DECISION NOTICE:
CHRONIC WASTING DISEASE MANAGEMENT
PLAN FOR FREE RANGING WILDLIFE IN MONTANA

The Montana Department of Fish, Wildlife & Parks (FWP) has developed an action plan intended to prevent the introduction of Chronic Wasting Disease (CWD) into Montana, to prevent the spread of CWD if it is identified in Montana, and to reduce the prevalence of CWD in specific locations if and when it is found. Actions relating to the *prevention* of CWD into Montana will be implemented as early as the winter of 2005/06 and will continue indefinitely depending on the status of CWD in Montana and any advances concerning the pathogenesis, transmission and potential treatment of CWD. Actions will be taken on a statewide level to prevent the introduction of CWD or the geographic spread of CWD into new areas. Actions related to the *control and/or management* of CWD will be initiated following the diagnosis of CWD in free ranging Montana deer or elk. Those actions will be focused around the location of the first CWD diagnosis in a deer or elk. The CWD Management program will be adaptive in that changes to the program will be instituted as levels of success achieved both in Montana's CWD management program and with programs ongoing in other states are evaluated and the most effective approaches to CWD prevention, reduction, or elimination are identified. A "CWD Task Force" consisting of interagency membership will facilitate modifications to the plan through periodic plan review.

A draft environmental assessment (EA) "Chronic Wasting Disease Management Plan for Free Ranging Wildlife in Montana" was distributed on August 15, 2005. The draft was made available on the FWP public website and at all regional headquarters across Montana. A public comment period was opened at that time with a deadline for public comments of September 23, 2005. In addition, a series of public meetings were held at all seven FWP administrative headquarters as well as in Butte, Montana to allow for public comment.

A total of 18 comments were received during the public comment period. Eleven of those comments were in support of aggressive measures to control CWD should it be found in Montana. Three comments favored less aggressive management actions reasoning that the success of aggressive management in other states has not yet been determined or completely supported by science at this time. Other comments dealt with outlawing "game farming"(1 comment), providing compensation to alternative livestock operators should CWD be found in the area of an alternative livestock ranch (1 comment), or simply submitted reprints concerning mad cow disease and potential public health issues (2 comments).

ELEMENTS OF THE DECISION

A FWP "preferred alternative" was not identified in the draft EA submitted for public comment. While the draft plan presented six general alternatives for management of CWD, site-specific management actions were not developed due to the number of variables dependent on the location of the first finding of CWD in Montana. Those variables include but are not limited to the habitat type, the species diagnosed with CWD, the geologic features in the immediate area, land ownership, and available population data. Following internal review of the draft EA and review of the public comments received by the department, FWP has selected a management plan that incorporates elements of both alternative IV and alternative V from the draft CWD Management Plan. The final decision on specific management of CWD at the diagnosed epicenter will be made by an "epidemiologic team" (epi-team) and based on the variables that the situation presents. Both

alternative IV and alternative V initiate management through the radio collaring of 50 animals and a determination of the "home range" of that set of animals through monitoring by radio-telemetry for 6-9 months. During that initial time period, the epi-team will use all "on the ground" information available to select a management action under either alternative IV or V that best fits the situation. The epi-team will also develop any mitigation measures at that time necessary to reduce effects of the management plan on the environment. Both alternative IV and alternative V are aggressive in their sampling and eradication efforts. Alternative IV operates under a "control at <1%" strategy and alternative V under a "statistical elimination" strategy.

Using the best scientific knowledge available, the management approach selected has been determined to be the most effective in preventing CWD from affecting Montana's wildlife populations, in managing CWD if it does affect our wildlife populations, in assessing the presence and/or prevalence of CWD in Montana, in providing timely information to the public concerning CWD, and in advancing the current knowledge of CWD through research within the capability of FWP. A summary of the selected alternative is presented below.

Prevention

Baiting and Feeding

Feeding of big game animals has been shown to increase the opportunity for transmission of disease by concentrating animals and potentially increasing disease prevalence. Studies from both Wisconsin and the Canadian Cooperative Wildlife Health Centre have established the role of wildlife feeding in the transmission of disease. Wyoming elk feed grounds have been implicated in the transmission of brucellosis while feeding practices in Michigan have contributed to the spread of tuberculosis in Michigan's white-tailed deer populations.

Montana's current restrictions on baiting and feeding of big game animals are covered under MCA 87-3-130 and state that "a person may not provide supplemental food attractants to game animals by purposely or knowingly providing supplemental feed attractants in a manner that results in an artificial concentration of game animals that may potentially contribute to the transmission of a disease or that constitutes a threat to public safety." That statute could be interpreted as allowing the feeding of big game animals as long as it did not result in an "artificial concentration" of big game animals, "potentially contributing to the transmission of a disease" or "constituting a threat to public safety."

The FWP preferred alternative suggests legislation to revise the baiting and feeding restrictions such that a stronger message, more enforceable, is incorporated into the laws to prevent baiting and feeding of big game animals.

Carcass Transport

Recent studies in Colorado (Miller, Williams, et. al., 2004) have shown that CWD infected animal carcasses have the capability after more than two years of decomposition to transmit CWD to uninfected animals. Although the role of environmental transmission in the natural epidemiology of CWD is unknown, it may play an important role. Due to this concern, over 25 states have instituted carcass import regulations that prohibit the import of heads and spinal columns of hunter harvested animals taken from states or areas within states that have diagnosed CWD in their wild populations.

Proper disposal of heads and spinal cords in appropriate landfills may significantly reduce the risk of environmental contamination. More efficient risk elimination may be achieved, however, by

prohibiting import into Montana of heads and spinal cords from animals harvested in states or provinces with active CWD. Although enforcement of this prohibition is expected to be difficult, having the prohibition in place is expected to be a more effective deterrent than recommendations currently in place advising hunters against importation of carcasses and carcass parts.

The FWP preferred alternative suggests that regulations be developed through the FWP Commission prohibiting the importation of heads and spinal columns of cervids harvested in states or provinces that have diagnosed CWD in their wildlife populations or from alternative livestock ranches from those states and provinces. A listing of those states and provinces will be posted on the FWP website and in the big game regulations and kept current by FWP personnel. Importation of processed meat, quarters, hides, antlers and/or clean skull caps, ivories, de-boned meat, and finished mounts will still be allowed from those identified states and provinces. The FWP Commission passed a carcass import regulation in February of 2006 to facilitate inclusion of that new regulation in the big game hunting regulations for 2006.

Translocation/Transplantation

Currently, there is no efficient and economical live animal test for CWD. Movement of live cervids within Montana or importation of live cervids from outside Montana presents a risk for introduction or spread of CWD. FWP has recently enacted a policy change eliminating the rehabilitation of orphan elk calves and deer fawns from Montana at the centralized Helena rehabilitation center. In the past, orphan ungulates from all over Montana were centralized at the rehabilitation center and later released back into the area where they originated. This policy change is intended to eliminate potential for the spread of CWD that could occur by mixing CWD infected, and non-infected orphaned animals at the rehabilitation facility and later releasing those animals back to their point of origin.

FWP has not moved live trapped wild cervids within the state since 1997 when elk trapped on the Moiese Bison Range were transplanted to Region One. The preferred alternative will establish a policy through the FWP Directors office restricting the importation or intrastate movement of wild cervids in Montana.

Intrastate and interstate movement of captive cervids (alternative livestock, i.e. game farm animals) is regulated by the Department of Livestock. Intrastate movement is currently restricted by the requirement for negative tuberculosis and brucellosis tests prior to movement. Importation of captive cervids from other states requires not only negative tuberculosis and brucellosis tests for individual animals, but also assurance that the herd of origin has been under an active CWD surveillance plan for 5 years with no incidence of CWD. The FWP preferred alternative suggests that FWP work with the Montana Department of Livestock to critically evaluate current policies concerning import of captive cervids into Montana and/or intrastate movement of captive cervids within Montana.

Carcass Disposal

Environmental contamination through dispersal of heads and spinal columns from butcher waste has the potential to either introduce or spread CWD in wild cervid populations. Evaluations of appropriate carcass disposal methods by the Environmental Protection Agency and by the State of Wisconsin have identified appropriate disposal methods as incineration, alkaline hydrolysis tissue digestion, and burying in municipal solid waste landfills (MSWLF's). The U.S. Environmental

Protection Agency has provided "recommended interim practices for large-scale disposal of potentially contaminated chronic wasting disease carcasses and wastes" in MSWLF's.

As of March of 2006, Montana has not detected CWD in free-ranging deer or elk through its ongoing surveillance program after testing over 9000 wild cervids. Carcass parts from animals harvested in Montana are therefore considered "low risk" for containing the prion thought to cause CWD and may be disposed of in MSWLF's as has occurred for decades. Should CWD be detected in Montana, carcass waste of animals harvested from management areas where CWD has been detected could still be disposed of in approved (40CFR Part 258) MSWLF's according to the EPA's recommended interim practices. The Montana Department of Environmental Quality, Solid Waste Division regulates and certifies MSWLF's in the state of Montana and has provided a listing of MSWLF's classified as Class II sanitary landfills that are qualified to dispose of materials that are potentially CWD contaminated according to the EPA recommended practices. Any carcasses or carcass wastes with confirmed CWD could also be incinerated when possible. The State of Montana (Department of Livestock) owns a portable incinerator. The preferred alternative directs FWP to develop a memorandum of understanding with the Department of Livestock authorizing use of that portable incinerator should a CWD management action be required in a confirmed CWD location. In that case, regulations prohibiting the movement of heads and spinal columns out of that area by the public would necessitate collection and incineration of those prohibited parts on site or movement off-site for incineration.

The FWP preferred alternative recommends that a memorandum of understanding be developed between the Montana Department of Environmental Quality, the Montana Department of Transportation (road killed carcasses) and FWP regarding disposal of carcasses and carcass parts in MSWLF's. The preferred alternative further recommends that an educational program be developed for the public, meat processors, taxidermists, and MSWLF operators to obtain cooperation in the proper disposal of carcasses and carcass parts.

Surveillance

The potential for success in eliminating CWD is dependent upon timely discovery of CWD in new areas. The longer CWD is present in a particular area, the more opportunity there is for transmission to additional animals and contamination of the environment making elimination of the disease more difficult. Rapid detection of CWD in Montana is critical to the success of management actions. A surveillance program for CWD was initiated by FWP in 1998. That initial program provided broad geographical surveillance for CWD of hunter harvested deer and elk across many areas of Montana. The surveillance program was modified in 2000 with emphasis on hunter harvested sample collection in identified "high risk" areas along Montana's borders with Wyoming, South Dakota, and Saskatchewan. The statewide collection of targeted samples from animals exhibiting clinical signs consistent with CWD and testing of road-killed animals are additional components of Montana's surveillance effort. Montana's effort is part of a nationwide surveillance strategy for CWD with surveillance plans and results reviewed and funding provided annually by USDA/APHIS/Veterinary Services. Montana's surveillance effort is only partially funded through this National program. Montana received approximately $90,000 in 2005 from USDA/APHIS for the CWD surveillance with additional funding coming from the FWP budget.

The FWP preferred alternative recommends that the collection of hunter killed samples for CWD surveillance continue with a focus on identified "high risk" areas, and that a program be initiated

to increase the statewide collection of road-killed samples providing an expanded geographical coverage. The preferred alternative also recommends an expanded educational effort so that citizens in the field can identify potentially CWD infected animals. The public will be asked to alert FWP of those animals so that they can be collected and tested for CWD by department personnel. Collection of targeted samples has been shown in other states to be a valuable and effective surveillance technique.

Management

If CWD is detected in Montana's cervid populations through the CWD surveillance program, timely and efficient management actions are intended to eliminate CWD positive animals and prevent more widespread distribution of the disease across the state. Six separate management alternatives were presented in the CWD draft management plan. The effects of each alternative on the physical, biological, and socio-economic environment were evaluated in the draft environmental assessment. Alternatives underwent extensive internal review and review by the public during the environmental assessment process.

FWP has determined that an additional assessment will be necessary following the first (and any subsequent) finding of CWD in Montana to select appropriate management actions. That assessment will determine whether management under alternative IV, "control at <1%" or alternative V "statistical elimination" is most appropriate in a particular area based on conditions present in the area. This assessment will be done by an epidemiologic team (epi-team) and will evaluate geological features, habitat, land ownership and access potential, cervid population parameters, and other relevant information. The department has developed an internal policy that defines the timelines, responsibilities, and make-up of the epi-team. Appropriate personnel will be included on the epi-team regarding site evaluation, cervid population evaluation, public involvement and landowner contact. The epi-team will make a final recommendation to the Director of FWP to pursue either alternative IV or alternative V as a management action. Either alternative, once initiated, incorporates progressive actions based on the results of data obtained during initial management actions. A summary of the actions included in the preferred alternative is given below:

1. Fifty deer (or elk) will be captured and radio-collared in the vicinity of the initial CWD case in Montana and a tonsil biopsy obtained from all radio-collared deer. Tonsil samples will be analyzed for CWD and, if any are positive, those animals will be located and euthanized. If 5% or more of the radio collared deer are positive for CWD, an immediate population reduction effort will be conducted to achieve a 50% population reduction within estimated population boundaries. If <5% of the radio-collared deer are CWD positive, the management action progresses to step #2.
2. An epidemiological team will be convened to evaluate on the ground conditions in the area of the CWD finding. Depending on their findings, a recommendation will be made to the Director of FWP to either control CWD in the immediate area (alternative IV) or to attempt to eliminate any evidence of CWD in the involved population (alternative V).
3. Radio-collared animals will be followed by radio-telemetry for 6-9 months to determine their home ranges and migration patterns. Using that information, a "population boundary" will be established and a population estimate made of total animals within that boundary.
4. Based on that population estimate, obex and retropharyngeal lymph nodes will be collected from a sufficient number of animals 6 months or older to detect CWD at a 1% incidence

with a 99% confidence level. Samples will be collected from hunter-harvested animals when possible with additional samples collected by agency personnel or cooperating agencies if necessary to achieve required sample numbers. Sample collections may take place over a 1-year period. If the statistical sample indicates a >5% prevalence of CWD, an immediate 50% reduction of the management population will be conducted in a population reduction effort. All animals collected will be tested for CWD exposure. If <5% CWD incidence is detected in the sample collected, management of CWD will proceed on the recommendation of the epi-team as a CWD control effort (alternative IV) or as a CWD statistical elimination effort (alternative V). Those two management alternatives are outlined below:

CWD Control (alternative IV)

a. If the statistical sample collected indicates <1% CWD incidence, the management area will be monitored for 5 years with testing of all hunter harvested animals mandatory. If, at any time during that 5 year period an incidence of >1% CWD incidence is detected in hunter harvested animals, a new statistical sample will be collected over the next year sufficient to determine a 1% CWD incidence at a 99% confidence level.
b. If the initial statistical sample indicates >1% CWD incidence, a second statistical sample will be collected over the next year to provide detection of CWD at a 1% incidence with a 99% confidence level. Again, samples will be collected from hunter-harvested animals when possible with additional samples collected by agency personnel or cooperating agencies if necessary to achieve required sample numbers. Progressive statistical samples will be collected until the incidence of CWD infection is found to be <1%. Once the CWD incidence is below 1%, the management area will be monitored as in (a).
c. If, at any time during the above scenarios an infection rate is detected at >5%, a 50% population reduction effort will be conducted in the management area.
d. Carcasses from animals obtained during agency conducted lethal collections will be held under refrigeration until sample results are obtained. Carcasses testing negative will be given to food banking systems and carcasses testing positive will be incinerated either on site or at an off site location.
e. Management areas will be maintained for a minimum of 5 years with annual sampling of hunter harvested cervids mandatory and movement of heads and spinal cords out of the management area by the public prohibited. When possible, heads and spinal columns as well as any CWD positive carcasses will be incinerated on-site with a portable incinerator.
f. CWD test results will be provided to hunters harvesting animals in the management zone as soon as possible. Sample turn-around times are currently estimated at 1 to 2 weeks.

CWD Statistical Elimination (alternative V)

a. If the statistical sample collected indicates 0% CWD incidence (no positive animals are found), the management area will be monitored for 5 years with mandatory testing of all hunter-harvested animals. If, at any time during that 5-year period a CWD positive animal is detected in hunter harvested animals, a new statistical sample will be collected over the next year sufficient to determine a 1% CWD incidence at a 99% confidence level.

b. If the statistical sample detects any CWD positive animals, a second statistical sample will be collected over the next year to provide detection of CWD at a 1% incidence with a 99% confidence level. Again**,** samples will be collected from hunter-harvested animals when possible with additional samples collected by agency personnel or cooperating agencies if necessary to achieve required sample numbers. Progressive statistical samples will be collected until the incidence of CWD infection is found to be 0%. Once the CWD incidence is measured at 0%, the management area will be monitored as in (a).
c. If, at any time during the above scenarios an infection rate is detected at >5%, a 50% population reduction effort will be conducted in the management area.
d. Carcasses from animals obtained during agency conducted lethal collections will be held under refrigeration until sample results are obtained. Carcasses testing negative will be given to food banking systems and carcasses testing positive will be incinerated either on site or at an off site location.
e. Management areas will be maintained for a minimum of 5 years with annual sampling of hunter harvested cervids mandatory and movement of heads and spinal cords out of the management area prohibited. When possible, heads and spinal columns as well as any CWD positive carcasses will be incinerated on-site with a portable incinerator.
f. CWD test results will be provided to hunters harvesting animals in the management zone as soon as possible. Sample turn-around times are currently estimated at 1 to 2 weeks.

Any management actions required following the discovery of CWD are dependent on the cooperation of the agency or individual who controls or owns land on which the management action is anticipated. Prior to initiating management actions, public meetings will be held in affected areas. Property interest agencies or individuals will be consulted concerning land access issues and involved with planning and implementation efforts. All of these activities to obtain cooperation by potentially affected parties will be conducted by members of the epi-team.

Public Information

Providing accurate information on a timely basis is critical to obtaining the cooperation and support of the general public and other agencies potentially affected by CWD. There are two phases to the public information plan included in the CWD Management Plan. Phase one during the active surveillance period prior to the discovery of CWD in Montana and phase two following the detection of CWD. Phase one involves continual and timely public updates providing surveillance status information and information on any new scientific developments concerning CWD. Included in phase one will be educational efforts concerning proper disposal of carcasses, carcass transport regulations, and national surveillance results. Phase two, in particular the first 10 days following an initial discovery of CWD in Montana, are critical in conveying confidence to the public that FWP has prepared for the event appropriately and is managing the situation using the best science available. The Communication/Education Division of FWP, along with the Wildlife Division, have developed a public information plan to provide current information concerning CWD and to inform the public about any management actions that may take place in Montana. The plan also provides a step-wise protocol for actions required to inform the public and affected agencies following the diagnosis of CWD in Montana.

The FWP preferred alternative recommends acceptance of the draft public information plan as included in the draft CWD Management Plan.

An additional aspect of public information involves providing timely sample results to Montana hunters harvesting cervids. This service becomes more critical once CWD is found in Montana, particularly for cervids harvested within or close to management zones. FWP intends to establish a web-based system, potentially using a bar coding system on big game tags, that would enable hunters to either call in to FWP or log on to the internet to check CWD test results.

Research

Currently, research projects in FWP Region 6 and in FWP Region 7 have provided or are providing demographic information and animal movement information on deer in areas of Montana selected as "high risk" areas for initial CWD diagnosis. Should CWD be found in either of those areas, the information obtained through these studies will be beneficial in establishing movement patterns and population estimates at the initiation of management actions. This type of information is essential to the epidemiologic team in selecting the appropriate management strategy (alternative IV or V) for CWD in a particular location. Baseline information about affected populations would also provide a basis for additional research on disease epidemiology, transmission, and pathogenesis and on the overall effects of an outbreak of CWD on a naïve population.

The FWP preferred alternative recommends an increased research effort to determine cervid population size, composition, density distribution, movement patterns, emigration rates, and habitat use on local levels. Initial research should focus on any additional areas and populations identified as high risk for contacting CWD due to the proximity of CWD infected animals in Montana or in neighboring states and provinces.

The CWD Oversight Committee, charged with the preparation of a CWD management plan, has made additional recommendations concerning research. The committee recommends that FWP create a GIS layer that would summarize seasonal distribution, movement patterns, and home range size for mule deer, elk and white-tailed deer from all past studies employing telemetry. These known locations describing distribution/movements could be used to extrapolate to similar environments where actual data is not available and to predict animal distribution and habitat use for the entire state. These spatial parameters would provide important information allowing the epi-team to model the potential for spread within or from newly identified CWD positive locations. Other spatial layers of importance such as land ownership and vegetation could be assembled in the same project.

The FWP preferred alternative recommends the establishment of a CWD Task Force charged with evaluating research needs, research results, management plan effectiveness, and potential management plan modifications. Makeup of this committee will include members from the FWP Director's Office, the FWP Research and Technical Services Unit and the FWP Enforcement Division. In addition, membership will include supervisory, wildlife and Conservation/Education personnel from regions where management actions have been initiated and representatives from any Federal agency or Tribal government likely to be affected by the management action.

A second important aspect of research relates to the adaptive nature of the CWD plan. As management actions are completed and populations monitored for CWD exposure, results of

management actions and their success in containing and/or eliminating CWD must be monitored. Changes to the management plan by the CWD Task Force may be made based on these evaluations or on new scientific information regarding CWD.

RATIONALE FOR DECISION

FWP has been entrusted by the citizens of Montana with the preservation and management of our wildlife resources. Included in this mandate is the identification evaluation, and management of wildlife diseases and the effects that they have on the health of wildlife populations and consequently on the economy of Montana. In order to meet the goals of its statutorily mandated responsibilities, the Department set four specific project objectives for the CWD Management Plan. Each alternative in the draft EA was evaluated for its ability to achieve those objectives and for any potential significant affects the alternative might have on the human environment.

> **Objective #1:** Prevent the introduction of CWD into Montana's free ranging deer and elk populations.
> **Objective #2:** Minimize the spread of CWD beyond affected areas and reduce the incidence of the disease within affected populations if it is detected in Montana.
> **Objective #3:** Provide timely, complete and accurate information about all aspects of CWD to personnel of participating agencies and to the public in Montana and throughout the United States.
> **Objective #4:** Maintain an adaptive CWD surveillance program in Montana to allow for the early detection of CWD and to allow for evaluation of population involvement and management action success as the plan itself develops in response to CWD.

Options for the management of CWD are limited. No vaccine is available to prevent infection in susceptible animals and there are no known treatments for infected animals. The long incubation period, possible environmental contamination with a persistent pathogen, and an incomplete understanding of the routes of transmission limit options for control of CWD. Prevention of CWD in new areas and/or elimination of new "hot spots" of CWD infections have generally been the focus of action plans from states that have not found CWD within their borders. If hot spots can be identified through surveillance programs and population densities manipulated to reduce the geographic movement of infected animals and the resulting environmental contamination in a timely manner, wildlife professionals believe that there is a chance to control the spread of CWD or to potentially eliminate CWD. Once CWD has become established, however, eliminating the disease completely may prove to be difficult or impossible. Attempts to reduce the prevalence of CWD in affected areas or to completely eradicate the disease are being pursued in Colorado and Wisconsin, respectively. Those attempts may provide insight into control and management of CWD in affected wildlife populations in future years.

Prevention

The preferred alternative selected by FWP substantially increases preventative measures available to the state of Montana. While alternatives I and II made no changes in preventative measures, alternatives III, IV, V, and VI all called for similar and substantive changes to carcass transport regulations, baiting and feeding laws, movement of wild cervids into and within Montana, and carcass disposal.

The preferred alternative calls for establishing rules prohibiting carcass import rather than simply providing public education and recommendations for carcass transport. The public was given an opportunity to comment specifically on carcass transport regulations when a prohibition on importing heads and spinal cords into Montana from CWD affected states and provinces was placed in the big game tentative regulations in December of 2005. In February of 2006, the FWP Commission finalized those rules and prohibited the importation of heads and spinal columns from cervids harvested in states that have experienced CWD. Although this new rule may present some hardships to resident taxidermists or meat processors who have clients harvesting cervids from other states, additional business will be generated for resident taxidermists and meat processors when non-resident hunters harvest a trophy animal in Montana and are unable to take the whole (unmounted) head back to their state of origin due to carcass import restrictions. Currently, 25 states have restrictions concerning the import of cervid heads and spinal cords from states or areas of states that have experienced CWD.

Revisions to baiting and feeding laws concerning game animals is a preventative measure that will not only help in the prevention and/or transmission of CWD in cervid populations, but also will aid in addressing the urban wildlife problems that are occurring in many Montana cities. The FWP preferred alternative recommends the development of more substantive laws in Montana prohibiting baiting and feeding of big game and providing enforcement penalties for non-compliance with the prohibition. Those changes must be initiated through the legislature and could be addressed in the 2007 legislative session.

FWP instituted a policy change in the spring of 2005 concerning the movement of wild cervids within Montana. That policy change curtailed the rehabilitation of orphaned fawns and elk calves at the centralized rehabilitation facility in Helena. FWP determined at that time that the risk of spreading CWD through the existing rehabilitation and release program outweighed the benefits provided to Montana's wildlife populations. The current CWD management plan also curtails the transplantation of wild cervids within Montana or from sources within or outside Montana. That prohibition will be instituted through policy changes made by the Director of FWP.

Finally, programs providing education and information regarding the proper disposal of carcass waste from harvested cervids will help protect our wildlife populations. Although alternatives III, V, and VI called for new regulations or laws concerning proper disposal of carcasses or carcass parts, an educational program was selected under the preferred alternative. Until CWD is discovered in Montana educational programs should adequately reduce the potential for improper disposal of carcasses that could contribute to the potential spread of CWD in Montana. These programs, coupled with appropriate communication and cooperation with the Department of Environmental Quality and the Department of Transportation should address the potential issues of environmental contamination as a potential source of CWD transmission.

Surveillance

FWP has maintained an excellent surveillance program since 1998 to detect the presence of CWD in Montana's wildlife. That program will be continued under the preferred alternative and will be supplemented through the increased collection of road-killed animal samples to monitor for CWD on a broad geographic basis. Surveillance will also be supplemented by educating the public and soliciting their help in informing FWP of any suspicious looking animals so that those "target samples" may be collected and tested for CWD.

While alternatives II and VI called for an expanded statewide surveillance of hunter-killed animals, the financial support for that expansion is not available at this time. Maintaining active surveillance in identified high-risk areas, with expanded geographical surveillance provided by testing of road-killed animals will provide a good alternative allowing general statewide surveillance of an easily obtainable sample set (road-killed animals) that has been shown to be a good indicator of CWD distribution. Concurrently, intensive sampling in identified high-risk areas will provide for rapid identification of CWD if it moves into Montana, as expected, from bordering states or provinces where it is currently found.

Disease Management

Based on public comments received, there was general support for aggressive management of CWD when it arrives in Montana. The most aggressive action possible, aggressive elimination, was presented in alternative VI of the CWD management draft That alternative attempted total elimination of the cervid population within a minimum 5 mile radius of the first detected case of CWD in Montana. Attempts at aggressive elimination in Wisconsin, where CWD was first detected in 2002, have now been scaled back to attempts at population reduction to densities of 5 deer per mi^2 in the disease eradication zone and 10 deer per mi^2 in the herd reduction zone. Total elimination of cervids in a specific area is difficult to achieve, may increase the immigration of deer from surrounding areas into newly evacuated and potentially environmentally contaminated habitat, and would lessen potential for cooperation of private landowners or government agencies on whose land management actions may need to be initiated.

Alternatives IV and V also presented aggressive management actions predicated on an initial determination of CWD incidence in a defined population at a high statistical confidence level. Both of those actions achieve a population reduction through sampling that, depending on the area in Montana in which CWD is first found, may result in population reductions to densities less than the 5-10 deer per mi^2 targeted in Wisconsin's plan. While alternative IV calls for additional samples and therefore additional population reductions if the sample indicates a prevalence of >1% CWD positive animals, alternative V calls for additional samples if any CWD positive animals are found in the sample taken.

Effective management of CWD will be influenced by the environmental and social factors present in the area of the first CWD detection. Because of this, the FWP preferred alternative includes an initial "branch point" or "decision point" based upon an evaluation of these factors. Following the initial detection of CWD, an epidemiologic team will be established. The function of the epi-team is to evaluate information relative to the local cervid population density, distribution, and demographics; the land ownership and factors influencing access to lands for management actions; and the geographical barriers that may assist with management actions. The epi-team will make a recommendation to the Director of FWP based on their evaluation as to whether management for control (alternative IV) or statistical elimination (alternative V) of CWD is the appropriate fit to factors on the ground. The initial actions of both alternative IV and alternative V are identical. Both call for the radio-collaring and potential CWD testing of 50 cervids from the immediate area and tracking those animals for 6-9 months to determine home range. The epi-team will have an opportunity during this initial 6-9 month period to complete their evaluation and recommend management for control of CWD or for statistical elimination of CWD to the Director. Both of these management actions will make use of licensed hunters to the greatest extent possible to carry out the objectives of the plan.

The cooperation of the hunting public, private landowners, public agencies, licensed outfitters, meat processors, taxidermists, etc. will be essential to the success of the selected management action. Department efforts to solicit cooperation from all groups, agencies, and individuals involved in the prevention and management of CWD will continue.

SIGNIFICANCE OF IMPACTS:
FINDING OF NO SIGNIFICANT IMPACT

Based on the following summary of effects (as discussed in the EA) FWP has determined that the alternative selected for prevention and management of CWD in Montana will not have significant long-term effects on the human environment. Short-term impacts on a localized area may occur and would include both beneficial and detrimental impacts. Long-term impacts in local areas are anticipated to be beneficial if successful in the eradication and/or reduction of CWD in an area. Statewide long-term impacts are also expected to be beneficial in that they would either eradicate CWD in Montana or prevent the spread of CWD to additional locations. Specific local impacts will vary due to the geographical, geological, and habitat characteristics in the location of the initial finding and subsequent findings of CWD in Montana. In each case, any detrimental impacts will be evaluated and mitigation measures put in place to reduce the level of significance of impacts if possible.

CWD has the capability to reduce deer, elk, and potentially moose populations within Montana causing significant biological, physical, social, economic, cultural, and aesthetic impacts. The prevention and management aspects of alternatives IV and V were evaluated in the draft environmental assessment not only for their potential to cause environmental impacts, but also in comparison with the impacts anticipated should CWD be allowed to enter Montana, become established and spread throughout cervid populations in the absence of any management actions.

The preventative aspects of the preferred alternative include actions prohibiting baiting and feeding of cervids as well as movement of live cervids. Preventative actions also restrict carcass transport and direct appropriate carcass disposal. No significant adverse environmental impacts were identified in the draft environmental assessment concerning those preventative aspects.

Management actions are taken annually in Montana in efforts to maintain deer and elk populations within the limitations of habitat availability. Montana FWP has established an “adaptive harvest management program” for both deer and elk. These programs require monitoring of deer and elk populations and provide specific “trigger points” for establishing various hunting regulation packages that will manipulate populations in specific areas. In many ways, the CWD management plan preferred alternative “dovetails” with the actions and intentions of these existing population management plans. Initial monitoring for CWD, discovery of disease, and determination of the prevalence of disease, all have built in trigger points that drive the CWD management plan to the succeeding level to either eliminate CWD or to prevent its distribution throughout cervid populations in Montana. While the adaptive harvest management program seeks to maximize the relationship of populations and available habitat, the CWD management plan seeks to minimize the opportunity for CWD to appear in Montana or to spread throughout Montana. The CWD management plan may reduce population levels below those that would be supported by existing habitat in an effort to contain an outbreak of CWD. In that regard, the actions directed under the CWD management plan preferred alternative will have short-term impacts on deer and elk populations. Those effects will be localized to management areas and are expected to be

reversible provided that CWD positive animals can be eliminated. In comparison, it is expected that taking no action upon the finding of CWD would have long term and irreversible impacts not only on a local basis, but also statewide.

As mentioned earlier, preferred alternative management actions will result in population reductions that may be above those normally achieved through the general big game season harvest dictated by the adaptive harvest management plan. Those population reduction efforts will initially supply an appropriate number of samples for CWD testing to enable the detection of CWD if it is present in 1% of the targeted population with a 99% confidence interval. Minor impacts are anticipated as a result of these sampling and/or population reduction efforts. While initial population reduction efforts may provide short term economic benefits in local areas through increased harvest activity, there could also be a reduction in hunter numbers in following years due either to the reduced number of available animals or to the loss of hunters who do not want to harvest an animal from an area identified as a CWD management zone. If CWD can be eliminated or controlled, however, the effected wildlife populations are expected to rebound resulting in a return of hunter numbers and a return of the local economic benefits of big game hunting to historical levels.

While there will be impacts resulting from the CWD management plan, in particular the portion of the plan requiring population reductions for CWD surveillance and control needs, those impacts identified through the draft environmental assessment were determined to have only minor environmental impacts that, if the management plan is successful, would be short term.

CWD MANAGEMENT PLAN FUNDING

All of the activities included in this management plan will require manpower and financing. Currently, the CWD surveillance program is financed through a $26,000 allocation from the general license fund and $90,000 from the USDA/APHIS/Veterinary Services based on Montana's identification as a Tier II CWD state. Those monies are only adequate to cover the expense of operating the current surveillance program and will not provide for an increase in road-killed sampling as recommended by the preferred alternative.

Should a management action be required in Montana, the plan would be a long-term commitment requiring at least 5 years of intensive monitoring, an initial statistical sampling, and a potential population reduction effort. Multiple management actions could be required in different areas of the state increasing the financial and manpower commitment.

Initial population evaluation efforts in a management area would require trapping and radio collaring 50 animals and monitoring those animals over a 9-month period at an estimated cost of $200,000. Following initial evaluation of the affected population, a statistical sampling effort would be necessary to determine the incidence of CWD in the population. Costs of this operation would depend heavily upon the delineated boundaries of the affected population and the population estimation within the boundaries. As an example, a population estimate of 2000 cervids within the management area boundary would require the lethal collection of 410 animals for analysis. Depending on available methods of collection (hunter collection, agency collection, etc.) and the needs for processing, holding, or disposal of carcasses and carcass parts, this type of operation, including manpower and equipment, is estimated to cost between $500,000 and $1,000,000. In comparison, Wisconsin spent $11 million in the first year of CWD management in

their effort to eliminate CWD from their "disease eradication zone" and prevent the spread of CWD in Wisconsin.

Finally, an effort to control CWD in a "hot spot" in Montana would be a commitment to spending over a 5-year period. Multiple hot spots may be identified in Montana resulting in multiple management actions undertaken concurrently. If CWD is found in Montana, the state will move to a tier 1 status under the USDA/APHIS cooperative agreement. Tier 1 status provided funding of $280,000 to tier 1 states in 2005. The future of that funding and the amounts available will depend upon the number of states that experience CWD (with funding amounts potentially reduced as the number of states involved increases) and upon appropriation of additional federal funding for CWD control.

Additional funding sources must be identified and budgeted to provide the necessary finances should a management action, or multiple management actions, be required in Montana. Emergency appropriations from the general license fund, general license fee increases to provide CWD management funding, or legislative action providing funding from the state general fund have been suggested.

In adopting the preferred alternative for prevention and management of CWD in Montana, the FWP has evaluated a number of alternatives currently being used by other states in an attempt to select the alternative best suited to our current conditions. The adaptive nature of the selected alternative will allow us not only to make final decisions concerning management based on the site of Montana's first CWD occurrence, but also to adapt the management plan based on the constantly evaluated outcome of our own management actions as well as the actions being taken in other states. At the same time, the management plan will seek to prevent the introduction of CWD into Montana. Our best hopes lie in the cooperation of the citizens and sportspersons of Montana to assist in the prevention and management aspects of this plan.

_____ _____

M. Jeff Hagener Date
Director, Montana Fish, Wildlife & Parks

This CWD Management Plan and the Decision Notice were presented to and concurred with by the FWP Commission at their June 6, 2006 meeting.

CHRONIC WASTING DISEASE MANAGEMENT PLAN FOR FREE RANGING WILDLIFE IN MONTANA

AUGUST, 2005

Montana Fish, Wildlife & Parks

Wildlife Division, Helena, MT 59620

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GLOSSARY

Biopsy: Removal of tissue from a living body for microscopic examination to establish diagnosis.

Cervid: Members of the *cervidae* family, which include deer, elk, moose, and caribou.

Ecological niche: The area within a particular habitat occupied by an animal in which it interacts with other different species of animals and plants.

Emigration: To leave one area to settle elsewhere.

Endemic area: A geographical area where a disease has been present in the population for a period of time or has become established.

Epizootic: A term used to describe a disease that attacks a large number of animals simultaneously.

High-risk area: A geographical area identified as having a higher probability of finding CWD within its boundaries.

Incubation period: The period of time between becoming infected with a disease causing organism or a prion and actually showing outward signs of the disease.

Immigration: To enter and settle in a new region.

Infective dose: The amount of infectious material required to establish an infection or disease in a susceptible animal.

Morbidity: An unhealthy condition indicating that a disease is ongoing in an animal.

Mortality: The frequency of number of deaths in proportion to a population.

Offal: Waste parts of a butchered animal.

Pathogen: An agent that causes a disease (bacterium, virus, prion, etc.)

Pathogenesis: The development of a diseased or morbid condition. Generally refers to the mechanism by which a pathogen is able to affect the cells, organs, and organ systems of an animal eventually causing disease.

Prevalence: The percentage of animals affected in a given population.

Spongiform lesions: Microscopic “holes” appearing in the brain tissue that are characteristic of transmissible spongiform encephalopathies.

Telemetry: The science and technology of automatic data measurement and transmission by radio from remote sources to a receiving station for analysis. Used in wildlife biology to locate and track animals that have been fitted with a device that sends out a radio signal.

Ungulate: Hoofed animals such as horses, cattle, swine, deer, and sheep.

Zoonotic: A term used to describe a disease that can be transmitted from animals to man.

CHRONIC WASTING DISEASE MANAGEMENT PLAN
DRAFT ENVIRONMENTAL ASSESSMENT

INTRODUCTION

This environmental assessment (EA) evaluates potential effects on the human environment from actions proposed by the Montana Department of Fish, Wildlife & Parks intended to prevent and/or control Chronic Wasting Disease (CWD) in Montana's free-ranging deer and elk populations. Any actions taken, or any actions not taken per the "no action alternative," have the potential to affect wildlife populations as well as the economic, agricultural, environmental and social issues directly tied to those wildlife populations. This document represents a coordinated effort using the "best science" currently available to state and federal agencies and their scientific staffs in the development of a CWD management plan for the state of Montana. Although we can benefit from the experience gained in other states where actions have been taken to manage ongoing CWD problems, conclusions regarding the success of those actions are premature at this time. Almost all scientists and wildlife managers in states faced with ongoing CWD problems have agreed, however, that action must be taken to prevent and/or control CWD. To be passive in the fight against this disease can only result in decreased wildlife populations and decreased opportunities for the enjoyment of this valuable resource in the state of Montana.

BACKGROUND

Disease has been defined as a "deviation from the normal" for a functioning organism or their systems. Bacteria, viruses, rickettsia, parasites, and fungi, generally referred to as "pathogens", have historically caused transmissible diseases. A new concept in transmissible disease has emerged in the last 20 years proposing that a set of diseases called transmissible spongiform encephalopathies (TSE's) are not caused by "historical" pathogens, but by a protein referred to as a "prion." A prion lacks the genetic information (DNA or RNA) that all of the previously mentioned pathogens rely on for their infective nature. Although the "prion theory" has not enjoyed full acceptance in the scientific community, prions have been implicated in a number of diseases in a wide variety of mammalian species. These diseases include Kuru and Creutzfeldt-Jakob Disease (CJD) in humans, scrapie in sheep, bovine spongiform encephalopathy (BSE or mad cow disease) in cattle, transmissible mink encephalopathy in mink, feline spongiform encephalopathy in cats, and CWD in deer and elk. There is no cure for any of the TSE's - all of these diseases cause the eventual death of the affected animal.

CWD was first identified as a fatal condition of unknown cause in captive deer at a Colorado wildlife research facility in the late 1960's. In 1978, that condition was linked to abnormalities found in the brains of the infected deer. Those abnormalities had a remarkable resemblance to what was observed in the brains of sheep infected with scrapie, a TSE disease that has afflicted sheep for centuries. This finding led scientists to conclude that the disease affecting the captive deer was a TSE. Field observations, proven later by experimental studies, indicate that CWD is transmissible from animal to animal, although

the exact method or natural route(s) of transmission remains unclear. Most researchers believe that transmission occurs when a susceptible animal is directly exposed to the urine, feces, or saliva of an infected animal. Transmission of CWD has also been shown to occur through exposure of non-infected animals either to pastures contaminated as long as two years earlier by infected animals or by exposure to decomposed carcasses of animals that have died of CWD. The role played by environmental contamination in the natural transmission of CWD is presently being evaluated. What is known is that the prion protein is very difficult to destroy and that normal inactivating agents such as alcohol, UV light, heat, and oxidizing agents normally effective in destroying bacteria, virus, etc. are much less effective in destroying the prions. Because of this, prions may remain in the environment for much longer than the classical pathogens.

CWD was first recognized as a disease in a free ranging elk in Colorado in 1981 and in Wyoming in 1985. By 1990, CWD had been found in free ranging mule and white-tailed deer in both states. Although the disease seemed to remain relatively localized for two to three decades within northeastern Colorado and southeastern Wyoming, appearance of CWD in captive game farm elk in Saskatchewan in 1996 preceded findings in game farms in South Dakota, Colorado, Oklahoma, Montana, Nebraska, Kansas, Wisconsin, Minnesota, New York, and in the province of Alberta. The movement of captive deer and elk by the game farm industry has been implicated in the spread of CWD to both captive cervids and free ranging cervids in other states. Increased surveillance efforts for CWD by many states may also have added to the known geographical distribution of CWD in the United States outside the original endemic area. In addition to Colorado and Wyoming, CWD has now been detected in free ranging deer or elk populations in Nebraska, South Dakota, Wisconsin, Illinois, Utah, New Mexico, New York, and in the province of Saskatchewan.

The minimum incubation period prior to the observation of clinical signs in animals experimentally infected with CWD is 15 months; incubation periods are variable and may exceed 25 months in deer and 34 months in elk (Williams et al. 2002a). The time course to observation of clinical signs, however, appears to be inversely related to the infective dose, so experimental data probably underestimates the incubation periods seen in natural infections (Williams et al. 2002b). Clinical signs in infected animals include weight loss, increased drinking, increased salivation and drooling, lowered head, drooping ears, and behavioral changes. Because these clinical signs mimic those seen in animals affected by other diseases, the only way to accurately diagnose CWD in deer and elk is by direct examination of either a section of the brain (obex) or of specific lymph nodes (lymph nodes of choice for diagnosis are retropharyngeal lymph nodes) from the affected animal. Previously, positive CWD diagnosis was accomplished by either microscopic examination of the collected tissues for evidence of characteristic "spongiform lesions" or by a technique employing specialized staining of the tissues called immunohistochemistry (IHC). Recent advances in diagnostic techniques, including development of an enzyme-linked immunosorbent assay (ELISA) for diagnosis of CWD, have decreased both the cost of performing the test and the time required to provide results. These advances in testing methodology and efficiency have come at a time when more states across the U.S have

either experienced CWD in their wildlife populations or have become concerned about it's possible presence resulting in dramatically expanded surveillance programs for CWD.

There is a good deal of work going on in the United States and around the world focused on the development of a diagnostic test for CWD and other TSE's. The goal of that work is to develop a diagnostic test that can be performed on a sample that can be collected from a live animal. Recently, a Canadian company announced progress in the development of a test that detects a specific protein in the blood of mammals that may indicate, among other things, infection with a TSE.

CWD remained limited in distribution to Colorado and Wyoming for 20-30 years. Although it was a new disease and of interest to researchers, effects on the deer and elk populations were thought to be minimal and there was little concern regarding public health or environmental issues. Experience with another TSE in the United Kingdom, however, brought international attention to the prion diseases when BSE (mad cow disease) was associated with a condition in humans called variant Creutzfeldt-Jakob disease (vCJD). Although sporadic CJD has occurred in the human population at a rate of approximately 1 per one million people for at least the last century, vCJD was suddenly implicated as a disease that was transmitted to humans from BSE infected cattle. Whereas sporadic CJD did not seem to be transmissible person-to-person and generally affected individuals 50 years or older, vCJD affected a younger population, seemed to be transmitted through eating contaminated meat from BSE affected cattle, and caused some distinguishing diagnostic characteristics in its victims allowing differentiation from sporadic CJD. As of December 1, 2003, a total of 153 cases of vCJD had been reported in the world: 143 from the United Kingdom, six from France, and one each from Canada, Ireland, Italy, and the United States (note: the Canadian, Irish, and U.S. cases were reported in persons who resided in the United Kingdom during a key exposure period of the U.K. population to the BSE agent) (Center for Disease Control, 2004). Concern over direct transmission of TSE diseases from other animal species to humans suddenly became a public issue. Public concern over the potential connection between mad cow disease and vCJD surfaced just as the distribution of CWD in deer and elk was increasing in the United States.

To date, there have been no cases of human prion disease that have been associated with CWD. Because of differing experiences seen with two more common animal TSEs, BSE and scrapie, there is a lingering uncertainty about assessing any potential risk that CWD may pose to humans (Williams et al. 2002a). Scrapie, a TSE disease-affecting sheep, has been found in sheep populations in many countries for at least 200 years. Although there is a long history of human exposure to the scrapie infective agent (prion) through handling sheep and consuming sheep tissues, including brain, there is no evidence that this exposure presents a risk to human health. In contrast, BSE, as discussed, has been implicated in the deaths of 153 humans due to vCJD. In the absence of complete information on risk, and in light of similarities between animal and human TSEs, public health officials and wildlife management professionals recommend that hunters, meat processors and taxidermists handling deer and elk carcasses from areas where CWD has been diagnosed should take measures to avoid exposure to the CWD agent and to other known zoonotic pathogens. Boning game meat is recommended as an effective way to reduce the potential for

exposure. It is also recommended that hunters not consume the brain, spinal cord, eyes, spleen, tonsils, or lymph nodes from harvested deer and elk, particularly those harvested from areas where CWD has been identified in the free ranging populations. These precautionary measures should serve as a "firewall" to further reduce any human risk from CWD.

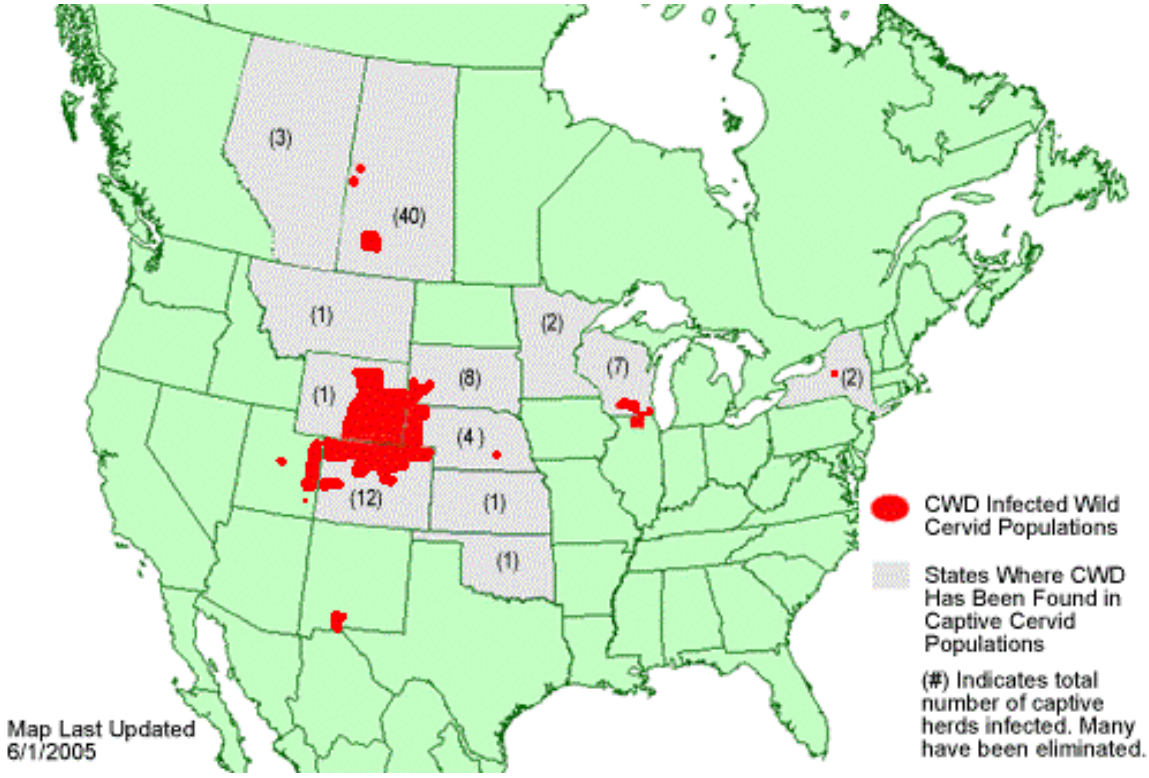


Figure 1. Distribution of CWD in both captive and wild deer and elk populations as of 2004. (from CWD Alliance webpage, CWD-info.org)

The discovery of CWD in both the captive industry (game farms) and in free ranging populations has caused concern for those participating in or regulating the captive deer and elk industry and for those state agencies involved with managing free ranging deer and elk populations. Attempts to minimize the distribution of the disease or to eliminate the disease have been initiated by both state and federal agencies. Formal discussions relative to a State/Federal program for this disease did not develop until the United States Animal Health Association (USAHA) passed resolutions in 1998 and 1999 endorsing a national program as the disease began to spread through the alternative livestock industry. As CWD was diagnosed in more and more captive elk herds (currently 39 herds in the U.S. and 43 herds in Canada have been diagnosed with CWD), the North American Elk Breeders Association also endorsed a cooperative state and federal program and proposed a program outline. USDA/APHIS/Veterinary Services convened a national working group for CWD in June of 2000. This national working group developed a draft national CWD program for captive elk, which was adopted and funded in fiscal year 2003. This program was

restricted to captive elk, offered surveillance support and provided guidance to all participating states for eradication and control of CWD. USDA/APHIS has now proposed the "Chronic Wasting Disease Herd Certification Program and Interstate Movement of Captive Deer and Elk" to eliminate CWD from captive deer and elk in the United States (USDA/APHIS, 2003). That plan is expected to go into place in late 2005.

In June of 2002, a task force of Federal agencies and state wildlife management agencies completed the "Plan for Assisting States, Federal Agencies, and Tribes in Managing Chronic Wasting Disease in Wild and Captive Cervids" (USDA/APHIS, 2002). An implementation plan, in place in 2003, provided almost $21.5 million in federal funding for control and eradication of CWD in wild cervids. Total state expenditures in 2003 were estimated at $15.2 million with an additional $2.7 million of Federal Aid and Wildlife Restoration Act funding allocated at the discretion of the states. The six elements of the implementation plan include surveillance, disease management, scientific/technical information, communication, diagnostics, and research.

Finally, in April of 2004, wildlife and natural resource managers from 24 states developed the "Multi-State Guidelines for Chronic Wasting Disease Management in Free-Ranging White-tailed Deer, Mule Deer, and Elk." The suggested multi-state guidelines include recommendations for addressing disease prevention, disease and population management, captive deer and elk management, carcass disposal, monitoring and adaptive management, environmental decontamination, and population restoration in plans developed by individual states. Many of those program elements are presented and discussed in the alternatives evaluated in this EA.

State action plans initiated by wildlife management agencies have been developed to address potential effects of CWD on wildlife populations. CWD is unlike other diseases that wildlife agencies have dealt with and there is limited history concerning the effects of CWD on wildlife populations. Scientists have therefore had to rely on computerized models to evaluate potential effects. Computerized models require the input of a number of disease parameters, some of which are still unresolved for various aspects of CWD. Early models have forecast declines in a cervid population once the prevalence of CWD in a given population exceeds 5% (Miller et al. 2000). Those models go on to predict that a given deer population of 1000 animals would experience a 10% reduction in 30 years, a 50% reduction in 50 years, and either a complete eradication of the deer herd or a 90% reduction in 100 years due to CWD. Those predictions have been based on a frequency dependent model where the number of contacts that an individual deer has with an infected deer is constant and is not affected by changes in the density of the deer population. Other models are based on a density-dependent parameter, where the number of contacts would decrease as the density of the population decreased due to disease or other mortality factors. The density dependent models may indicate that a reduced population density could eventually be obtained that would be insufficient to sustain continued transmission of the disease resulting in the disease eventually "dying out." Unknowns in the density dependent model include the role environmental contamination may play in the natural transmission of CWD and the effect that movement or migration of infected animals from an infected herd to adjacent uninfected herds may have on the model outcome.

In response to the threat of CWD, and in many cases with the aid of the above-mentioned programs and models, various state wildlife and conservation agencies have developed plans for the prevention, control, or eradication of CWD within their borders. Options for the management of CWD are limited. No vaccine is available to prevent infection in susceptible animals and there are no known treatments for infected animals. The long incubation period, possible environmental contamination with a persistent pathogen, and an incomplete understanding of the routes of transmission limit options for control of CWD (Miller et al. 2000). Prevention of CWD in new areas and/or elimination of new "hot spots" of CWD infections have generally been the focus of action plans from states that have not found CWD within their borders. If hot spots can be identified through surveillance programs and population densities manipulated to reduce the geographic movement of infected animals and the resulting environmental contamination in a timely manner, wildlife managers believe that there is a chance to control the spread of CWD or to potentially eliminate CWD. Once CWD has become established, however, eliminating the disease completely may prove to be difficult or impossible. Attempts to reduce the prevalence of CWD in affected areas or to completely eradicate the disease are being pursued in Colorado and Wisconsin, respectively. Those attempts may provide insight into control and management of CWD in wildlife populations in future years.

Chapter 1: Purpose of and Need for Action

1.1 Proposed Action

The Montana Department of Fish, Wildlife & Parks (FWP) proposes to authorize actions intended to prevent the introduction of Chronic Wasting Disease (CWD) into Montana, to prevent the spread of CWD if it is identified in Montana, and to "reduce" the prevalence of CWD in specific locations if and when it is found. The proposed actions relating to the prevention of CWD into Montana could be implemented as early as the summer or fall of 2005 and would continue indefinitely depending on the status of CWD in Montana and any advances concerning the pathogenesis, transmission and potential treatment of CWD. Actions related to the control and/or management of CWD would be initiated following the diagnosis of CWD in a free ranging Montana deer or elk. The program would be adaptive in that changes to the program could be instituted as levels of success acheived both in Montana's CWD management program and with programs ongoing in other states are evaluated and more effective approaches to CWD prevention, reduction, or elimination are identified.

1.2 Location

Diagnosis of CWD in a deer or elk harvested from a known location will result in focused efforts taken in and around that location. Actions may also be taken on a statewide level to prevent the introduction of CWD or the geographic spread of CWD into new areas.

1.3 Need for the Action

FWP has been entrusted by the citizens of Montana with the preservation and management of our wildlife resources. Included in this mandate is the identification evaluation, and management of wildlife diseases and the effects that they have on the health of those populations and consequently on the economy of Montana.

CWD has been recognized in free ranging deer or elk populations in the United States since 1981. Since that initial discovery, additional diagnoses have been made in either captive populations of deer and elk (9 states and 2 provinces) or in free ranging populations (9 states and 1 province). These additional discoveries have been the result of increased surveillance but also reflect an increased distribution of the disease to new areas through either natural movements and migrations of wild populations or through human influenced movement of captive reared and privately owned deer and elk.

CWD is a fatal disease in deer and elk caused by a protein referred to as a prion. The disease is transmitted from animal to animal and may also be spread by exposure of deer and elk to environments that have been contaminated by CWD infected deer and elk. The concept of an infectious disease that is caused by a protein is a new concept in the field of disease. Only recently have information and new techniques concerning prion related diseases been available to aid in the study of these diseases. The effects of CWD on an overall deer or elk population over a given time are unknown. Computer generated models have predicted, however, that left unchecked CWD may

reduce a deer population by 10% in 30 years, by 50% in 50 years, and by 90% in 100 years (Madson, Chris 2003).

As of August 2005, CWD has not been detected in free ranging deer or elk populations in Montana after testing more than 7000 samples from individual animals. CWD has been detected, however, in free ranging wildlife populations in Wyoming, South Dakota, and Saskatchewan in close proximity to Montana's borders. Scientists and Wildlife Managers in Montana are concerned that CWD will eventually be found in Montana. This action plan is a proactive attempt to first prevent or slow the initial introduction of CWD into Montana and second, to be prepared to manage CWD effectively if it is found in Montana's wildlife populations.

1.4 Objectives of the Action

In order to meet the goals of its statutorily mandated responsibilities, the Department has set the following specific project objectives:

1.4.1 Objective #1: Prevent the introduction of CWD into Montana's free ranging deer and elk populations.

1.4.2 Objective #2: Minimize the spread of CWD beyond affected areas and reduce the incidence of the disease within affected populations if it is detected in Montana.

1.4.3 Objective #3: Provide timely, complete and accurate information about all aspects of CWD to personnel of participating agencies and to the public in Montana and throughout the United States.

1.4.4 Objective #4: Maintain an adaptive CWD surveillance program in Montana to allow for the early detection of CWD and to allow for evaluation of population involvement and management action success as the plan itself develops in response to CWD.

This environmental analysis evaluates the ability of six separate alternatives (Chapter 2) to fulfill the above objectives and discusses the potential environmental impacts that may be associated with each of the alternatives.

1.5 Decisions to be Made

- Determine if the alternatives discussed in this document meet the objectives.
- Determine the appropriate alternative most likely to achieve the stated objectives
- Determine whether the effects of each of the alternatives are significant on the human environment and, if so, what measures may be taken to mitigate those effects.

1.6 History of the Planning and Scoping Process

Public "scoping" meetings were initiated in March of 2004 and conducted in all seven administrative regions of MFWP. Approximately 30 people in total attended the various scoping meetings. Questionnaires concerning potential issues associated with CWD in Montana were distributed to all attendees and were returned by 20 individuals.

Presentations concerning transmissible spongiform encephalopathies in general and CWD in particular were given to numerous groups including the Prickly Pear Sportsman's Association, the American Association for Clinical Laboratory Science, the Great Falls Conservation Council (BLM, MWF, Audubon, etc.), Montana Meat Packers Convention, FWP Enforcement Division, the FWP Wildlife Division, to the general public at a CWD Symposium held at Rocky Mountain Laboratories in Hamilton, Montana, and to the Boy's State delegates at the 2005 Boy's State convention.

A CWD Action Plan Oversight Committee was appointed and met on multiple occasions during preparation of the CWD Action Plan. The oversight committee had representatives from the Montana Department of Public Health and Human Services, the Montana Department of Livestock, and the Montana Department of Fish, Wildlife & Parks.

Meetings were held or input obtained during the preparation of this document with representatives of the U.S. Fish and Wildlife Service, the National Parks Service, the U.S. Geological Survey Biological Resource Division, the Native American Indian Tribes with land ownership within Montana's borders, the Montana Wildlife Federation, Montana Alternative Livestock Producers, Montana Board of Outfitters, and with private landowners.

1.7 Relationship to Other Plans and Goals

Issues regarding the management of Montana's wildlife overlap with a number of state and federally produced management plans and directives. In 1998, the FWP Wildlife Division completed a programmatic environmental impact statement intended to provide a management philosophy and specific guidance as to how FWP should approach wildlife management. Additional management plans adopted by FWP for big game species include the 1998 Deer Management Policy, a 2001 Adaptive Harvest Management Plan for mule deer, and a 2004 Elk Management Plan, which also incorporates aspects of adaptive harvest management.

Various management plans and programs have been developed statewide regarding the management of CWD. The Montana Department of Livestock (DoL) is the regulatory agency with jurisdiction over health issues and therefore control of CWD on alternative livestock ranches (game farms) in Montana. As such, DoL has promulgated regulations for alternative livestock regarding CWD testing and movement of animals both interstate and intrastate. FWP is responsible for the health of the free ranging wildlife populations in the state. Through its Wildlife Disease Laboratory, MFWP has developed programs for diagnosis and surveillance of wildlife diseases including a CWD surveillance program initiated in 1998. That program is adapted on an annual basis as the status of CWD in surrounding states changes, as new "high risk" areas within Montana are identified, and as the needs of Montana's surveillance requirements change.

On a national level, a task force consisting of representatives from the United States Department of Agriculture, the United States Department of the Interior, and from state wildlife management agencies developed a "National Plan for Assisting States, Federal Agencies, and Tribes in Managing Chronic Wasting Disease in Wild and Captive Cervids" in 2002. In 2003, USDA/APHIS published proposed rules for "CWD Herd Certification and Interstate Movement of Captive Deer and Elk." That program is intended as a national program to help prevent the spread of CWD within the captive cervid industry and the free ranging populations of cervids in the U.S. Finally, the United States Fish and Wildlife Service (USFWS) distributed "Chronic Wasting Disease Planning Guidelines for U.S. Fish and Wildlife Service Lands" in February of 2004. That document guides the development of site-specific plans for USFWS Regions and their field stations for surveillance and for contingency response should CWD be found on-site.

The Montana CWD Action Plan will be developed using the advice and direction provided by the national plans and in cooperation with other state and federal agencies involved with the management of disease and wildlife populations.

1.8 Permits, Licenses, and Other Authorizations Required

Interagency cooperation and, more importantly, cooperation from private landowners, will be required should CWD be found within Montana's borders. Any actions taken on properties not controlled by FWP require that prior authorization be obtained from the controlling entity. In some cases, actions may be joint actions completed in cooperation with the controlling entity, whether state, federal, or private. A list of the stakeholders from which authorization may be required prior to initiating any actions include the following:

- USFWS
- NPS
- USFS
- BLM
- Tribes
- Private Landowners

1.9 Issues

1.9.1 Issues Studied in Detail

1.9.1.1 What is the potential effect of CWD on Montana's native deer and elk populations?

The introduction of CWD into deer and elk populations in Montana will likely effect population dynamics in the free ranging herds and ultimately reduce overall populations or eliminate populations in affected areas over time.

Indicators: The Adaptive Harvest Management Program in place through the FWP Wildlife Division provides annual census data for deer and elk populations throughout Montana. Although populations are effected by

many factors, a significant population decrease in a specific area as a result of CWD could be quantified.

1.9.1.2 What is the potential effect of CWD on Wildlife Management Tools?

Management of big game populations, particularly deer and elk, in Montana is accomplished through controlled harvest techniques using hunters as a primary management tool. Recently, the Department has adopted the Adaptive Harvest Management concept whereby intensive monitoring of regional populations results in better quality population trend data that indicate when to recommend appropriate hunting regulations (standard, liberal, restrictive) to maintain desired population characteristics. Loss of hunter numbers due to concerns about CWD would reduce the efficiency of this very important management tool.

Indicators: Monitoring trends in the number of big game hunting licenses sold in Montana will provide data on the effect of CWD on wildlife management tools.

1.9.1.3 What is the potential effect of CWD on Montana's economy?

In 2001, approximately $250 million was spent on hunting in the state of Montana. In addition, $350 million was spent by individuals interested in wildlife viewing (USDI, Fish and Wildlife Services and U.S. Department of Commerce, U.S. Census Bureau 2003). Montana's wildlife resources make a significant contribution to the state's annual economy. Either real or perceived disease problems in wildlife may result in a decrease in that annual contribution that would be felt not only within the state governmental agencies, but also within the business communities throughout Montana. These negative financial impacts would especially impact regions within CWD management areas or CWD "endemic" areas where CWD has been detected and actions are ongoing.

Some states faced with the presence of CWD have established programs to eradicate the disease. Other states have attempted to eliminate the disease when it occurs in new locations within the state. These programs are costly and are a burden to already stretched state wildlife management budgets. Should control operations be needed in Montana, current state and federal funding will be inadequate to finance the cost of the operations. Anticipated costs for management actions planned in Wisconsin during 2003, which included operations costs, disposal costs, and revenue loss due to anticipated loss of hunters was in excess of $14.7 million. It becomes evident that prevention of CWD is much more cost effective in protecting wildlife and economic resources than management actions taken after CWD has been found in a state.

Indicators: The number of hunter days is used annually to determine hunting related expenditures in the state. National surveys are also used to determine expenditures on wildlife viewing in Montana.

1.9.1.4 What is the public perception of the effect of CWD on human health?

The concept of an abnormal protein, or prion, causing a disease is novel. Many diseases have now been attributed to prions, including variant Creutzfeldt-Jakob disease (vCJD) in humans as well as CWD in deer and elk. vCJD had killed over 150 humans worldwide as of June, 2005. vCJD in humans has been linked to the ingestion of beef infected with bovine spongiform encephalopathy (mad cow disease). Although the prion thought to cause CWD has not been shown to affect humans, the perception of risk due to the association between mad cow disease and vCJD has caused public concern regarding CWD. Continued research on prion diseases will expand our understanding of any potential risks to the human population from CWD. All information regarding public health risks will be provided to the public immediately with the cooperation of the Montana Department of Public Health and Human Services as new information becomes available.

Indicators: Surveys designed to monitor public perception on the effect of CWD on human health.

1.9.1.5 What effect could CWD have on the captive, privately owned deer and elk industry?

CWD is a disease of mule deer, white-tail deer, black-tail deer and elk and, as such, may be transmitted freely from wild cervids to captive cervids and vice versa. The alternative livestock industry in Montana was reported by Montana Alternative Livestock Producers (MALP) to be a $20 million industry in 2000. At that time, there were approximately 4,500 cervids contained behind the high fences of approximately 80 alternative livestock facilities. In situations where CWD has been detected in captive populations, the standard action has been to kill and test all animals within the fences for CWD. Although indemnity payments have been authorized by USDA/APHIS, destruction of a privately owned herd may have devastating financial impacts on individual alternative livestock ranchers. Indemnity has been limited to 95% of the appraised value for an individual animal with a cap of $3000 per animal. The appraised value is based on the market value as determined by the meat or breeding value of the animal and is fixed by an APHIS official appraiser and/or a State official appraiser.

CWD has had detrimental effects on the alternative livestock industry nationwide through limitations on interstate movement of animals and reductions in market value. Epidemiological studies have shown that the sale and interstate movement of captive deer and elk has, in some cases at least, been responsible for the appearance of CWD in spatially separated

geographical areas in the United States and Canada. Should CWD be found in Montana, additional limitations on interstate movement of animals would further affect Montana's alternative livestock industry. The alternative livestock industry will play a key role in surveillance for and control of CWD in Montana.

Indicators: Change of ownership and movement of alternative livestock is reported by licensees to both FWP and the Department of Livestock. A reduction in activity would be easily monitored as would an overall reduction in the number of alternative livestock in the state.

1.9.1.6 How can CWD environmental contamination be reduced by the proper disposal of waste from CWD infected animals?

Recent studies have verified that the prion protein may stay infective for up to two and one half years in sites where shedding of the protein from infected animals has occurred. In addition, the same studies have verified that decomposed carcasses from CWD fatalities also have the ability to transmit CWD after 2 years. Improper disposal of contaminated materials may cause environmental contamination resulting in potential spread of the disease. Studies are underway to determine the most effective methods for environmental detection and for decontamination. Environmental decontamination in large areas where CWD either is or has been present, however, will be difficult.

Disposal of materials potentially contaminated with the CWD prion is a significant issue. Waste materials may be generated from sample remnants (heads) taken for the CWD surveillance program. Whole carcasses of either road kill fatalities or collected as part of CWD management actions also present disposal issues. The prion suspected of causing CWD may remain "viable" for long periods of time and may not be inactivated or "destroyed" by methods typically used for other pathogens. Methods used by various states for proper disposal include high-temperature incineration, alkaline hydrolysis tissue digestion, and disposal at municipal solid waste landfills. The United States Environmental Protection Agency has prepared "recommended interim practices for disposal of potentially contaminated CWD carcasses and wastes." Those interim practices provide direction for disposal of carcasses in a landfill area with management of leachate, daily cover considerations, and compliance with 40CFR Part 258.

1.9.2 Issues Eliminated from Further Study

1.9.2.1 What is the effect of CWD and on domestic livestock?

White-tail deer, mule deer, black-tail deer, elk, and hybrids of those species are susceptible to CWD. Studies evaluating natural transmission of CWD to

cattle, sheep, and a variety of other domestic species have indicated that natural transmission of CWD to domestic livestock does not readily occur. This issue will therefore not be evaluated in this document. Should natural transmission of CWD to domestic species ever be demonstrated either under laboratory or field conditions, however, the implications to the livestock industry will radically affect current policies and action plans that attempt to prevent, reduce, or eliminate CWD in the wild populations.

1.9.2.2 What is the effect of CWD on endangered species?

CWD has not been shown to be infective to species other than deer and elk. Although there is no direct effect from CWD expected on any endangered species, there may be indirect effects depending on the location where CWD is found, management actions undertaken in that area, and any population of endangered species found in that specific location. The indirect effects from management actions may originate from the reduction in deer and/or elk in the management zone if the endangered species is predatory and deer and/or elk are a prey species. Because the location of any management action is unknown at this time, an evaluation of the effects of a management action on endangered species cannot be undertaken. If CWD is found in Montana, any effects of a management action on endangered species in the immediate area will be evaluated. It is thought that those effects would be minimal and would be localized to the management area.

1.9.2.3 What is the effect of CWD on other government agencies?

The major impacts resulting from the discovery of CWD in Montana deer and elk will be to MFWP. If the first finding of CWD is on land belonging to other state or Federal agencies, there will be effects on those agencies. Initial contacts have been made with most other state and government agencies and, in many cases, they have been involved with the development of this plan. Initially, cooperation from other state and federal agencies may involve authorization to carry out management actions on the controlled lands. Some agencies may potentially be directly involved in assisting with the management actions. Ownership status of lands that may be affected in the future by CWD is unknown. Once CWD is found in Montana, effects on other government agencies will be evaluated in cooperation with any government agency controlling land in the management zone. Until that government agency is identified, however, it was not possible to assess the impact on any particular agency.

Chapter 2: Alternatives

2.1 Introduction

The alternatives presented in Chapter 2 are the heart of this EA. Six alternatives were selected for consideration. Each alternative is described in terms of plan objectives that have been adapted from those recommended for inclusion in a CWD action plan by the "Multi-state Guidelines for CWD Management in Free-Ranging White-tailed Deer, Mule Deer and Elk." Those objectives include 1) prevention of CWD 2) surveillance for CWD 3) management of CWD 4) public information and communication and 5) research. The most evident differences between the various alternatives may be found in the prevention section and management section of each alternative description.

This chapter will summarize the predicted effects of each of the alternatives on the quality of the relevant resources described in "Chapter 3: Affected Environment." The chapter will also evaluate how well each of the alternatives satisfies the objectives of the CWD Action plan presented in Chapter 1. These comparisons and evaluations are intended to provide a clear basis for choice among the alternatives. Comparisons regarding the environmental effects of each of the alternatives will be expanded upon in "Chapter 4: Environmental Consequences."

With the exception of the Alternative I, the "no action alternative," the management actions described for each alternative will be influenced by the cervid species in which CWD is detected, the habitat features of the surrounding area, any geologic or geographical barriers that serve to discreetly separate distinct populations, and estimated population densities. Without prior knowledge of these variables, only general actions can be described for each alternative at this time.

2.2 Description of Alternatives

2.2.1 Alternative I: No Action Alternative

Under the no action alternative, the surveillance program currently in place to monitor for the presence of CWD in Montana would be continued. No additional preventative actions and no actions designed to eliminate or reduce the incidence of CWD in Montana, if and when it is discovered, would be planned.

2.2.1.1 Past Relevant Actions of Alternative I

- **Prevention:** MFWP's current approach for the prevention of CWD in Montana would continue and would include the following programs:

  Baiting and Feeding: Statutes regarding the baiting and feeding of wildlife (MCA 87-3-130(c)) would remain unchanged and no additional priority would be given to the enforcement of those statutes.

  Translocation of Cervids: Laws prohibiting interstate and intrastate translocation of deer fawns, elk calves and any other wild cervids would be developed. These laws would prevent the movement of any wild cervids to a central rehabilitation facility and therefore eliminate the current rehabilitation program for orphaned deer fawns and elk calves. Translocation of captive cervids is regulated by the Department of

Livestock and by a national program for the control and elimination of CWD in captive cervids scheduled to be finalized in the fall of 2005.

Carcass Transport: MFWP would continue to recommend that heads and spinal columns of deer and elk harvested by Montana hunters from out of state areas where CWD is endemic be disposed of in the state of harvest and not brought back into Montana.

Carcass Disposal: Montana Department of Environmental Quality regulations state that "dead animals" may not be placed in or upon any highway, road, street, or alley of this state; in or upon any public property, highway, street, or alley under the control of the state of Montana or any political subdivision thereof or any officer or agent or department thereof; within 200 yards of such public highway, road, street, or alley or public property; or on privately owned property where hunting, fishing, or other recreation is permitted unless consent is obtained from the owner of the property or his agent.

- **Surveillance**: Surveillance for CWD would continue in selected "high risk" areas of Montana to monitor for the presence and/or prevalence of CWD in Montana's cervid populations. Those high-risk areas have currently been identified as MFWP administrative regions 5, 6, and 7 for coverage in areas bordering Wyoming, South Dakota, and Saskatchewan. Sample collections would be supplemented with road-killed animals and "targeted samples" (animals displaying abnormal behavior or physical debilitation). Sample numbers would be targeted to provide detection of CWD at a 1% incidence at a 95% confidence interval. Surveillance for CWD on alternative livestock ranches as regulated by the Montana Department of Livestock would continue to require that any animal 16 months of age or older that dies be tested for CWD. A diagnosis of CWD in any wild or captive deer or elk would result in the area being designated a high-risk areas with mandatory sampling of harvested deer or elk required for the next 5 years.
- **Disease Management:** No specific actions would be planned to manage CWD if it appeared in Montana's wildlife populations.
- **Public Information and Communication:** The results of the surveillance surveys would be reported to the public on an annual basis. A public information plan developed by MFWP (Appendix 1) would be put in place in the event that CWD were found in Montana.
- **Research:** An existing research study to evaluate demographics in two populations of prairie mule deer in Southeastern Montana would be continued as scheduled (Appendix 2).

2.2.2 Alternative II: Enhanced Surveillance

Under Alternative II, FWP would initiate activities to enhance surveillance for the detection of CWD in Montana. No elaborate plans or multi-party agreements would be developed for management of the disease should CWD be found through the surveillance program. The preventative measures employed in Alternative II are the same as those currently in place

and described in Alternative I, the No Action Alternative – that is they remain as they have been in past years. Management of CWD will be minimal and will involve adjustment of harvest quotas in affected areas to decrease populations while providing additional samples to determine the prevalence of CWD in the affected area. In Alternative II, MFWP proposes a series of actions designed to enhance the surveillance program for CWD in Montana.

2.2.2.1 Principal Actions of Alternative II

- **Prevention**: (as alternative I)
- **Surveillance**: Surveillance for CWD would be conducted statewide. Hunter harvested samples would be collected at check stations at appropriate locations in each FWP administrative region. Sample collections would be supplemented with road-killed animals and "targeted samples" (animals displaying abnormal behavior or physical debilitation). The number of samples required would be determined based on the number needed to detect a 1% incidence of CWD with a 99% confidence interval within the defined population. Regional populations would be defined as deer and elk living within the boundaries of each of the seven FWP administrative regions and estimates made of numbers of animals within those boundaries. These estimates would provide the basis for the number of samples necessary to achieve the desired statistical significance. Surveillance for CWD on alternative livestock ranches as regulated by the Montana Department of Livestock would continue to require that any animal 16 months of age or older that dies be tested for CWD. Any diagnosis of CWD would result in designation as a high-risk area and mandatory sampling of hunter harvested samples for the next 5 years.
- **Disease Management:** Increases in harvest quotas during established big game seasons would be used to reduce population densities in affected areas if CWD were detected. CWD sampling of harvested animals would be mandatory from any affected area. In addition, the removal of whole heads and/or spinal columns from animals harvested in the management area would be prohibited. The affected area would be determined based on existing population data and geographic/geologic barriers that restrict movement of the population in that affected area.
- **Public Information & Communication** In the event that CWD were found in Montana's wildlife populations, the draft CWD public information plan (Appendix 1) would be put in place to keep the public informed of all findings concerning prevalence and distribution of CWD in the deer and elk populations and to inform the public of all latest information concerning the disease itself.
- **Research**: Overall effectiveness of the management strategy would be evaluated based on annual CWD prevalence data in the affected area. The effect of the management action on the total population would be evaluated using population estimates obtained through aerial surveys and survivorship determined from radio marked animals. Aspects of disease ecology,

including changes in population size, density, distribution, age structure, sexual bias for CWD prevalence, and disease related mortality would be monitored.

2.2.3 Alternative III (Enhanced Prevention and Containment)

Alternative III would enhance efforts for the prevention of CWD in Montana and establish "buffer zones" to contain the spread of CWD to other populations in Montana or beyond Montana's borders. Containment methods would be heavily dependent upon geologic/geographic aspects of the affected area as for the development of habitat modification methods to create a containment buffer.

2.2.3.1 Principal Actions of Alternative III

- **Prevention:** Alternative III would focus on efforts to prevent the "introduction" of CWD into Montana. These efforts would include:

  Baiting and Feeding: Current laws preventing baiting and feeding of game animals would be revised through legislative procedure to provide for easier interpretation and more effective prosecution/deterrent ability.

  Translocation of Cervids: Laws prohibiting interstate and intrastate translocation of deer fawns, elk calves and any other wild cervids would be developed. These laws would prevent the movement of any wild cervids to a central rehabilitation facility and therefore eliminate the current rehabilitation program for orphaned deer fawns and elk calves. The DoL would conduct a risk assessment concerning any requests for importation or movement of captive cervids into or within Montana. Only movements of captive cervids identified by DoL as low risk for transmitting CWD would be authorized for importation or would be allowed to move from one alternative livestock facility to another within Montana.

  Carcass Transport: Laws and/or regulations concerning carcass transport would be developed through appropriate legislative procedure or MFWP commission rules. These laws/regulations would prohibit the import of certain cervid carcass parts (whole heads or spinal columns) of animals harvested from states and/or areas of states experiencing CWD in wild populations. Carcass parts allowed for importation would include:

  1. Meat that is cut and wrapped
  2. Quarters or other portions of meat with no part of the spinal column or head attached.
  3. Meat that has been boned out.
  4. Hides with no heads attached
  5. Clean (no meat or tissue attached) skull plates with antlers attached
  6. Antlers with no meat or tissue attached
  7. Upper canine teeth, also known as "buglers", "whistlers" or "ivories"
  8. Finished head, partial body or whole body mounts already prepared by a taxidermist.

  Carcass Disposal: Laws and/or regulations concerning disposal of heads, spinal cords, and remains of harvested cervids would be developed

through appropriate legislative procedures. These laws would require appropriate disposal of carcasses and carcass parts in Class II municipal solid waste landfills. Meat processors, taxidermists, and others normally involved with the disposal of carcass parts would be contacted through mailings to inform them of disposal requirements. Contaminated carcasses or heads and spinal cords from disease management areas would be disposed of through incineration at the management site.

- **Surveillance**: Monitoring for CWD would be continued in areas designated as high-risk areas. Those high-risk areas currently include MFWP administrative regions 5,6, and 7, that border Wyoming, South Dakota, and Saskatchewan. Sample collections would be supplemented with road-killed animals and "targeted samples" (animals displaying abnormal behavior or physical debilitation). The discovery of CWD in Montana or in new areas of adjacent states would result in the identification of new high-risk areas. The program for collection of road-kill samples for CWD testing would be expanded to provide state coverage on a limited number of samples. "Regionally intensive" surveillance would occur in the CWD management zones. Surveillance for CWD on alternative livestock ranches as regulated by the Montana Department of Livestock would continue to require that any animal 16 months of age or older that dies be tested for CWD. Any diagnosis of CWD in deer or elk would result in designating surrounding areas as high-risk areas with mandatory CWD sampling of harvested animals for 5 years.
- **Disease Management:** Buffer zones would be established around a management zone to keep potentially affected cervids within the management zone boundaries and restrict movement of cervids into the zone. Buffers would be established depending on local geographic or geologic features and known movement patterns of cervids. In addition, harvest quota adjustments in surrounding areas could be used to establish buffer areas. CWD sampling of any animals harvested within the buffer zone or the management zone would be mandatory. In addition, the removal of the whole heads and/or spinal columns from animals harvested in the management area would be prohibited. All harvested animals would be sampled for CWD and results supplied to the tag holder. Any animals harvested by department personnel would be held until the CWD testing results were available. Animals with no evidence of CWD that are harvested by department personnel would be provided to food banks while CWD positive carcasses would be incinerated.
- **Public Information & Communication** In the event that CWD were found in Montana's wildlife populations, the draft CWD public information plan (Appendix 1) would be put in place to keep the public informed of all findings concerning prevalence and distribution of CWD in the wildlife populations and to inform the public of all latest scientific information relating to CWD.

- **Research**: Overall effectiveness of the management strategy would be evaluated based on annual prevalence data in the effected area. The effect of the management action on the total population would be evaluated using population estimates obtained through aerial surveys. Aspects of disease ecology, including changes in population age structure, sexual bias for CWD prevalence, disease related mortality, and changes in predator populations and behavior would be monitored.

2.2.4 Alternative IV (Control at 1%)

Alternative IV would strengthen CWD prevention policies through changes in baiting and feeding laws and through the development of policies or educational programs concerning carcass transport, cervid translocation, and carcass disposal. Surveillance activities would be moderately enhanced above current activities with intensive sampling in affected areas (management zones) and statewide sampling of road-kill fatalities. Disease management programs would first determine population boundaries of affected populations prior to intensive and continued sampling exercises until a prevalence of < 1% CWD positive animals was detected in a statistical sample.

2.2.4.1 Principal Actions of Alternative IV

- **Prevention**

  Baiting and Feeding: Current laws preventing baiting and feeding of game animals would be revised through legislative channels to provide for easier interpretation and more effective prosecution/deterrent ability.

  Translocation of Cervids: The translocation of all wild cervids intrastate and interstate would be prohibited through policy. This policy would curtail the current practice of rehabilitation of orphan fawns and elk calves at a centralized Wildlife Center in Helena. The DoL would conduct a risk assessment concerning any requests for importation or movement of captive cervids within or into Montana. Only movements of captive cervids identified by DoL as being of low risk for transmitting CWD would be authorized for importation or for movement within Montana.

  Carcass Transport: An education program for hunters would be developed stressing the potential impacts of bringing heads and spinal cords of cervids back to Montana from states or areas of states where CWD has been detected. Montana hunters successful in obtaining big game licenses from states with active CWD in free ranging populations would be contacted by mail. Those hunters would receive strong recommendations from the Department concerning the proper disposal of heads and spinal cords and be advised not to bring those carcass parts back into Montana.

  Carcass Disposal: Appropriate conditions for disposal of all harvested heads, spinal cords, and remains from cervids would be communicated to the public through a media and educational campaign. Again, those methods involve the disposal of carcasses or carcass parts in a Class II municipal solid waste landfill. Contaminated carcasses or heads and

spinal cords from disease management areas would be disposed of through incineration at the management site

- **Surveillance:** Under alternative IV, surveillance would continue to be focused on designated high-risk areas. The program for collection of road-kill samples for CWD testing would be expanded to provide statewide coverage on a limited basis. Sample collections would be supplemented with "targeted samples" (animals displaying abnormal behavior or physical debilitation). "Regionally intensive" surveillance would be conducted in the management zone with CWD sampling mandatory for all animals harvested within the zone. Surveillance for CWD on alternative livestock ranches as regulated by the Montana Department of Livestock would continue to require that any animal 16 months of age or older that dies be tested for CWD. A diagnosis of CWD in deer or elk would result in the designation of surrounding areas as high-risk areas with mandatory sampling of harvested deer or elk for the next 5 years.
- **Disease Management** Upon initial diagnosis, 50 cervids from the immediate area would be radio collared. Tonsil biopsies or other acceptable live animal tests for the diagnosis of CWD would be conducted on each collared animal. If any radio collared animals were CWD positive, they would be removed from the population. The movements of radio-collared animals would be monitored with telemetry for 5 months to 12 months to determine population boundaries. Using population estimates within the determined population boundaries, a sample of animals of adequate number to enable detection of a 1% incidence of CWD at a 99% confidence interval would be collected. If CWD were found at >1%, another statistical sample would be obtained for testing by killing additional animals and this process continued until the result obtained was <1% incidence. Upon reaching a disease incidence of <1%, the area would be designated as a "high risk" area and mandatory sampling of hunter harvested animals conducted for 5 years. A >1% incidence of CWD in the annual sample would initiate another statistical sampling as described earlier. If at any time during the sampling process, a CWD prevalence of >5% were detected in the sample, immediate population reduction activities would be initiated in an attempt to reduce the estimated population by 50%. All harvested animals would be sampled for CWD and results supplied to the tag holder. Any animals harvested by department personnel would be held until the CWD testing results were available. Animals with no evidence of CWD that are harvested by department personnel would be provided to food banks while CWD positive carcasses would be incinerated.

  Movement of harvested carcasses or carcass parts out of the management zone would be limited to:

  1. Meat that is cut and wrapped
  2. Quarters or other portions of meat with no part of the spinal column or head attached.

3. Meat that has been boned out.
4. Hides with no heads attached
5. Clean (no meat or tissue attached) skull plates with antlers attached
6. Antlers with no meat or tissue attached
7. Upper canine teeth, also known as "buglers", "whistlers" or "ivories"
8. Finished head, partial body or whole body mounts already prepared by a taxidermist.

- **Public Information & Communication:** The results of the surveillance surveys would be reported to the public following compilation of results on an annual basis. A public information plan developed by MFWP (Appendix 1) would be put in place in the event that CWD were found in Montana.
- **Research**: Overall effectiveness of the management strategy would be evaluated based on annual prevalence data in the effected area. The effect of the management action on the total population would be evaluated using population estimates obtained through aerial surveys and utilizing the radio-collared sample. Aspects of disease ecology, including changes in population age structure, sexual bias for CWD prevalence, disease related mortality, and changes in predator populations and behavior would be monitored.

2.2.5 Alternative V (Control at 0%)

Alternative V employs a more aggressive program for the prevention of CWD than Alternative IV in that it proposes the development of laws focused on the preventative aspects. Alternative V also takes a more aggressive management position in that once an affected population is discovered, that population is sampled through collection of samples from elk and/or deer in a series of sampling efforts until no CWD is detected in the sample taken.

2.2.5.1 Principal Actions of Alternative V

- **Prevention**

  Baiting and Feeding: Current laws preventing baiting and feeding of game animals would be revised through the legislative process to provide for easier interpretation and more effective prosecution/deterrent ability.

  Translocation of Cervids: Laws prohibiting the translocation of wild cervids would be developed through legislative procedures. These laws would curtail the current practice of rehabilitation of orphan deer fawns and elk calves at the Wildlife Center in Helena as well as any translocation of wild cervids in Montana. The DoL would conduct a risk assessment concerning any requests for importation or movement of captive cervids within or into Montana. Only movements of captive cervids identified by DoL as being of low risk for transmitting CWD would be authorized for importation or for movement within Montana.

  Carcass Transport: Laws and/or regulations concerning carcass transport would be developed through appropriate legislative procedure or through MFWP commission rules. These laws/regulations would prohibit

the import of carcasses from states and/or areas of states experiencing CWD in wild populations and would be enforced by MFWP. The only carcass parts allowed into Montana from states where CWD has been diagnosed would be:

1. Meat that is cut and wrapped
2. Quarters or other portions of meat with no part of the spinal column or head attached.
3. Meat that has been boned out.
4. Hides with no heads attached
5. Clean (no meat or tissue attached) skull plates with antlers attached
6. Antlers with no meat or tissue attached
7. Upper canine teeth, also known as "buglers", "whistlers" or "ivories"
8. Finished head, partial body or whole body mounts already prepared by a taxidermist.

Carcass Disposal: Regulations would be developed either through the legislative procedure or through Commission Rule concerning disposal of heads and spinal cords. Those regulations would require disposal of carcass parts in municipal Class II municipal solid waste landfills and would provide penalties for those not complying with the regulations. Contaminated carcasses or heads and spinal cords from disease management areas would be disposed of through incineration.

- **Surveillance** Surveillance in designated high-risk areas would continue, but the collection of road-kill samples would be expanded to provide for statewide coverage. Sample collections would be supplemented with "targeted samples" (animals displaying abnormal behavior or physical debilitation). "Regionally intensive" surveillance in the management zones would be initiated along with the management actions. Surveillance for CWD on alternative livestock ranches as regulated by the Montana Department of Livestock would continue to require that any animal 16 months of age or older that dies be tested for CWD. The diagnosis of CWD in any elk or deer would result in surrounding areas being designated a high-risk with mandatory sampling of harvested animals for the next 5 years.
- **Disease Management** Upon initial diagnosis, 50 cervids from the immediate area would be radio collared. Tonsil biopsies or other acceptable live animal tests for the diagnosis of CWD would be conducted on each collared animal. If any radio collared animals were CWD positive, they would be removed from the population. The movements of radio-collared animals would be monitored with telemetry for 5 months to 12 months to determine population boundaries. Using population estimates within the determined population boundaries, a sample of adequate size to enable detection of a 1% incidence of CWD at a 99% confidence interval would be collected. If any CWD positive animals were found in that sample, another statistical sample would be obtained for testing and this process continued until the result obtained was 0% incidence. Upon reaching a disease incidence of 0%, the area would be

designated as a "high risk" area and mandatory sampling of hunter harvested animals required for 5 years. Any detection of CWD in the annual sample would initiate another statistical sampling as described earlier. If at any time during the sampling process, a CWD prevalence of >5% were detected in the sample, immediate population reduction activities would be initiated in an attempt to reduce the estimated population by 50%. All harvested animals would be sampled for CWD and results supplied to the tag holder. Any animals harvested by department personnel would be held until the CWD testing results were available. Animals with no evidence of CWD that are harvested by department personnel would be provided to food banks while CWD positive carcasses would be incinerated.

Movement of harvested carcasses or carcass parts out of the management zone would be limited to those parts allowed under carcass transport requirements above. Heads and spinal cords would not be allowed out of the management zone.

- **Public Information & Communication** The results of the surveillance surveys would be reported to the public following compilation of results on an annual basis. A public information plan developed by MFWP (Appendix 1) would be put in place in the event that CWD were found in Montana.
- **Research**: Overall effectiveness of the management strategy would be evaluated based on annual prevalence data in the effected area. The effect of the management action on the total population would be evaluated using population estimates obtained through aerial surveys. Aspects of disease ecology, including changes in population size, density, distribution, age structure, sexual bias for CWD prevalence, and disease related mortality would be monitored. Re-colonization of the area by non-local cervids following sampling or depopulation efforts would be monitored.

2.2.6 Alternative VI (Aggressive Elimination) Similar to actions taken in Wisconsin following the finding of CWD in 2002, Alternative VI calls for an aggressive elimination of animals within a pre-determined "eradication zone". Alternative VI also provides an aggressive strategy in the development of laws anticipated to aid in the prevention of CWD in Montana. Finally, the surveillance program is expanded in Alternative VI to statistically sample the entire state for the presence of CWD.

2.2.6.1 Principal actions of Alternative VI

Prevention

<u>Baiting and Feeding:</u> Current laws preventing baiting and feeding of game animals would be revised through the legislative process to provide for easier interpretation and more effective prosecution/deterrent ability.

Translocation of Cervids: Laws prohibiting the translocation of wild cervids would be developed through legislative procedures. These laws would curtail the current practice of rehabilitation of orphan deer fawns and elk calves at the Wildlife Center in Helena as well as any translocation of wild cervids in Montana. The DoL would conduct a risk assessment concerning any requests for importation or movement of captive cervids within or into Montana. Only movements of captive cervids identified by DoL as being of low risk for transmitting CWD would be authorized for importation or for movement within Montana.

Carcass Transport: Laws and/or regulations concerning carcass transport would be developed through appropriate legislative procedure or through MFWP commission rules. These laws/regulations would prohibit the import of carcasses from states and/or areas of states experiencing CWD in wild populations and would be enforced by MFWP. The only carcass parts allowed into Montana from states where CWD has been diagnosed would be:

1. Meat that is cut and wrapped
2. Quarters or other portions of meat with no part of the spinal column or head attached.
3. Meat that has been boned out.
4. Hides with no heads attached
5. Clean (no meat or tissue attached) skull plates with antlers attached
6. Antlers with no meat or tissue attached
7. Upper canine teeth, also known as "buglers", "whistlers" or "ivories"
8. Finished head, partial body or whole body mounts already prepared by a taxidermist.

Carcass Disposal: Regulations would be developed either through the legislative procedure or through Commission rule concerning disposal of heads and spinal cords. Those regulations would require disposal of carcass parts in municipal Class II municipal solid waste landfills and would provide penalties for those not complying with the regulations. Contaminated carcasses or heads and spinal cords from disease management areas would be disposed of through incineration at the management site

- **Surveillance**: Surveillance for CWD would be conducted on a statewide level. Hunter harvested samples would be collected at appropriately located check stations in each FWP administrative region. Sample collections would be supplemented with road killed animals and "targeted samples" consisting of animals reported to FWP as being sick or acting strangely. The number of samples collected would be determined based on the number needed to provide detection of a 1% incidence of CWD with a 99% confidence interval within a defined population. Separate populations would be defined as animals living within the boundaries of each FWP administrative region and estimates made of numbers on animals within those boundaries. Surveillance for CWD on alternative

livestock ranches as regulated by the Montana Department of Livestock would continue to require that any animal 16 months of age or older that dies be tested for CWD. A diagnosis of CWD in any deer or elk would result in surrounding areas being designated high-risk areas with mandatory sampling of harvested deer or elk required for the next 5 years.

- **Disease Management** Following the initial detection of CWD, population "boundaries" of the local cervid population would be estimated using available data. At a minimum, a 5-mile radius would be established from the index case and animals within that 5 miles radius (approximately 80 square miles) eradicated to the extent possible. Eradication would be carried out through the use of hunter incentives during established big game seasons and/or through harvest by department personnel. All harvested animals would be sampled for CWD and results supplied to the tag holder. Any animals harvested by department personnel would be held until the CWD testing results were available. Animals with no evidence of CWD that are harvested by department personnel would be provided to food banks while CWD positive carcasses would be incinerated.
- **Public Information & Communication** The results of the surveillance surveys would be reported to the public following compilation of results on an annual basis. A public information plan developed by MFWP (Appendix 1) would be put in place in the event that CWD were found in Montana.
- **Research** Evaluate the effectiveness of strategy based on sample data collected in areas bordering the management zone following elimination of the affected population. Monitor re-colonization of the area by radio-collaring and tracking 50 animals from outside the eradication zone. Evaluate disease prevalence data in the affected area based on age structure and sexual bias for positive animals.

2.3 Process Used to Develop the Alternatives

Initially, CWD was a regional disease affecting only areas of Colorado and Wyoming. Following the discovery of CWD in the game farm industry in 1996 and the spread of CWD to wildlife and captive cervids in other locations throughout the United States, states and provinces hurried to install management plans in the face of disease activity. National plans have provided guidance for control of CWD both in the captive cervid industry as well as for wildlife management programs dealing with free ranging populations of cervids. While the success of these programs is unknown regarding reduction or elimination of the disease in either captive or free ranging cervids, it is well accepted that early actions both to prevent the introduction of CWD and to eradicate initial "hot spots" provide the best chance for success in any program.

Alternatives evaluated for Montana's CWD Action Plan were generated through scoping meetings where issues were identified and developed, through input from the CWD Action Plan Oversight Committee, through input from other agencies and

organizations, and through guidance from existing statutes and regulations. CWD has been diagnosed on one alternative livestock ranch in Montana, but has not yet been diagnosed in the free ranging deer or elk populations. This fact has directed the development of alternatives that stress the preventative aspect of the program and that, in some cases, aggressively "attack" any initial diagnosis of CWD in Montana. An efficient sampling program is also present in each alternative to facilitate the early discovery of CWD and to evaluate its prevalence. Population reduction strategies, found in some of the alternatives, are intended to prevent the spread of the disease and perhaps completely eliminate the disease.

One of the main objectives of this document is to provide public information and to educate the general public and the hunting public concerning CWD. That knowledge should help the public to understand the potential impacts of finding CWD in Montana's wildlife populations and why particular actions are being considered. The potential success of any of the proposed alternatives for the prevention and management of CWD is unknown. Periodic review of the selected management plan by a state CWD Management Team to determine management success or failure as well as to evaluate any new information concerning success or failure of plans in use by other states will allow for modification of any selected alternatives on an annual basis.

In evaluating potential environmental effects, the no action alternative has fewer significant environmental effects that may be seen in the immediate future than any of the other alternatives. To take no action in the fight against CWD could, however, have the most significant environmental effects in the long term through eventual reduction of overall herd health and of big game populations that could be permanent.

The public must be advised that although the best scientific information possible has been used to make presumptions concerning the short and long term environmental effects of CWD on the human environment, many of the conclusions are conjecture. Again, the adaptive nature the selected alternative will provide for changes to the plan on an annual basis as the body of scientific knowledge concerning CWD evolves.

2.4 Summary Comparison of the Activities of Each Alternative, Predicted Achievement of Objectives, and Predicted Environmental Effects on Issue Resources. Tables, 2.4.1, 2.4.2, and 2.4.3 provide a comparative summarization of the alternatives presented in this chapter. Comparisons are made of what types of activities each alternative suggests (Table 2.4.1), how each alternative fulfills the objectives of a CWD Action program discussed in section 1.4 (Table 2.4.2), and what the predicted environmental impacts of each alternative are (Table 2.4.3).

2.4.1 Table 1: Summary Comparison of the Activities of Each Alternative

	Prevention	Surveillance	Management	Public Info	Research
Alternative I (no action)	No changes in baiting and feeding enforcement, wildlife rehab., carcass transport, or carcass disposal requirements	Surveillance in identified high-risk areas. Continued alternative livestock 16 month testing requirement.	No management actions developed	Report annual CWD surveillance reports. Public info plan for keeping public up to date on status of disease in Montana.	SE Montana study continued for prairie mule deer demographics.
Alternative II (Enhanced Surveillance)	As alternative I	Statewide surveillance of hunter, road kill, and targeted by administrative region. Goal of 1% detection at 99% CI. Continued alternative livestock 16 month testing requirement	Adjust harvest quotas to reduce populations in "affected areas." Mandatory sampling from affected areas. Affected area boundary based on geographic or geologic barriers limiting population movement.	As alternative I.	Continue SE Montana study. Evaluate disease ecology in affected area.
Alternative III (Enhanced Containment & Prevention)	Revise baiting and feeding laws; develop laws prohibiting movement of cervids, no rehabilitation of orphan fawns/calves; new laws on carcass transport and carcass disposal	Surveillance in high-risk areas. Enhance road kill collection for statewide coverage. Maintain targeted sample collection. Surveillance in CWD management zones. Continued alternative livestock 16 month testing requirement	Develop buffer zones around affected areas to decrease immigration and emigration of cervids.	As alternative I	Monitor effectiveness of buffer, prevalence of CWD within and around management area, and effect of action on population.

2.4.1 Summary Comparison of the Activities of Each Alternative (cont.)

	Prevention	Surveillance	Management	Public Info	Research
Alternative IV (Control at 1%)	Revise baiting and feeding laws; no rehabilitation of fawns/calves; educate hunters on carcass transport and carcass disposal.	Surveillance in high-risk areas. Enhance road-kill for statewide coverage. Regionally intensive surveillance in management areas. Continued alternative livestock 16 month testing requirement	Radio collar and tonsil test 50 deer. Delineate population. Sample for 1% detection 99% CI. If <1%, surveillance as "high risk" next year. If >1% take second sample and continue until <1%. If find >5% initiate 50% population reduction.	As alternative I	Effectiveness of strategy per prevalence data. Monitor effect of the action on population. Evaluate disease ecology. Monitor re-colonization of area.
Alternative V (Control at 0%))	Maximize baiting and feeding laws; new laws on translocation (no rehabilitation); regulations on carcass transport and disposal.	Surveillance in high-risk areas. Enhance road-kill for statewide coverage. Regionally intensive surveillance in management areas. Continued alternative livestock 16 month testing requirement	Radio collar and tonsil test 50 deer. Delineate population. Sample for 1% detection 95% CI. No positives then annual surveillance as "high risk." If any positive continue with additional samples until no positives detected. If find >5% initiate 50% population reduction.	As alternative I	Effectiveness of strategy per prevalence data. Monitor effect of the action on population. Evaluate disease ecology. Monitor re-colonization of area.
Alternative VI (Aggressive Elimination))	Maximize baiting and feeding laws; new laws on translocation (no rehabilitation); regulations on carcass transport and disposal.	Statewide surveillance of hunter, road-kill, and targeted by administrative region. Goal of 1% detection at 99% CI. Continued alternative livestock 16 month testing requirement	Eradication zone developed with goal of elimination of cervids within that zone.	As alternative I	Sample areas bordering eradication zone for effectiveness of strategy. Monitor re-colonization. Disease ecology studies.

2.4.2 Table 2: Summary Comparison of the Achievement of Project Objectives

	Alternative I (No Action)	Alternative II (Enhanced surveillance)	Alternative III (Containment & Prevention)	Alternative IV (Control at 1%)	Alternative V (Control at 0%)	Alternative VI (Aggressive Elimination)
Objective #1 Prevent Introduction of CWD	Carcass transport, baiting & feeding, improper disposal of carcasses, and translocation of cervids all have the capacity to bring the first case of CWD into Montana	Carcass transport, baiting & feeding, improper disposal of carcasses, and translocation of cervids all have the capacity to bring the first case of CWD into Montana	Development of laws controlling transport, baiting & feeding, proper disposal, and translocation should slow or prevent the appearance of CWD in Montana	Development of laws and educational programs for CWD prevention may prove more effective than the development of laws that may be difficult to enforce.	Development of laws controlling transport, baiting & feeding, proper disposal, and translocation should slow the appearance of CWD in Montana	Development of laws controlling transport, baiting & feeding, proper disposal, and translocation should slow the appearance of CWD in Montana
Objective #2 Minimize Spread of CWD	No management actions taken to minimize spread	Reduction in population densities through quota adjustment may slow the spread of CWD	An effective buffer zone and preventative measures would limit spread	Density reductions in management zone and preventative measures would limit spread	Density reductions in management zone and preventative measures would limit spread	Elimination of affected population and preventative measures would spread
Objective #3 Provide Timely Information to Public	Information plan developed by Conservation Education Division	Information plan developed by Conservation Education Division	Information plan developed by Conservation Education Division	Information plan developed by Conservation Education Division	Information plan developed by Conservation Education Division	Information plan developed by Conservation Education Division
Objective #4 Maintain Adaptive CWD Surveillance	Surveillance in areas as being of high risk for CWD	Surveillance state-wide with 99% CI of detection @ 1%	Surveillance in high risk areas – road-kill for statewide	Surveillance in high risk areas – road-kill for statewide	Surveillance in high risk areas – road-kill for statewide	Surveillance state-wide with 99% CI of detection @ 1% -

2.4.3 Table 3: Summary Comparison of Predicted Environmental Effects

	Effect of CWD on Montana's native deer and elk populations?	What is the effect of CWD on wildlife management tools?	What is the effect of CWD on Montana's economy	What is the effect on the public perception of CWD on human health?	Effect of CWD on the captive, privately owned deer and elk industry?	What is the effect on disposal of CWD infected animals on environmental contamination?
Alternative I (No Action)	With only current prevention strategies and no intervention, CWD may occur sooner in Montana. Effects forecasted by models indicate significant population reductions within 30-50 years.	If CWD does not occur in Montana, no effect. If CWD is found and prevalence increases, hunter participation can be expected to decline.	Local effects due to reduction in hunter numbers, which would become generalized statewide if CWD spread to new areas.	Providing current and scientifically sound information will allow informed public decisions and perceptions concerning CWD.	Shipment of cervids out of state may be inhibited and some facilities could be quarantined and/or depopulated. Potential needs for double fencing in affected area.	No requirements in place for disposal of infected animals or parts of infected animals. This could lead to an increased potential for the spread of CWD in Montana.
Alternative II (Enhanced Surveillance)	Timely intervention by quota adjustment may slow the spread of CWD or eradicate CWD. Population effects could be limited to local population reductions unless CWD spreads to other areas.	More surveillance data may influence hunters hunt in "CWD free" areas. Hunter numbers in affected areas may decline depending on prevalence of CWD in the population.	Increased quotas for management may benefit local economies if hunters respond. If CWD becomes established, however, locally negative effect through loss of hunter numbers.	Providing current and scientifically sound information will allow informed public decisions and perceptions concerning CWD.	Shipment of cervids out of state may be inhibited and some facilities could be quarantined and/or depopulated. Potential needs for double fencing in affected area.	No requirements in place for disposal of infected animals or parts of infected animals. This could lead increased potential for the spread of CWD in Montana.

2.4.3 Summary Comparison of Predicted Environmental Effects (continued)

	Effect of CWD on Montana's native deer and elk populations?	What is the effect of CWD on wildlife management tools?	What is the effect of CWD on Montana's economy	What is the effect on the public perception of CWD on human health?	Effect of CWD on the captive, privately owned deer and elk industry?	What is the effect on disposal of CWD infected animals.
Alternative III (Enhanced Containment and Prevention)	If containment can be achieved, the effects would be on the local population only. Prevention may slow appearance of CWD in MT.	Buffer zones may require high hunting pressures in areas surrounding management zone. Hunter incentives may be necessary to provide required numbers. Less desire to hunt in affected area anticipated.	Local effects through reduction of hunter numbers. May be overcome by continuous efforts to maintain buffer zone that will provide income to the local community.	Providing current and scientifically sound information will allow informed public decisions and perceptions concerning CWD.	Shipment of cervids out of state may be inhibited and some facilities could be quarantined and/or depopulated. Potential needs for double fencing in affected area.	Laws prohibiting improper disposal will aid in the prevention of environmental contamination and reduce potential for spread of CWD.
Alternative IV (Control at 1%)	Reduction of the local cervid population would occur through continual monitoring of defined local area until <1% prevalence detected. Prevention aspects provide statewide protection of cervid population.	May see reduction in hunter numbers in affected area(s). May need incentives to provide required hunter numbers for management. If management goals attained, should not significantly affect statewide hunter interest.	Local effects through reduction of hunter numbers over time and short-term loss of animal numbers. If successful in elimination, long-term beneficial effects statewide.	Providing current and scientifically sound information will allow informed public decisions and perceptions concerning CWD.	Shipment of cervids out of state may be inhibited and some facilities could be quarantined and/or depopulated. Potential needs for double fencing in affected area.	Educational programs for carcass transport and disposal are expected to aid in prevention of environmental contamination and reduce the potential for spread of CWD.

2.4.3 Summary Comparison of Predicted Environmental Effects (continued)

	Effect of CWD on Montana's native deer and elk populations?	What is the effect of CWD on wildlife management tools?	What is the effect of CWD on Montana's economy	What is the effect on the public perception of CWD on human health?	Effect of CWD on the captive, privately owned deer and elk industry?	What is the effect on disposal of CWD infected animals.
Alternative V (Control at 0%)	Aggressive reduction to achieve 0% detection more likely than Alternative IV to have significant effect on local population. If CWD controlled, protective effect on statewide population.	May see reduction in hunter numbers in affected area(s). May need incentives to provide required hunter numbers for management. If management goals attained, should not significantly affect statewide hunter interest.	Local effects through reduction of hunter numbers over time and short-term loss of animal numbers. If successful in elimination, beneficial effects statewide.	Providing current and scientifically sound information will allow informed public decisions and perceptions concerning CWD.	Shipment of cervids out of state may be inhibited and some facilities could be quarantined and/or depopulated. Potential needs for double fencing in affected area.	Laws prohibiting improper disposal will aid in the prevention of environmental contamination.
Alternative VI (Aggressive Elimination)	Significant effect on local population. If successful in eliminating CWD, protective effect on statewide population.	Eventual loss of hunters in immediate area due to lack of game. May need incentives initially to provide required hunter numbers. If management goals attained, should not significantly affect statewide hunter interest.	Local effects through reduction of hunter numbers over time and short-term loss of animal numbers. If successful in elimination, beneficial effects statewide.	Providing current and scientifically sound information will allow informed public decisions and perceptions concerning CWD.	Shipment of cervids out of state may be inhibited and some facilities could be quarantined and/or depopulated. Potential needs for double fencing in affected area.	Laws prohibiting improper disposal will aid in the prevention of environmental contamination.

Chapter 3: Affected Environment

3.1 Introduction

Chapter 3: This section describes the existing conditions of the environmental resources in Montana that could be affected by implementing any of the alternatives presented in Chapter 2. The description of the existing environment in Chapter 3, combined with the predicted effects of the "no action alternative, (Alternative I) in Chapter 4 will establish the baseline conditions against which the decision maker and the public can compare the potential effects of Alternative II through VI on the environment.

3.2 Description of Relevant Affected Resources

3.2.1 Montana's Native Deer and Elk Populations (Issue #1)

Montana is populated by two species of deer: white-tailed deer (*Odocoelius virginianu*s) and mule deer (*O. hemionus).* The two species have evolved individual attributes that constrain each to its own ecological niche and contribute to differences in habitat selection (Mackie, et al. 1998). Mule deer and white-tailed deer are distributed statewide with an estimated 500,000 or more deer living in Montana.

Figure 2. 2004 Montana Mule Deer Distribution and Population Estimate

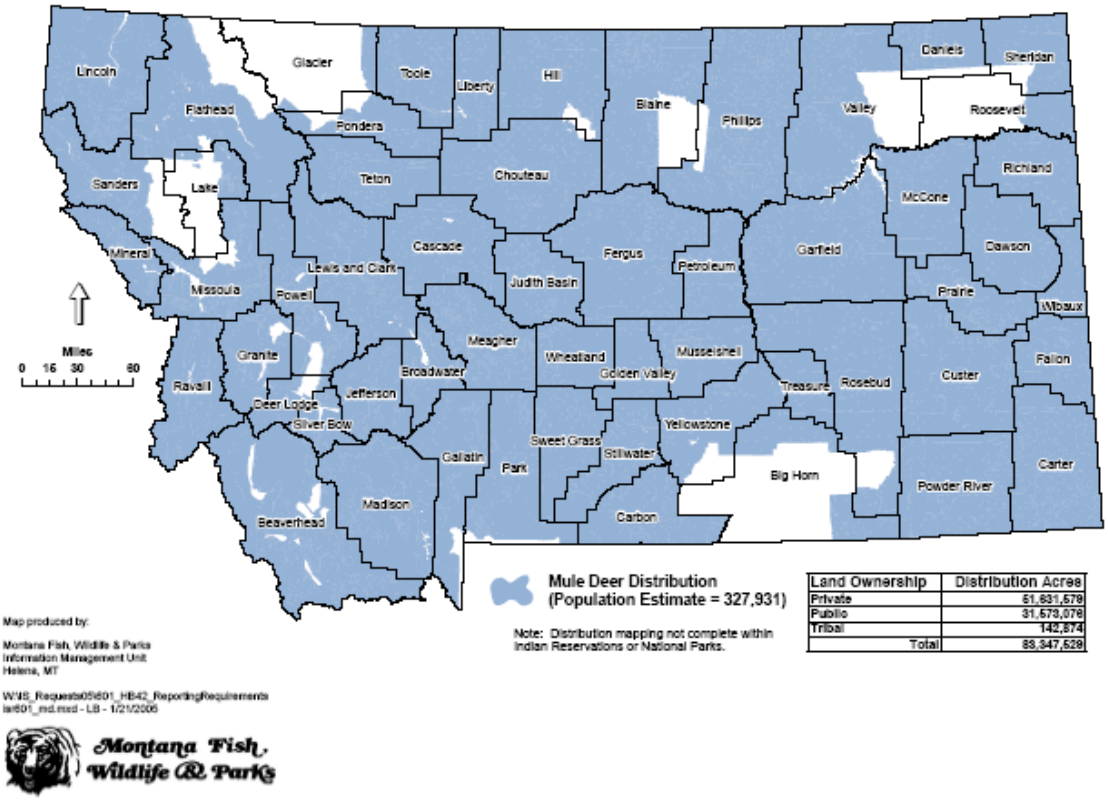
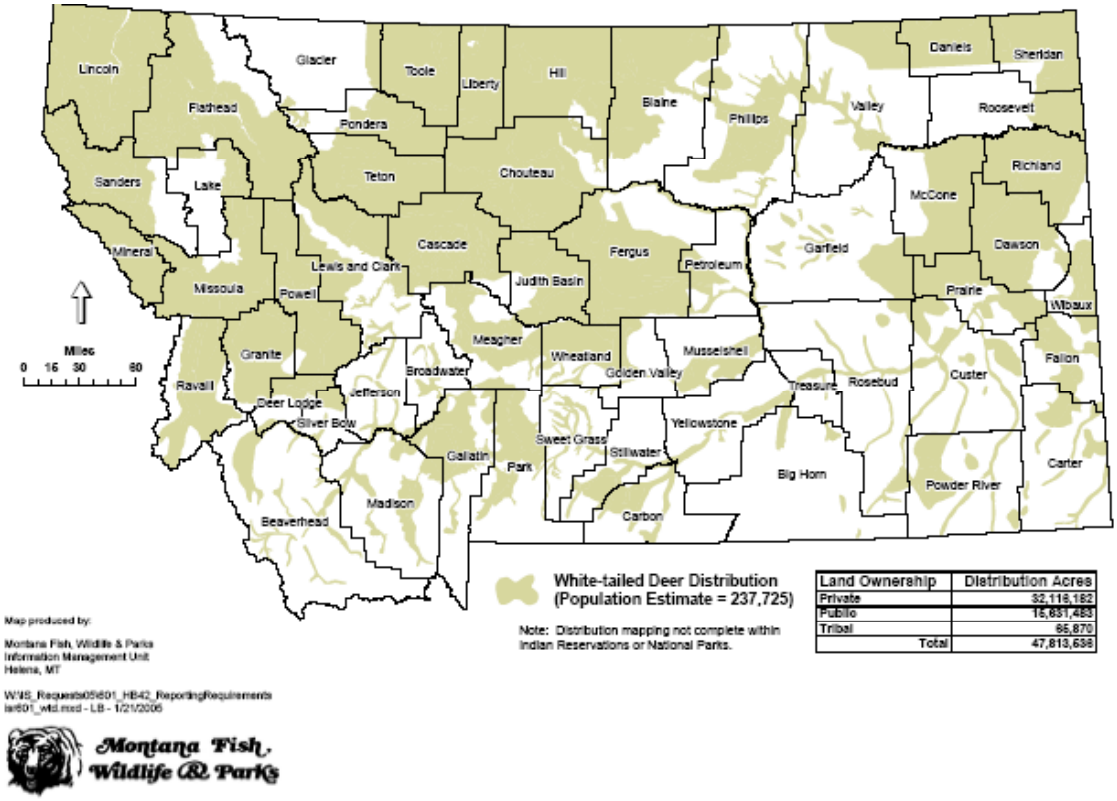


Figure 3. 2004 Montana White-tailed Deer Distribution and Population Estimate



Land Ownership	Distribution Acres
Private	32,116,182
Public	15,831,483
Tribal	65,870
Total	47,813,636

Viable deer populations exist in some places and not in others, according to the distribution of habitat of varying quality. The dynamics of deer populations constantly adjust as the environment fluctuates whether it's the wide variation in mule deer fawn survival and population size experienced in the prairie/breaks or the more limited variation that occurs in white-tailed deer populations on river-bottom habitats augmented by irrigated agriculture. For example, mule deer numbers in the prairie/breaks can double in as little as two years during favorable environmental conditions. In such years, fewer than 20 percent of fawns die in their first year of life and only a percentage or two of adults die of natural causes. When conditions are unfavorable, deer numbers can decline up to 50 percent in a single year. During the severest of conditions, 95 % of all fawns may die before their first birthday and 25-35 % of adults can succumb to natural causes of mortality. In contrast, mortality patterns for white-tailed deer in river-bottoms associated with irrigated agriculture display less annual variation. Fawn survival and recruitment averages 75+/- 20 fawns/100 adult females which is the highest recorded among all deer populations studied in Montana. Because of high fawn recruitment rates, and low-moderate natural losses of adult females (11-16 percent), whitetail populations in these environments can sustain comparatively high hunter harvest rates (Hamlin and Mackie 1989, Mackie et al 1998). The effects of disease-related mortality on deer population dynamics can only be understood in the ecological context of other important factors that influence populations.

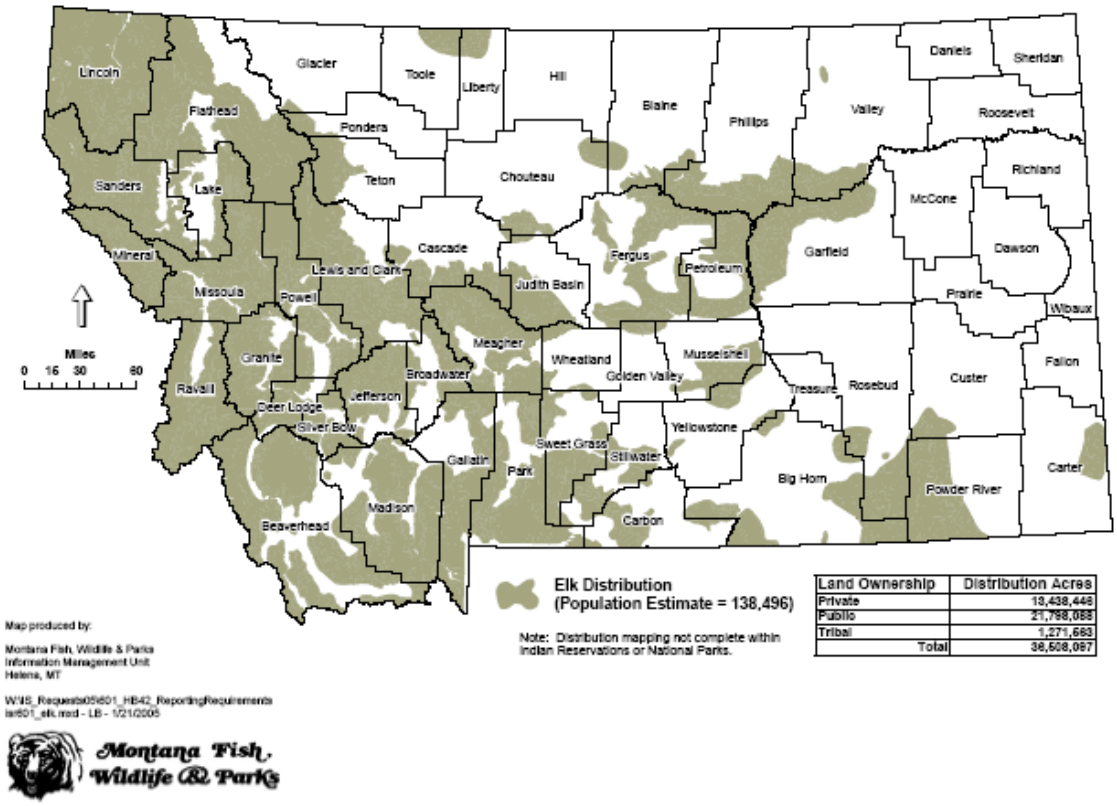
Movement and dispersal of mule deer and white-tailed deer is tied directly to the preferred habitats of the distinct species that is in turn tied to the environmental adaptations that the

species have acquired through time. Morphological differences such as body size, musculature and gait, coloration, and antler growth make mule deer more suited to life in dry, open, rugged terrain and white-tailed deer more suited to dense deciduous woodland. Subtle differences in digestive systems and physiology of the two species can also be associated with habitat selection. While mule deer are better adapted to handling larger amounts of coarse forage typical of dry, open areas, white-tailed deer are restricted to more succulent, higher quality foods which is evident from the species' close association with agricultural lands. These and other behavioral and environmental resource issues determine the movement and dispersal of members of each of the species (Mackie et al. 1998).

Although movement and dispersal is a complex topic that is difficult to generalize, members of both species would prefer as their fundamental strategy to inhabit one local environment for yearlong residency that would supply all of their basic requirements. When resource requirements cannot be met in one local area, specialized uses and use of home ranges begin to develop. Habitat differences across Montana result in varying home range sizes for mule deer and white-tailed deer depending on the area. In a study of mule deer and white-tailed deer inhabiting a 543 km^2 area of eastern Montana prairie, mule deer occupied home ranges varying from 0.5 km^2 to 19.7 km^2 for winter home range and 0.5 km^2 to 6.2 km^2 for summer home range. Similarly, white-tailed deer had winter home ranges varying from 1.1 km^2 to 13.7 km^2 and summer home ranges varying from 0.5 km^2 to 8.8 km^2 (Wood et al. 1989). Movement patterns for white-tailed deer, however, were not as discreet as those of mule deer and varied in response to the distribution of available forage and cover resources over time. White-tailed deer showed less fidelity to home range with emigration of white-tailed deer, especially females, from home ranges more common than for mule deer. One radio collared white-tailed doe in the study of eastern Montana prairie populations left the home range at 3 years of age and was shot 2 years later 93 km away.

Rocky Mountain Elk (*Cervus elaphus*) are generally associated with coniferous mountain habitats in western and central Montana. Elk also can be found in coniferous breaks habitat along major drainages. Although elk utilized open grassland habitats in eastern Montana prior to settlement of the prairies, current elk populations use extensive areas of conifer forests for security cover. Consequently, elk are sensitive to cover loss in logged and roaded forests. Elk will often avoid areas intensively grazed by cattle, especially during the growing season. An estimated 130,000 to 160,000 elk live in Montana.

Figure 4. 2004 Montana Elk Distribution and Population Estimate



Elk feed on a combination of grass and forbs on a yearlong basis with grass generally dominating the diet. Shrubs can be an important part of the diet during winters of deep snow cover and depleted grass resources. Elk are elevationally migratory in mountainous areas of Montana, concentrating on low elevation southerly exposures during the winter. However, elk generally winter at slightly higher elevations than mule deer and have a greater tolerance for snow cover. Low elevation elk populations in eastern Montana show some seasonal shifts in distribution from summer to winter. Higher elevation elk of western Montana tend to have favored calving areas usually at the upper elevation portions of their winter range. In general, elk are highly mobile and have large home ranges (Mussehl and Howell, 1971).

Seasonal migrations among Montana's elk herds from summer to winter ranges vary depending on habitat resources and topography. Cow elk in the Gravelly-Snowcrest area migrate between 13 and 72 miles with emigration from the herd as much as 121 miles and immigration as much as 105 miles. Individual bulls in the same herd have shown emigration maximums of 250 miles to near Ten Sleep, Wyoming. Immigration into the area of individual bulls has been as far as 125 miles from the National Elk Refuge in Jackson, Wyoming (Hamlin and Ross, 2002). Cow elk from the Lower Clark Fork herd have been documented to migrate from 7 to 30 miles during the year while emigration of both bulls and cows of up to 90 miles has been documented (Henderson and Sterling, et al., 1993). Annual migration movements of elk in the Blackfoot Clearwater –South Fork Flathead herd has been shown to be as much as 27 miles for cows and 51 miles for bulls (Hurley, 1994). Elk in the Gallatin Drainage show maximum migration distances of 35 to 40 miles with at least half the

population migrating only about half that far (Hamlin, personal communication). A 3-year-old bull elk that was shot on the C.M.Russell Wildlife Refuge in the Timber Creek area in November of 2002 had been tagged on the Theodore Roosevelt National Wildlife Refuge in Medora, North Dakota as a calf and had probably traveled in excess of 200 miles (Tim Feldner, personal communication). In October of 2003, a bull elk shot north of Hinsdale, Montana was identified as an alternative livestock (game farm) animal that had escaped from an alternative livestock facility in Climax, Saskatchewan, a distance of over 80 miles.

MFWP has been testing the wildlife populations of Montana for the presence of CWD since 1996. An early surveillance program in wild elk was initiated in areas adjacent to Yellowstone National Park in 1996 to determine if the disease might have moved northward out of Wyoming. Increased surveillance activities began in 1998 following a directive from the Governors Office for Montana Fish, Wildlife & Parks (MFWP) and Montana Department of Livestock (DoL) to work together on surveillance and control of this disease. MFWP developed and adopted a more detailed surveillance program in October 1999 for wild deer and elk. The purpose of the survey was to determine the presence or absence of the disease in wildlife with some as yet to be determined statistical reliability. Statistical reliability is dependent upon sample size, population size, and success of collection, which are constrained by access to samples (check stations) and various harvest regulations (opportunity to hunt deer or elk) within each area. This 1999 plan included broad geographic surveys, special collections, and targeted surveys. Initially, the broad geographic surveys emphasized the central and southern portions of Montana where deer and elk are most common and where CWD would naturally spread from Wyoming, South Dakota or Colorado where it was currently found. After the discovery of CWD in Saskatchewan Canada, emphasis was also directed to region 6 along Montana's northern border with Canada. Since 2000, surveys have concentrated on high-risk areas, where MFWP considers possibility of detecting the first case of CWD in Montana the greatest. The high-risk areas include Saskatchewan border with Montana (region 6) and along the border with Wyoming and South Dakota (regions 3, 5, and 7). An additional high-risk area was added in 2000 and included the area around an alternative livestock ranch where captive cervids had been diagnosed with CWD in late 1999 (region 2). Special sample collections were conducted by FWP outside of hunting seasons as opportunities presented themselves. Targeted surveys emphasized animals with clinical symptoms collected by the field biologists and wardens throughout the state (Anderson, N., and K. Aune. 2004).

The results of the surveillance surveys conducted since 1998 are presented in Table 4. With the addition of over 300 samples collected during a late hunt outside of Yellowstone National Park in early 2005, there have been over 7000 samples tested since 1998 with no deer or elk testing positive for CWD in Montana.

Table 4. CWD Survey Result Totals for Montana from 1998 through 2004

Year	Hunter	Road kill	Targeted	Special	Total (PrP not detected)
1998	443	1	2	0	446
1999	575	3	4	0	582
2000	240	2	20	74	336
2001	191	1	18	10	220
2002	976	4	18	0	998
2003	2002	3	31	96	2132
2004	2050	28	13	0	2091
Total	6477	42	106	180	6805

3.2.2 Wildlife Management Tools (Issue #2)

The historical concept of deer and elk management from the 1930's until the mid-1970's stressed that the number of mule deer, white-tailed deer, or elk able to be sustained in a given area was a function of the availability of appropriate habitat and forage. Populations reaching high densities overgraze available forage, particularly on winter ranges. The decline in habitat quality results in high mortality rates and low fawn recruitment rates causing precipitous drops in populations that take years to recover. Over-utilized habitat may take 10-20 years to recover to a condition that will support a population increase. Management of deer and elk populations under the historical management objectives were accomplished in two manners: by providing more available habitat and thereby more forage, especially on winter ranges, or by maintaining populations that could be supported by the existing habitat and forage. A successful management program attempted to maintain quality habitat by properly harvesting excess animals when necessary. Management hunts (general and late season to manage population size and distribution) are the primary tool for control of the wildlife populations within the limits of existing habitat and forage. Those hunts must achieve consistent population reductions in order to be successful. Obtaining an adequate harvest is sometimes restricted by rugged terrain or by private ownership of land where access is restricted.

Wildlife biologists now believe that the population dynamics and ecology of deer and elk are much more complicated than the cause and effect relationships between available forage and habitat and population numbers. Rather than the traditional view of a balance between a few components such as deer density and forage quantity, wildlife biologists now believe that deer populations function in complex ecosystems and vary in accordance with a balance of the total environment (Mackie et al. 1998). The most influential factors in deer population dynamics seem to be weather, habitat condition, predation and other natural mortality, and hunter harvest. Although harvest of deer and elk by hunting mortality is still the essential and most easily controllable management tool, not only available habitat, but an array of environmental variations affect fawn recruitment rates and natural mortality rates and must be considered when determining the "window of opportunity" for hunter harvest.

Until recently, Montana's mule deer population was managed as one continuous population across the state. Under Montana FWP's Adaptive Management Plan initiated in 2001, five population management units have been identified based upon mule deer population dynamics and habitat characteristics. Those management units include the Northwest Montane, the Mountain Foothills, the Prairie/Mountain Foothills, the Southern Mountains, and the Prairie Breaks. "Population indicators" for each of the population management units have been established based upon historical population data to define objectives for each unit and to aid the department in developing regulations (standard, liberal, and restrictive) for hunting season recommendations to the FWP Commission (MFWP-Adaptive Harvest Management, 2001). In studying and managing the deer populations, mortality factors, habitat carrying capacity, reproduction and recruitment, and many other factors are taken into consideration to provide instructive insight into proper actions required to manage the populations at preferred levels. The goal of the adaptive management plan is to "manage for the long-term welfare of Montana's deer resource and provide recreational opportunities that reflect the nature of the deer populations." The major components of the Adaptive Management Plan are population objectives, monitoring program, hunting regulation alternatives, and modeling.

A primary management tool used by wildlife professionals is the big game hunter. By adjusting harvest quotas in population management units as well as the population segment targeted (antlered vs. antlerless), game management objectives for male:female ratios and for manipulation of total populations numbers have been achieved in most areas. New evaluation techniques, introduced with the 2004 Draft Elk Management Plan issued by FWP in September of 2004, will provide increasingly sophisticated information upon which quotas can be established for management of the elk herds. The adaptive harvest management plan employed by FWP for mule deer and white-tailed deer will provide the same information concerning management.

The annual mule deer harvest in Montana has ranged from about 42,000 to 92,000 animals. The annual white-tailed deer harvest in Montana has been increasing steadily with 65,000 white-tailed deer harvested in 1996. In 2001, almost 170,000 hunters took to the field during deer season resulting in a harvest of almost 112,000 mule deer and white-tailed deer combined. Similarly, over 100,000 elk hunters took to the field in 2002. The annual elk harvest has been increasing in recent years from an average of 15,000 to a current average of about 30,000 animals.

3.2.3 Wildlife and Montana's Economy (Issue #3)

Hunting in Montana is big business. Almost two-thirds of Montana's hunters are Montana residents with a 24% rate of participation in hunting among Montana residents. Statistics suggest that approximately 44% of Montana's adult male population and 13% of Montana's female population purchase a hunting license annually. In 2002, elk license sales to Montana residents generated almost $1.9 million in income to MFWP and non-resident elk license sales generated $11.7 million in income to MFWP. This total of $13.6 million was about 53% of all license fees received by MFWP and does not include elk permit drawing fees, archery license fees, or conservation license fees not included in license packages. In 2002, total deer license sales to residents and non-residents generated

$5.2 million in license fees. In addition, deer and elk hunters accounted for a large share of the $5.6 million in Federal Pittman-Robertson funds distributed to MFWP as a result of federal excise taxes collected on the manufacture of rifles, handguns, ammunition, and archery equipment. Thus, elk and deer hunting are of major importance in direct funding to MFWP for conservation and management programs for elk, deer and other wildlife species native to Montana.

In addition to providing funding to MFWP through the sale of hunting licenses, the hunting and wildlife viewing industry in Montana are substantial contributors to the state's overall economic output. In 2001, hunters spent an estimated $237.6 million in Montana (USDI, Fish and Wildlife Services and U.S. Department of Commerce, U.S. Census Bureau 2003). Big game hunting accounted for about 80% of this total. Wildlife viewing provided an additional estimated expenditure of $350 million. Thus hunting and wildlife watching accounted for an estimated $589 million in expenditures in Montana. This expenditure was equivalent to about 1.6% of the total economic output for Montana in 1999 (Minnesota IMPLAN Group, 2002). The amount spent on hunting and wildlife viewing represents 23% of the economic output provided by farming, ranching, and agricultural services combined in Montana in the same time period. Similar comparisons are 62% of the combined economic output of all mining, 38% of the output of the petroleum industry, and 32% of the combined output of forestry products, wood products, and pulp and paper. All of these dollars provide a "multiplier effect" as the money spent for lodging, fuel, sporting goods, equipment, etc. are then used to provide jobs and income to local communities where the dollars generated are again turned over to purchase more local goods and services.

3.2.4 Human Health (Issue #4)

There are a number of transmissible spongiform encephalopathies (TSEs) that affect humans. Most of the TSEs affecting humans occur as a sporadic disease with no identifiable source of infection or as a familial disease linked with mutations on the prion protein gene (Belay, ED, 1999). A notable exception among the human TSEs is the variant form of Creutzfeldt-Jakob disease (vCJD), which is associated with the foodborne transmission of bovine spongiform encephalopathy (BSE or "mad cow") to humans (Will et al. 1996). Unlike sporadic CJD, vCJD, affects a younger population and causes some distinguishing diagnostic characteristics in its victims allowing differentiation from sporadic CJD. As of December 1, 2003, a total of 153 cases of vCJD had been reported in the world: 143 from the United Kingdom, six from France, and one each from Canada, Ireland, Italy, and the United States (note: the Canadian, Irish, and U.S. cases were reported in persons who resided in the United Kingdom during a key exposure period of the U.K. population to the BSE agent) (Center for Disease Control, 2004).

The prion thought to cause CWD has not been shown to affect humans. There is a perception of risk from CWD, however, due to the association that has been established between mad cow disease, a domestic animal TSE, and vCJD, a human TSE. That perception has caused public concern and heightened public awareness of TSE diseases. There have been numerous reports by the media of big game hunters who have developed CJD. These reports, for the most part, have not indicated whether the disease diagnosed in

the humans has been sporadic CJD or variant CJD. The reports have resulted in investigations by the Center for Disease Control (CDC) evaluating the risk of CWD to hunters or to those consuming venison. A causal relationship, such as a food-born link between CWD and the human illness, could not be identified in any of the cases investigated. Despite the fact that CWD has been present in free-ranging cervids in Colorado and Wyoming for decades, the incidence of CJD and the age distribution of CJD case-patients in these two states are similar to those seen in other parts of the United States (Belay, et. al., 2004). As mentioned above, there has only been one case of vCJD reported in the United States. That case involved an individual that had been exposed to the BSE agent in the United Kingdom prior to moving to the United States. Studies done by CDC have not identified a link between CWD and any form of prion disease in humans.

As a means of providing additional protection against any potential risk of human exposure to CWD, the Montana Department of Fish, Wildlife & Parks has suggested that hunters follow some simple precautions:

- Animals that appear sick should not be harvested or consumed.
- Wear rubber latex gloves when field dressing carcasses.
- Minimize handling and don't eat the brain or spinal cord.
- Bone out the meat and discard the brain, spinal cord, eyes, spleen and lymph nodes.
- Be sure to wash your hands and all utensils after processing your animal.

These precautions provide a degree of protection to individuals not only against any possible exposure to the CWD prion agent, but also against a number of other pathogens that could potentially be carried by wildlife.

3.2.5 Alternative Livestock (Issue #5)

Alternative livestock are defined as any privately owned caribou, white-tailed deer, mule deer, elk, moose, antelope, mountain sheep, or mountain goat indigenous to the state of Montana, a privately owned reindeer, or any other cloven-hoofed ungulate as classified by the Department of Fish, Wildlife & Parks (MFWP). An alternative livestock ranch is defined as an enclosed land area upon which alternative livestock may be kept for the purposes of obtaining, rearing in captivity, keeping, or selling alternative livestock. Finally, a person may not operate an alternative livestock ranch in Montana without having first obtained an alternative livestock ranch license from FWP prior to November 7, 2000.

Alternative livestock production in Montana has been regulated by MFWP since the early 1900's. The legislature passed the original statute directing the administration of alternative livestock production in 1917. Until the 1980's the number of alternative livestock operations was relatively small, and without significant controversy. Non-significant changes to regulations were made as needed. In the 1970's and 1980's regulations were passed that required alternative livestock operations to be licensed by MFWP in order to purchase, sell, transport, or otherwise transfer game animals as private property (Mundinger and Beck, 2000). Currently, the alternative livestock industry is co-regulated by MFWP and the Montana Department of Livestock (DoL). MFWP has primary jurisdiction with regard to licensing, reports, recordkeeping, exterior fencing, classification of certain species, inspection of exterior fences and records, and unlawful

capture. DoL has jurisdiction with regard to marking, inspection of interior facilities and animals, transportation, importation, quarantine, hold orders, interior facilities, and health of the alternative livestock.

The number of alternative livestock licensees in Montana increased dramatically in the 1990's. At that time, the industry was considered by some as an opportunity to supplement traditional livestock income sources. Some excellent resources, including a Michigan "white paper" (Captive Cervid White Paper, 1999) have been prepared describing the markets for captive raised deer and elk in North America. Those markets, especially the elk breeding stock market, experienced substantial growth in the 1990's with prices for breeding stock peaking in 1996. In comparing select sale prices of elk breeding stock obtained from 1996-7 auctions to those prices obtained in 1998 and early 1999, Watson (1998) concluded that the overall elk breeding stock prices "are down 35 to 60% from high posted in 96 and 97".

As of January, 2005, there were 61 licensed alternative livestock facilities in Montana that reported a total of 2600 alternative livestock animals, approximately 95% of which were elk, behind their exterior fences. These facilities generate income from the sale of breeding stock, meat or animal products, and velvet antler. Prior to November, 2000, an additional source of income to a limited number of licensees had involved the charging of a fee to an individual for the opportunity to shoot alternative livestock. That method of revenue generation was eliminated in November, 2000 by the passage of a citizen's initiative, Initiative 143 (I-143). I-143 prohibited the shooting of alternative livestock for a fee, the issuance of any new alternative livestock licenses by MFWP, and the transfer of an alternative livestock license to a third party. Both the state of Montana and MFWP have been named in numerous lawsuits that have sought either a reversal of the elements of I-143 due to issues of "unconstitutionality" or a payment to the plaintiffs for a "taking" of private property or private property value without any just compensation. In all cases decided to date, the constitutionality of I-143 has been upheld and the courts have found that the implementation of I-143 did not result in an uncompensated taking of property.

As of June of 2005, CWD has been diagnosed in captive cervids in 9 states and 2 Canadian provinces. Animals from at least 36 captive alternative livestock herds in the U.S. and 46 herds in Canada have tested positive for CWD. In most cases, the infected herds have been depopulated. CWD was diagnosed at a Montana alternative livestock facility in November of 1999. That herd was depopulated and all 87 animals (elk) tested for CWD resulting in the detection of 9 animals positive for CWD. A trace quarantine herd was identified in Montana that had received elk from the original CWD infected herd. All 29 elk from that trace quarantine herd were also killed and tested for CWD. None of those trace herd animals were positive for CWD.

Currently, the Montana Department of Livestock requires by their administrative rules that any alternative livestock animal over 16 months of age that dies on an alternative livestock ranch in Montana be tested for CWD. Since initiation of that program in 1999, almost 3500 samples have been submitted from alternative livestock ranches for CWD testing.

Only 9 samples, all from the 1999 index herd mentioned above, have tested positive for CWD.

Once CWD is found in a captive herd, that herd is quarantined and an epidemiological investigation initiated to identify any trace back and trace forward herds. Any herds identified as CWD positive or CWD exposed are subsequently quarantined and a herd health program established. In the case of a CWD infected herd, depopulation has generally been conducted to enable CWD testing of the entire herd. Indemnification programs through the USDA/APHIS will provide payment to the operator at a rate of 95% of the appraised value of the animals up to a maximum of $3000 per animal. Indemnity payments currently require the entire depopulation of the captive cervid herd that is determined to be CWD positive with no restocking on depopulated premises without APHIS approval.

USDA/APHIS published proposed rules for "CWD Herd Certification and Interstate Movement of Captive Deer and Elk" in December of 2003. That program is intended as a national program to help prevent the spread of CWD within the captive cervid industry and the free ranging populations of cervids in the U.S. The program requires CWD testing for all animals that die on the premises over 16 months of age, individual identification of every animal in the herd, and maintenance of complete records concerning date of acquisition, source, date of disposal and destination of any animal removed from the herd. Following 5 years of compliance with the herd certification program, the herd is given a "certified" status which is maintained as long as the herd stays enrolled in the program and continues to fulfill the requirements. Interim status levels of 1 through 5 are given based on the number of years that the herd has been successfully enrolled in the certification program. Certified status 5 eliminates the requirement for CWD testing of animals that are slaughtered or that are killed on "shooter" operations. The program is expected to become codified upon finalization of the proposed rules in 2005.

Many individual states, including Montana, have established programs similar to the proposed federal program and alternative livestock licensees will be given consideration when entering the federal program for years enrolled in qualified state programs. Montana has required the elements of the federal program since 1999 resulting in the testing of almost 3500 alternative livestock over 16 months of age that have died over the past 5 years. In establishing their current programs, many states have prohibited the importation of any cervids unless they have originated from out of state facilities that have been successfully enrolled in a CWD surveillance program for anywhere from 3 to 5 years. Montana is one of those states that have not allowed the importation of cervids unless originating from facilities where surveillance programs have been in existence for 5 years. Because of that requirement, Montana has not allowed the importation of any cervids since 1999.

3.2.6 Disposal/Environmental Contamination (Issue #6)

Disposal

The disposal of carcasses and/or offal of domestic and wild animals is an issue regulated by multiple departments in the state of Montana. In most cases, deer or elk harvested in the

field have been field dressed at the site of harvest and the internal organs left for scavengers. The inedible remains of hunter-harvested animals following processing have been disposed of at the discretion of the hunter or processor, but hopefully at municipal solid waste landfills. Due to the "waste of game" statutes in place in Montana, these remains have been composed primarily of skeletal remains and remnants of meat not easily removed from the bones.

In the case of meat processors, the material remaining after processing, which may amount to over 35% of the original body weight of the dead animal, may be taken to rendering facilities. Rendering facilities retrieve the fat and protein from these remains through heating at 125-135 degrees centigrade followed by extraction procedures. The final products containing the fat and protein are utilized in many domestic products, but primarily in pet feed, poultry feed, and swine feed. In 1997, the FDA prohibited the use of rendered protein and bone meal obtained from ruminants for use in feed for other ruminants. In addition, on November 12 2002 the FDA announced that "*the Agency will not permit material from Chronic Wasting Disease (CWD)-positive animals, or animals at high risk for CWD, to be used as an ingredient in feed for any animal species*" (FDA, Center for Veterinary Medicine, 2002).

Road killed wild animals have been disposed of under agreement with the Montana Department of Transportation by highway maintenance crews. These carcasses are disposed of, once again, in municipal solid waste landfills. Wild game that dies naturally in the field (either private or public lands) is almost always left to decompose naturally or is consumed by scavengers.

In the case of animals suspected of dying from contagious diseases, the primary goal of carcass disposal is to prevent spread of the disease agent to other animals. In the event of an outbreak of a foreign animal disease, special measures are needed to ensure the disease agent is eradicated to contain the outbreak and prevent its revivification at a future time. In some cases, the agent will not survive long after the death of the infected animal and proper burial is sufficient for the animal carcass. Other diseases can require incineration. Determining the required option to contain the disease and protect future animals from it is addressed on a case-by-case basis by state agencies. It is the owner's responsibility to properly dispose of animals he or she knows to be sick (see Department of Livestock Statutes later in this section). Diseases that agencies are typically concerned with are Hoof and Mouth disease, Anthrax, and Transmissible Spongiform Encephalopathy's. Options for disposal in these cases include burial at an engineered and regulated landfill, rendering with controlled disposal, incineration, and digestion by high pressure- high temperature-alkaline hydrolysis.

Modern landfill sites include engineered liners, caps, and leachate and gas collection systems and provide an excellent capacity for carcass disposal. They are relatively low cost as compared to other methods of disposal. The Wisconsin Department of Natural Resources prepared a risk assessment on the disposal of potential CWD infected deer from Wisconsin in municipal solid waste landfills (Wisconsin DNRC, 2002). In that analysis, they determined that the primary pathway of potential risk identified for the CWD prion

following landfill disposal of infected deer can be described as carcass⇒landfill⇒leachate⇒wastewater treatment plant⇒sludge⇒farm field⇒ingestion by humans or deer/elk. While they concluded that a quantitative or semi-quantitative assessment of the risk was not possible due to unknowns such as the quantity of infectious agent in a deer carcass and the dose required for infection, they did conclude that it was "reasonable that while absolute numbers relating to human health risk cannot be generated, the available knowledge about CWD and other TSEs suggests that landfilling of CWD-infected deer does not pose a significant risk to human health." The Wildlife Diagnostic Laboratory disposes of cervid tissue remnants from the surveillance program by landfill. These carcasses do not present a risk at this time. If CWD becomes "endemic" in areas of Montana, disposal methods for those materials will be re-evaluated.

Rendering as a means of disposal of animal carcasses involves cooking of animal tissues at specific temperatures for set time periods, to produce water, tallow (fats) and meat and bone meal (the protein portion). Rendering involves some level of inactivation of the prion agent and may reasonably be expected to reduce infectivity by 10-100 fold. Studies using BSE and scrapie agents, however, indicate that TSE agents can survive rendering to some degree. Controlled disposal would be required since the tallow and meat-and-bone-meal could contain infectious agent and could not be marketed for fertilizer or animal feed. There are potential concerns regarding water contamination and quality. If water from the process contained solids the prion agent could "stick" to this. Filtering solids from the wastewater before discharge could reduce potential infectivity in wastewater. The use of the rendering option for disposal may be limited by refusal of rendering plants to accept cervids (as happened in Wisconsin following the discovery of CWD in the area) (Bartelt, G., Pardee, J., & Thiede, K. 2003)

Incineration is another method for disposal of animal carcasses. Montana maintains an air curtain incinerator for the incineration of large numbers of contaminated materials to prevent contamination of the environment. Incineration is a highly effective method for complete inactivation of the prion protein responsible for TSE diseases if temperatures are sufficiently high. Air curtain incinerators will reach temperatures of 1800 ^{o}C to 2800 ^{o}C when operated properly and will provide efficient incineration and inactivation of the prion. Air curtain incinerators utilize an open topped pit or combustion box, are commonly fueled with wood, and have a fan along the length of the pit or box to both provide the oxygen necessary for high temperature combustion and an air curtain preventing the escape of smoke or unburned particulate from the pit or box. Air curtain incinerators have the capacity to incinerate as many as 100 elk carcasses in a day.

Finally, alkaline hydrolysis may be used for disposal of CWD infected carcasses or carcasses at high risk of contamination with the CWD agent. The tissue digestion equipment is expensive and has a low volume capacity. The process does, however, provide for inactivation of TSE agents and results in a sterile aqueous solution of small peptides, amino acids, sugars, and soaps. By-products consist of the mineral constituents (ash) and softened bones and teeth remnants that can be recovered as sterile bone meal. The process uses alkaline hydrolysis at an elevated temperature to convert the proteins,

nucleic acids, and lipids of all cells and tissues, as well as infectious microorganisms and TSE agents.

Carcass disposal became an issue in Montana after finding CWD on an alternative livestock ranch in southwestern Montana. Eighty-seven animals either died or were sacrificed and samples taken for diagnosis and research. Initially, the carcasses were slated for disposal at a municipal landfill. Those plans, however, were abandoned when county authorities at the landfill location balked at disposing of the potentially contaminated carcasses in that county. Eventually, carcasses were disposed of by incineration using a trench incineration technique that incorporated an air curtain to completely incinerate the elk carcasses.

Statutes and Rules Regarding Animal Carcass Disposal in Montana:

Department of Environmental Quality Statutes:

75-10-212. Disposal in unauthorized area prohibited -- exception. (1) No person may dispose of solid waste except as permitted under this part. (2) It shall be unlawful to dump or leave any garbage, dead animal, or other debris or refuse: (a) in or upon any highway, road, street, or alley of this state; (b) in or upon any public property, highway, street, or alley under the control of the state of Montana or any political subdivision thereof or any officer or agent or department thereof; (c) within 200 yards of such public highway, road, street, or alley or public property; (d) on privately owned property where hunting, fishing, or other recreation is permitted, provided this subsection shall not apply to the owner, his agents, or those disposing of debris or refuse with the owner's consent. (3) Any person in violation of this section is absolutely liable, as provided in 45-2-104, and is subject to the civil penalties provided in 75-10-233.

75-10-213. Unlawful disposition of dead animals -- exception. It is unlawful to: (1) place all or any part of a dead animal in any lake, river, creek, pond, reservoir, road, street, alley, lot, or field; (2) place all or any part of a dead animal within 1 mile of the residence of any person unless the dead animal or part of a dead animal is burned or buried at least 2 feet underground; or (3) being the owner, permit all or any part of a dead animal to remain in the places specified in subsections (1) and (2) of this section except as provided in subsection (2) of this section.

75-10-214. Exclusions -- exceptions to exclusions. (1) (a) This part may not be construed to prohibit a person from disposing of his own solid waste that is generated in reasonable association with his household or agricultural operations upon land owned or leased by that person or covered by easement or permit as long as the disposal does not create a nuisance or public health hazard or violate the laws governing the disposal of hazardous or deleterious substances. (b) This part does not apply to the operation of an electric generating facility, to the drilling, production, or refining of natural gas or petroleum, or to the operation of a mine, mill, smelter, or electrolytic reduction facility. (2) The exclusions contained in subsection (1) of this section do not apply to a division of land of 5 acres or less made after July 1, 1977, that falls within the definition of subdivision in Title 76, chapter 4, part 1, or the Montana Subdivision and Platting Act in Title 76, chapter 3.

Montana Department of Livestock Statutes:

81-2-108. Diseased animals not to run at large --burial of carcasses. It shall be unlawful for any owner, agent, or person in charge of any domestic animal or animals that are known to be suffering from or exposed to a dangerous, infectious, contagious, or communicable disease to permit such animal or animals to run at large on the public range or public highway. It shall be the duty of the owner or agent or person in charge of animals, which died, or they have reason to suspect did die from an infectious, contagious, communicable, or dangerous disease to properly bury or burn the same.

Montana Department of Livestock Administrative Rules:

32.3.125 DISPOSAL OF CARCASSES (1) Carcasses of animals that have died from other causes than anthrax must be disposed of in a satisfactory manner so as not to become a public nuisance or a menace to livestock or poultry. Carcasses of dead animals may not be disposed of along public highways, streams, lakes, or rivers, or allowed to remain on the ground surface so as to become a public nuisance or a menace to livestock or poultry

32.3.1002 HANDLING OF CARCASSES AND CARCASS PARTS OF ANTHRAX INFECTED ANIMALS (1) The carcasses of animals which have died of anthrax may not be skinned or opened, except when considered necessary by a deputy state veterinarian in order to make a definite diagnosis.

(2) Hides from carcasses of animals that have died of anthrax shall not be removed. Hides which have been removed prior to diagnosis of anthrax shall be burned or buried.

(3) Carcasses of animals that have died of anthrax must be completely burned, covered with quick lime and buried 6 feet deep from the tip of the carcass, or sterilized in a licensed rendering plant under the immediate supervision of a deputy state veterinarian.

(4) If it is necessary to move the carcass of an animal that has died of anthrax, the natural openings must be plugged with cotton or other suitable material.

(a) The carcass must be rolled onto a stone boat or skid and hauled to the nearest spot suitable for burning or burial.

(b) The stone boat or skid must be burned or thoroughly disinfected.

(c) Carcasses may be moved in an approved licensed rendering plant truck by written permission from and under the supervision of a deputy state veterinarian.

32.3.1002 HANDLING OF DEAD ANIMALS OR FOWL

(3) Where bodies, or parts of bodies, of dead animals or fowl are to be converted into tallow and other inedible material, the processing or rendering and cooking must be done in a manner that insures that all material is sterile.

(4) Where bodies, or parts of bodies, of dead animals, or fowl (including viscera contents) are to be disposed of by burning, the burning must be complete. The place where burning is done must be located, constructed and arranged to not interfere with the comfortable enjoyment of life and property of residents of this state.

(5) Where bodies, or parts of bodies, of dead animals or fowl (including viscera contents) are to be disposed of by burying, they must be buried so that no part shall be nearer than 4 feet from the natural surface of the ground. Every part must be covered with quicklime and then 4 feet of earth. The burial pit may not be located near any river, stream, lake, pond, well, or any gulch or draw which is the source of any stream. The burial pit may not drain on any ground, which may be flooded by the overflow water of any river, stream, lake or pond.

(6) If disposition of the viscera contents or parts of carcasses is to be made in any manner other than as provided in these rules, the disposition must be approved by the department after written application by the licensed renderer.

Environmental Contamination

The role that environmental contamination plays in the transmission and epidemiology of CWD remains unclear. There is concern, however, that the potential exists for indirect natural transmission of CWD through contamination of the environment by excretions, secretions, or the decomposition of infected animal carcasses. (USDA/APHIS, 2002) Studies recently completed in Colorado (Miller, et al. 2004) have provided preliminary information concerning environmental contamination. In one study, CWD negative animals placed in a pen that had contained CWD infected animals 2.2 years earlier eventually developed CWD as a result of the environmental exposure. In a second study, deer developed CWD following exposure to carcasses of CWD infected deer that had been placed in pens 1.8 years earlier and allowed to decompose. These findings indicate that "environmental sources of CWD infection represent potential obstacles to control in natural and captive settings." Fearing environmental contamination, at least 15 states have imposed carcass import restrictions concerning importation of heads and spinal cords of deer and elk harvested from other states. The implications of the Colorado environmental studies on carcass import should, however, be taken in context. First, the infective material used as the "contaminant" in the Colorado studies originated from animals that were either in the end stages of CWD or had died of CWD. In the wild, the majority of CWD infected animals harvested, if any, would not be showing clinical symptoms and would conceivably not have the concentration of abnormal prion in the nervous tissue and lymph tissue that the study sources did. Viscera and other wastes left in the field by hunters harvesting normal appearing animals would provide much less of an "infective dose" than that provided by the experimental animals as would the brains and spinal cords brought home or to the meat processor. Second, the experimental animals in the Colorado study were confined in relatively small pens where repeated exposure to the contaminated material was more likely to occur.

Prions, the theoretical causative agent of CWD and other TSE's, are highly resistant to standard decontamination procedures and agents typically used to inactivate other "pathogens." Those decontamination procedures include ultraviolet light, temperature extremes, and oxidizing agents. At the present time there does not appear to be a practical way of disinfecting large areas of contaminated ground in order to deactivate the CWD agent. To date de-stocking and disinfecting CWD-infected premises, followed by restocking after an interval of time, has not been successful in eliminating the disease on the premises. The reasons for such failures are not known. Further research is required to determine how effective disinfection of large areas (e.g. deer or elk farms) can be carried out.

3.3 Other Regulatory Agencies

Federal agencies and other Montana state agencies either have plans in place or are in the process of preparing plans for prevention and/or management of CWD in captive cervid and/or free-ranging cervid populations. Those plans, separated by responsible agency, are summarized below. In addition, overviews of CWD action plans developed by other states have been summarized to allow for a comparison with alternatives presented in this plan.

USDA/APHIS

In September of 2000, the Veterinary Services division of USDA/APHIS proposed a program designed "to eradicate CWD from captive elk herds in the United States". That program entitled "Chronic Wasting Disease Herd Certification Program and Interstate Movement of Captive Deer and Elk" was published and made available for comment in the Federal Register in December of 2003. Elements of the program include requirements for animal identification, testing, herd management, and movement of animals into and from herds. After 5 years of participation in the program with no evidence of CWD, a herd would be granted a "certified" status and movement of captive cervids from that herd allowed for interstate commerce. Comments on the program design have been collected by USDA/APHIS and implementation of the plan is expected in late 2005.

USFWS

In anticipation of finding CWD on United States Fish and Wildlife Service (USFWS) lands, planning guidelines were prepared by USFWS in February of 2004. The guidelines were intended to assist Regions in working with their field stations (primarily refuges and hatcheries) to develop site-specific plans for CWD surveillance and for management of CWD should it occur on USFWS lands. The guidelines placed a high priority on coordination of actions and shared use of resources with state wildlife agencies, other state and federal agencies and other partners. Plans for specific each of the USFWS stations in Montana were prepared by October of 2004. Information was provided to field station personnel by MFWP to assist in their plan preparation.

DoL

The Montana DoL instituted a program for surveillance of CWD in captive cervids in April of 1999. Elements of that program include annual inventory inspections, reporting of deaths of all animals that have been individually identified (individual identification required by January 1 of the year following their birth) and CWD testing of all animals that die and are 16 months of age or older. Herds of origin wishing to import animals into Montana were initially required

to have a 12-month surveillance period in compliance with the Montana requirements. That 12-month requirement was modified to 24 months in November of 1999 and modified once again in February of 2000 to 60 months.

Idaho CWD Action Plan

Idaho has prepared a CWD plan that includes elements of risk reduction for the appearance of CWD, surveillance for the presence of CWD, and containment of CWD should it appear in the state. The essential elements of the containment or management plan are as follows.

1. If CWD is diagnosed in the wild or a captive facility, the Idaho Department of Fish and Game (IDFG) will immediately collect samples from 50 deer within a 5-mile radius of the affected site. If CWD is not detected in these samples, general surveillance at hunter check stations will be conducted in the affected Game Management Units using statistically generated sampling sizes to detect the disease at a 95% confidence interval.
2. If CWD is detected in the 50 deer sampled, the deer and/or elk population will be reduced 25-50% within 5 miles of the affected site using IDFG personnel and hunters. In addition, eradication effects may be initiated for deer and elk within a 1-mile radius of known infected animals.
3. If CWD is detected in subsequent general surveillance, the deer and/or elk population will be reduced 25-50% within 5 miles of the affected site using IDFG personnel and hunters. In addition, eradication effects may be initiated for deer and elk within a 1-mile radius of known infected animals.

South Dakota CWD Action Plan

The goals included in South Dakota's CWD Action Plan are to monitor the occurrence and spread of CWD in free-ranging cervids, to prevent the further spread of any CWD in free-ranging cervids and eliminate the infection where it exists, and to educate the public concerning CWD. Their management and elimination program includes the following actions: The response to a finding of CWD in free-ranging cervids will be based on a 10% sample of the baseline populations.

1. <u>≤1% infection rate</u> = monitor through hunter harvest (voluntary submission) with increased tags to reduce herd.
2. <u>1-3% infection rate</u> = (#1 guidelines) plus GFP organized sampling to confirm infection rate and to further reduce herd.
3. <u>3% infection rate and above</u> = mandatory hunter harvested checks, attempt to depopulate designated zone of infection.

    a. Unlimited, free tags in the zone during season established.
    b. GFP organized cervid reduction by any necessary means.

Utah CWD Action Plan

Utah's goals for management of CWD in free-ranging cervids are to: 1) prevent introduction of disease into free-ranging populations and captive herds; 2) eradicate the disease when it is detected in new areas or herds; and 3) reduce prevalence of disease in endemic areas to minimize effects of the disease on wild populations. Their management plan has four specific goals that are presented below:

Goal 1: Prevention: To maintain populations or areas free from CWD.

- The UDWR will continue to cull and test all wild deer and elk from inside domestic elk farms. Increased efforts will be made to eliminate wild deer and elk located inside domestic elk facilities. This strategy will require substantial effort by UDWR employees not limited to fixed-wing and helicopter flights as well as attempts for removal from snowmobile.
- The UDWR will continue targeted surveillance efforts throughout the state by removing and testing samples from all deer, elk, and moose exhibiting clinical symptoms of CWD.
- The UDWR will work closely with the Utah Department of Agriculture and Food (UDAF) to prevent introduction of disease into free-ranging populations as well as prohibiting the disease from entering captive herds. This will be accomplished by limiting contact between free-ranging and captive animals.

Goal 2: Elimination: To remove CWD and prevent its reintroduction from a specific area.

- When CWD is detected in a new area, the UDWR will initiate an outbreak surveillance program and cull animals from the area to determine the extent of the infection and attempt to eradicate CWD from the area. This strategy, also known as "hot-spot culling", is an attempt to identify foci of CWD infections, determine infection rates, and cull local populations to reduce prevalence and spread of the disease. Generally, this effort will require taking and testing of deer by UDWR personnel. In addition to culling efforts, the UDWR will use targeted surveillance to promptly remove and test samples from all deer, elk and moose exhibiting clinical symptoms of CWD, regardless of location throughout the state.

Goal 3: Maintenance: To maintain CWD below a specified level of prevalence.

- The UDWR will continue to maintain an accurate database of CWD information utilizing GIS and other systems, which includes sampling data from previous years efforts. Management this year will include efforts to collect more accurate locations on all animals that are tested.

- The UDWR will continue to test for CWD with 95% confidence limits at a ≥1% prevalence rate.

- The UDWR will reduce or maintain herd populations in CWD positive areas below herd unit objectives. Hunting will be used as the primary management tool to reduce deer and elk populations in units where CWD has been detected. All herd reduction efforts will be coordinated with adjacent states where applicable.

- The UDWR will look at policies to limit feeding of wildlife in areas where positive cases have been identified and look at ways to reduce feeding programs in the state to reduce prevalence and prevent transmission of CWD.

Goal 4: Containment: To keep CWD from spreading outside of an area where it is confirmed.

- The UDWR has been working on and will complete a memorandum of understanding between UDWR, UDAF, and the Utah Division of Solid and Hazardous Wastes (UDSHW) to ensure that carcasses are disposed of properly. The UDWR will put together information for the public on the proper care and disposal of carcasses. UDWR currently has laws in place that restrict the movement of carcasses that are brought into the state from known positive areas. We are looking at restricting the movement of carcasses within the state areas with known positive cases.

- The UDWR will continue targeted surveillance efforts by the prompt removal and testing of samples from all deer, elk and moose exhibiting clinical symptoms of CWD, regardless of location, throughout the state.

- The UDWR will reduce or maintain herd populations in CWD positive areas below herd unit objectives. Hunting will be used as the primary management tool to reduce deer and elk populations in units where CWD has been detected. All herd reduction efforts will be coordinated with adjacent states where applicable.

The UDWR will look at policies to limit feeding of wildlife in areas where positive cases have been identified and look at ways to reduce feeding programs in the state to reduce prevalence and prevent transmission of CWD.

Chapter 4: Environmental Consequences

4.1 Introduction

In a standard environmental assessment, this chapter would compare the effects of each alternative on the issues identified in section 1.9 of this document and on the relevant resources that might be affected. In this environmental assessment, the environmental consequences will be evaluated somewhat differently. First, the predicted environmental consequences of finding CWD in Montana's free ranging deer and elk populations will be evaluated in terms of its effect on the issues identified in section 1.9. That evaluation is essentially an evaluation of the effects of alternative I, the no action alternative. Second, the impact that implementation of alternatives II through VI would have on the environmental resources and on the issues will be evaluated.

The ability of any of the alternatives presented in this evaluation to manage or eliminate CWD from the free ranging deer and elk herds in Montana is difficult to predict. An evaluation of the success of programs implemented in other states is premature, although experiences in other states do provide some basis for predicting success of the alternatives. It is the responsibility of the department, after reviewing scientific data and public input, to determine which of the alternatives is the most logical and reasonable alternative to implement. That determination must weigh the impacts of the management actions against the impacts of CWD on the environment.

Each of the alternatives presented discuss methods for the prevention of CWD in Montana, for CWD surveillance programs, for management of CWD once it is found in Montana, for the dissemination of information to the public, and for research concerning CWD. The public information plan is consistent throughout all of the alternatives and has been provided in Appendix 1. Providing public information is a responsibility taken very seriously by the department and only the most timely and efficient program was considered for equal incorporation in each of the alternatives. Research on CWD is only briefly discussed in each of the alternatives. Appropriate research projects will be closely tied to the species, population density, and habitat parameters present where the disease develops and can only be discussed in general terms because specific information on those parameters is not currently known. In all cases, the research will include methods to evaluate the success of any management action implemented. A CWD Task Force, made up of wildlife biologists and wildlife disease experts, will evaluate management success and any new scientific information concerning CWD. That Task Force will make annual recommendations for any changes or modifications to the existing plan based on the best science available.

4.2 Cumulative Impacts

Cumulative impacts are impacts on the environment that result from incremental impacts of the action when added to other past, present, and future reasonably foreseeable actions. Management action taken in alternatives II through VI would have some cumulative impacts on the local area in which CWD is initially identified. They would be considered cumulative as the management actions would be commitments to annual actions taken until management goals are reached for each alternative. In most cases, this impact would

occur as a decrease in the overall deer and/or elk population in the area and accompanying economic loss to the local economy from the decrease in big game and big game hunters in the area. These localized short term economic losses must be compared to potential long term losses that could occur if no management action were taken and CWD became established in the deer and elk populations not only locally, but also state-wide.

Preventative actions taken in alternatives III, V, and VI, and to a lesser extent alternative IV, could have cumulative financial impacts on taxidermists and meat cutters in Montana over the years that the measures are in place. The preventative actions provide laws to prohibit the import of carcass parts, including deer and elk heads, from other states. Although that prohibition could negatively impact taxidermists who regularly process trophies from out of state animals, the impact may be reduced because other states have similar prohibitions. Therefore, many non-resident hunters harvesting an animal in Montana would have their trophy mounted in Montana prior to return to their home state. In the same regard, some meat cutters may lose business from resident hunters who have harvested an animal from out of state and must have the animal either boned or processed before bringing it back to Montana. Again, non-resident hunters who harvest an animal in Montana may provide additional business to the local meat cutters if they live in a state with similar prohibitions.

4.3 Irreversible and Irretrievable Commitments

An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time whereas an irreversible commitment of a resource is one that cannot be reversed. Management actions to reduce wildlife population densities or to eradicate CWD in a particular area would represent an irretrievable commitment of a resource. Although the resource (big game population) may be lost, or at lease reduced, for a period of time, the overall effect would be to allow for a healthy return of the resource, either through reproduction or immigration, in an environment not affected by CWD.

4.4 Environmental Consequences of CWD on Identified Issues (Alternative I: The No Action Alternative)

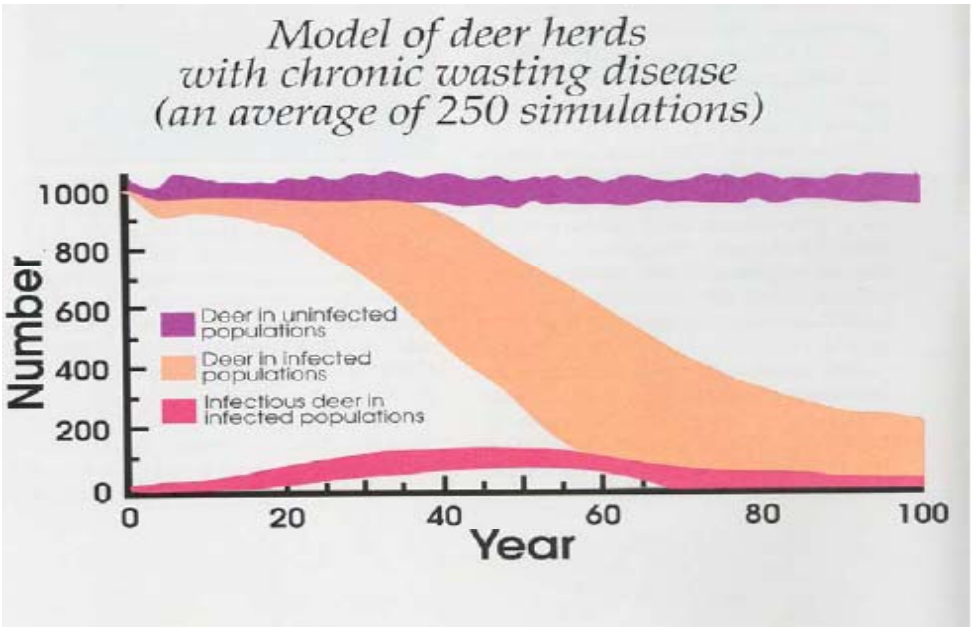
4.4.1. Effect of CWD on Montana's Wild Deer and Elk Populations

CWD is unlike other diseases that affect wildlife populations. Most disease agents, once they have established an infection in a susceptible host population, have the ability to move through that population rapidly. In those cases, outbreaks of the disease called epizootics may result in a high percentage of the population being affected (high morbidity) and, depending on the disease agent, a high percentage of death in the affected population (high mortality). In those cases, predicted effects on overall populations may be easily determined for diseases that are well understood.

CWD has an absolute mortality rate (100%) but does not produce a high rate of infection (morbidity) over short periods of time due, presumably, to relatively inefficient transmission and long incubation periods. In order to evaluate the effects of CWD on cervid populations, scientists have developed computer models. Those computer models are based on normal factors that affect

population dynamics in deer herds and what is known about CWD mortality, the rate of transmission for CWD and the time it takes for an infected deer to begin shedding the prion and infecting other animals. Model predictions indicate that CWD can have significant impacts on cervid populations, but only over long periods of time and only in situations where no management actions are undertaken. Computer models of CWD have forecast declines in affected cervid populations once the prevalence of CWD in a given population exceeds 5% (Miller et al. 2000). If CWD is left unmanaged, models forecast that CWD endemic regions such as northeastern Colorado or southeastern Wyoming could experience CWD prevalence rates increasing 2- to 4-fold over the next several decades with disease abating only with the extinction of infected deer populations (Gross and Miller, 2001). Those predictions are based on a frequency-dependent model where the number of contacts that an individual deer has with an infected deer is constant and is not affected by changes in the density of the deer population. (Figure 4)

Figure 5. From "CWD's impact on deer Herds", Chris Madson, Wyoming Game & Fish Dept., 2003)



Arguments have also been presented for a density-dependent model for transmission of CWD rather than a frequency dependent model (Schauber and Woolf, 2003). In the density dependent model, the number of contacts between deer would decrease as the density of the population decreased due to disease or other mortality factors. If a reduced population density were eventually reached that would not be sufficient to sustain continued transmission of the disease, CWD could eventually "die out." The unknowns in this density-dependent model include the role that environmental contamination may play in natural CWD transmission, the movement or migration of infected individuals from a herd to

adjacent uninfected herds causing new outbreaks of infection, and the population density required to sustain continued transmission of CWD.

The location of the initial CWD diagnosis in Montana and the affected cervid species will have a great influence the overall impact of CWD. Montana's deer herds have been divided into management units. Those management units include the Northwest Montane, the Mountain Foothills, the Prairie/Mountain Foothills, the Southern Mountains, and the Prairie Breaks. Depending on where CWD is found, the population density of the local herds and their migratory patterns within and out of those management units will influence the speed at which CWD is able to move across the landscape. Differences in environmental characteristics and population dynamics contributed to the definition of management units. From the perspective of disease ecology, however, Montana's deer herds should be considered as one continuous population. Geological or geographic barriers may slow the spread of the disease, but without adequate prevention and management, CWD may ultimately affect deer and/or elk throughout the state. Whether computer models have correctly forecast potential impacts on overall populations is yet to be determined.

4.4.2 Effects of CWD on Wildlife Management tools.

In 2001, almost 170,000 hunters took to the field during the Montana deer season resulting in a harvest of almost 112,000 mule deer and white-tailed deer combined. Similarly, over 100,000 elk hunters per year have participated in the management of the elk population in recent years with annual harvests averaging about 30,000 animals. In addition to providing a substantial economic impact to Montana's local economies and funding MFWP efforts to manage big game populations, those hunters have provided a vital tool for the management efforts needed to maintain healthy big game populations within the boundaries of habitat availability and social pressures. A reduction in numbers of hunters could have significant impacts on the ability of FWP to manage big game populations in Montana.

In 2002, license sales for the Wisconsin gun deer-hunting season declined approximately 11% following the discovery of CWD in the state (Vaske, J.J. et al, 2004). Hunter surveys conducted in South Dakota (Gigliotti, L.M., 2004) indicated that the prevalence of CWD in a particular hunting unit had a direct influence on hunter participation in that unit. Survey results in 2003 indicated that 59% of South Dakota hunters would change their hunting habits if only one CWD positive deer was discovered in their deer-hunting unit. If the prevalence of CWD in that hunting unit were 5%, however, 89% of the hunters indicated that they would change their hunting habits. Whereas only 2% to 4% of hunters indicated they would stop hunting deer in their unit if only one CWD positive deer were found, 9% to 15% indicated they would stop hunting deer in their unit if the prevalence of CWD were at 5%.

While the effect of CWD on resident hunter participation may be localized to endemic areas or regions of a state where CWD has been diagnosed, non-resident hunters indicated that they would be more likely to hunt in other states not affected by CWD. All of these reactions to CWD by hunters are tied both to CWD prevalence and to the perceived threat of CWD to human health. If prevalence levels increase to 50% in a particular state, surveys have shown that almost 50% of hunters will stop hunting in that state. Based on the findings from South Dakota and Wisconsin, 60% to 68% of hunters will stop hunting deer/elk in their state if prevalence level increases to 50% and CWD is shown to be transmissible to humans or cause human death (Needham, M.D. et al, 2004).

In addition to the potential loss of hunters as a general wildlife management tool, loss of hunter participation in regions of the state where CWD has been found may affect the success of potential management actions. Many of the alternatives described below enlist hunters to harvest animals from affected areas providing CWD prevalence data. Hunter's involvement will also be important, when possible, in the reduction of population densities in CWD affected areas. If there is a reduction in hunter participation, responsibility to carry out management actions may fall more with trained agency staff. Surveys have shown that the public acceptability of using trained agency staff to take management actions as opposed to using hunters is directly related to the prevalence of CWD in the management area and the status of any CWD human health issues.

4.4.3 Effect of CWD on Montana's Economy

In 2002, elk license sales to Montana residents generated almost $1.9 million in income to MFWP and non-resident elk license sales generated $11.7 million in income to MFWP. This total of $13.6 million was about 53% of all license fees received by MFWP and does not include elk permit drawing fees, archery license fees, or conservation license fees not included in license packages. In 2002, total deer license sales to residents and non-residents generated $5.2 million in license fees. In addition, deer and elk hunters accounted for a large share of the $5.6 million in Federal Pittman-Robertson funds distributed to MFWP as a result of federal excise taxes collected on the manufacture of rifles, handguns, ammunition, and archery equipment. Thus, elk and deer hunting are of major importance in direct funding to MFWP for conservation and management programs affecting elk, deer and other wildlife species native to Montana.

Funding management programs for the prevention and control of CWD in Montana would provide additional economic strain on MFWP. Wisconsin reported an expenditure of $14.7 million in 2002-2003 fiscal year for combating CWD. Of that $14.7 million, $12.6 million was spent by the Wisconsin Department of Natural Resources, Wisconsin's equivalent of MFWP (Bishop, 2004). Currently, Montana's CWD surveillance program is being partially funded through grants from USDA/APHIS that amounted to $89,000 for fiscal year 2005. In addition, license fees received by MFWP funded approximately $26,000 for the surveillance program and for providing public information concerning CWD.

Finally, additional dollars have been appropriated from license fee funding for the development of this CWD Action Plan. The monies currently appropriated from license dollars or from USDA/APHIS for CWD surveillance and public information will be inadequate should management actions be necessary for CWD in Montana. If CWD is diagnosed in Montana, funding from USDA/APHIS would increase from $89,000 to approximately $280,000, but additional funding would be required either from legislative appropriations from the general fund, from license dollars acquired through the sale of hunting and fishing licenses, or through additional federal grant dollars. It is anticipated that the funding of CWD management through appropriated license dollars would adversely impact other programs at MFWP designed to manage and protect our wildlife resources.

In addition to providing funding to MFWP through the sale of hunting licenses, the hunting and wildlife viewing industry in Montana are substantial contributors to the state's overall economic output. In 2001, hunters spent an estimated $237.6 million in Montana (USDI, Fish and Wildlife Services and U.S. Department of Commerce, U.S. Census Bureau 2003). Big game hunting accounted for about 80% of this total. Wildlife viewing provided an additional estimated expenditure of $350 million. Thus, hunting and wildlife viewing accounted for an estimated $589 million in expenditures in Montana. This expenditure was equivalent to about 1.6% of the total economic output for Montana in 1999 (Minnesota IMPLAN Group, 2002). The amount spent on hunting and wildlife viewing represents 23% of the economic output provided by farming, ranching, and agricultural services combined in Montana in the same time period. Similar comparisons are 62% of the combined economic output of all mining, 38% of the output of the petroleum industry, and 32% of the combined output of forestry products, wood products, and pulp and paper. All of these dollars provide a "multiplier effect" as the dollars spent for lodging, fuel, sporting goods, equipment, etc. are then used to provide jobs and income to local communities where the dollars generated are again turned over to purchase more local goods and services.

Information generated in Wisconsin during the 2002 and 2003 hunting seasons indicated a 9.9% reduction in hunters in 2002 (the year of the initial CWD diagnosis in Wisconsin) and a 5.9% reduction in 2003. The slight increase in hunters between 2002 and 2003 was most likely the result of surveillance efforts conducted in 2002 and assurance to hunters that CWD was limited to a few southern counties (Bishop, Richard C., 2004). Although only 6% of Wisconsin hunters were non-residents, there was a 19% decrease in the number of non-resident hunters in 2002. In evaluating Wisconsin's economic losses due to CWD concerns, Bishop pointed out that, although he estimated a $55 million loss to Wisconsin due to CWD, most of that loss was not removed from the Wisconsin economy since Wisconsin's predominantly resident hunters probably spent their hunting dollars on other commodities in Wisconsin. Approximately 16% of Montana big game hunters are non-residents. If, Montana lost 19% of those non-resident hunters as Wisconsin did, the economic impact would be significant. The

economic contributions to Montana retail sales from non-resident hunter of all types was estimated at $85 million in 2001 (IAFWA, 2001). After applying an economic multiplier effect to those dollars, the impact is estimated at $157 million to Montana's economy. Non-resident deer and elk hunters generated much of that $157 million. A loss of 19% of those non-resident hunters would amount to an impact of between $20 and $30 million.

Resident hunters in Montana make up approximately 85% of the total hunter numbers. Of the $237.6 million dollars generated in 2001 by hunting related activities in Montana, a large portion of that was money spent by resident hunters in local economies. Although those dollars may be redistributed to other expenditures and not lost to the total Montana economic output if CWD were diagnosed in Montana, that redistribution could have significant impacts on local economies. Many businesses in those local economies depend heavily on the big game hunting season to supply a substantial portion of their annual incomes.

4.4.4 Effect of CWD on the Alternative Livestock Industry

MFWP currently licenses 61 alternative livestock ranches (game farms) in Montana. Those licensed facilities reported an inventory of 2,582 animals in their December, 2004 inventory reports to the department. Elk are farmed for breeding stock, velvet antler production, meat production, and sale to out of state "game parks" for the harvest of trophy bulls.

Nationwide, the National Elk Breeders Association has estimated that there are 150,000 elk on 2,300 U.S. alternative livestock ranches. Based on an estimated average value of $2500 per elk, the value of all 150,000 elk on U.S. farms is $375 million. In 1999, gross receipts for the elk farming and velvet antler industry in North America totaled an estimated $150 million (USDA/APHIS, 2003). CWD has, however, had a significant impact on the economy of the alternative livestock industry since 1999. CWD was first found in an alternative livestock herd in South Dakota in 1997. Since that time, CWD has been found in additional farmed cervid herds in South Dakota, Colorado, Nebraska, Montana, Wisconsin, Kansas, Oklahoma, Minnesota, and New York. The finding of CWD either in captive or free ranging cervids has prompted at least 23 states to ban the import of cervids. In addition, the Republic of Korea has suspended all imports of deer and elk, and their products, including velvet antler, from the United States. While it is difficult to determine the economic loss in the U.S. from the sale of velvet antler to Korea, Canada did show an 80% drop in their CA$13 million sale of velvet antler to Korea the year after CWD was introduced into Korea from Saskatchewan (Saskatchewan Agriculture and Food, 2000). Likewise, the ban on the import of animals has reduced the market size and corresponding market value for breeding stock sales economically affecting the alternative livestock industry.

Economic impacts of CWD to the alternative livestock industry result not only from the loss of market value of the animals and their products, but also from the expenses incurred by alternative livestock ranchers to participate in state and

federal programs required for the control of CWD. Currently, any alternative livestock animal in Montana that dies and is 16 months of age or older must be tested for CWD. Since the program was initiated in April of 1999, over 3500 animals have been tested for CWD. The cost for that testing, has amounted to approximately $525,000 (3500 X estimated cost of $150 per test) or $87,500 per year, and is paid by the alternative livestock rancher. In addition, the CWD testing program requires that an annual inventory be conducted on each alternative livestock herd by a D.V.M. certified by the state of Montana as a "designated agent" of the Department of Livestock (DoL). Ear tags on all alternative livestock must be read and the final inventory verified against department records. Those inventory costs, estimated at $1000 per herd, would amount to an additional $61,000 (61 facilities X $1000) per year paid by the alternative livestock industry. Using the above figures, a direct cost of $148,500 per year is spent by the industry, or an average of approximately $2435 per alternative livestock licensee ($148,500/61), to comply with the CWD program currently in place in the state of Montana. When including indirect costs, USDA/APHIS has estimated the cost to the producer of participation in a CWD program at $12,350 a year for an average herd of 50 animals (USDA/APHIS, 2001)

The diagnosis of CWD either in an alternative livestock herd or in a wildlife population in close proximity to a captive herd would result in the quarantine of that facility by the DoL. DoL would develop a "herd plan," in cooperation with the alternative livestock licensee. One outcome of that herd plan could be depopulation of the animals to allow for CWD testing. In the event of depopulation and subsequent testing for CWD, USDA/APHIS has provided an indemnity payment to the licensee to compensate for the lost animal. The USDA/APHIS indemnity program, established through an interim rule in February, 2002 provided payment to the licensee at a rate of 95% of the appraised value of the animals up to a maximum of $3000 per animal. That interim rule is expected to be finalized in September of 2005. Those indemnity payments require depopulation of the entire captive cervid herd determined to be CWD exposed and no restocking on the affected premises with cervids without APHIS approval. Other costs involved with the killing, testing, and disposal of the alternative livestock would be evaluated and distributed on a case-by-case basis. The developed herd plan may also restrict the rancher as to what animals may be kept on what had been captive cervid pastures for a long period of time resulting in further economic loss to the licensee. In the one instance where a Montana alternative livestock licensee was faced with the diagnosis of CWD in his herd, a total of 87 animals were "depopulated." Although the herd plan included a requirement that cervids not be allowed on that land for a minimum of 2 years, the former licensee has since opted to relinquish his alternative livestock license and not to restock the facility with captive cervids.

If an operator did not opt for depopulation of CWD exposed animals, the other option would be a state-imposed quarantine lasting for several years. Quarantine

of the animals would require that the facility have a double fence to restrict any direct contact with domestic livestock or with free-ranging wildlife. Under quarantine conditions, the licensee would not be able to sell or move live animals from the facility severely limiting any economic opportunities.

4.4.5 Effect of CWD on Human Health

The prion thought to cause CWD has not been shown to affect humans. The perception of risk from CWD due to the association that has been tentatively established between mad cow disease, a domestic animal TSE, and variant Creutzfeldt-Jakob Disease (vCJD), a human TSE, has caused public concern and heightened public awareness of TSE diseases. There have been numerous reports by the media of big game hunters who have developed CJD. These reports, for the most part, have not identified the disease diagnosed in the humans as sporadic CJD or variant CJD. As a result of the media reports, studies have been conducted by the Center for Disease Control (CDC) to evaluate the risk of CWD to hunters or to those consuming venison. In all cases, a causal relationship, such as a food-born link between CWD and a human illness, could not be identified. Additionally, even though CWD has been endemic in Colorado and Wyoming for decades, the incidence of sporadic CJD and the age distribution of sporadic CJD case-patients in those two states is similar to that seen in other parts of the United States (Belay, et. al., 2004). There has only been one case of vCJD reported in the United States. That case involved a female patient in Florida that had been exposed to the BSE agent in the United Kingdom prior to moving to the United States. Studies done by CDC to this point have not identified a link between CWD and any form of prion disease in humans.

Although there is no scientific evidence to implicate CWD in any form of human illness, it is anticipated that the finding of CWD in wildlife populations will raise new concerns among the public. Based on the results of surveillance studies carried out in deer and elk in Montana since 1998, there is no known human exposure to the CWD prion agent in Montana due to handling or consumption of free-ranging deer or elk or tissues at this time. Many hunters may decide that irregardless of current scientific information, they will not hunt big game in particular areas of Montana, or anywhere in Montana, if CWD is diagnosed in Montana free-ranging deer and/or elk.

4.4.6 Effect of CWD on Environmental Contamination and Carcass Disposal

The role that environmental contamination plays in the transmission and epidemiology of CWD remains unclear. There is concern, however, that indirect natural transmission of CWD could occur through contamination of the environment by excretions, secretions, or the decomposition of infected animal carcasses. (USDA/APHIS, 2002) Studies recently completed in Colorado have provided new information concerning environmental contamination. In one study, CWD negative animals placed in a pen that had contained CWD infected animals 2.2 years earlier eventually developed CWD as a result of the environmental exposure. In a second study, CWD uninfected deer developed

CWD following exposure to carcasses of CWD infected deer that had been placed in pens 1.8 years earlier and allowed to decompose. These findings indicate that, "environmental sources of CWD infection represent potential obstacles to control in natural and captive settings" (Miller, et al. 2004).

Even before the Colorado study, many states had imposed carcass import restrictions limiting importation of heads and spinal cords from deer and elk harvested in other states. Dr. Mike Miller, the author of the study, has indicated that the implications of the Colorado environmental studies must, however, be taken in context concerning the spread of CWD via parts from harvested animals. First, the infective material used as the "contaminant" in these studies originated from animals that were either in the end stages of CWD or had died of CWD. In the wild, the majority of CWD infected animals harvested would not be showing clinical symptoms and would conceivably not have the concentration of abnormal prion in the nervous tissue and lymph tissue that the study sources did. Viscera and other wastes left in the field by hunters harvesting normal appearing animals, even if they had been infected with CWD, would provide much less of an "infective dose" than that provided by the study animals as would the brains and spinal cords of harvested animals brought home or to the meat processor. Second, the experimental animals in the Colorado study were confined in relatively small pens where repeated exposure to the contaminated material was more likely to occur than would be expected on the open ranges.

Nevertheless, animals dying in the wild from CWD would have the capacity to transmit CWD to non-infected herd mates. If environmental CWD exposure does turn out to be an important aspect of natural CWD transmission in the wild, the disease may be expected to sustain itself in the face of eradication attempts that do not involve attempts to remove animal carcasses from the landscape. In addition, carcass remnants from harvested animals could provide an additional source of contamination if proper disposal methods are not utilized. The finding of CWD in Montana's wildlife populations may, therefore, precipitate some changes in carcass disposal requirements in Montana. Those requirements would be expected to decrease the possibility for the spread of CWD. Without a definite management plan, the form those requirements may take is difficult to predict.

4.5 Predicted Environmental Impacts of Alternative II - Under alternative II, MFWP would expand the current surveillance program to provide for a statewide coverage. Surveillance area boundaries would be established as MFWP regional boundaries with a goal of detection of a 1% incidence of CWD on a regional basis with a 99% confidence. No additional preventative requirements would be put in place. Management of CWD would be attempted through increased harvest quotas in affected areas intended to reduce the population density, the number of animal contacts, and thus the spread of CWD. An affected area would be defined based on any geologic or geographic barriers that would help to delineate a population. Movement of carcass parts (heads and spinal cords) out of the affected area would be prohibited.

4.5.1 Biological Environment

Deer and Elk Populations

Increased surveillance for CWD under alternative II would be accomplished by establishing additional check stations across the state. No direct environmental impacts are anticipated through increased surveillance. Increased surveillance would provide a better understanding of the CWD status of deer and elk throughout Montana and could potentially identify "hot spots" of disease earlier. An increase in harvest quotas in the "affected area" would reduce the local deer/elk populations and the potential for transmission of CWD while providing data for the prevalence of CWD in the affected area. This reduction in population through increased harvest quotas would be temporary and would be monitored annually to evaluate changes in the population and changes in prevalence of the disease. Overall statewide populations would not be negatively affected but could benefit if CWD were eliminated or contained in the management area.

Other Wildlife Populations

Local effects on other species are unknown. Any large predators in a management zone would be expected to be affected by decreases in the cervid population. Those predators may substitute other prey sources or leave the area. Scavenger populations would be expected to show a temporary increase due to the increase in viscera left behind from increased harvests. There is no indication at this time that scavenger or predator species can be "infected" by CWD. Any effect on endangered species would be evaluated depending on the population of endangered species, if any, in the area.

Wildlife Management Tools

Based on surveys done in other states where CWD has been detected, hunter participation is inversely related to the prevalence of CWD in an area and to the current information available on the transmission of CWD to humans. Some decrease in hunter participation in the management area would be expected. This decrease in participation could be mitigated through incentives given to hunters to harvest animals in the affected area.

4.5.2 Physical Environment

Soil

Alternative II does not increase preventative measures and thus does not reduce the potential for importation of CWD contaminated carcasses or the potential for improper disposal of carcasses from animals harvested within or outside of Montana. Contamination of soil with prions could be an issue, although the importance of that issue in the natural transmission of CWD is not fully understood at this time. A prohibition on the removal of contaminated carcasses or of heads and spinal cords from the management area would reduce the potential for contamination of soils outside of the management zone with CWD.

Water

See section on soil.

Air
Management actions in a defined area would require that no heads or spinal cords from animals harvested in that area be allowed to leave. Incineration of those carcass parts would be required using a state-owned portable incinerator. There would be minimal effect on the air due to the incineration of those carcass parts and that effect would be localized and short lived.

4.5.3 Socioeconomic Environment

Alternative Livestock Industry
No direct effects are anticipated through the enactment of management actions included in Alternative II. If there is an alternative livestock facility within the home ranges of free ranging cervids in the affected area, it would be expected that DoL would take appropriate actions to assure the safety of the rest of Montana's alternative livestock industry. Those actions may include a facility quarantine and accompanying herd plan.

Economy
The effect of CWD on Montana's economy has been discussed previously in section 4.4.3. Alternative II would be expected to have a short-term positive effect on the local economy as increased harvest took place over the years. That positive effect may be reduced if the management plan is successful in reducing local big game populations but would rebound if CWD is eradicated or kept at low levels and an uninfected population rebounds.

Human Health
No human health implications would be expected with the implementation of alternative II. The public would be kept informed of the CWD status in Montana cervids and of any developments in prion science that might affect human health.

4.6 Predicted Environmental Impacts of Alternative III – Under alternative III, MFWP would enhance the prevention program for CWD through the development of laws and regulations prohibiting baiting and feeding, translocation of wild cervids, and transport of cervid carcasses. The surveillance program would focus on high-risk areas, targeted samples, enhancement of road-kill collection, and surveillance in a management zone. A management program would attempt to establish buffer zones around the affected area to decrease immigration and emigration of cervids.

4.6.1 Biological Environment

Deer and Elk Populations
Depending on the geological and geographical nature of the identified management zone, increased harvest quotas may be necessary to establish a buffer zone around the affected area. These increased harvests would be focused on the periphery of the management zone to attempt to contain movement out of the management zone by potentially infected cervids. Due to the long incubation period of CWD in cervids and to the relatively low rate of transmission, a commitment would be needed to maintain the buffer zone for many years as the

disease developed within the management zone. If a buffer could be adequately established and maintained, the "closed population" within the buffer zone could afford unique opportunities to study the epidemiology of CWD in a closed population.

Increased harvests would have impacts on local cervid populations by reducing the numbers of animals in the buffer area. As mentioned, this population reduction would need to be maintained until CWD was no longer present inside the buffer zone for the management action to be successful.

Other Wildlife Populations
Increased harvest in the buffer zone may attract more scavengers to the area. Depending on the mortality rate in cervids within the management zone from CWD, increased predators and/or scavengers may be attracted. Effects on endangered species would be evaluated on a location-by-location basis.

Wildlife Management Tools
Hunter participation is expected to depend on the prevalence of CWD in the management zone and on the perceived danger of CWD to humans. Cervids from the buffer zone would be expected to have a lower prevalence of CWD than those animals within the management zone. If CWD remains localized to the management zone and, at a lesser prevalence, the buffer zone, hunter participation statewide should be affected little while decreased participation in the management and buffer zones could be expected. Hunter incentives may be required to achieve buffer maintenance.

4.6.2 Physical Environment

Soil
Enhanced preventative measures incorporated into alternative III could reduce potential contamination of the soil with CWD prions by prohibiting the import of carcasses from other states and by requiring proper disposal of carcasses harvested in Montana.

Water
See section on soil.

Air
Movement out of the buffer zone or management zone of heads and spinal cords of harvested animals would be prohibited. Disposal of those heads and spinal cords may be achieved on site through incineration using a state-owned portable incinerator. There would be minimal effect on the air from this high temperature incinerator.

4.6.3 Socioeconomic Environment

Alternative Livestock Industry

Alternative III would have no direct effects on the alternative livestock industry unless a facility were located within the buffer zone or management zone. In those cases, DoL would take appropriate action to protect the alternative livestock industry in Montana by potentially quarantining the affected herd and requiring a herd plan.

Economy

Active maintenance of a buffer zone would require either department personnel or hunter involvement over many years. That activity could initially be a boost to local economies in the affected area. Should hunter participation due to the discovery of CWD in the area be reduced, however, a detrimental impact to local economies may be expected.

Increased preventative measures associated with alternative III would prohibit the import of carcass parts from other states and require that meat brought into Montana be either processed or boned out. Meat processors may lose a portion of their business from customers harvesting big game out of state and returning to Montana. On the other hand, non-resident hunters who harvest animals in Montana, depending on their state of residence, may have to bone out or process meat prior to their return home thus adding business to Montana meat processors. Increased preventative measures will have the same effects on Montana taxidermists. Taxidermists may lose the business of Montana hunters who harvest animals in other states, but will gain some business from non-resident hunters that harvest big game in Montana.

Finally, outfitters whose operation plans include lands on which management actions will be taken may find it difficult to attract clients to the area. Both the prevalence of CWD in the area and the current scientific knowledge concerning the transmission of CWD to humans will determine the amount of business that may be lost by the outfitters. Every attempt will be made by the department to enlist the outfitters and clients in an affected area in reducing populations in the buffer zone or the management zone. Eventual reduction of populations through buffer maintenance may reduce the attractiveness of the immediate area and reduce marketing potential to outfitter clients.

Human Health

No human health implications would be expected with the activation of alternative III. The public would be kept informed of the CWD status in Montana cervids and of any advances in the field of prion research.

4.7 Predicted Environmental Impacts of Alternative IV – Under alternative IV, MFWP would increase preventative measures through laws or policy to curtail baiting and feeding of cervids and the translocation or transplantation of cervids in Montana. Carcass transport would not be prohibited, but an educational program to influence hunters not to

bring specific carcass parts back into Montana from other states would be developed. Surveillance would focus on high-risk areas with regionally intensive surveillance in management zones. The collection of road-kill and targeted samples would continue. Disease management would require a determination of the population "range" of the affected population by radio-collaring 50 animals of the affected species and monitoring them through radio-telemetry for a season. Then, based on the determined range and estimated population within that range, a statistical sample to allow for detection at 1% incidence with a 99% confidence interval would be collected from that population. Repeated statistical sampling would continue until a result of <1% incidence were achieved.

4.7.1 Biological Environment

Deer and Elk Populations

Management actions under alternative IV are designed to provide additional surveillance data and to reduce the population density in the affected area. Sample size required to monitor for prevalence would depend on total population estimates, but an estimated population of 2000 animals, for example, would require samples from over 400 animals, or 20% of the total population. If those samples resulted in a CWD incidence of >1%, the management plan would call for an additional statistical sample of the remaining population resulting in further population reduction. Repeated sampling in an area until reaching the <1% incidence goal could result in a substantial reduction of cervid numbers from the management zone. It is predicted that the population reduction would help to either eliminate CWD or to slow the transmission of CWD resulting in short term local population reductions followed in 5-10 years by the rebound of a healthy population while providing protection to other cervid populations in Montana.

If CWD were found during sampling at a level of >5%, an immediate 50% reduction in cervid population would be carried out. Depending on the CWD prevalence found in the samples collected from the population reduction, additional statistical samples may be collected until the prevalence in a sequential statistical sample is found to be <1%. Based on this scenario, an even more substantial reduction in population density would take place within the identified population. Effects would, however, be limited to the local population and would provide protection for other cervid populations in Montana.

Other Wildlife Populations

Any large predators in a management zone would be significantly affected by the cervid population decreases. Those predators would be expected to substitute other prey sources or to leave the area. Scavenger populations would be expected to show a temporary increase due to the increase in viscera left behind from sampling operations. Any effects on endangered species would be evaluated depending on the area of the management action.

Wildlife Management Tools
Again, the determined prevalence of CWD and the current scientific information concerning human risk will greatly influence the participation of hunters in a CWD endemic area. Hunter participation would be expected to decline in the management area with hunter incentives necessary to achieve the required harvests. It is anticipated that the harvest of even the first required statistical sample from an area may partially require the participation of department staff to achieve the sample goals.

Actively combating CWD, providing information on CWD prevalence in the area, and providing current surveillance data statewide should help to maintain the hunter participation on a statewide basis.

4.7.2 Physical Environment

Soil
Policy changes and educational programs should reduce the improper disposal of carcass parts and therefore any potential contamination of soil by prions.

Water
See section on soil.

Air
Prohibitions on the movement of heads and spinal cords from harvested animals out of the management zone would require incineration of those carcass parts on site. There would be minimum and only temporary impacts to the air quality by emissions from the incinerator.

4.7.3 Socioeconomic Environment

Alternative Livestock Industry
Management actions of alternative IV would have little impact on the alternative livestock industry. If an alternative livestock facility were located within the designated management zone, however, DoL would take appropriate action to protect the alternative livestock industry in Montana by potentially quarantining the affected herd and requiring a herd plan.

Economy
Under alternative IV, management actions would remove a statistical sample, and perhaps consecutive statistical samples, of cervids from the management zone. These sampling actions would provide short-term economic benefits to the local area due to an increase in hunters and/or department staff involved in the sampling effort. In the long term, however, a significant population reduction would be achieved in the management zone. Depending on the size of that management zone, adverse economic impacts may occur due to the loss of hunter dollars. In addition, finding CWD in the area may detract from the number of big game hunters that come to the area.

Although alternative IV would not prohibit carcass import by law, anticipated compliance with the preventative aspects of the alternative due to effective education programs concerning carcass import would result in a potential loss of income to local taxidermists and meat processors. That loss should be overcome, however, due to similar prohibitions by other states that would require non-residents harvesting cervids in Montana to have their taxidermy work completed in Montana or have their meat processed in Montana prior to returning to their state of residence.

Finally, outfitters whose operation plans include lands on which management actions will be taken may find it difficult to attract clients to the area. Both the prevalence of CWD in the area and the current scientific knowledge concerning the transmission of CWD to humans will determine the amount of business that may be lost by the outfitters. Every attempt will be made by the department to enlist the outfitters and clients in an affected area in reducing populations in the management zone. Eventual reduction of populations may reduce the attractiveness of the immediate area and reduce marketing potential to outfitter clients.

Human Health
Same as alternative III.

4.8 Predicted Environmental Impacts of Alternative V – Like alternative IV, alternative V first determines a cervid population's yearlong distribution, estimates a population number, and then requires a statistical sample to detect a 1% incidence of CWD at a 99% confidence interval. Alternative V differs from alternative IV in that consecutive statistical sampling would continue until a result of 0% CWD detection rather than <1% in the sampled population was achieved. The predicted environmental impacts are therefore the same but with the potential to be slightly more severe. Alternative V also establishes laws and regulations for CWD prevention issues rather than employing public information and education or policy changes.

4.8.1 <u>Biological Environment</u>

Deer and Elk Populations
Populations of deer or elk within the management zone would be impacted due to implementation of this alternative. Depending on the prevalence of CWD in the population, repeated statistical samples might be required to achieve the goal of 0% detection from a sample capable of detecting a 1% incidence with a confidence interval of 99%. Repeated statistical samples could, in the short term, drastically reduce and potentially eliminate a cervid population within the management zone. That effect would be short term with repopulation of the area expected within 5-10 years. The management action is predicted to either eliminate CWD from the area or significantly reduce the opportunity for spread of the disease to other cervid populations in Montana.

Finally, outfitters whose operation plans include lands on which management actions will be taken may find it difficult to attract clients to the area. Both the prevalence of CWD in the area and the current scientific knowledge concerning the transmission of CWD to humans will determine the amount of business that may be lost by the outfitters. Every attempt will be made by the department to enlist the outfitters and clients in an affected area in reducing populations in the management zone. Eventual reduction of populations may reduce the attractiveness of the immediate area and reduce marketing potential to outfitter clients.

Other Wildlife Populations
Same as alternative IV.

Wildlife Management Tools
Same as alternative IV.

4.8.2 Physical Environment

Due to the similarities between alternatives IV and V, the predicted environmental impacts on the physical environment for alternative V are the same as those described for alternative IV.

4.8.3 Socioeconomic Environment

Alternative Livestock
Same as alternative IV

Economy
The predicted economic impacts for alternative V are similar to those for alternative IV. One exception is the potential for a more severe economic impact in the local area. A more extensive population reduction in the management zone would require more initial public and/or department involvement that may provide a short term benefit to the local economy. The eventual population reduction would, however, have a detrimental economic impact on the hunting dollars put into the local economy until the cervid population recovered to normal levels. That recovery could take 5-10 years depending on the quality of habitat available in the management zone.

As with the other alternatives that establish laws and regulations prohibiting carcass transport, taxidermists and meat processors may lose business from residents that leave Montana to harvest deer or elk. That loss should be overcome, however, due to similar prohibitions by other states that would require non-residents harvesting cervids in Montana to have their taxidermy work and meat processing done locally before returning to their state of origin.

Finally, outfitters whose operation plans include lands on which management actions will be taken may find it difficult to attract clients to the area. Both the prevalence of CWD in the area and the current scientific knowledge concerning the transmission of CWD to humans will determine the amount of business that may be

lost by the outfitters. Every attempt will be made by the department to enlist the outfitters and clients in an affected area in reducing populations in the management zone. Eventual reduction of populations may reduce the attractiveness of the immediate area and reduce marketing potential to outfitter clients.

Human Health
Same as alternative III.

4.9 Predicted Environmental Impacts of Alternative VI – Alternative VI represents the most aggressive alternative. Preventative measures would be required by law, surveillance would be statewide, and management would involve development of an "eradication zone" in which attempts would be made to kill and test all cervids.

4.9.1 <u>Biological Environment</u>

Deer and Elk Populations
Under alternative VI, deer and elk populations within the management zone would be eliminated to the greatest extent possible. The size of the management zone would depend on what is known about the home ranges of resident populations, geographic and geologic barriers, as well as access issues on privately owned lands. As a point of reference, a management zone with a 5-mile radius would encompass approximately 80 square miles and contain 400 animals if there were 5 deer per square mile. Eliminating 400 animals would definitely have a local effect on the cervid population but, if successful in eliminating this initial "hot spot" of CWD, would protect other cervid populations in Montana.

Other Wildlife Populations
Same as alternative IV

Wildlife Management Tools
Same as alternative IV.

4.9.2 <u>Physical Environment</u>

Soil
Laws and regulations would greatly reduce the improper disposal of carcass parts and therefore any potential contamination of soil by prions.

Water
See section on soil.

Air
Prohibitions on the movement of heads and spinal cords from harvested animals out of the management zone would require incineration of those carcass parts on site. There would be minimum and only temporary impacts to the air quality by emissions from the incinerator.

4.9.3 Socioeconomic Environment

Alternative Livestock Industry

Same as alternative IV

Economy

As is true with the less aggressive management plans, initial operations could provide some positive economic effects to the local economy. Elimination of cervids from the management zone would, however, create a negative economic impact. In addition, the stigma of having a CWD management zone in an area would likely reduce hunter participation in surrounding areas causing further economic impact in the local economy.

Finally, outfitters whose operation plans include lands on which management actions will be taken may find it difficult to attract clients to the area. Both the prevalence of CWD in the area and the current scientific knowledge concerning the transmission of CWD to humans will determine the amount of business that may be lost by the outfitters. Every attempt will be made by the department to enlist the outfitters and clients in an affected area in reducing populations in the management zone. Eventual reduction of populations may reduce the attractiveness of the immediate area and reduce marketing potential to outfitter clients.

Human Health

Same as alternative III

Chapter 5: List of Individuals Associated with the Project

Chronic Wasting Disease Oversight Committee:

Tim Feldner	Manager, Commercial Wildlife Permitting, Montana FWP CWD Project Coordinator, Compiler
Ron Aasheim	Con Ed Administrator, Montana FWP
Neil Anderson	Wildlife Laboratory Supervisor, Montana FWP
Dr. Mark Atkinson	Wildlife Veterinarian, Montana FWP
Keith Aune	Research and Technical Services Section Chief, Montana FWP
Gary Dusek	Wildlife Biologist, Montana FWP
Dr. Kammy Johnson	Epidemiologist, Montana DPHHS
Dr. Tom Linfield	State Veterinarian, Montana DoL
David Pac	Wildlife Biologist, Montana FWP
Chris Smith	Chief of Staff, Montana FWP
Evaleen Starkel	Alternative Livestock Program Specialist, Montana DoL

Chapter 6: List of Persons and Agencies Consulted

Montana Fish, Wildlife and Parks
All Regional Wildlife Managers
All Warden Captains
Jeff Herbert
Don Childress
Gary Hammond
Jack Lynch
Rob Brooks
Jim Kropp
Dianne Tipton
Tom Palmer
Jennifer Pelej
Andrew McKean
Patti Buckingham
Brian Sommers

Other Individuals or Groups Consulted or Contacted
Montana Wildlife Federation
Montana Taxidermists Association
Montana Meat Processors Association
Montana Veterinary Medical Association
Prickly Pear Sportsmen Association

Kathy Green	Colorado Division of Wildlife
Rick Thompson	Montana DEQ (Waste Management Bureau)
Wayne Johnson	Montana Board of Outfitters
Hank Edwards	Wyoming Game & Fish
Steve Griffin	South Dakota Game, Fish & Parks
Leslee McFarlane	Utah Division of Wildlife Resources
Dr. Bruce Morrison	Nebraska Game & Parks
Dr. Mike Miller	Colorado Division of Wildlife
Dr. Phil Maumer	Idaho Fish & Game
Dr. Richard Mackie	Montana FWP (retired)
Jacquie Ermer	North Dakota Game & Fish
Don McKinnon	Saskatchewan Environment, Fish & Wildlife Branch
P.J. White	National Park Service
Kevin Callele	Saskatchewan Environment, Fish & Wildlife Branch
Dr. Simon Hollamby	Wisconsin DNR
Joseph Brusca	Wisconsin DNR
Rebecca Mesaros	Montana Alternative Livestock Producers
Dr. William Hadlow	Rocky Mountain Laboratories (retired)
Dr. Rick Race	Rocky Mountain Laboratories
Dr. Byron Caughy	Rocky Mountain Laboratories
Dr. Tom Roffe	U.S. Fish & Wildlife Service

BIBLIOGRAPHY

Anderson, N., and K. Aune. (2004). CWD surveillance 1998-2003. Montana Fish, Wildlife and Parks Unpublished Report. 11 pp.

Bartelt, G., Pardee, J., & Thiede, K. (2003). Environmental impact statement on rules to eradicate chronic wasting disease from Wisconsin's free-ranging white-tailed deer herd. Wisconsin Department of Natural Resources.

Belay E.D. (1999). Transmissible spongiform encephalopathies in humans. Annual Review of Microbiology. 53, 283-314.

Belay, E.D., Maddox, R.A., Williams, E.S., Miller, M.W. Gambetti, P., Schonberger, L.B. (2004). Chronic wasting disease of deer and elk and the species barrier. Emerging Infectious Diseases, 10(6)-1082.

Bishop, Richard C. (2004) The economic impact of chronic wasting disease (CWD) in Wisconsin. Human Dimensions of Wildlife. 9(3), 181-192.

Coon, T.G., et. al. (1999). Farming captive cervids in Michigan: a review of social, economic, ecological, and agricultural opportunities and risks. Michigan State University Department of Fisheries and Wildlife. 110 pp.

Center for Disease Control. (2004). Fact sheet: New variant Creutzfeldt-Jakob Disease.

Dunkley, L., and M. R. L. Cattet. (2003). A comprehensive review of the ecological and human social effects of artificial feeding and baiting of wildlife. Canadian Cooperative Wildlife Health Centre, Department of Veterinary Pathology, University of Saskatchewan, CANADA. (available at: http://wildlife.usask.ca/english/CCWHCFeedingBaitingReportFinal_Feb2003.pdf)

FDA, Center for Veterinary Medicine. (2002). Material from CWD positive animals should not be used for animal feed.

Gigliotti, Larry M. (2004). Hunters' concerns about chronic wasting disease in South Dakota. Human Dimensions of Wildlife. 9(3), 233-239.

Hamlin, K.L. and M.S., Ross. (2002) Effects of hunting regulation changes on elk and hunters in the Gravelly-Snowcrest mountains, Montana. Montana FWP, Helena.

Henderson, R.E., B.A. Sterling, and T.O. Lemke. (1993) The lower Clark Fork elk study: Final report 1985-1990. Montana FWP.

International Association of Fish and Wildlife Agencies. (2001). Economic Importance of Hunting in America.

Macke, Richard J., David F. Pac, Kenneth L. Hamlin, and Gary Dusek. (1998). Ecology and management of mule Deer and white-tailed deer in Montana. Report from the Montana Department of Fish, Wildlife & Parks.

Miller, W.M., E.S. Williams, C.W. McCarty, T.R. Spraker, T.J. Kreeger, C.T. Larsen, E.T. Thorne. (2000). Epizootiology of Chronic wasting disease in free-ranging cervids in Colorado and Wyoming. J. Wildl. Manag. 36(4), 676-690.

Miller, Michael W., E.S. Williams, N. Thompson Hobbs, L.L. Wolfe. (2004). Environmental sources of prion transmission in mule deer. Emerg. Infect. Dis. 10. 1003-1006.

Minnesota IMPLAN Group. 2002. State Level Data – 1999.

Montana Department of Fish, Wildlife & Parks. (2001) Adaptive Harvest Management. January 15, 2001.

Mundinger, J. and B. Beck. (2000). Alternative Livestock Program Evaluation. Consulting for Creative Solutions, L.L.C. and Beck Consulting. Helena, Mt.

Mussehl, T.W., and F. W. Howell. (1971). Game Management in Montana Fed. Aid Proj. W-3-C. Montana Fish and Game Dept.

Needham, Mark D. J. J. Vaske, M.J. Manfredo. (2004). Hunters' behavior and acceptance of management actions related to chronic wasting disease in eight states. Human Dimensions of Wildlife. 9(3), 211-231.

Saskatchewan Agriculture and Food. (2000) Elk production: economic and production information for Saskatchewan producers.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA/APHIS). (2001). Base line estimates of costs to state governments and to elk producers of chronic wasting disease eradication effects.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA/APHIS). (2002). Plan for assisting states, federal agencies and tribes in managing chronic wasting disease in wild and captive cervids.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA/APHIS). (2003). Chronic wasting disease herd certification program and interstate movement of captive deer and elk. Federal Register, 66:247

U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. (2003). 2001 national survey of fishing, hunting, and wildlife-associated recreation.

Vaske, Jerry J. et al. (2004). Chronic wasting disease in Wisconsin: hunter behavior, perceived risk, and agency trust. Human Dimensions of Wildlife. 9(3), 211-231.

Watson,D. (1998). Tracking elk prices. North American Elk Breeders Association.

Will, R.G., Ironside, J.W., Zeidler, M. Cousens, S.N., Estiberiro, K., Alperovitch, A., et al. (1996). A new variant of Creutzfeldt-Jakob disease in the UK. Lancet. (347), 921-925.

Williams, E.S., M.W. Miller, T.J. Kreeger, R.H. Kahn, and E.T. Thorne. 2002. Chronic wasting disease of deer and elk: a review with recommendations for management. J. Wildl. Manag. 66(3), 551-563

Williams, E.S., M.W. Miller, E.T. Thorne. 2002. Chronic wasting disease: implications and challenges for wildlife managers. Transactions of the North American Wildlife and Natural Resources Conference.

Wisconsin Department of Natural Resources. 2002. An analysis of risks associated with the disposal of deer from Wisconsin in municipal solid waste landfills.

Wood, Alan K., R.J. Mackie and K.L. Hamlin. (1989). Ecology of Sympatric Populations of Mule Deer and White-Tailed Deer in a Prairie Environment. Montana Department of Fish, Wildlife & Parks.

APPENDIX 1

PUBLIC INFORMATION PLAN

CHRONIC WASTING DISEASE

IN MONTANA

Public Information Plan

CHRONIC WASTING DISEASE IN MONTANA

While chronic wasting disease has not yet been detected among Montana's wild, free-ranging population of deer or elk, we may not get to enjoy that distinction much longer. Infected herds of free-ranging cervids border Montana (South Dakota, Wyoming, Saskatchewan), and it is reasonable to expect that the disease will eventually enter the state. It is even possible that a Montana deer or elk has already been infected but not yet detected.

Following the end of the 2004 big game season, Fish, Wildlife & Parks had tested over 7000 samples taken from deer and elk harvested in Montana for exposure to CWD. None of those samples had tested positive for the disease. Sample collections in designated "high risk areas" for possible CWD cases have been such that there is a 95% chance that CWD would be detected if it were at a 1% incidence in the deer population.

In public scoping sessions held in conjunction with 2003 big-game tentative regulation meetings, and in 2004 prior to initiation of a draft "CWD Management Plan" Montana's sportsmen and sportswomen indicated that while they don't have many specific questions or concerns related to CWD at this time, they expect FWP to be the lead agency in managing any infection among wildlife in the state.

Considering the department's mission as steward of Montana's wildlife resources, it's appropriate that FWP take the lead in providing public information about the disease and its implications, and about any specific infection events. The details and tenor of the department's outreach will ensure that reasoned judgment guides public discourse of this issue.

Equally important is that the department work with other agencies, especially Public Health and Human Services and Livestock, to provide consistent, clear and accurate information regarding possible risks of transmission to humans and other animals.

This Public Information Draft Plan is intended to prepare the department for the eventual arrival of CWD, and will serve to identify key audiences and refine outreach activities.

THE PROBLEM

A positive test will generate enormous interest, from national and statewide media, from citizens concerned about public health risks, from hunters and conservation groups concerned about impacts to wildlife populations and hunting opportunities, and from interest groups affected by specific management actions. Those interest groups may include meat processors and taxidermists who may be economically affected, ranchers who may fear possible transmission to livestock, and solid waste municipal landfills that may be responsible for proper disposal of contaminated materials.

PURPOSE OF THIS PLAN

This plan details how FWP will develop and deliver public information, the type of message appropriate for various scenarios, and the key audiences and potential affected interests who need to be targeted. The goal of the plan is to gain the public's trust of, informed consent for, and potential participation in various management actions, both immediate and long-term, related to CWD. Any information will aim to minimize fear, overreaction and uninformed reaction and to be consistent within FWP and other agencies.

OVERVIEW OF THE ISSUES AND PROBLEMS

Chronic wasting disease is an always-fatal, contagious disease affecting elk, white-tailed deer and mule deer. The disease is a type of transmissible spongiform encephalopathy (TSE) that affects the nervous system of these cervids. Some states have attempted to eradicate the disease once it is discovered while other states where the disease has been present for years are trying only to manage the disease by preventing an increase in its prevalence and preventing the spread to new areas. State agencies, in most cases, have redirected priorities and resources to manage wildlife in the context of the disease.

CWD tends to be a slowly progressing disease in an individual animal. In the initial phases of a CWD outbreak in a defined population, the disease does not seem to rapidly decimate herd numbers. More time and research will be needed, however, to determine long-term impacts on wildlife populations. At this time, computerized models have indicated that long-term effects could significantly reduce population numbers.

While there is no evidence suggesting that CWD can be transmitted to humans or livestock, the public has repeatedly demonstrated that they fear transmission and will change behavior to minimize that perceived risk. In some cases, meat from harvested animals has been discarded, creating a sanitation and enforcement problem. In other cases, hunters have simply declined to hunt, an action that has created revenue declines in some state wildlife agencies and has made management of the disease more difficult. Most states dealing with the disease provide testing services – sometimes free, sometimes expedited - to hunters. Although tests provide information on the prevalence of CWD in given populations, they are not intended as an indication of the safety of consuming the harvested meat.

In Montana, the **key issues** regarding CWD are its short-term and long-term impact on wildlife populations, including reductions in range and densities; the impact on public health in terms of possible transmission to humans; and the reduction in hunting as a form of recreation and wildlife population control, with impacts to the state's economy. FWP should also be prepared for mistrust of and resistance to management activities

Equally important as the known affects of CWD are the perceived impacts of the disease. The department can defuse some expected reaction by researching and discussing other states' experiences with the disease and by providing factual, consistent information.

Specific behaviors the department can expect in the context of a CWD infection are:

- High volume of information requests, from media and citizens, of department personnel, license agents, Hunter Education instructors, meat processors and taxidermists, guides and outfitters, land-management agencies.
- Reduction in license sales.
- Administrative redirection of staff priorities.
- Criticism that FWP did not do enough to prevent infection and/or will not do enough to contain infection.
- Criticism that FWP is being too aggressive in its reaction to CWD.
- Scrutiny and criticism from the public regarding specific management actions, possible legal action (judicial injunction, etc.) to halt action.
- Geographical shift in hunting pressure away from infected area, with impacts on local economies, license sales, Block Management cooperators.
- Increased demand for either free or expedited testing, both statewide and in the affected region.
- Controversy or confusion over the various testing methods concerning their specificity, sensitivity, and their intended purpose (i.e. not as a meat inspection test).
- Increased incidence of waste of game violations.
- Requirements for increased enforcement activity in an affected area.
- Possible accusations that human illness or death is attributable to CWD and, by extension, the department.
- Possible accusations that CWD is FWP's fault.
- Loss of business for meat processors and taxidermists.
- Landowner distrust of agency, could close off sects of land to hunting, serving as possible refuge for disease.
- Concern over appropriate disposal of deer and elk carcasses or carcass parts.
- Concern over the movement of harvested carcasses and carcass parts out of Montana or into Montana from other states.
- Concern over potential spread to alternative livestock facilities.

INTERNAL ACTIVITIES

- The FWP Wildlife Laboratory and Wildlife Division will review and solicit comments from headquarters management team and regional supervisors on this information plan and the department's "Chronic Wasting Disease Management Plan for Free Ranging Wildlife in Montana" document. The goal will be to gain informed consent of managers charged with implementing specific management actions outlined in plan.
- FWP will (through Conservation and Education and other divisions) coordinate CWD-related public information with other state departments, including Public Health and Human Services and Livestock.
- The FWP Commission will be briefed on CWD plans.
- ConEd, with input from other divisions, will prepare generic news releases and accompanying fact sheets in advance of test results.

INTERNAL PROTOCOL AND ACTIVITY CHRONOLOGY

- Just prior to and during annual big game seasons, FWP will coordinate with other agencies (esp. Health and Livestock) on public-information planning.
- Just prior to and during annual big game seasons, FWP will develop draft news releases and fact sheets in advance of test results.
- If a positive CWD test is obtained from a deer or elk that is harvested or dies in Montana, notification to appropriate personnel and agencies will take place according to the following protocol:
    1. The laboratory receiving the positive test result (FWP Wildlife Disease Laboratory) will notify the FWP Directors Office, the FWP Wildlife Division Administrator, and the Regional Supervisor in the region affected.
    2. An Enforcement representative will contact the hunter (if appropriate) to determine the exact kill location and to determine the status of the harvested animal.
    3. An Enforcement representative will contact the landowner or land manager where the animal was harvested.
    4. FWP designee will contact the Montana State Veterinarian, State Epidemiologist, and Regional USDA veterinarian and inform them of the positive animal, including details of where and when the animal was harvested.
    5. The CWD Management Team, consisting of members of FWP staff from the affected region(s), FWP Directors Office, Wildlife Division, Enforcement Division, Con/Ed Division, and from the Department of Livestock, Department of Public Health and Human Services, the Governor's office, and any Tribal, Federal, or State land agency with jurisdiction over any lands within 20 miles of the affected area will be alerted and convened.
    6. FWP designee will alert department employees and partner agency contacts including USFWS, NPS, USFS, BLM, Tribes; news release, fact sheet, and speaking points will be included in the notification.
    7. FWP designee will prepare and distribute news release materials and accompanying fact sheet to statewide and local media.
    8. A public meeting will be scheduled in the affected region to provide additional information and to answer questions from the public. Potential management actions will be presented.
    9. Informational letters will be sent to non-resident hunters who request deer and elk license applications.
    10. FWP website will be updated to provide additional and current CWD information including test results and map of test result locations from around Montana.

CONTENTS OF PUBLIC INFORMATION MESSAGE

The details in this section assume management of information following a positive test

News release and accompanying fact sheet for statewide distribution should include the following points:

- Specific species, age, sex, geographic area, date and prior level of testing in area that infected animal was harvested
- Brief description of disease, its history, and consequences of the disease as seen in other states

- Herd population numbers and susceptible species in the area.
- Specific management actions recommended in FWP's Management Plan, with rationale for action stressing need to determine the prevalence of disease before management plans are implemented.
- Accompanying the above, a statement that management actions aren't guaranteed to "eradicate" the disease, but that inaction is not a valid alternative.
- Announcement of public meeting in affected area and in all FWP administrative regions to discuss incident and department responses
- Statement that FWP has been looking for disease, with specific attention to "high-risk areas" and is not surprised at its arrival. Include maps showing distribution of samples collected since 1998.
- Nationwide distribution of CWD and an overview of management responses and outcomes in other states.
- Review of risk of transmission to humans; consumption advisories ("Hunters should never eat meat from an animal that appears sick, and even in a healthy animal, the nervous and lymphatic tissues should not be consumed."). Refer to language detailed in FWP's Chronic Wasting Disease pamphlet.
- Assurance that FWP has contacted the hunter who submitted the positive sample and has waived requirement that meat be consumed. Also assurance that landowners within a 5-mile radius of where animal was harvested have also been contacted.
- Assurance that FWP is contacting landowners and land-management agencies in affected area, specifically asking trespass permission, where appropriate, in order to conduct management activities.
- Requirement that hunters in the affected area in subsequent seasons will need to submit heads of deer and elk for testing. Results of tests will be expedited and made available to the participating hunters.
- Requirements for disposal of carcass wastes and/or contaminated carcasses, especially from affected areas.
- Announcement of updated FWP web site devoted to CWD issues in general and infection incident in particular
- Details on contacting FWP and Health and Human Services (county health departments, regional and statewide phone numbers), plus respected sources of CWD information (web sites, etc.), including Centers for Disease Control, World Health Organization, CWD Alliance, etc.
- Q&A format addressing basic questions of disease and its implications.

MESSAGE DELIVERY MECHANISM TO MEDIA

Immediate outreach activities:

- Phone calls to first-tier media outlets (AP contact, primary Conservation/Education division media contacts, et al).
- Convene news conference in Helena at FWP headquarters. Hagener, Aune, Aasheim, Childress, Palmer, Feldner in attendance.
- Statewide news release package (infection incident plus Q&A fact sheet) distribution to statewide media including newspapers, television, and radio.

- Regional news release package in affected region (ensure that Regional Information Officers have updated media distribution lists for their regions).
- Updated information on FWP web site
- Speaking points provided to state and regional personnel involved with media outreach.

Secondary outreach activities:

- Letter on status of CWD in Montana to accompany non-resident deer and elk license applications.
- Letter to license agents, Hunter Ed instructors, meat processors, taxidermists, county health departments, livestock associations.
- Letters to landowners in affected area(s). Important to keep them directly informed.

KEY AUDIENCES AND POTENTIALLY AFFECTED INTERESTS

- FWP Commission
- FWP staff
- State agencies – Dept. of Livestock, State Epidemiologist, State Veterinarian, Dept. of Health, DNRC, Board of Outfitters, Tourism
- Federal agencies – U.S. Fish & Wildlife Service, BLM, National Park Service, Forest Service, USDA/APHIS
- Tribal governments
- Local jurisdictions – county commissions, county health departments, conservation districts, grazing associations
- Wildlife agencies in neighboring jurisdictions
- Stockgrowers, alternative livestock associations and landowner organizations
- Media – local, statewide newspapers, radio, TV, websites, national magazines, western media (CO, WY, SD, etc.)
- Legislators
- License agents
- Montana and non-resident hunters
- Commercial meat processors/taxidermists
- Outfitters/MOGA
- Statewide conservation groups and local sportsmen's clubs
- Hunter Ed and Bowhunter Ed instructors
- Universities
- Landfills, waste facilities

MISC. CONSIDERATIONS

- Department will announce annual surveillance results even if all tests are negative. This action will further educate public about sample collection and testing results following each hunting season.
- Department should also inform public that testing is ongoing, via road kill collection and targeted surveillance, and that results may be returned at any time of the year.

ACTION ALERT PHONE TREE

- Neil Anderson (Wildlife Disease Laboratory 994-6358) or Dr. Tom Linfield (Montana State Veterinarian 444-0782)) learn of positive test result(s)
- Anderson or Linfield call FWP **Director's Office** (444-3186) and **Wildlife Division** (444-2612)
- Wildlife or Director calls Conservation/Education Admin. **Ron Aasheim** (444-4038), supervisor of affected region, CWD management team
- Aasheim calls **Tom Palmer** (444-3051) and **Andrew McKean** (228-3723) who prepare news release
- Aasheim contacts departments of Livestock's **Karen Cooper** (444-9431), state epidemiologist **Todd Damrow** (444-3986)
- Enforcement Division contacts **hunter** and **landowner**, **affected jurisdictions**
- Palmer distributes information via email to **FWP All**
- Aasheim and Palmer contact first-tier **media**
- Palmer distributes news release and fact sheet to statewide **media**

MANAGEMENT ACTIONS

Management actions taken in reaction to the diagnosis of CWD in a Montana deer or elk will vary in their aggressive nature depending on the CWD Management Plan selected as being most capable of limiting or eliminating CWD. In all cases, additional sample collections will be required to determine disease prevalence. Carcass transport issues may restrict movement of carcasses or carcass parts out of the management area and special hunts may be initiated to supply needed samples or to effect population densities in management areas. All of these actions will require the distribution of additional public information. Press releases, television and radio coverage, local public meetings, and on site presence in management areas by FWP personnel to collect samples and distribute information may be required. Concentrated informational efforts targeting landowners, land agencies and/or Tribes, sportsmen, waste disposal facilities, involved state agencies, and the general public will be initiated by the CWD Management Team prior to beginning management actions.

APPENDIX 2

MULE DEER POPULATION ECOLOGY AND CHRONIC WASTING DISEASE STUDY

SOUTHEASTERN MONTANA

***DRAFT* Mule Deer Population Ecology and Chronic Wasting Disease Study**

Southeast Montana

The southeastern corner of Montana represents a probable entry point for Chronic Wasting Disease (CWD). CWD is a neurodegenerative disease characterized by changes in behavior, progressive weight loss, and ultimately death (Williams and Young, 1980, 1982, 1992, and Spraker et al. 1997). The disease has not been detected in Montana among 4,643 samples collected from free-ranging populations of deer or elk during organized statewide surveillance conducted 1998-2003 (Anderson and Aune 2004). Prevalence or susceptibility appears to be higher in mule deer and white-tailed deer compared to elk in endemic areas of Colorado and Wyoming (Miller et al. 2000). In the Black Hills of South Dakota, mule deer, white-tailed deer, and elk from free-ranging populations have tested positive for CWD, some as close as 70 miles from the southeast corner of Montana. Free-ranging mule deer near Moorcroft, Wyoming, have tested positive for CWD approximately 50 miles south of where the Little Powder River enters Montana.

Loss of cervid populations, reduced hunting opportunities, and perceived threats to human health have elevated public concern over entry of the disease into Montana. In contrast to neighboring states, Montana has an opportunity to prepare for the probable occurrence and detection of CWD. Mule deer represent the most likely species to transmit the disease across our borders because of their wide distribution and seemingly high degree of susceptibility to the disease. Mule deer habitats supporting relatively high densities in southeast Montana are continuous with areas of South Dakota and Wyoming that have tested positive for CWD. Montana FWP has studied population ecology of mule deer in a number of important environments (Mackie et al 1998, Pac et al 1991, Hamlin and Mackie 1989, Wood et al 1989) although such data are lacking in the extreme southeast corner of the state. A scientifically valuable opportunity exists to study population demography before the disease is detected and, quite probably, after it's occurrence and expansion. The ultimate impact of mortality caused by CWD on size and trend of wild populations has not been determined.

We have initiated efforts to study mule deer populations in two different environments in Southeast Montana to describe population size, composition, density distribution, movement patterns, emigration rates, and habitat use along the Montana border adjacent to Wyoming and South Dakota. These data are fundamental to designing an ecologically effective CWD response plan for southeast Montana. The Boxelder Creek study area represents the sagebrush/grassland prairie that predominates to the east and south of Broadus, Montana. The proposed Devil's Backbone study area represents the ponderosa pine upland habitat predominating to the south and west of Broadus. Approximately 25 landowners have been contacted and have given permission to FWP personnel to conduct research on their properties.

The general study objectives described below apply to both study areas with the exception of Phase I 1.a. which, will be directed only toward the Boxelder study area.

PHASE I OBJECTIVES-

1. Describe and monitor the demographics of a mule deer population in a sagebrush/grassland environment prior to documented exposure to CWD.
    a. Estimate trends in population size and composition during a 4-year period.
    b. Determine causes and rates of mortality of adult females and males during a 4-year period.
2. Determine the seasonal movement patterns and density distribution of adult females and males with emphasis on interstate movements along the South Dakota and Wyoming border.
3. Measure use vs. availability of large-scale habitat types at the landscape level for the VHF radio-collared sample of adult females and males.
4. Intensify CWD surveillance in southeast Montana with emphasis on harvest of mule deer, white-tailed deer, and elk.
5. Develop a CWD response plan for southeast Montana incorporating data on population ecology of mule deer in the sagebrush/grassland prairies and ponderosa pine habitats.

PHASE II OBJECTIVES

1. Determine the seasonal movement patterns and emigration of juvenile female and male mule deer.
2. Measure fine-scale habitat use vs. availability on individual home ranges of adult females, adult bucks, and possibly juveniles.

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