 2000. (1) |
| Oppose | Support the baiting and feeding ban. |
| Oppose | No comment on sheet. |
| Oppose | Food plotting should be allowed statewide on county, state and national forests, with the exception of areas that must be cleared by hand tools only. Powdered mineral supplements should be allowed because they contain high levels of copper known to help d |
| Oppose | Oral- owns property-intensive harvest zone. Going to continue to expand. Killed 93 deer for DNR, no positives. Don't have a problem will not do it anymore. |
| Oppose | Comments from DNR are controversial. High conc of reg & cd. Scientific data doe. Feeding & baiting ban is being shotted down our throats. Sportsmen had enough-sick of lies. People want the truth and we are telling lies. Talks about feeding and baiti |
| Oppose | In support of feeding, not baiting. Hunter is losing b/c this issue is dividing us. Should we shoot a doe nursing a fawn? Why is the fine $2000 for hunting over bait & $200 for feeding? DNR has back against wall. Losing hunters/the non-hunter is winn |
| Oppose | After meeting still no reason for stopping baiting or feeding in the northern part of state. (2) |
| Oppose | Oppose baiting ban. |
| Oppose | I am in support of baiting for hunting b/c they have not found that CWD in our area and I'm been doing this for 30 yrs. |
| Oppose | all residents including my cousins on the reservations have and abide by the same regulations |
| Oppose | as long as we have no cwd in our area let the baiting continue. We need all our land values to stay steady and our small businesses to survive |
| Oppose | we been feeding deer in the north woods for 30+ years. We have a very healthy deer herd for that reason. There is no real facts that tell us that feeding deer spreades cwd I also own the butternut feed mill. This rule has been extremely difficult on ou (2) |
| Oppose | Against ban on feeding/baiting. Older folks should be able to bait. |
| Oppose | You have NO right to tell me that I can't feed animals on land that I own. If animals yard up in winter they are a much larger number in a small area. Trying to find food - if many people feed a few animals they will be spread out more. 2 |
| Oppose | I also oppose the 23 day hunting season - How about wolf delisting and lower populations in N WI. |
| Oppose | Wolf delisting/control/population |
| Oppose | I am for cleaning house. Release all DNR officials and hire new ones. MI did it and it helped. |
| Oppose | My wife and I own the Butternut feed mill. We have lost over $95,000 in sales since this rule has been in effect. We have been feeding deer for 20 yrs in our area and have a very healthy deer herd. There is NO reason for this ban at all! 2 |
| Oppose | Feels winter kill will be drastic can't eradicate a deer population, severe winter will wipe out turkey pop statewide. |
| Oppose | I am in support of deer baiting and feeding b/c we have been doing it for years and there is no CWD in the North. |
| Oppose | I'm totality against our right to bait and feed deer. That is why I didn't buy a hunting license last year. I'm not concerned about CWD. |

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|---|---|---|
| Oppose | 15- In favor of baiting only b/c his grandfather not capable of doing things w/out bait. *Attended meeting in Eau Claire also, spoke and turned in form comments. | |
| Oppose | Opposes both rule orders. Long written position - (ran out of time - belligerent) 2nd time - further written testimony read. No fair chance to get an animal due to his health record. | |
| Oppose | Explained a ceases and desist order from Rex Slockman. Elk baiting. Native American baiting, pushing low copper issue. Brains don't work. 6 positive deer came from Conkey deer farm, all came from DNR, rehabbed fawns. Soil samples from his farm - cadi | 2 |
| Oppose | Opposed to baiting ban. | |
| Oppose | I am in oppostion of Earn a buck deer in any zone. | |
| Oppose | If baiting is not allowed to any degree the number of hunters will decrease in the North. Mostly bowhunters. | 3 |
| Oppose | against ban, dnr has no credibility took 2nd chance to speak | |
| Oppose | impacts ban has on economics, property rights, and wildlife during winter stress times. It goes against all conservation and humane standards. Should feed deer and not let them starve | 3 |
| Oppose | against ban, feeding elk is ok, why not deer? | |
| Oppose | if baiting is allowed: to improve your chance of getting a deer, during bow season, place 2-3 gallons of bait down every other day if baiting is not allowed: I will not bow hunt. No baiting or feeding= no license not | |
| Oppose | bad science on cwd proposal. Took 2nd chance to speak | 2 |
| Oppose | no cwd where they bait, cwd where they don't bait | 2 |
| Oppose | kids will start hunting more with bait | |
| Oppose | (restrictions) - from other comment to continue | |
| Oppose | against ban, it doesn't hurt to eat them. Dnr people who support ban would get fired at private corporation | |
| Oppose | against ban, thinks its wrong to kill healthy deer | |
| Oppose | regulate deer farms, baiting most effective way to harvest deer. 2nd chance denied | |
| Oppose | More testing needed, no eradication | 2 |
| Oppose | No documentation that eradication will work, most states think this rule is a joke. Baiting and feeding is a joke, natural foods. This is a big economical issue. What about old people that feed deer? Copper deficiency is a big problem. Genetics and m | 2 |
| Oppose | Eradication of all deer is ridiculous, do not need EZ in Richland Co. Richland county positive could be false positive. Generally opposes rule. Speaking a second time, said that teaching kids it is ok to kill a deer and then throw it in a dumpster is s | |
| Oppose | After having read the EIS, there seems to be a noted lack of hard evidence or fact and a preponderence of supposition and guess work as well as a decided lack of substantive scientific rigor. The DNRs approach seems to be to gravely overcomponsate by ove | 2 |
| Oppose | I'm concerned about game farms and an overreaction to a single positive test and the description in the rules as far a reaction. | |
| Oppose | 1. Clarification of sick deer rule: Can citizens statewide shoot a sick looking or acting deer any time and any place, and expect that the carcass will be picked up promptly for CWD testing by state agency personnel. If not-why? 2. If adaptive manage | |
| Oppose | misinformation on ban. Baiting has led to more deer | 2 |
| Oppose | with the taxes paid on land we own, we should have the right to choose to bait or not to bait. If you were 100% sure baiting is the only cause of a life threatening disease, the yes ban baiting for a time but there is no proof. Let hunters be hunters an | 2 |
| Oppose | Oral - Against baiting ban: restrict/enforce more. Written - Proposed baiting - why not try a year or two restricting the baiting to a gallon or two per person/per parsal so that the bow hunters can still get deer if there is such an over population. Ho | 4 |
| Oppose | Against baiting ban - bow hunter | |
| Oppose | I am in favor of a statewide rule banning baiting and feeding deer. I am also in favor of permitted deer baiting restricted to disabled hunters or when herd reduction is especially needed. | |
| Oppose | Opposes ban. Believes more time & effort should be put into research of alternative theories such as copper, genetics & bacteria. See written comments & summary of verbal comments. | 2 |
| Oppose | Deer season same as in the past | |
| Oppose | Did not come up when called to speak. | |
| Oppose | Opposed verbally | |

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| | | |
|---|---|---|
| | only lip service It's time the dnr stands up and admits they acted in an uninformed(misinformed) and rash manner by eliminating baiting and feeding in the | |
| Oppose | northwoods and there by causing financial havoc statewide and within the dnr and now as before the | |
| Oppose | rather than these new rules enforce the baiting regulations that are on the books | |
| Oppose | in favor of wardens but against feeding ban additional comments on back of questionaire. | |
| Oppose | bring back the baiting and feeding. "IF NOT" I will not buy anymore hunting licenseing. | |
| | keep the baiting and feeding. Limit the amount. Divide the state if necessary stop the transportation of deer and elk to and from game farms the cause of | |
| Oppose | cwd in wi | |
| Oppose | question had been answered..did not speak | |
| | if feeding spreads cwd, why don't all the deer in a deer farm have the disease if on deer on that farm has it? Salt causes deer to get hit on road no more | 3 |
| Oppose | than baiting | |
| Oppose | against cwd regulations see additional comments | |
| Oppose | warden knows he's baiting, is still baiting and will keep baiting | |
| Oppose | Oral- Disagrees with baiting and feeding ban. | |
| | I oppose the ban on baiting and feeding white tail deer and other wildlife. We as landowners and taxpayers should be able to do as we wis on our own | |
| Oppose | land. I enjoy watching all the wildlife around our home and think it is a wonderful experience for and an | |
| | Limited baiting during hunting should be reinstated for 2003 season. Home feeding should be reinstated - this was only an emergency regulation. | |
| Oppose | Warrants more consideration due public sentiment. Too large deer herd in this area can not be controlled cur | |
| Oppose | Put immediate end to CWD scam, Oral - Opposed ban | |
| | Opposes ban, wants DNR to be able to enforce. Seen no proof that baiting harms herd. Feels game farms & animal buying/transport is a bigger problem. | 2 |
| Oppose | See written comments. | |
| Oppose | You have no scientific test results showing urine, feces, saliva (nose to nose) ever to contain the "infectious prion." | 2 |
| Oppose | declined to speak | |
| Oppose | baiting one gal per day | |
| Oppose | Limited baiting during hunting season should be reinstated as should feeding deer at your own home. | |
| Oppose | I think a lot more studies have to be done on this before you can ban statewide. | 2 |
| Oppose | I would no mind a baiting ban for gun deer season, but I am 100% opposed to a baiting ban for archery season! Oral - Opposed ban. | |
| Oppose | Not enough science/Dept. failed deer mgmt/EZ not working/Feeding elk in Clam Lake | 2 |
| Oppose | Opposed ban | |
| | Disagrees with ban on baiting, but if it's really needed, feels that Hwy 64 should be the north/south line. Wants to see imperical data. 70 hrs in a stand, | 2,4 |
| Oppose | saw 5 deer, "wow." Will spend money another state… | |
| | WRITTEN-WI BOW HUNTERS ASSOCIATION. OPPOSES BAN- REDUCED DEER KILL, LOSS OF REVENUE, DIE-OFFS IN SEVERE WINTERS, | |
| | MORE DEER ON PRIVATE LANDS, DEER HEALTH WILL GO DOWN. (SEE ATTACHED) ORAL- OPPOSES BAITING AND FEEDING | 3 |
| Oppose | RESTRICTIONS. | |
| Oppose | This is plain foolishness. | |
| Oppose | Let us feed DEER! | |
| Oppose | BAITING AND FEEDING SHOULD BE ALLOWED WITH REGULATIONS. | |
| Oppose | I think they should continue deer baiting and feeding. | |
| Oppose | No comments recorded. | |
| Oppose | Against statewide ban; no different than ag community - possibly smaller amount | |
| Oppose | Opposed ban | |
| | What is stopping people from continuing to bait deer through the use of large bird feeders? Clearly you can not ban all bird feeders, but something should | |
| Support | be done. I would suggest making public announcements encouraging people not to attempt such strate | |
| Support | Against baiting ban: Will not buy patron license anymore | |
| Support | why is the dnr baiting in the cwd zone they won't kill all the deer and if this in fact spreads cwd, they are spreading it. | 3 |
| | Written - For the past 20 yrs I have hunted in the Northern most unit (28 Iron). I did this b/c of so many hunters in central WI, it is almost impossible to | |
| Support | hunt this area with natural movement. There are no roads within miles, no acorn ridges, no field | |

0 = 7 5 = 1

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| Support | #3 supported in CWD area only. Feeding deer by house or cabinet just to watch deer should not be banned. | |
| Support | Supports rule | |
| Support | Kevin made me fill out a form! | |
| Support | ORAL-SUPPORTS RULE PACKAGE. MONEY SPENT ON BAITING WILL BE SPENT ELSEWHERE, SO WILL NOT HURT ECONOMY, EXCEPT THOSE WHO SELL BAIT. USING BAIT HAS REDUCED HUNTER SUCCESS BECAUSE DEER PATTERNS HAVE CHANGED. | 5 |
| Support | Against 23 day season that would start on Nov. 15. Leave 9 day season as it is currently. | |
| Support | Earn a buck supported in EZ but not statewide. CWD landowner incentives might be necessary to get proper eradication. Not in favor of a bounty system, but wonders about a possible tax reduction | 3,4 |
| Support | I'm a landowner in Ashland County for 3 years. I've seen the effects of feeding, baiting, ATUS. Too many deer overbrowsing, overbaiting, and abuse of public land trails. Declined oral statement. | 5 |
| Support | GO TO IT!!! | |
| Support | The DNR has made a capacity & contact disease out of CWD which is being acknowledged by biologists as related to heredity and not deer populations | 2 |
| Support | Permanent ban on baiting and feeding. | |
| Support | Supports baiting/feeding ban. Supports extended gun season. Believes rules should be put in place to limit animals harvested from CWD infested areas. Warden since 1998. See written comments. | |
| Support | Interested in a permanent ban on baiting/feeding. | |
| Support | Supports 1-6 in CWD area only. Baiting restrictions opposed in outlying areas. Believes rule changes in CWD area shouldn't apply to the rest of the state. In favor of eradication. Car kills occur because of cars, not because deer population is too hig | |
| Support | What has the DNR done to inform hunters that venison is safe to eat? What was the percent of bucks and does that got CWD? | |
| Support | Supports. Tree farm in Sauk County (MZ) - less deer is better for tree farms. Landowner participation is key, DNR is doing right thing. | 5 |
| Support | I APPRECIATE THE WORK DNR HAS DONE TO BE PROACTIVE AND USE SCIENCE TO MAKE DECISIONS. I HAVE GUN AND BOW HUNTED FOR 34 YEARS AND HAVE BEEN SUCCESSFUL W/O BAIT. | 5 |
| Support | End baiting/feeding for good. Add an extra earn a buck for bowhunters to shoot 2 bucks a year if you shoot a doe. | |
| Support | Have you determined how the disease spreads? Supports 3-6 only in EZ. Says DNR is doing the right thing by eliminating the deer, should continue. Supports (in EZ). | 5 |
| Support | Supports extended CWD hunting season in CWD affected area only. | |
| Support | I'm in favor of a continued ban on all baiting and feeding of deer statewide. Let's make it a hunt and not just a shoot! | |
| Support | Never baited and would like to see it stopped!! | |
| Support | In support of everything in affected areas only, not statewide. | 3,5 |
| Support | End baiting & feeding for good. | |
| Support | BANNING BAITING SHOULD SLOW DOWN THE SPREAD OF THE DISEASE. SUPPORTS RULE PACKAGE. | 6 |
| Support | A gentelman spoke regarding EAB, that I consider an idea to think about. I realize the DNR had problems collecting the # of samples they hoped for, so the thought of allowing a buck, not being predeeded by a anterless kill, providing the head is left for | 4 |
| Support | DNR does a damn good job! | |
| Support | for baiting | |
| Support | Plans to submit detailed comments in writing. | |
| Support | Opposed ban | |
| Support | Opposed ban | |
| Support | Eradicate all deer in CWD zone. Can even take bucks/does from other areas and relocate into that zone once it is gone. Earn a buck for whole state (have to shoot first) to eliminate T-zones. Eliminate bait/feeding deer - not necessary! | |
| Support | The question I have is this-what if it doesn't work? What if it abates and re-occurs naturally. Are you willing to return to baiting if the public so desires? | 2,3 |
| Support | I support the DNR and those that are educated to make decisions. Politicians and those who speak on emotions do not have my support. Please make educated decisions. | 5,6 |
| Support | Oppose Ban. | |

0 = 5 = 12

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| Support | Would like to see some inclusion in EIS/Plan regarding transportation of deer carcasses outside of endemic area unless processed, such as Colorado and other states have. | 4 |
| Support | The DNR needs to regulate the "hunted" carcasses brought into the state from "CWD infected" states, these carcasses should not be permitted into the state. | 4 |
| Support | Gun season start Nov. 25 and open at least to Jan. 1, Leave end of October hunting to archery hunters to make them happy (I am not an Archery hunter), | |
| Support | Gun season not an earn a buck, Let those in the northern part of the state have their traditional Thank | |
| Support | Just don't overdo it, I want some deer to hunt with my son | |
| Support | As resident and owner of 100 acres in the eradication zone, and an avid deer hunter. It is painful to think about the eradication of deer in this area. However, I strongly feel the DNR is taking the correct steps and approach to protect the entire state | 5, 6 |
| Support | See written comments. | |
| Support | Baiting and feeding ban should be 3 yr. Moratorium, use the full three years wisely. Don't reduse HRZ faster than IHZ. Don't reduce IHZ faster than EZ. | 4 |
| Support | added another point; opposed feeding but supports baiting signed up but didn't speak | |
| Support | eliminate baiting and feeding of deer, except in cwd area | |
| Support | baiting and feeding are good for individual deer but not for the herd. What other animals do we turn into feed lot animals without having to worm and inoculate them. There's more than cwd we're trying to prevent. This last season the deer sign was more | 5 |
| Support | please let science be the ruling factor not monetary gain or self interest! | 5 |
| Support | Oral- Supports rule, ethics, not hunting, hopes more landowners cooperate. Written- I believe the landowners in the CWD management area should be giving the DNR more cooperation in trying to eliminate CWD. | 6 |
| Support | our natural resources aer not here for people to "make a profit" just because they pick a job that relates to the resource. We need to manage for the resource not the people. | 6 |
| Support | PREBAITING YEARS SMALL GROUPS OF DEER WERE SEEN. POST BAITING ARE SEEING LARGE GROUPS OF DEER. LAST YEAR NO BAITING AND NO MORE LARGE GROUPS OF DEER. I SUPPORT THE BAN. | 5 |
| Support | please allow science and biology to make critical decisions on cwd. Not peoples self interests or monetary interests | 5 |
| Support | signed up but did not speak | |
| Support | some conduit - fund CWD effort, buy shells | |
| Support | I believe baiting/feeding should be allowed. The disabled need the baiting restrictions limited in order to harvest deer and assist in controlling the increasing population. Disabled and against ban, passed on 3 deer because they were difficult shots. | 3,4 |
| Support | not here | |
| Support | ? - CWD & Dept. of Ag (deer farms) much greater regulation required | 6 |
| Support | Supported ban - concerned about car-deer crashes and ethics of baiting | |
| Support | If baiting/feeding are banned, we will no longer be supporting such high deer populations. Thus our deer population problem would correct itself. Good job on CWD zone so far. In favor of continuing and eliminating it. | 5,6 |
| Support | Supported ban | |
| Support | signed up but didn't speak...points were already covered | |
| Support | "Suck it up" until we know more about the disease. Favors ban until more about disease is known. | 6 |
| Support | lets stop cwd before it is too late | 6 |
| Support | While this is a difficult situation. I applaud the DNR for their efforts. At this time, I believe the action of banning and feeding to be the right action. This act does not say you cannot hunt no observe wildlife. | 6 |
| Support | I'm strongly in support of the DNR's positions on CWD & the banning of feeding and baiting | |
| Support | We are wasting far to many deer in the zone for eradication. 2% of infected animals does not warrant this type of bill. | 3 |
| Support | I feel baiting ban should be continued. As we do not know the extent and harm of this disease We also had a much better hunt this year without bait being allowed. We (my family) enjoyed our experience without baiting being allowed. | 6 |
| Support | more people would respect dnr's position on baiting/feeding if dnr didn't use these practices to bait elk/deer at clam lake Also, if didn't employ this practice in the eradication zone. Proposed statewide 23 day gun deer season is a joke, I hope. | 3,4 |

0 = 5 = 20

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| Support | we need to follow the advice of trained experts and not game farm operators! Perhaps ship infected deer to Texas since they don't see any problem with CWD. | 6 |
| Support | Want to see more info on plans for disposing of infected deer carcasses safely. | 4 |
| Support | baiting and feeding goes beyond cwd, many othe disease implications to say nothing of the moral element | 6 |
| Support | in strong support of eliminating all baiting and feeding of deer | |
| Support | baiting- if you want to kill more deer and baiting does it. Why stop it? Safety for other hunters. Feeding=good observation post to what the herd health is. | 3 |
| Support | do not cave to pressures to bring back baiting/feeding-it is not worth the price(TB or CWD or ethically). WI sportsmen do not corn to kill deer | 6 |
| Support | MS in Biology(retired teacher), feels CWD arrived by truck - feels baiting and feeding. | 5 |
| Support | Concerned w/ deer starving with feeding and baiting ban - opposed. | 3 |
| Support | No comments on oral comment summary | |
| Support | Taxidermist - oppose baiting/feeding ban, has affected them financially. | 3 |
| Support | ORAL-SUPPORTS RULE PACKAGE, ESPECIALLY BAITING AND FEEDING RESTRICTION. | |
| Support | Split state at Hwy 8, quoted an article questioning Elizabeth Williams (for baiting). | 4 |
| Support | the impact to all northern businesses is devastating. I own a Green Bay Packers and Nascar store and baiting law even affects us. All area north of highway 8 should be allowed to bait year round unless cwd is found in northern wisconsin | 3 |
| Support | support ban feed/bait. A lot of evidence disease is real. Error on side of deer not our wants | 5,6 |
| Support | cwd and TB transfer animal to animal, baiting increases transmission, support ban on feed/bait | 5 |
| Support | Ecola-not ethical baiting- n. Wi wolves protect against cwd-hold game farms accountable | 5 |
| Support | see comments on hearing appearance slip | |
| Support | domesticating deer herd not a good idea. Some cities bring in sharp shooters. Feeding/baiting prohibits dnr from managing deer herd why can't we get rid of it. Increased damage to surrounding areas due to feeding, car-kills related to baiting. Hazard. | 5,6 |
| Support | I would like to see feeding north of hwy 29 and continue cwd testing | 4 |
| Support | ban baiting and feeding south of hwy 64. Open feeding in the north until cwd is proven to have a strong hold in the north | 2,4 |
| Support | good luck! | |
| Support | I support the ban on baiting and feeding | |
| Support | I would like to see all baiting and feeding of deer banned in Wi | |
| Support | I heard o credible challenge to the science in the EIS | 5 |
| Support | I don't mind not baiting but not feeding is removing one of my rights. Last time I checked this was america. | 3 |
| Support | God these meetings are painful! Anyway, I come from a hunting family- both my parents hunt and I married a man that hunts incessantly. I enjoy venison but do not support baiting. Limited baiting for elderly and handicapped would be acceptable during s | 3,4 |
| Support | do whatever it takes to bring the herd down. NO baiting or feeding of deer (outside CWD zone) Lets do whatever it takes to contain CWD to the area it's no in. Let the land owners (in CWD zone) bait and shoot and be paid a small bounty to get the herd d | 4,6 |
| Support | all baiting and feeding of deer should be banned. There is no place for this type of activity connected with hunting or viewing of wildlife. | 6 |
| Support | we cannot cave in to the vocal minority who want to bring back feeding and baiting. Our first concern should be the deer herd, not economic interest. Public lands should definitely not be open to baiting. People who beit tend to think that they have so | 5 |
| Support | strongly encourage you to eliminate baiting deer all together | |
| Support | it was nice to see deer moving before dark! | 5 |
| Support | The eliminations of baiting and feeding permanently is an absolute "no brainer". And this is not based solely on CWD. Baiting and feeding are known transmitters of several other diseases and is highly suspect in cwd. The only opposition is from those w | 5 |
| Support | Strongly in favor of permanent ban of baiting for deer(statewide)!! In favor of eliminating the practice of importing and exporting deer across state lines. | 4,5 |
| Support | I hunt in unit 14 with out the aid of bait, you have taken the fun out of bow hunting. | 3 |
| Support | Will send written report on my ideas. | |
| Support | Written - I hope to God that we do something SOON about the volume of artificial feed we have been dumping in our ecosystems over the past 15 yrs, with the exception to the ban period. I also hope that a decision on this matter does not come down to poli | 5 |

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| E | Support | Support feeding and baiting ban, deer farms are dirty. | 5 |
| E | Support | Support feeding and baiting ban because of other diseases. | 5 |
| E | Support | Hunting v.s shooting, privatization of deer, baiting and feeding issues, supports baiting and feeding ban. | 6 |
| E | Support | Privatization through feeding of "wild" deer has and will continue to contribute to: hunter conflicts, car deer collisions, disease spread, habitat degredation. Oral - Same as comments + majority of hunters support ban, all organizations support emergen | 5,6 |
| E | Support | I fully support all the proposed rule changes. | |
| E | Support | Corn does NOT keep deer alive in harsh winters. It is like putting kids in a candy store. It has no food value. I don't think people who practice baiting and feeding realize this. There never was a dividion in hunter ranks until baiting and feeding be | 5,6 |
| E | Support | Baiting in northern WI concentrates deer around cabins and other private land. Therefore much fewer deer on public land to be hunted not killed over a bait pile. | 5 |
| E | Support | To allow winter feeding in bad winters. | 3 |
| E | Support | I would like to suggest that instead of Earn-a-buck the state have a buck quota. To reduce the herd numbers the buck harvest is limited to lottery limits. The baiting and feeding ban is the best thing to happen in hunting in WI since I started hunting. | 4/6 |
| E | Support | WI has a very diverse envioronment. B/c of this I believe the DNR needs to seriously look at adjusting the baiting and feeding law to fit the state. The Northern half of the state needs to be addressed differently than the southern half. This is true n | 3,4 |
| E | Support | IN FAVOR OF THE BAITING BAN. | 6 |
| E | Support | in favor of ban-le concerns also with bait feed, make it permanent | 6 |
| E | Support | Written- In favor of the DNR"s position on these topics. This was the 1st yr in the last 5 yrs that I saw deer during legal hunting hrs on family land north of Portage since the neighbors could not bait. Also the first deer I harvested in recent yrs, 1 | 5 |
| E | Support | Oral- Everyone wants to bait. | 3 |
| E | Support | In my opinion, the WI-DNR has taken the proper approach in trying to eliminate the spread of CWD. Total eradication is the only answer. Landowner cooperation is a must to achieve the results. Baiting and feeding must continue to be stopped. | 5,6 |
| E | Support | ORAL- FAVOR DEPOPULATION OF DEER IN INFECTED AREAS AND BAITING AND FEEDING RETSRICTIONS. FAVOR STRICT REGULATION OF GAME FARM. WRITTEN-NEED TO ACT IMMEDIATELY TO PREVENT SPREAD OF CWD. CONTINUE TO KILL DEER IN EZ, BAN BAITING, MONITOR CAPTIVE DEER FARMS, | 5 |
| E | Support | in a severe winter, I have yet to hear a proposal or alternative to starvation as a solution to "preserving" a valued resource | 3,4 |
| E | Support | Need more study on CWD and it's possible human effects. Support DNR's efforts, but don't want all the deer shot off | 2,4 |
| E | Support | Oral-In favor of entire CWD package. Written- employed by dairy farm. Chance of exposing cattle to TB or CWD is too much risk not to oppose baiting and feeding. Would be huge economic losses and cost of testing is high. Proposal is proactive rather than r | 5,6 |
| E | Support | A REDUCTION OF THE LEGAL AMOUNT OF BAIT OR FEED WILL BE INEFFECTIVE, IT MUST BE A TOTAL BAN. | 5 |
| E | Support | WRITTEN-THE BAITING AND FEEDING BAN IS LONG OVERDUE. DNR JOB IS TO PROTECT/MANAGE THE RESOURCES.BAITING IS EASY AND PEOPLE ARE LAZY.ORAL- SUPPORTS BAN. | 5 |
| E | Support | Grandfather died of JC disease. Believes DNR wants complete jurisdiction to control deer on private lands. Opposes ban on baiting. Ojibwa bowhunters. | 3 |
| E | Support | BAITING AND FEEDING BAN DOES NOT MAKE SENSE. SHOULD NOT BE STATEWIDE, SINCE CWD IS LOCALIZED. KILL RATE IS DOWN BECAUSE OF THE BAN. BAITING BAN WOULD LIMIT HANDICAPPED AND ELDERLY. | 3,4 |
| E | Support | In addition to maintaining the baiting ban as a pre-cautionary measure to minimize the chance of spreading CWD, we must also remember that baiting may be a factor in the spread of other diseases, I.e. TB, should they ever be present. "Better safe than so | 5 |
| E | Support | If baiting is an effective tool in IZ/EZ zones, why not statewide? Is there a compromise to allow baiting in smaller amounts? Agree with a baiting ban in high impact zones where there is a higher chance of CWD. | 3,4 |
| E | Support | Please keep the ban on baiting for all areas of the state except the eradication zone. Lets follow the advice of the DNR professionals and keep the politics out of this issue. | 5 |
| E | Support | ASIDE FROM SCIENCE OF BAITING ISSUES, DEER HUNTING IS A BETTER EXPERINENCE WITHOUT BAITING. FAVOR LIMITED QUANTITY FOR DEER VIEWING PURPOSES. | 4,5 |
| C | Support | Has there been any research or discussion for the use of biological control of CWD? There is an insect borne illness (hemorroagic) that would reduce the herd in an area. The insect is killed off by frost and needs to be re-established each year. | 4 |

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| E | Support | ORAL- W/O BAITING, DEER WERE MORE DISPERSED. SUPPORTS RULE PACKAGE. | 5 |
| E | Support | OWN ARCHERY SHOP, WITH 195 BOWHUNTERS SHOOTING/WEEK DURING A 15 WEEK WINTER LEAGUE. HAVE A PRETTY GOOD FEEL OF PEOPLE'S OPINIONS, OBSERVATIONS AND SUCCESS. DEER ARE BECOMING NOCTURNAL, BAITING IS NOT HUNTING. (SEE ATTACHED). | 5,6 |
| E | Support | ORAL-SUPPORTS DNR CWD MANAGEMENT. BIOLOGY SHOULD DIRECT REPONSE. SUPPORTS RULE PACKAGE. | 5 |
| E | Support | Suggest if there is an extended season and I do not support one; only extend it in the T-Zone areas. | 4 |
| E | Support | WRITTEN-BAN BAITING, DNR DOING A WONDERFUL JOB OF COMBATTING CWD. TRUST OUR NATURAL RESOURCE PROFESSIONALS. ORAL-SUPPORTS BAITING BAN. NEVER USED BAIT. | 5 |
| E | Support | Oral - Supports rule: CC-3yr moritorium w/ re-evaluation. Written - Personally I agree w/ the entire CWD package the DNR has proposed - As a Conservation Congress Delegate, we supported the ban on feeding and baiting for a 3 yr moritorium. If this does | 4,5 |
| E | Support | LEAVE LANDOWNERS ALONE. WE PAY OUR TAXES AND OBEY LAWS BUT THIS IS GETTING OUT OF HAND. I'M A HANDICAPPED PERSON WHO RELIES ON BAIT TO HARVEST DEER. PUT A LIMIT ON THE AMOUNT OF BAIT USED. | 3,4 |

Opposed

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12
7

$T_o = 24$

Support

1
12
20
27
26
7

$T_s = 93$

C = 5 : 7