

DRAFT
ENVIRONMENTAL ASSESSMENT
FOR THE
MANAGEMENT OF
WOLF CONFLICTS AND DEPREDATING WOLVES
IN WISCONSIN



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SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Wildlife Services (WS) and the United States Department of the Interior, Fish and Wildlife Service (USFWS), in cooperation with the Wisconsin Department of Natural Resources (WDNR) and the Ho-Chunk Nation, in accordance with State and Federal regulations and guidance on wolf management, propose to implement an Integrated Wildlife Damage Management (IWDM) program in Wisconsin to protect resources from gray wolf (*Canis lupus*) damage and promote wolf conservation. The analysis covers wolf damage actions that could be conducted by the USFWS, WS and the WDNR while wolves are federally protected under the Endangered Species Act (ESA).¹ The proposed action includes the USFWS issuing permits for take of wolves under Section 10(a)(1)(A) of the Endangered Species Act. WS would act as agents of the WDNR which is the agency requesting a permit for the take of depredated wolves from the USFWS. Under the preferred alternative, damage management would be conducted on private or public property in Wisconsin when the resource owners/managers request assistance to alleviate wolf damage, wolf damage is verified, and agreements have been completed specifying the details of the damage management action. The types of wolf conflicts that could be addressed include: 1) depredation on livestock, 2) depredation on pets, and 3) potential threats to human safety. Under the preferred alternative, the IWDM strategy would encompass the use of the full range of legal, practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, wolves, other species, and the environment. Under this action, WS and the WDNR would provide technical assistance and operational damage management, including non-lethal and lethal management methods selected after applying the WS Decision Model (Slate et al. 1992). When appropriate, farm management practices (animal husbandry), frightening devices, and livestock guarding animals could be recommended and utilized to reduce wolf damage. In other situations, when the damage situation and landowner practices meet USFWS and WDNR requirements, wolves would be removed as humanely as possible using foot-hold traps, foot snares, cable restraints, and shooting. In determining the damage management strategy, preference would be given to non-lethal methods when they are deemed practical and effective. Lethal methods would be used to reduce damage after practical and appropriate non-lethal methods have been considered and determined to be ineffective or inappropriate in reducing damage to acceptable levels. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate initial response to a wolf damage problem could be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. All wolf damage management would be conducted in compliance with appropriate federal, state, and local laws and court-mandated restrictions.

¹ Ordinarily, the actions of state agencies are not subject to the requirements of the National Environmental Policy Act. However, while wolves are federally protected under the Endangered Species Act, actions taken by the WDNR will depend upon the management decisions (permits, 4(d) rules) of the USFWS which are subject to the requirements of NEPA.

ACRONYMS /ABBREVIATIONS

APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BO	Biological Opinion
CDFG	California Department of Fish and Game
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DPS	Distinct Population Segment
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
GAO	U. S. General Accounting Office
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
IPM	Integrated Pest Management
IWDM	Integrated Wildlife Damage Management
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NWRC	National Wildlife Research Center
SOP	Standard Operating Procedure
T/E	Threatened and Endangered
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFS	U. S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WCES	Wisconsin Cooperative Extension Service
WCFA	Wisconsin County Forester Association
WDATCP	Wisconsin Department of Agriculture, Trade and Consumer Protection
WDM	Wolf Damage Management
WDNR	Wisconsin Department of Natural Resources
WRS	Wisconsin Revised Statutes
WS	Wildlife Services
WWMP	Wisconsin Wolf Management Plan

CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

1.0 INTRODUCTION

Gray wolf (*Canis lupus*) populations in North America, including the wolf population in Wisconsin, have undergone a dramatic recovery in recent years. The combination of an increasing Wisconsin wolf population, human encroachment on wild habitats and conversion of natural landscapes to agricultural and urban environments has led to increased conflicts between wolves and humans. Conflicts with wolves include predation on livestock and pets, and risks to human health and safety from potentially hazardous or threatening wolves. Management of conflicts with wolves is addressed in the Wisconsin Wolf Management Plan (WWMP; Wisconsin Department of Natural Resources (WDNR) 1999) and in the United States Department of Interior, Fish and Wildlife Service (USFWS) Eastern Timber Wolf Recovery Plan (USFWS 1992). Prompt, professional management of damage and conflicts with wolves is an important component of wolf recovery efforts because it facilitates local public acceptance and tolerance of wolves (Fritts et al. 1992, Fritts 1993, Mech 1995, WDNR 1999, 50 CFR 17.40(o), Wydeven and Jurewicz 2005).

Gray wolves are currently federally listed as an endangered species under Section 4 of the Endangered Species Act (ESA). While federally listed, primary management authority for wolves rests with the USFWS. The ESA and its implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal to take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these) any endangered wildlife species. However, under the provisions of Section 10 of the ESA, the USFWS may issue permits for the take of a federally listed species for, “scientific purposes or to enhance the propagation or survival of the affected species, including, but not limited to, acts necessary for the establishment and maintenance of experimental populations pursuant subsection (j); or (B) any taking otherwise prohibited by section 9(a)(1)(B) if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity”. The USFWS cooperates with the WDNR on the management of wolves in the state. If wolves were to be reclassified to a threatened species, the USFWS would retain primary management authority for wolves, but could designate additional management authority to state and tribal natural resource agencies via 4(d) rules under the ESA. Wildlife Services could provide assistance with management of conflicts with wolves at the request of the USFWS, or as the designated agent of WDNR or at the request of specific tribe.

Wildlife damage management, a specialized field within the wildlife management profession, is the science of reducing damage or other problems caused by wildlife and is recognized as an integral part of wildlife management (Berryman 1991, The Wildlife Society 1992). Wildlife Services² (WS) is the Federal agency authorized by Congress to conduct wildlife damage management to protect American agricultural, industrial and natural resources, property and human health and safety from damage associated with wildlife (Act of March 2, 1931 as amended 46 Stat. 1486; 7 USC 426-426c). Wildlife Services is a cooperatively-funded, service-oriented program that provides assistance to requesting public and private entities and government agencies. Before WS responds to requests for assistance and conducts any wildlife damage management, a request must be received and an *Agreement for Control* must be signed by the landowner/administrator for private lands or other comparable documents for public lands must be in place. Wildlife Services responds to requests for assistance when valued resources are damaged or threatened by wildlife. Responses can be in the form of technical assistance or

² On August 1, 1997, the Animal Damage Control program was officially renamed “Wildlife Services.”

operational damage management depending on the complexity of the wildlife problem and the funding that is available. Wildlife Services activities are conducted in accordance with applicable Federal, State and local laws, Cooperative Agreements, “Agreements for Control”, Memoranda of Understanding (MOUs), and other applicable documents (WS Directive 2.210). These documents establish the need for the requested work, legal authorities and regulations allowing the requested work, and the responsibilities of WS and its cooperators.

This environmental assessment (EA) documents the potential impacts to the human environment of alternatives for USFWS, WDNR and WS involvement in wolf damage and conflict management in Wisconsin. This analysis relies mainly on existing data contained in published documents (Appendix A), including The Eastern Timber Wolf Recovery Plan (USFWS 1992), the Animal Damage Control (WS) Programmatic Final Environmental Impact Statement (EIS) (U.S. Department of Agriculture (USDA) 1997, Revised), and the WWMP (WDNR 1999) whereby pertinent portions of these documents are incorporated by reference.

1.1 PURPOSE

The purpose of this EA is to evaluate the potential impacts of alternatives for managing conflicts with wolves and wolf damage in Wisconsin including actions that may be taken with permits issued by the USFWS under Section 10(a)(1)(A) of the ESA or via special conservation regulation promulgated by USFWS under section 4(d) of the ESA. Management activities would be intended to protect agricultural resources, pets, and human health and safety in Wisconsin, and to conserve wolf populations. This EA evaluates management of conflicts with wolves while wolves are federally protected under the ESA.

1.2 NEED FOR WOLF DAMAGE MANAGEMENT IN WISCONSIN

The need for action in Wisconsin is based on wolf predation on and threats to livestock, game farm animals and pets, and risks to human safety from potentially hazardous or threatening wolves. The need exists to provide a prompt, professional, effective program to resolve wolf conflicts in order to minimize negative attitudes toward wolf recovery in Wisconsin and enhance wolf conservation efforts. Any wolf damage management (WDM) program developed should include access to a range of damage management techniques that allow for the minimum impact to wolves while still effectively addressing damage by and conflicts with wolves. The program should be conducted by personnel well trained and qualified in WDM. Control methods should target depredating wolves. There should be a system for monitoring of use of WDM control methods and cumulative impacts on the wolf population. WDM should not have significant adverse effects on the statewide wolf population or non-target species populations.

Section 10(a)(1)(A) of the ESA allows the USFWS to issue permits for the take of a federally listed species for, “scientific purposes or to enhance the propagation or survival of the affected species”. If wolves are federally reclassified as threatened, the USFWS may also issue special conservation regulation promulgated by USFWS under section 4(d) of the ESA which could allow for WDM. In the revised Eastern Timber Wolf Recovery Plan (USFWS 1992) and the WWMP (WDNR 1999), the USFWS and WDNR determined that a wolf damage management program including the relocation and/or removal of depredating wolves is necessary and advisable to minimize negative attitudes toward wolf recovery and facilitate wolf conservation. The WDNR has identified social tolerance of wolves as one of the primary factors limiting expansion of the Wisconsin wolf population (Wydeven and Jurewicz 2005). This determination is consistent with the opinion of wolf experts who have asserted that wolf distributions could be expanded if some form of wolf damage management were implemented (Bangs et al. 1995,

Mech 1995, Boitani 2003, Fritts et al. 2003, Mech and Boitani 2003). Mech (1995), the nation's leading expert in wolf biology and management, noted that wolf conservation at the local level may become more socially acceptable if some form of localized wolf control is allowed (Mech 1995; Section 1.3.10). The Wildlife Society is an international organization of professional wildlife biologists especially focused on North America states. This professional organization has stated that "Control of wolves preying on livestock and pets is imperative and should be prompt and efficient if illegal killing is to be prevented and human tolerance of the presence of wolves is to be maintained" (Peek et al. 1991).

1.3 BACKGROUND

1.3.1 Wolf Distribution and Classification - General

The original distribution of wolves covered most of the Northern Hemisphere north of latitude 20°N (Mech 1974). This places the wolf second only to the Pleistocene lions (*Panthera leo*) in having attained the widest distribution of all wild land-dwelling mammals (Nowak 1983). Wolves are not restricted to specific habitat types but occupied a wide range of habitats that contained suitable prey. Wolves once occurred in the Middle East and all across Europe, including the old Soviet Union (Pimlott 1975, Mech 1982).

Prior to European settlement, gray wolves occupied much of North America except, possibly, for the large desert areas of the United States and parts of the eastern and southeastern United States which were occupied by the red wolf (*C. rufus*). Subsequent to European settlement, the decline in wolf numbers in the United States progressed rapidly, starting from the east and moving westward. By about 1900 the species had disappeared from the eastern half of the United States except for the upper Great Lakes region, and by about 1930 most wolf populations in the west were almost eliminated. In Canada the trend was similar (Carbyn 1983a) but not as complete. Then occurred what Nowak (1983) referred to as "one of the most remarkable wildlife comebacks in history."

In 1974 the gray wolf in the contiguous 48 states was listed as endangered under provisions of the ESA. A Federal "Recovery Plan for the Eastern Timber Wolf", approved in 1978 and revised in 1992, stated that a primary objective is to reestablish viable populations in as much of its former range as possible (USFWS 1978, 1992). As a result of the protection placed upon them, wolves spread back into formerly occupied ranges from Alaska to the Great Lakes. In response to increasing and expanding wolf populations, on April 1, 2003, the USFWS changed the classification of the gray wolf under the ESA. The USFWS established three distinct population segments (DPSs) for the wolf in the conterminous US. The wolves in Wisconsin were in the Eastern DPS and were reclassified from endangered to threatened in this action (68 FR 15804-15875). The USFWS also established a special regulation under section 4(d) of the ESA which applied provisions similar to those in Minnesota, where wolves have been classified as "threatened" since the 1974 listing, to most of the Eastern DPS. This special regulation allowed for lethal control of depredating wolves in situations where management authorities deemed those actions were warranted. USFWS found that these special rules were necessary and advisable to provide for the conservation of the wolves in the Western and Eastern DPS (50 CFR 17.40(n) and (o), respectively). Lethal control was carried out by the WDNR and USFWS or their designated agents. Personnel from WS were designated agents of the WDNR through a cooperative agreement signed by the WDNR Bureau of Endangered Resources and Bureau of Wildlife Management and WS. On July 21, 2004, the USFWS initiated the process for delisting wolves in the Eastern DPS (69 FR 43663 43692).

On January 31, 2005 a United States District court in Oregon enjoined and vacated the USFWS' Final Reclassification Rule of April 2003 that changed the status of the gray wolf from endangered to threatened in the Eastern and Western DPSs. The ruling effectively returned the wolves in Wisconsin to their previous endangered status and cancelled the special regulations established under section 4(d) of the ESA. After learning of the court ruling, the USFWS advised WDNR to cease any lethal control activities including actions by their authorized agent, WS. Lethal removal of depredating wolves now requires a Section 10(a)(1)(A) permit from the USFWS. On April 1, 2005 the USFWS issued a Section 10(a)(1)(A) permit which allowed WDNR and WS (as WDNR's authorized agent) to resume most of the wolf research and depredation control activities allowed under the previous 4(d) rule. On September 13, 2005 the United States District Court in the District of Columbia enjoined the USFWS from allowing any activities authorized under the permits because of procedural problems with the permits. The WDNR subsequently applied for a new permit for similar damage management take activities. At present, WDNR and WS assistance with wolf depredations on livestock is limited to documenting the event and providing technical assistance on non-lethal methods for resolving wolf damage including husbandry techniques (e.g., fencing, night penning [bringing animals in at night], guard dogs) and other non-lethal methods permitted under a cooperative conservation agreement between the USFWS and WDNR (Section 1.7.7).

1.3.2 Wolves in Wisconsin

Gray wolves occurred throughout Wisconsin prior to European settlement. However, they were extirpated from southern Wisconsin by the 1880's and central Wisconsin by 1914. A remaining wolf population occurred in a few northern Wisconsin counties, but had declined to fewer than 50 animals by 1950. The last Wisconsin wolf was probably killed in the late 1950's (Wydeven et al. 1995).

In 1974 the gray wolf in the contiguous 48 states was listed as endangered under provisions of the ESA. The State of Wisconsin listed wolves as endangered in 1975 when it appeared that wolves were beginning to reinhabit the state. A Federal "Recovery Plan for the Eastern Timber Wolf", approved in 1978 and revised in 1992, stated that a primary objective is to reestablish viable populations in as much of its former range as possible (USFWS 1992). Under the protections of the ESA, wolf populations in Wisconsin and Minnesota freely disperse (Figure 1-1). Wolf population monitoring by WDNR began in 1979, when the wolf population was estimated at 25 wolves in five packs (Figure 1-2). The number of wolves has increased considerably since that time. During the winter of 2004-2005, the minimum population estimate was 425 wolves in 108 packs. Wisconsin's annual minimum wolf population estimates are provided in Figure 1-2. These estimates are derived from surveys conducted during winter, prior to pup production, when population size is at an annual low. Over the period of 1995 to 2005 the Wisconsin wolf population has increased at an average annual rate of 18% (range 4% to 49%). The Wisconsin wolf estimate of 425 for 2005 represents a 14% increase from 2004.

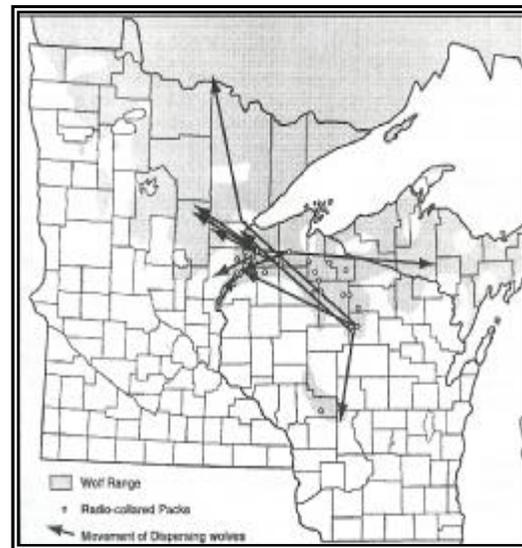


Figure 1-1. Dispersal of Wisconsin Wolves

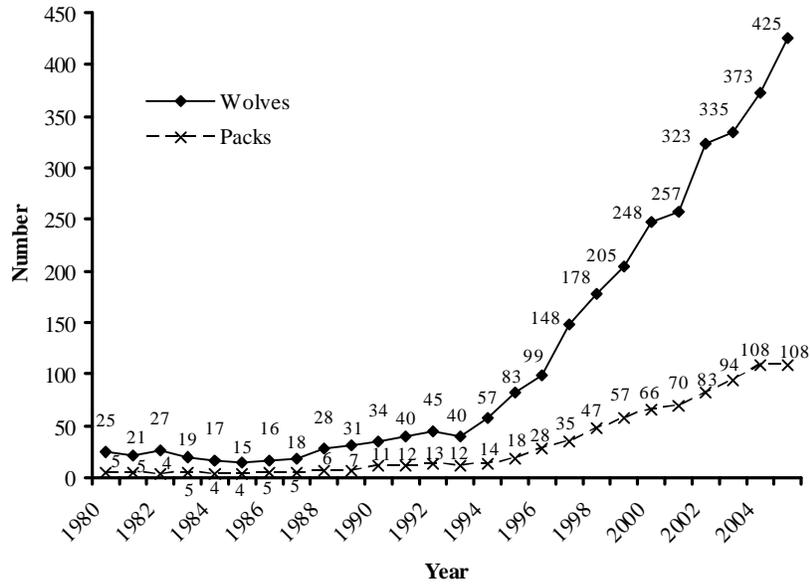


Figure 1-2. Late winter wolf numbers in Wisconsin. (These are statewide counts and include tribal lands)

In 1986, the WDNR created a Wolf Recovery Team to develop a Wisconsin Wolf Recovery Plan. The Wisconsin Wolf Recovery Plan was approved by the Wisconsin Natural Resource Board in 1989 (WDNR 1989). This plan followed the intent of the Federal Recovery Plan and supported reclassification of the wolf in Wisconsin from “*endangered*” to “*threatened*” when a minimum population of 80 animals was maintained for three consecutive years. The Wisconsin recovery goals were achieved in 1997, and in 1999 wolves were officially reclassified to “*threatened*” by the State. The WWMP was revised in 1999 after the state reclassified wolves as threatened (WDNR 1999). The WDNR removed wolves from the state threatened species list in 2004 and listed them as protected wild animals (nongame species).

The wolf population has also exceeded all recovery criteria established for the eastern United States in the Federal wolf recovery plan (USFWS 1992). The Federal plan requires that at least two viable wolf populations must exist within the eastern United States. One of these populations must be reestablished outside of Minnesota and Isle Royale. The Federal recovery plan provides two alternatives for reestablishing this second viable wolf population. If the wolf population is more than 100 miles from the Minnesota population, it must contain 200 wolves for at least 5 consecutive years (USFWS 2003). If the wolf population is less than 100 miles of the Minnesota population, it must contain at least 100 wolves for at least 5 consecutive years (USFWS 2003). The Michigan/Wisconsin wolf population is less than 100 miles from Minnesota and recent surveys indicate more than 800 wolves in these two states. A minimum population of at least 100 wolves has been exceeded since 1994 (Fig 1-3). Also, while no numerical individual state recovery criteria for Michigan and Wisconsin are listed in the Federal plan, State subgoals were incorporated. For Wisconsin and Michigan, the subgoals are 80 and 80 – 90 wolves, respectively (USFWS 1992). Current populations in both these States are more than four times these numerical subgoals.

The Federal recovery plan also required that the wolf population in Minnesota be stable or growing, and its continued survival must be assured. In Minnesota, the wolf population size is

not surveyed or estimated annually, however in 2004 Minnesota Department of Natural Resources estimated the wolf population had reached approximately 3,020 individuals. The previous estimates for the winter wolf population in Minnesota were 2,445 in 1997-98, 1500-1750 for 1988-89, and 1235 for 1978-179 (Fuller et al. 1992). A wolf depredation control program, similar to the preferred alternative for this EA, has been conducted in Minnesota since 1978 when wolves were reclassified as threatened and a 4(d) regulation was promulgated. After 25 years of wolf damage management including lethal removal of wolves, the Minnesota wolf population has still increased by 245%, or almost 2 ½ times the 1979 population and at present is believed to be relatively stable (Erb and Benson 2004).

In 2003, the Federal recovery goals were met for the Eastern U.S. and the reintroduced wolf population in the Western U.S. was increasing. The USFWS issued a final rule on April 1, 2003 which redefined the Distinct Population Segments (DPSs) for wolves and changed the classification of wolves in the Eastern DPS from endangered to threatened (50 CFR 17.40(o)). However, this decision was enjoined and vacated by a Federal court, primarily because of problems with the new DPSs and not problems with the status of wolves in Wisconsin/Michigan/Minnesota, thereby returning wolves in Wisconsin and Michigan to their Federal “endangered” status.

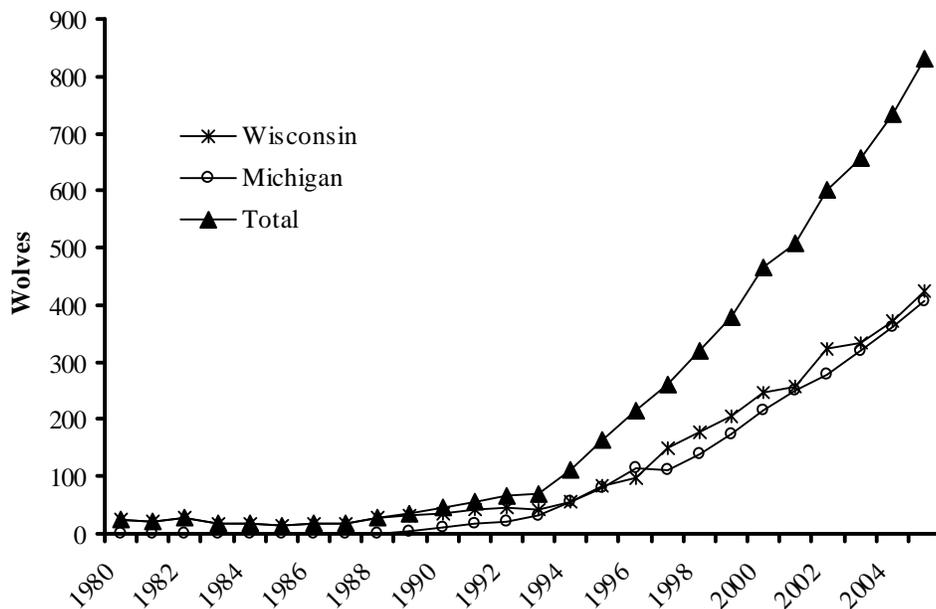


Figure 1-3. Wolf population estimates for Wisconsin, Michigan, and Wisconsin and Michigan combined (total) from 1980 - 2005.

1.3.3 Wolf Ecology

Gray wolves are carnivores and acquire food through predation and scavenging. Wolves can attain speeds of 35–44 miles/hour over short distances (Mech 1974) and a travel gait of five miles/hour can be maintained for long distances. The presence of wolves in an area is dictated in part by the availability of habitat for its prey species. Wolves in forested environments appear to

depend generally on their sense of smell and hearing (Mech 1970). Their sense of smell is highly developed, enabling them to detect odors from distances as far as 1½ miles; smell functions both to detect prey (Mech 1970) and in territorial marking and social interaction (Asa et al. 1985). Harrington and Mech (1982) reported that wolves replied to human howls from a distance of three miles and possibly from as far as six miles. Vision in wolves is apparently acute but, compared with smell and hearing, may be the least highly developed; however, this is difficult to test.

The social behavior of gray wolves is affected by their reproductive cycle and need to hunt in packs. Pack dynamics, social status of individuals, movements, and certain aspects of seasonal habitat use are all affected by their reproductive behavior. Gray wolf packs normally consist of several sub adult and adult males and females that can produce young. However, about 38% of all adult females fail to reproduce (Packard et al. 1983). This failure is believed to be the result of deferred reproduction (i.e., lack of copulation) rather than the suppression of hormonal cycles (Packard et al. 1983, 1985). Delayed behavioral maturation provides an adaptive advantage to the pack in that many members help raise just a few young or the young of the dominant pair. The pack can remain as a viable social unit, necessary for successful hunting, while reducing competition for mates and maintaining pack unity through their social hierarchy. This also provides an advantage to the alpha males and females by increasing the probability that only their genes are passed on.

The social standing of wolves within a pack influences the breeding cycle among high-ranking members in the hierarchy. Alpha animals suppress lower-ranking animals in their behavior towards them and generally mate with other high-ranking animals. Some captive females have been observed as capable of conceiving at ten months of age (Medjo and Mech 1976), but sexual maturity in the wild usually is attained at 22 months and often wolves do not breed until their third or subsequent years. Females coming into estrus for the first time may do so two weeks later than those that have previously bred (Rausch 1967). Estrus in wolves lasts from five to seven days (Mech 1974) or longer and occurs any time from January to March, depending on latitude. Most breeding in Wisconsin occurs in February (WDNR 1999).

Ovulation and implantation are regulated by a number of factors. In one study (Rausch 1967), females breeding for the first time shed an average of 6.1 ova and implanted 5.4 embryos, whereas older females shed an average of 7.3 ova and implanted 6.5 embryos. Five adult females found in Wisconsin in the 1980s and early 1990s, had an average of 5.2 (range 3-8) fetuses. Gestation lasts about 63 days and average litter size is about six, with extremes recorded being from 1 to 11 (Mech 1974). A wolf pack generally produces one litter per year (Packard and Mech 1980); however, well-documented cases of births of more than one litter per pack per year have been recorded both in captivity (Paquet et al. 1982) and in the wild (Murie 1944, Van Ballenberghe 1983). In Yellowstone National Park, the production of 2-3 litters in one year by a single pack has been documented on multiple occasions (USFWS et al. 2002, Smith et al. 2005). In such cases, adults in the pack often divide their time between dens and will unite the family groups after the pups become mobile (Murie 1944). Occasionally, subordinate wolves that have left the pack are known to have produced pups (Peterson et al. 1984).

Young are usually born in earthen dens dug by female wolves or in dens taken over from other animals. Availability of suitable habitat for denning is only of secondary importance when compared to prey availability (Carbyn 1975, Ballard and Dau 1983). Young are born with their eyes closed and initially have a poor thermoregulatory system. In Wisconsin, birth occurs from mid to late April (WDNR 1999). Newborn pups weigh about one pound (Rutter and Pimlott 1968) and their movements are limited to a slow crawl. Eyes open at 11–15 days (Mech 1970),

but pups see poorly until they are several weeks old.

At about three weeks pups will emerge from the den and can be found romping near den entrances (Young and Goldman 1944). Social interactions begin to develop during this period. After several weeks pups are moved to activity sites, which are also referred to as “*rendezvous*” or “*home sites*”; generally less than 1.2 miles from den sites (Carbyn 1975, Peterson et al. 1984). Thereafter, pup activity is centered on a succession of home sites progressively farther from the den. By four to six months, pups have reached nearly adult size; they then range with packs in winter circuits.

Wolves are opportunistic predators and prey most extensively on ungulates and beaver (*Castor canadensis*); although in exceptional cases they have resorted to feeding on garbage (Grace 1976) or such unusual food items as insects (Kuyt 1972) and fish (Bromley 1973). Mandernack (1983) found deer at 55%, beaver at 17%, and snowshoe hare (*Lepus americanus*) at 12% volume (relative bulk density) of 334 wolf scats found in Wisconsin, but scat samples were biased toward the warmer months. Mettke (1998) found 78% deer by volume in 47 scats from a pack in northwest Wisconsin in late winter and early spring. Surprisingly both studies also found pig (*Sus scrofa*), probably from carcasses thrown in the forest, and Mettke (1998) also found 3% volume of calf remains in scats.

In general, wolves prey on the most vulnerable animals. Young, older, or otherwise less robust individuals are most vulnerable to wolf predation (Murie 1944, Pimlott et al. 1969, Mech and Frenzel 1971, Mech and Karns 1977, Peterson 1977, Carbyn 1983b). Snow conditions and forage limitations may render a large proportion of a prey population vulnerable to wolves. When food is plentiful, wolves normally eat meat at about 2 oz prey/pound of wolf/day (Kolenosky 1972) (i.e., an 80 pound wolf would consume about 10 pounds of meat); however, consumption rates in the wild may be as high as 3 oz. prey/pound wolf (i.e., 15 pounds of meat for an 80 pound wolf) (Fuller and Keith 1980) and 4 oz prey/pound wolf (20 pounds of meat for an 80 pound wolf) (Carbyn 1983b). However, wolves have an amazing ability to survive long periods with little or no food. Mech (1977) learned that as a result of food deprivation during winter, wolves conserved energy by traveling less and sleeping more than under normal conditions.

Wolves kill and consume other carnivores, including other wolves (Van Ballenberghe and Erickson 1973, Fuller and Keith 1980), dogs (L. Carbyn, pers. observation) and bears (*Ursus americanus*, *U. maritimus*) (Horejsi et al. 1984, Ramsay and Stirling 1984, Paquet and Carbyn 1986). At other times carnivores are killed and not consumed. For example, wolves have been observed to kill but not eat dogs, coyotes (*Canis latrans*) (Carbyn 1982, Crabtree & Sheldon 1999), wolverines (*Gulo gulo*) (Boles 1977), and mink (*Mustela vison*). In addition, instances have been recorded where more prey are killed than can be consumed (i.e., surplus killing) (Björvall and Nilsson 1976, Mech 1977, Eide and Ballard 1982, DelGiudice 1998). Killing by wolves ranges from predation (killing to eat either an entire carcass or part of it) to defensive, territorial and surplus killing. In cases where coyotes, dogs, or other wolves are killed but not consumed defensive or territorial killing is implicated.

Once thought to need wilderness areas to survive, research, as well as the expansion of wolf range over the last two decades, has shown that wolves can successfully occupy a wide range of habitats, and they are not dependent on wilderness areas for their survival. Wolves tend to more readily occupy heavily forested areas and landscapes with low road densities (Mladenoff et al. 1995). Mech (1995) believes that inadequate prey density and a high level of human persecution are the main factors that limit wolf distribution.

1.3.4 Benefits of Wolves and Ecological Impact

Wildlife generally is regarded as a source of economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. Direct benefits are derived from a user's personal relationship or direct contact with wildlife and may include both consumptive (e.g., using or intending to use the animal such as in hunting or fishing) and non-consumptive uses (e.g., observing or photographing animals) (Decker and Goff 1987).

Wolves play an important role in predator/prey relationships. By culling old, young, sick, and injured individuals from a prey population, it is believed that wolves help maintain healthier, viable prey populations when other prey population mortality factors are in balance (Mech 1970).

Wolves may also play a role in the development of riparian and upland plant communities in various locations within the U.S. Research has shown that wolf predation on elk in the greater Yellowstone National Park region of northwestern Wyoming and southwestern Montana altered elk behavior and habitat use which, in turn, resulted in less foraging pressure on sensitive riparian areas and increased willow and quaking aspen height in riparian/wet meadow habitats (Ripple et al 2001, Ripple and Beschta 2004). A similar study by Fortin et al. (2005) suggests that there may also be a behavioral component to these wolf-elk interactions. Elk may still travel through high wolf use areas, but they may alter their habitat preferences from aspen in riparian zones to conifer forest and open meadow habitat types (Fortin et al. 2005).

On Isle Royale National Park in Lake Superior, balsam fir growth has been linked to wolf-moose interactions (McLaren and Peterson 1994). When wolves were relatively scarce, moose numbers grew, which led to depletion of balsam fir forage. It was observed that vegetation response followed moose response. When wolf numbers were higher, moose numbers were low and balsam fir growth increased (McLaren and Peterson 1994). These studies suggest that wolf recovery may present a management tool for helping to restore certain types of vegetation and to conserve biodiversity (Ripple et al. 2001, Ripple and Beschta 2004).

A study in Wisconsin and Michigan has shown that diversity and biomass of forbs in white cedar (*Thuja occidentalis*) stands was more diverse and at higher biomass in the interior than on the edge of wolf pack territories (Anderson et al. submitted). Differential use by wolves of core and edge portions of their territories cause deer to spend less time in the interior, and more time on the edge of wolf territories (Mech & Harper 2002). Since the 1990s, deer populations in much of northern Wisconsin have been above management goals, thus any predation by wolves may reduce some of the effects from excess deer numbers, and reduce negative impacts of deer in remote areas.

Wolves are important predators on beaver (Potvin et al. 1992), which in turn may affect trees, orchids, trout habitat, and forest roads. Predation by wolves on coyotes and other mesopredators, may benefit smaller predators and ground nesting birds that can be affected by mid-sized predators (Crabtree and Sheldon 1999).

Viewing wolves or hearing them howl in their natural habitat is a popular activity in certain areas and is considered to add value to many people's outdoor experience. Organized tours for the purpose of viewing wolves or hearing them howl are conducted at some U.S. and Canadian national parks such as Yellowstone (WY), Denali (AK), Wood Buffalo (Alberta, Canada), and Riding Mountain (Alberta, Canada). Howl tours are also held in northern Wisconsin by several groups (WDNR 1999, Wydeven and Wiedenhoef 2005). Small or large group howling attempts

can also be made in any area where wolves are known to be present. Such activities provide not only aesthetic viewing but there may also be associated economic (tourism) benefits.

1.3.5 Importance of Wolves in Native American Culture and Beliefs

Wolves play an important role in tribal culture and beliefs. The exact nature of this relationship and role varies among tribes. One example of the role of wolves in tribal beliefs comes from the Anishinabeg (Ojibwe). Ma'iingan, the wolf, has special significance to the Anishinabeg, who regard the wolf as a brother, and as a being with whom their fates are intertwined. Anishinabeg teachings state that Ma'iingan and Original Man were told by the Creator to travel the earth together and name all of creation. During their journey, the two became as brothers. After their task was completed, the Creator told them they must go their separate ways. The Creator said that from that time forward they both would be feared, respected and misunderstood by the people that would join them later on this earth, and that what would happen to one of them would also happen to the other. Wolves also figure prominently in the Clan Systems used by some tribes.

The USFWS, WDNR and WS recognize the importance of wolves in tribal culture and are working with the Ho-Chunk Nation and Lac Du Flambeau Tribe of Lake Superior Chippewa Indians to try and address their concerns regarding WDM in Wisconsin. Information from the tribes will be included in the final decision and/or the final EA.

1.3.6 Wolf Impact on Elk and Moose in Wisconsin

In 1995, the WDNR reintroduced elk to northern Wisconsin. In the *3rd quarter 2005 Clam Lake Elk Herd Update* (WDNR 2005), the Wisconsin Elk herd was estimated at approximately 113 animals. Elk are currently classified as a protected species in the state. Predation, primarily by bears and wolves has been an important mortality factor, and deaths of 5 elk were attributed to wolves in 2005. Wolf territory placement also impact spatial distribution and habitat use by elk in the state (Anderson et al. 2005). Wisconsin also has a small population of moose that may also serve as food for wolves (Wiedenhoeft and Wydeven 2005). However, it is also important to note that white-tailed deer, another important prey item for wolves, numbers exceed management goals in many parts of the state.

1.3.7 Wolf Predation on Livestock and Pets

The ability of wolves to injure and kill cattle, sheep, poultry, game farm animals and other livestock is well documented (Young and Goldman 1944, Fritts 1982, Carbyn 1983*b*, Fritts et al. 1992, Treves et al. 2002, USDA 2005). The economic impact of wolf depredation on livestock can be substantial for individual producers. Further, when wolves come into contact with people (Linnel et al. 2002) and kill or injure their pets there is both an economic and an emotional loss. There is the cost to replace a pet that has been killed or to care for one that has been injured. Also, many people are attached emotionally to their pets and have very strong feelings concerning their injury or loss.

The number of wolf complaints reported to the WS and the WDNR has shown an increasing trend at the same time that State wolf population has increased (Willging and Wydeven 1997, Treves et al. 2002, Figure 1-4). One of the likely reasons for recent increases in wolf conflicts relates to the fact that the areas of suitable remote habitat are occupied by wolves, and much of the recent wolf population expansion is into agricultural areas at the edge of the northern forest. Opportunities for wolf-human interactions, including conflicts, are higher in these agricultural areas. The

number of farms with verified wolf depredation has increased from 8 in 2002 to 14 in 2003, 22 in 2004, and 25 in 2005 (Table 1-1). As wolf conflicts increase, there is an increasing need for prompt professional WDM assistance and efforts to maintain public support and acceptance of wolves (WDNR 1999, Treves et al. 2002). Not all complaints investigated by WS are verified as being caused by wolves. For example, in Fiscal Year 2005, (October 1, 2004 to September 30, 2005) Wisconsin WS conducted 142 site investigations in response to wolf complaints, but only 44% of these complaints were actually confirmed as being attributable to wolves (WS, FY 2005 Monitoring Report). In some instances, there was insufficient evidence or the evidence was not of sufficient quality to confirm the source of the problem. In other instances, the problem was determined to have been caused by another species (e.g., coyotes or feral dogs).

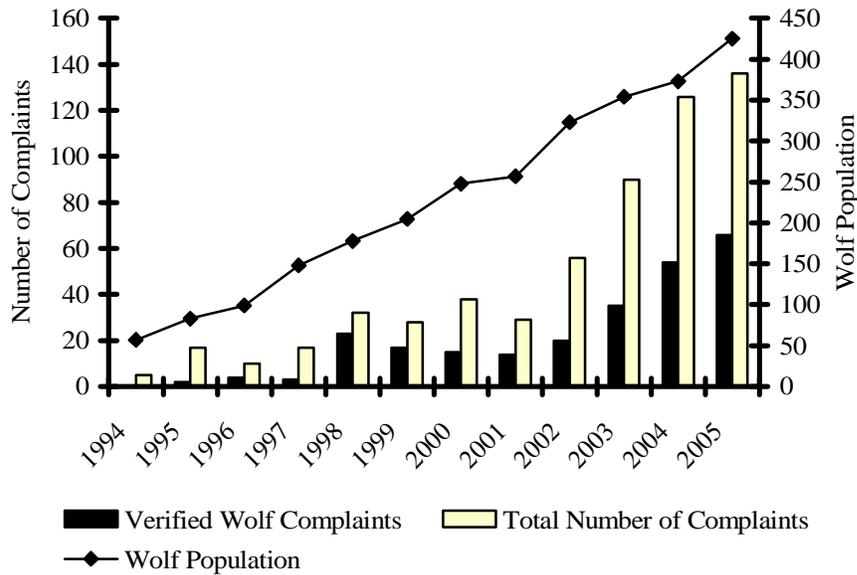


Figure 1-4. Annual wolf depredation complaints and annual minimum wolf population estimates in Wisconsin.

Domestic dogs and cats are occasionally killed and eaten by wolves (Fritts and Paul 1989, Treves et al. 2002, Wydeven and Wiedenhoeft 2005). In Wisconsin, hunting dogs used to pursue bear, coyotes, and bobcats are occasionally killed by wolves during hunting seasons (Treves et al. 2002). From 2000-2005 WS and WDNR verified that wolves killed an annual average of 9 dogs per year (range 3-14 dogs/year; WDNR, Bureau of Endangered Resources, unpublished data 2005). There are probably other instances where wolves attacked dogs, but the incidents were not reported or the dogs just “went missing”. Wolves may carry off the carcass of a small dog or drag a dog’s carcass out of the yard and into the woods. Such attacks raise public concerns about both pet and human safety.

The WDNR provides compensation payments for all verified wolf depredations of livestock and dogs including bills for veterinary services for injured animals. Wolf damage compensation payments made by WDNR from 1985 to 2005 have ranged from \$0 in 1986 and 1988 to a maximum of \$109,941 in 2004 (Table 1-2). The average annual compensation payment for the period of 2000 to 2005 was \$55,914. Although the proportion of all farms in Wisconsin that have had verified wolf depredation is very low, the cost of wolf depredation is not spread out across all farms. The impacts on individual producers can be substantial. Most depredation events in

Wisconsin involve one or two animals, but the total number of animals WS has confirmed lost to wolf predation by an individual producer in one year has been as high as 26 animals (WS, Unpublished data).

Table 1-1. Wolf depredation on domestic animals in Wisconsin (verified losses only).

Wolf Depredation	Year													
	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05
Farms Affected	2	3	0	4	1	2	8	6	8	5	10	14	22	25
Wolf Population	45	40	57	83	99	148	178	205	248	257	323	335	373	425
Horses killed											3	-	-	2
Horses injured											-	-	-	1
Sheep killed	8	-	-	-	-	-	-	-	-	-	7	24	5	3
Sheep injured	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cattle killed	1	-	-	11	1	10	20	7	6	11	37	20	27	31
Cattle Injured	-	1	-	-	-	-	-	-	1	1	-	-	-	4
Farm Deer	-	-	-	-	-	-	4	19	3	-	5	1	6	-
Poultry Losses	-	27	-	-	-	-	-	44	4	74	-	-	-	-
Dogs killed	2	-	2	-	5	5	11	2	5	17	10	6	15	17
Dogs injured	-	-	-	-	2	1	5	2	-	1	4	4	3	6
Total Losses*	11	28	2	11	8	16	40	74	19	104	66	55	56	64

* Losses include killed & injured. Wildlife-caused losses or damages confirmed by WS. These figures usually represent a fraction of the total losses (Connolly 1992).

Table 1-2. Wisconsin annual wolf damage payment summary. Prior to 2005, payment procedures including negotiations with landowners on the value of animals killed and injured by wolves which lead to delays in making payments, so the compensation payments listed below may include some payments for previous year's losses and will not necessarily be directly correlated to numbers in Table 1-1.

Resources (\$)	2000	2001	2002	2003	2004	2005	Totals
Sheep	0	0	2,453	1,425	2,025	750	6,653
Cattle/calves	3,505	15,003	7,125	8,400	64,239	21,409	119,681
Cattle/adult	0	0	3,500	2,400	7,250	9,175	22,325
Turkeys	0	120	0	0	0	0	120
Pets	2,100	28,150	25,000	12,550	26,400	34,319	128,519
Commercial Game Animals	13,000	0	8,100	1,200	5,300	0	27,600
Chickens	25	3,731	0	0	0	0	3,756
Equine	0	0	10,000	2,250	0	4,750	17,000
Veterinary Services	0	449	819	1,882	4,727	1,952	9,829
Totals	18,630	47,453	56,997	30,107	109,941	72,355	335,483

1.3.8 Other Types of Wolf Conflicts

There have been few reported wolf attacks on people. However, there are reports where wolves have been viewed as threatening to human health and safety or have stalked and attacked people for unknown reasons (e.g., reasons unrelated to disease or injury; Linnel et al. 2002, McNay 2002). When wolves approach human residences and threaten or kill people's pets or exhibit bold behavior, people often become concerned for human safety. This is especially true if small children are present at those residences.

Linnel et al. (2002) reported several cases from around the world in which non-diseased wolves attacked people, but no humans were killed during the attacks; the wolves, in most cases, were later killed and examined. The wolves involved in those attacks seemed to have acclimated to the presence of people and became more aggressive (bold) toward people. Fortunately, in many of these incidents, others accompanied the person attacked and they were able to drive the wolf away. In many cases the person attacked received minor injuries and made a full recovery in a few days to weeks. There are no verified instances of wolves having attacked and injured people in the lower 48 United States. However, in January of 2005, an individual was attacked by a wolf while jogging near the community of Key Lake in northern Saskatchewan, Canada. The man was able to fight off the animal and later was flown to a hospital for stitches to non-life threatening injuries. An attack by wolves appears to have been the cause of death for a man near Wollaston Lake in Northern Saskatchewan, on November 8, 2005. A group of four wolves had been seen in the area for some time and appeared to be losing their fear of humans. There was also evidence that the victim and friends had been recently interacting with the wolves at close range (International Wolf Center 2005). The investigation has not been completed, but the injuries discovered in the autopsy are consistent with animal bites and wolf tracks were found near the body. The wolves involved in the attack may have become accustomed to humans and/or may have been deliberately or inadvertently (via improperly stored garbage) fed by humans. This is believed to be the first documented human mortality from wolves in North America. Wisconsin has not had any verified cases where wolves have stalked or attacked people.

McNay (2002) reviewed human-wolf interactions and analyzed case histories of incidents where wolves had behaved aggressively towards humans in Alaska and Canada. McNay notes that incidents of wolves behaving aggressively towards humans are extremely rare. For much of the 20th century there were no documented cases of wolves killing or seriously injuring a person in North America. McNay (2002) does provide case histories for 11 instances of what he considered unprovoked incidences of aggressive behavior of wolves which resulted in no injury (4) or minor injuries (7) over the period of 1969-1993. As wolf and human populations have increased, the opportunity for interaction between the species has also increased. Although wolves have a high aesthetic and cultural value and calling and viewing wolves is extremely popular, not all of these interactions have been positive. McNay provided evidence of 7 cases of unprovoked wolf aggression over the period of 1994-2000, 5 of which involved wolves inflicting severe bites on humans.

Wolf familiarity with (habituation to) humans appears to be an important factor in aggressive behavior of wolves toward humans. Of the 18 unprovoked incidents of aggressive behavior reported by McNay for the period of 1969-2000, 11 were associated with what he defined as habituated wolves, (e.g. wolves which had lost their fear response to humans after repeated non-consequential encounters). Bites were inflicted in all 11 cases where habituated wolves displayed unprovoked aggressive behavior, but bites were inflicted in only 2 of the 7 cases where naïve wolves displayed aggressive behavior. All instances where wolves inflicted severe bites were

associated with habituated wolves. Human behavior may have had an impact on the outcome of interactions between wolves and humans. In most instances where naïve wolves behaved aggressively toward humans, the humans defended themselves by hitting the wolf with a heavy object, firing a rifle into the air or, in two instances, killing the wolf. None of the individuals who were bit by habituated wolves defended themselves with anything other than their voices, hands or arms. It was difficult to determine if food conditioning (wolves learning to associate humans with the availability of food) played a role in all cases. However, 6 of the 11 aggressive habituated wolves were known to be food conditioned. It was unlikely that the naïve wolves were food conditioned because all of those incidents occurred at sites well away from human use areas. The data provided by McNay (2002) indicates the importance of human behavior management and public education programs in the prevention of adverse human-wolf encounters. These efforts coupled with non-lethal techniques designed to reduce or prevent wolf habituation to humans will likely prevent or resolve most situations where wolf behavior causes concern for human safety. However, there will be rare instances where removal of the problem wolf may be necessary.

In Wisconsin, instances of perceived risks to human health and safety from wolves are very rare and tend to occur in areas of fragmented habitat where wolves routinely have exposure to humans. There has been at least one situation where a wolf was acting aggressively towards automobiles that slowed or stopped in a certain area along a major northern highway. Acting on a request from WDNR, WS attempted to trap the animal but was unsuccessful. The wolf eventually left the area. With a growing wolf population and many people living in occupied wolf range, opportunities for wolves to become habituated to humans and risks of adverse interactions between humans increase.

Wild wolves rarely contract rabies, but it is possible, and there is a serious concern for humans or their pets should they be bitten. McNay (2002) reported 2 people that died as result of bites from wolves with rabies in Alaska in the 1940s, but rabies is rare in wolves south of the arctic in North America. Wolves could possibly spread other wildlife diseases to dogs (e.g., sarcoptic mange) should they have contact with a dog or their environment and *vice versa*. For example, in Wisconsin, wolf deaths attributed to infectious disease have been primarily attributable to mange (Thomas et al. 2005, Wydeven and Wiedenhoef 2005)

1.3.9 Wildlife Services and Wisconsin Department of Natural Resources Efforts to Reduce Wolf Damage in Wisconsin

Wildlife Services' and WDNR efforts to alleviate wolf problems have been based on a combination of technical assistance and operational damage management in an Integrated Wildlife Damage Management (IWDM) program. As the number of wolf conflicts in Wisconsin has increased, so has the need to implement operational damage management projects (Figure 1-4). However, the IWDM approach does appear to be effective in reducing damage by wolves. Although the number of properties with verified wolf depredation complaints has increased, the number of verified losses to wolf predation did not increase over the period of 2003-2005 when IWDM assistance was available to livestock producers (Table 1-1).

In 1976, the WDNR completed a cooperative conservation agreement with the USFWS. This cooperative conservation agreement allows qualified and authorized WDNR personnel and their agents to conduct some types of non-lethal WDM activities (e.g. harassment), research, and trap and relocate activities without needing a permit or special 4(d) rule from the USFWS (50 CFR 17.21 (a)(5), also see Section 1.7.7 of this EA).

Since 1988, WS has cooperated with the WDNR concerning several aspects of wildlife damage management. In 1990, a cooperative agreement was developed which included a provision for reducing damage caused by endangered species, including wolves. Under terms of the current cooperative agreement, WS “*will provide personnel and equipment for depredation control and damage loss appraisal activities for damage by Endangered and Threatened species.*” WS conducts field investigations of potential wolf depredations within 48 hours of receipt of a complaint. In accordance with the WWMP (1999), WS categorizes each complaint into one of four categories: 1) confirmed depredation, 2) probable depredation, 3) confirmed non-wolf depredation, and 4) unconfirmed depredation. WS provides technical assistance to producers as appropriate, and may also provide operational assistance with non-lethal WDM methods. Prior to 2003, while wolves were still classified as endangered, problematic wolves were trapped and relocated by WDNR and WS personnel. When wolves were reclassified as threatened (April 1, 2003 to January 30, 2005), the USFWS established a 4(d) rule under the ESA which allowed WDNR and their authorized agent (WS) to lethally remove wolves for damage management. As discussed in Section 1.3.2, a decision by the United States District court in Oregon returned Wisconsin wolves to their previous status as “endangered” on January 31, 2005. After learning of the court ruling, WDNR ceased all lethal WDM activities including actions by their authorized agent, WS. On April 1, 2005 the WDNR obtained a USFWS Section 10(a)(1)(A) permit which allowed WDNR and WS (as WDNR’s authorized agent) to resume most of the wolf depredation control activities allowed under the previous 4(d) rule. All WDM activities allowed under the permit were enjoined by the U.S. District Court in the District of Columbia on September 13, 2005. At present WDNR and WS assistance with wolf depredations on livestock is limited to documenting the event and providing technical assistance on non-lethal methods for resolving wolf damage including husbandry techniques (e.g., fencing, bringing animals in at night, guard dogs) and other non-lethal methods permitted under the cooperative conservation agreement between the USFWS and WDNR (Section 1.7.7).

WS also assists the WDNR with wolf population monitoring efforts. For example, in FY 2005, WS captured, radio-collared, and released at site 5 wolves to augment the WDNR’s wolf population monitoring program.

1.3.10 Wolf Damage Management as a Component of Wolf Recovery Programs

There has been some question as to whether removal of individual problem wolves (e.g., those involved with confirmed cases of livestock depredation) can prevent or minimize the development of negative public attitudes, or even foster greater tolerance, toward wolves and therefore enhance the survival and recovery of the species.

Although the liberal killing of wolves by humans caused wolves to initially become endangered in the U.S. south of Canada, and across much of Europe (Mech 1970, Lopez 1978, Thiel 1993), highly selective lethal removal of individual wolves by governmental agencies are considered by many professional biologists to be an important part of recovery and conservation programs for wolves (Sillero-Zubiri and Laurenson 2001, Boitani 2003, Breck and Meier 2003). For example, Dr. David Mech, the leading wolf biologist in the U.S., has written that “lethal control will remain the ultimate means of curbing wolf damage to livestock and pets (Mech 1995)”. He further states that, “Direct lethal control is still usually the only practical course under most conditions”. Mech (1995) argued that a more flexible system of lethal controls could actually allow wolves to occur over much larger portions of North America, if problem animals can readily be controlled. The Wildlife Society, an international organization of professional wildlife biologists, especially focused on North America, stated in their technical review on the restoration of wolves in Western North America that “Control of wolves preying on livestock and

pets is imperative and should be prompt and efficient if illegal killing is to be prevented and human tolerance of the presence of wolves is to be maintained (Peek et al. 1991).” Musani et al (2004) noted that in Western North America, the rate of expansion of depredation has been less than the rate of wolf population growth, and attributed this trend to elimination of individuals and packs from the population that had learned to kill livestock.

Considerable information from prominent social theory and research shows that tolerance toward a wildlife species is influenced by the value of losses attributable to that species, the benefits attributable to the species by the affected individual, and by the perception of the risk of losses as controlled or voluntary (Slovic 1987). Risks considered involuntary by an individual are less likely to be viewed as acceptable whereas risks that can be controlled are generally considered to be more acceptable. Risk theory and associated research (e.g., Slovic 1987) suggest that a government which simultaneously imposes the risk of wolf depredation (i.e., supports wolf recovery) and prohibits individuals from effectively reducing those risks (i.e., no chance for removal of problem wolves) is creating an intolerance of the wolf presence. In effect, this situation lowers the social carrying capacity for wolves and could threaten the well being of the population, both presently and in the future if the situation persists. Livestock producers have the capability to resolve their own depredation problems, either legally or illegally, with or without assistance from the government (Dorrance 1983). **If no government-sanctioned relief from the loss of livestock is in sight, intolerant stakeholders will likely adopt anti-wolf behaviors including illegal killing (Fuller et al. 2003). In this scenario, social carrying capacity effectively will be lowered because stakeholders erroneously turn their attention to the wolf population at large as the primary cause of wolf problems.**

Although it is the nature and frequency of positive and negative interactions with wolves that is most influential in determining the social carrying capacity for wolves in Wisconsin, the public often focuses on the number of wolves when positive interactions (e.g., sightings by wolf enthusiasts) are too low or negative interactions (e.g., livestock depredations) are too high. Negative interactions associated with livestock depredation do not necessarily increase proportionately with wolf abundance per se; rather, they are localized events. An appropriate management response to depredation is to address the negative interactions and target problem wolves in a local area rather than implement broad population-level controls focusing on reducing overall numbers of wolves. Removing problem wolves can reduce the negative interactions that create intolerance for wolves among livestock producers.

Research indicates that public support for the presence of large carnivores largely depends on confidence that problems caused by individual animals will be resolved effectively. A public attitude survey of residents in Ninemile Valley, Montana found that 65 percent of wolf supporters might change their support for the presence of the population if wolves that kill livestock were not controlled quickly or effectively (Wolstenholme 1996). In a study that examined which factors would encourage residents of the Flathead Indian Reservation to support protection of grizzly bear habitat on private lands, Frost (1985) found that rapid assistance to bear-related problems was the most important factor, with 76 percent of respondents desiring that assurance. By contrast, only 42 percent of respondents felt that compensation for livestock losses was a valid incentive for supporting protection.

Studies have also shown that local acceptance of wolves is improved if government lethal controls are allowed on problem wolves. In a 1995 survey of American households, 60% of respondents supported removing of predators that preyed on livestock (Reiter et al. 1999). Prior to the 1995 reintroduction of wolves into Wyoming, a larger proportion of residents surveyed supported wolf recovery than opposed it (44 vs. 34.5%), but the majority of respondents

supported killing of wolves (58.5%) that killed livestock (Thompson and Gasson 1991). Similarly, Wisconsin surveys indicate that residents, especially rural people in wolf range accept and expect control of wolves that kill livestock or pets on private land. In a 2001 survey of bear hunters, farmers, and residents in wolf range, 52.5 % expressed support for destroying wolves that had killed livestock or family pets (Naughton-Treves et al. 2003). Support for killing problem wolves was highest for bear hunters (77%), lowest for general residents (32%), and intermediate for farmers (45%) (Naughton-Treves et al. 2003).

In a more recent opinion survey, a stratified random sample of zip codes was used to survey urban areas outside wolf range, rural areas outside of wolf range, urban areas in wolf range, and rural areas in wolf range (Naughton et al. 2005). Respondents were also compared by contributors to endangered resources programs versus non-contributors, as well as livestock producers and non-producers. Non-contributors supported translocation of wolves slightly above lethal control on problem wolves (35% vs. 45%), but among endangered resources contributors there was a much lower preference for lethal control (14%), compared to translocations (53%). However, the survey asked persons if they preferred translocation of problem wolves to wilderness areas, compared to lethal control or other actions, but it was not clear if respondents were aware of feasibility and problems with translocations. When asked about reliability of killing only the problem wolves, only 5% of endangered resource contributors and 11 % of non-contributors said they opposed all lethal controls. Among livestock producers nearly 1/2 preferred lethal control (46%). If lethal control of wolves was to be done, about 70% respondents preferred government agents conducting the controls (Naughton et al. 2005).

A survey of random Wisconsin residents was conducted in 2003 of general attitudes toward wolves (Schanning et al. 2003). A total of 66.4 % of respondents to this survey supported DNR shooting problem wolves, and 54.4% supported translocation of problem wolves. For problem wolves killing livestock, 43.7% of respondents agreed these wolves should be killed, and 19.9% were neutral on DNR killing of such wolves, but 63.2% of respondents agreed that farmers should have the right to kill wolves that kill or injure livestock. It does appear that with adequate justification, the majority of respondents support or do not oppose the killing of problem wolves.

In Minnesota, 80% of residents had positive attitudes toward wolves, including 60% of the farmers, but farmers (83%), and northern Minnesota residents (71%) expected wolves that killed livestock to be eliminated (Kellert 1999). Thus it appears that even where there is strong support for wolf conservation, most people in wolf range expect problem wolves to be removed.

As an example of the attitudes that may be addressed by an effective, professional WDM program; the agencies are aware of a web site already in existence that provides instructions for the broadcast poisoning of wolves. The following quotes are from the prelude to the instructions for poisoning wolves. The sentiments expressed in the article are neither unique nor are they exclusive to the western U.S.

“Poison causes an agonizing, violent death. I think every animal on earth deserves better, but under the circumstances, in the U. S., if these federally dumped and federally protected wolves populate further out of control, we will lose our hunting heritage, hunting/outfitting revenues, gun ownership, ranching industry and many other blessings we derive from proper management of our resources....Poisoning wolves is illegal in the U. S. and Canada. I am only passing on information that was sent to me. People will have to decide for themselves just how much they will

allow an out of control federal agency (USFWS) to destroy their rights, hobbies, businesses and misuse the supposed “public trust”...

... Wolves will continue to breed and expand while the bureaucrats argue about wolves, so if “we the people” do nothing, the wolves will destroy our game herds and businesses all on their own. Throughout the history of this country, civil disobedience has set the government straight when they were out of control--prohibition comes to mind. It is our choice, although our only viable timely options to control wolf numbers are currently illegal.....Each rocky mountain state has only a few federal (USFWS) law enforcement personnel...If a sufficient number of wolf killings took place, they would be over loaded in very short order.”

1.4 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

1.4.1 Actions Analyzed

The scope of this EA is to evaluate the potential impacts of alternatives for the USFWS, WS and WDNR involvement in WDM in Wisconsin while wolves are federally protected under the ESA. Ordinarily, the actions of state agencies are not subject to the requirements of the National Environmental Policy Act. However, while wolves are federally protected under the ESA, actions taken by the WDNR will depend upon the management decisions (permits, 4(d) rules) of the USFWS which are subject to the requirements of NEPA.

Activities could include wolf damage management initiated to protect agricultural resources, pets, and human safety in Wisconsin; and wolf research and population monitoring. Prompt, professional response to wolf conflicts would help maintain and enhance local tolerance of wolves. While wolves are Federally listed as an endangered species, the USFWS retains primary management authority for wolves, and may issue special permits for wolf take under Section 10(a)(1)(A). When and if wolves are reclassified as threatened species, the USFWS would retain ultimate management authority for wolves, but could designate additional management authority to state and tribal natural resource agencies via section 4(d) rules under the ESA. Any direct action taken by Wisconsin WS to address wolf conflicts would be conducted at the request of the USFWS or as the designated agent of WDNR or a specific tribe.

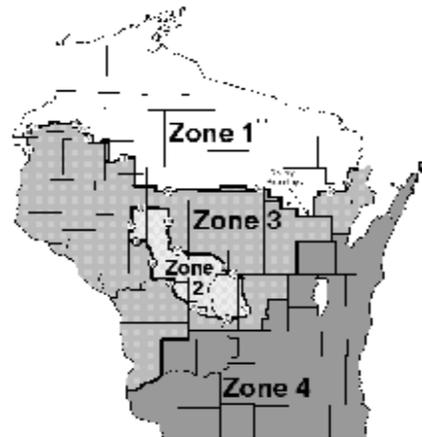


Figure 1-5. Wolf Management Zones

Four Wolf Management Zones have been established to help guide management of wolves in Wisconsin (Figure 1-5, WWMP 1999). Wolf Management Zone 1 contains the best wolf habitat in Wisconsin and encompasses about 11,765,760 acres, Zone 2 contains suitable wolf habitat and encompasses about 2,893,440 acres, Zone 3 is a buffer zone and encompasses about 11,520,000 acres and Zone 4 has almost no opportunity for wolves to colonize and encompasses about 10,240,000 acres. The establishment of management zones is frequently recommended as part of

wolf recovery plans, wolf conservation and management plans (Mech 1995) and the establishment of protective areas helps assure long-term survival of small, disjunctive wolf populations (Haight et al. 1998). The purpose of management zones is to allow for differences in management depending on potential wolf habitat and the possibilities of conflict between wolves and humans. Fritts (1993) listed three assumptions inherent in zone management for wolves: 1) wolves belong in some areas and not others because of potential conflicts with humans, 2) adequate habitat to support a viable population should exist in the zones where the species is afforded the most protection, and 3) the species should receive high priority in the areas of most suitable habitat. Damage problems involving wolves can occur statewide resulting in requests for assistance to the WDNR or WS, but would more likely be from Management Zones 1, 2 and the northern edge of zone 3 (Figure 1-6). Table 1-3 provides data on counties where WS responded to wolf damage complaints in FY 2005.

Table 1-3. Wolf Complaints received by WS in FY 05

COUNTY	COMPLAINTS NOT VERIFIED	COMPLAINTS VERIFIED	TOTAL COMPLAINTS
Adams	1	0	1
Ashland	1	5	6
Barron	5	1	6
Bayfield	6	8	14
Burnett	5	3	8
Chippewa	3	1	4
Clark	2	0	2
Douglas	4	12	16
Forest	0	1	1
Iron	2	0	2
Jackson	2	0	2
Juneau	1	0	1
Lafayette	1	0	1
Langlade	1	0	1
Lincoln	5	4	9
Marathon	1	0	1
Marinette	3	0	3
Marquette	1	2	3
Monroe	2	0	2
Oconto	2	0	2
Oneida	2	3	5
Polk	2	1	3
Portage	2	0	2
Price	5	10	15
Rusk	5	4	9
Sauk	2	0	2
Sawyer	3	6	9
St. Croix	1	0	1
Taylor	3	5	8
Vilas	1	0	1
Washburn	5	0	5
Waupaca	1	0	1
Waushara	1	0	1
TOTAL	81	66	147

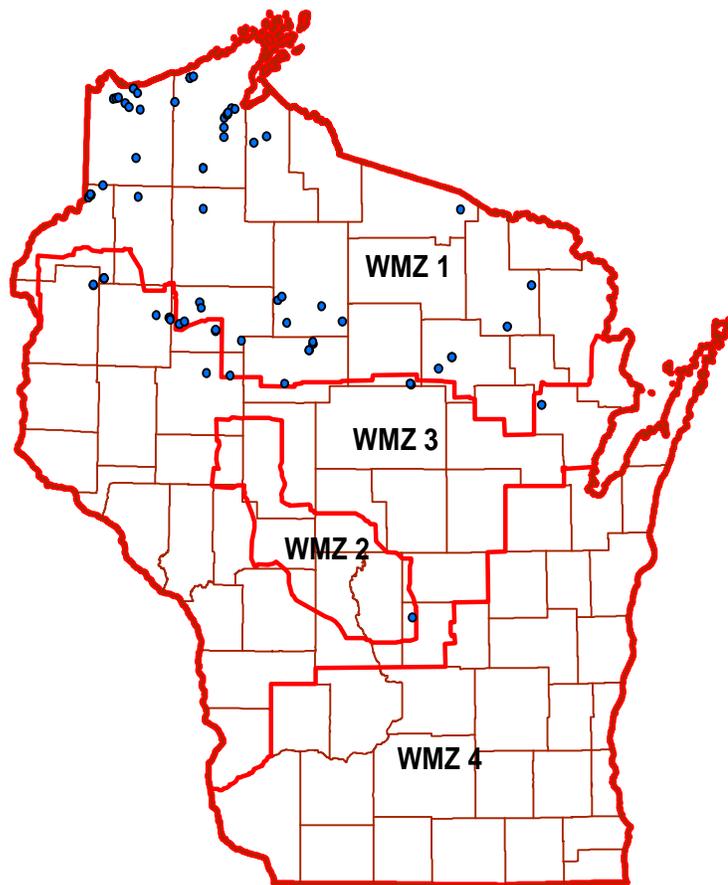


Figure 1-6. Farms with Wolf/Livestock Depredations in Wisconsin, 2001-2005. A total of 54 properties had verified wolf predation on livestock during this period.

Under the Proposed Action, wolf management could be conducted on private, Federal, State, tribal³, county, and municipal lands in Wisconsin with the permission of the appropriate land owner/manager. Most wolf damage management activities would be conducted on private land. Wolf damage management activities are only likely to be conducted on public land if that land is within the damage management perimeter (set by USFWS permits and the WWMP) around the site of a verified depredation event on private land, in the unlikely instance that a wolf preys on livestock legally present on public lands⁴, or in the rare instance that a wolf is exhibiting behavior that poses a threat to human safety. For example, of the 26 properties where WS conducted damage management actions (23 for the protection of livestock, 2 for the protection of pets, 1 for human safety) in FY 2005, in only 3 instances (protection of livestock) was damage management conducted on adjacent public land. It is more likely that wolf trapping and radio-collaring for wolf population monitoring and research could be conducted on public land (state, county and national forest lands). The public lands where wolf trapping for the purpose of radio-collaring

³ WS wolf damage management would only be conducted on tribal lands with the Tribes request/consent and only after appropriate documents had been signed by WS and the respective Tribe.

⁴ WS is aware of a limited number of instances where livestock is or has been allowed to graze on State and county land.

and population monitoring has been conducted include Great Divide Ranger District of the Chequamegon–Nicolet National Forest, as well as County and WDNR land in Bayfield, Douglas, Marinette and Oneida Counties.

The USFWS, WS and WDNR anticipate increases in WDM activities as wolf populations grow and disperse into more agricultural and suburban/urban areas. This EA takes the potential increase in future requests for assistance into account by considering potential needs for WDM and the number of wolves likely to be removed as a function of population size (Chapter 4). Through USFWS, WS, and WDNR wolf monitoring and surveillance, any increase in wolf populations and damage management activities would be accounted for and any adaptive management adjustments would be considered to ensure wolf conservation.

1.4.2 Native American Lands and Tribes

Tribal wolf management decisions are outside the scope of this analysis and decisions made in this EA do not alter the tribes' authority or rights relating to wolf management. However, this analysis does include the types of assistance WS may offer the tribes, if requested. Wildlife Services would only conduct WDM activities on reservation lands at the request of the Tribe and only after appropriate authorizing documents (including MOUs) were signed. Currently, Wisconsin WS does not have any MOUs for wolf damage management with any Native American Tribes. If WS enters into an agreement with a Tribe for WDM, this EA would be reviewed and supplemented, if appropriate, to ensure compliance with NEPA. MOUs, agreements, and NEPA compliance would be conducted as appropriate before conducting WDM on reservation lands.

Wolves have an important role in tribal culture and religious beliefs (Section 1.3.5). The Ho-Chunk Nation and Lac Du Flambeau Tribe of Lake Superior Chippewa have expressed concerns regarding the use of lethal WDM techniques and the impact of lethal WDM on the wolf population in Wisconsin's central forest area. The USFWS, WDNR and WS are working with these tribes to address their concerns. Wolf Damage Management actions will be conducted in accordance with agreements and MOUs among WDNR, USFWS and the tribes.

1.4.3 Period for which this EA is Valid

If it is determined that an EIS is not needed, this EA would remain valid until the USFWS, WDNR, WS and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed or until wolves are no longer protected by the ESA. At that time, this analysis and document would be amended pursuant to NEPA. Monitoring and review of this EA will be conducted each year to ensure that the impacts of the program are within parameters analyzed in the EA.

It is anticipated that the Federal status of wolves in Wisconsin (currently federally listed as endangered) may change. As authority for wolf management is returned to the state and tribes, the importance of the WWMP increases. Wildlife Services is cooperatively working with the WDNR and will comply with the policies and guidelines set forth in the WWMP (WDNR 1999) whereby pertinent portions are incorporated in this EA by reference. The WDNR is currently reviewing the WWMP. If the WWMP is revised, WS will evaluate this EA to determine if WS' compliance with the revised WWMP would result in needs for action and/or impacts greater than those analyzed. Some examples of actions that might be taken when the revised WWMP is implemented that could trigger revision of this analysis include: (1) WS is requested to take a higher proportion of the wolf population than is proposed in this EA or cumulative impacts on the

wolf population in WI (mortality from all known causes) exceeds that analyzed in this EA; (2) the plan results in a request for WS to conduct WDM to protect resources not analyzed in this EA; (3) the plan results in requests for WS to change or add methods of conducting WDM that would result in greater impacts on the affected environment than those analyzed in this EA; or (4) mortality from all known causes results in a precipitous decline in statewide wolf populations. If this is the case, then WS and the USFWS will revise this EA in accordance with the NEPA.

1.4.4 Site Specificity

This EA analyzes the potential impacts of wolf damage management on all public and private lands in Wisconsin under MOU, Cooperative Agreement, and in cooperation with the appropriate public land management agencies. Information on the counties where WS has responded to WDM complaints and a description of the role of the Wisconsin wolf management zones is provided in Section 1.4.1.

Planning for the management of wolf damage is conceptually similar to federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, insurance companies, etc. Although some of the sites where wolf damage will occur can be predicted (Treves et al. 2004), all specific locations or times where such damage will occur in any given year cannot be predicted (Ruid et al. 2005). This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever wolf conflicts and resulting management occurs, and are treated as such. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS in Wisconsin (see Chapter 3 for a description of the Decision Model and its application). The analyses in this EA are intended to apply to any action that may occur *in any locale* and at *any time* within the State of Wisconsin. In this way, WS and the USFWS believe they meet the intent of NEPA with regard to site-specific analysis and that this is the only practical way for WS and the USFWS to comply with NEPA and still be able to meet needs for assistance with WDM in a timely fashion.

The EA also addresses the impacts of WDM on areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional wildlife damage management efforts could occur. Thus, the EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program. This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever wolf damage and resulting management occurs, and are treated as such. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS in Wisconsin (see Chapter 3 for a description of the Decision Model and its application).

1.4.5 Public Involvement/Notification

As part of the public involvement process, and as required by the Council on Environmental Quality (CEQ), APHIS-NEPA, and DOI implementing regulations, this document and the subsequent Decision will be made available to the public through "Notices of Availability" (NOA) published in local media, direct mailings of NOA to parties that have specifically requested to be notified, and through agency news releases and web sites. New issues or alternatives raised after publication of public notices will be fully considered to determine

whether the EA should be revisited and, if appropriate, revised. Public notification regarding the availability of the final EA and Decision will be identical to that used for the draft EA.

1.5 DECISION TO BE MADE

WS and the USFWS are lead agencies in the preparation of this EA. This proposal would require the participation of other agencies that have management authority and expertise related to this project (consulting agencies). The WDNR provides for the control, management, restoration, conservation and regulation of birds, fish, game, forestry and all wildlife resources of the state. The WDNR is a cooperating agency in the preparation of this EA. The Tribes exercise similar authority on tribal lands, in addition to having retained the right to hunt, fish, and gather on lands and waters within the ceded territories. Wolves also have special cultural significance for Native American Tribes and the Wisconsin Ho Chunk Nation and the Lac Du Flambeau Band of Lake Superior Chippewa accepted WS' and the USFWS' invitation to be a cooperating agency in the production of this EA. The Lac Du Flambeau Band of Lake Superior Chippewa status as a consulting agency was a more appropriate description of their involvement in this EA. The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) manages/represents tribal interests in wildlife management on lands in the ceded territories. GLIFWC also agreed to be a consulting agency in the preparation of the draft EA. The lead, cooperating and consulting agencies will work together to address the following questions in the EA.

- How can WS and the USFWS best respond to the need to reduce conflicts with wolves and assist with wolf management in Wisconsin?
- What are the environmental impacts of alternatives for reducing damage by and conflicts with wolves and assisting with wolf management in Wisconsin?
- Would the proposed action have significant impacts on the quality of the human environment requiring preparation of an EIS?

Although the lead, cooperating and consulting agencies have worked together to produce a joint document and intend to collaborate on WDM in Wisconsin, each agency will be making its own decision on the alternative to be selected in accordance with the standard practices and legal requirements pertaining to each agency's decision making process.

1.6 OBJECTIVES FOR THE WISCONSIN WDM PROGRAM

- Respond to 100% of requests for wolf damage management assistance within 48 hours (investigate complaints within 48 hours).
- No significant adverse effects on the statewide wolf population or non-target species populations.
- Contribute to understanding, ecology, biology and health of the Wisconsin wolf population.

All WDM would be conducted in compliance with appropriate federal, state, and local laws and court-mandated restrictions.

1.7 RELATIONSHIP OF THIS EA TO OTHER ENVIRONMENTAL DOCUMENTS

1.7.1 ADC Programmatic EIS. Wildlife Services has issued a final EIS (USDA 1997 Revised) and Record of Decision on the National APHIS-WS program. This EA is tiered to the ADC Programmatic EIS.

1.7.2 USDA-APHIS-WS Environmental Assessment: Management of Wolf Conflicts and Depredating Wolves in Wisconsin. Wildlife Services completed an EA to evaluate a program to reduce gray wolf (*Canis lupus*) damage in Wisconsin and a Decision and Finding of No Significant Impact (FONSI) was signed on October 31, 2004⁵ (USDA 2004). WS evaluated the need for wolf damage management in Wisconsin and the relative effectiveness of different alternatives to meet that need while accounting for the potential environmental effects (*i.e., issues analyzed in detail*) of each alternative. The alternative selected by WS was an Adaptive Integrated Wolf Damage Management (AIWDM) approach, a strategy that uses a variety of methods either concurrently or sequentially, to reduce damage caused by wolves impacting livestock, pets, human health and safety, and other resources. The 2004 WS EA will be replaced by the current analysis.

1.7.3 USDA-APHIS-Wisconsin WS/USFWS Biological Opinion. A formal consultation occurred between the USFWS and WS on May 9, 2001 and August 12, 2003. The USFWS determined that WS current and proposed wolf damage management program would have no effect or not likely to adversely affect listed species (not including wolves) in Wisconsin. The USFWS also concluded that the proposed action would not jeopardize the Wisconsin wolf population (J. Smith, USFWS letter to D. Nelson, WS, August 12, 2003; L. Lewis, USFWS letter to G. Larson, WS, May 9, 2001).

1.7.4 USDA-APHIS-Wisconsin WS/WDNR Environmental Review. A consultation occurred between the WDNR and WS on March 23, 2002. The WDNR determined that WS current and proposed wolf damage management program would not adversely affect listed species in Wisconsin (S. Holtz, WDRN letter to D. Nelson, WS, March 23, 2002).

1.7.5 USFWS Eastern Timber Wolf Recovery Plan. This plan (USFWS 1992) outlines management strategies and population goals for recovery of wolf populations and provides recommendations for wolf depredation control. Pertinent information from this recovery plan is incorporated into this EA by reference.

1.7.6 Wisconsin Gray Wolf Management Plan (WWMP) . The Wisconsin DNR initially listed wolves on the state list of endangered species in 1975. A State recovery plan, initiated in 1989 and signed in 1999, set a goal for reclassifying the wolf from State endangered to threatened once the population remained at 80 or more wolves for 3 consecutive years (WDNR 1989). The Wisconsin wolf population has been at 80 or more since 1995 and downlisted to state threatened species in 1999. The WWMP (WDNR 1999), developed by the Wisconsin Wolf Advisory Committee of the WDNR and ratified by the Wisconsin Natural Resources Board on October 27, 1999, outlines management of wolves in Wisconsin for the next 10-15 years. These guidelines provide a conservation strategy for maintaining a healthy, viable gray wolf population in Wisconsin and contribute toward national recovery, while addressing problems that may occur with wolf depredation on livestock or pets. The WDNR removed wolves from the state

⁵ Copies of the EA and Decision/FONSI are available for review from the State Director, USDA/APHIS/WS, 750 Windsor Street, Room 101, Sun Prairie, WI 53590.

threatened species list in 2004 and listed them as protected wild animals (nongame species). WS is cooperatively working with the WDNR and will comply with the policies and guidelines set forth in the WWMP (1999) whereby pertinent portions are incorporated by reference.

1.7.7 Endangered Species Section 6 Cooperative Conservation Agreement Between the United States Fish and Wildlife Service and the Wisconsin Department of Natural Resources. Effective date: September 28, 1976. Section 6 of the Endangered Species Act allows the USFWS to establish cooperative agreements with the states for the management of federally listed species. Under such agreements, any qualified and authorized employee or similarly qualified and authorized agent of a State Conservation Agency with a cooperative conservation agreement with the USFWS may take an endangered species without a permit or 4(d) rule from the USFWS provided the taking is not reasonably expected to result in: 1) the death or permanent disabling of the specimen; 2) the removal of the specimen from the state where the taking occurred; 3) the introduction of the specimen to an area outside the historical range of the species; or 4) holding the species in captivity for a period of more than 45 days. (50 CFR 17.21 (a)(5)). Wolf management activities in Wisconsin that are not covered by 50 CFR 17.21 and would require a USFWS permit or 4(d) rule include aversive conditioning using modified dog-training collars, rubber bullets and other non-lethal projectiles, and lethal removal of depredating wolves.

1.8 AUTHORITY AND COMPLIANCE

1.8.1 Authority of Agencies involved in WDM in Wisconsin

Wildlife Services and the USFWS are the lead agencies in the preparation of this EA. Wolf damage management in Wisconsin requires the participation of other agencies that have management authority and expertise related to this project (consulting agencies). The WDNR, and the Wisconsin Ho Chunk are cooperating agencies in the preparation of this EA. GLIFWC and the Lac Du Flambeau Band of Lake Superior Chippewa are consulting agencies in the production of this EA.

1.8.1.1 Wildlife Services

The mission of the USDA/APHIS/WS program is to provide federal leadership in managing conflicts with wildlife. Wildlife Services' mission, developed through its strategic planning process (USDA 1999), is: 1) *“to provide leadership in wildlife damage management in the protection of America’s agricultural, industrial and natural resources, and 2) to safeguard public health and safety.”* Wildlife Services' Policy Manual⁶ reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training wildlife damage management professionals;
- Research, development and improvement of strategies to reduce losses and threats from wildlife;
- Collection, evaluation, and dissemination of management information;
- Informing and educating the public on how to reduce wildlife damage; and
- Providing a source for limited-use management materials and equipment, including pesticides.

⁶ WS' Policy Manual provides guidance for WS personnel to conduct wildlife damage management activities through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced as Literature Cited in Appendix A.

The primary statutory authorities for the WS program are the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). WS recognizes that wildlife is an important public resource greatly valued by the American people. By its very nature, however, wildlife is a highly dynamic and mobile resource that can cause damage to agriculture and property, pose risks to human health and safety, and affect industrial and natural resources. WS conducts programs of research, technical assistance and applied management to resolve problems that occur when human activity and wildlife conflict.

WS has limited Federal authority in controlling wolf damage in Wisconsin, and must acquire State issued permits in order to collect, trap, or otherwise take wildlife in the State of Wisconsin.

Normally, individual wildlife damage management actions could be categorically excluded from further National Environmental Policy Act (NEPA) analysis, in accordance with implementing procedures for NEPA for the Animal and Plant Health Inspection Service (APHIS) (7 CFR 372.5(c), 60 Fed. Reg. 6,000, 6,003, (1995)). However, preparation of EAs serves to: 1) facilitate planning, interagency coordination, and the streamlining of program management; 2) clearly communicate to the public the analysis of individual and cumulative impacts of program activities; and 3) evaluate and determine whether there are any potentially significant or cumulative adverse impacts from the proposed program.

1.8.1.2 U.S. Department of Interior, Fish and Wildlife Service (USFWS)

The Mission of the U.S. Fish & Wildlife Service is to work with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Under the authority of the ESA, the USFWS acts to prevent the extinction of plant and animal species. It does this by identifying species at risk of extinction, designating ("listing") these species as threatened or endangered, providing protection for these species and their habitats, developing and implementing recovery plans to improve their status, and ultimately "delisting" these species and returning full management authority to the states and tribes. While a species is listed, most management authority for the species rests with the USFWS. However, the USFWS continues to work with other Federal agencies, states, and tribes along with private landowners to protect and recover the species. The USFWS helps ensure protection of listed species through consultations (section 7 of the ESA) with other Federal agencies. Under section 10 of the ESA, the USFWS also issues permits which provide exceptions to the prohibitions established by other parts of the Act. These permits provide for conducting various activities including scientific research, enhancement of propagation or survival, and incidental take while minimizing potential harm to the species. For species federally classified as threatened, the USFWS may also issue 4(d) rules which may allow for greater management flexibility for the species. The USFWS also issues grants for protection and enhancement of habitat and for research intended to improve the status of a listed species. 16 United States Code (U.S.C.) 1531 *et seq.*, Endangered Species Act (ESA) of 1973, as amended; 16 U.S.C. 703-712,

1.8.1.3 Wisconsin Department of Natural Resources (WDNR)

The WDNR, under the direction of a Governor appointed Natural Resources Board, is specifically charged by the Legislature with the management of the State's wildlife resources. Although legal authorities of the Natural Resources Board and the WDNR are expressed throughout Wisconsin Administrative Code (WAC), the primary statutory authorities include establishment of a system to protect, develop and use the forest, fish and game, lakes, streams, plant life, flowers, and other outdoor resources of the state (s. 23.09 Wis. Stats.) and law enforcement authorities (s. 29.001 and s. 29.921 Wis. Stats.). The Natural Resources Board adopted mission statements to help clarify and interpret the role of WDNR in managing natural resources in Wisconsin. They are:

- To protect and enhance our natural resources: our air, land and water; our wildlife, fish and forests and the ecosystems that sustain all life.
- To provide a healthy sustainable environment and a full range of outdoor opportunities.
- To ensure the right of all people to use and enjoy these resources in their work and leisure.
- To work with people to understand each other's views and carry out the public will. And in this partnership consider the future and generations to follow.

After the status of wolves reverted to "endangered" in 2004 because of a court ruling, the WDNR's authority to respond to wolf-related damage and human safety concerns was provided by 50 CFR 17.21 as noted above and a permit issued under Section 10(a)(1)(A) of the Federal ESA. On September 13, 2005 the United States District Court in the District of Columbia enjoined the USFWS from allowing any activities authorized under permits issued to Michigan and Wisconsin, and the USFWS was further directed to "immediately halt any "takings" of gray wolves for depredation control purposes in Michigan and Wisconsin pursuant to these permits". At present WDNR authority for assistance with wolf depredations on livestock is limited to documenting the event and providing technical and operational assistance with non-lethal methods for resolving wolf damage including husbandry techniques (e.g., fencing, bringing animals in at night, guard dogs), and other non-lethal methods authorized under the cooperative conservation agreement between the USFWS and WDNR (Section 1.7.7).

1.8.1.4 Great Lakes Indian Fish and Wildlife Commission (GLIFWC)

The Great Lakes Indian Fish and Wildlife Commission is an agency of eleven Ojibwe nations in Minnesota, Wisconsin, and Michigan, with off-reservation treaty rights to hunt, fish and gather in treaty-ceded lands and waters. It exercises powers delegated by its member tribes. GLIFWC assists its member tribes in the implementation of off-reservation treaty seasons and in the protection of treaty rights and natural resources. GLIFWC provides natural resource management expertise, conservation enforcement, legal and policy analysis, and public information services. GLIFWC's member tribes include: the Bay Mills Indian Community, Keweenaw Bay Indian Community and the Lac Vieux Desert Band in Michigan; the Bad River, Red Cliff, Lac du Flambeau, Lac Courte Oreilles, Sokaogon and St. Croix Bands in Wisconsin; and the Fond du Lac and Mille Lacs tribes in Minnesota. All member tribes retained hunting, fishing and gathering rights in treaties with the U.S. government, including the 1836, 1837, 1842, and 1854 Treaties.

GLIFWC's Board of Commissioners, comprised of a representative from each member tribe, provides the direction and policy for the organization. Recommendations are made to the Board of Commissioners from several standing committees, including the Voigt Intertribal Task Force (VITF). The VITF was formed following the 1983 Voigt decision and makes recommendations regarding the management of the fishery in inland lakes and wild game and wild plants in treaty-ceded lands of Wisconsin.

1.8.1.5 Federally Recognized Native American Tribes in Wisconsin.

If and when wolves are removed from the federal endangered species list, the Wisconsin Native American tribes will have authority for wolf management on tribal lands. The federally recognized Native American tribes in Wisconsin at the time this EA was completed include the Bad River Band of the Lake Superior Tribe of Chippewa Indians of the Bad River Reservation, Forest County Potawatomi Community, Ho-Chunk Nation of Wisconsin, Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin, Lac du Flambeau Band of Lake Superior Chippewa Indians of the Lac du Flambeau Reservation of Wisconsin, Oneida Tribe of Indians in Wisconsin, Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin, Sokaogon Chippewa Community, St. Croix Chippewa Indians of Wisconsin, Stockbridge Munsee Community, and the Menominee Indian Tribe of Wisconsin.

1.8.2 Compliance with Federal and State Statutes

Several federal laws, state laws, and state regulations regulate USFWS, WDNR and WS actions. Wildlife Services, the WDNR and the USFWS comply with these laws and regulations, and consult and cooperate with other agencies as appropriate.

1.8.2.1 National Environmental Policy Act (NEPA). The National Environmental Policy Act (NEPA) of 1969 (42 USC Section 4231 et seq.) is implemented by Federal Agencies pursuant to Council on Environmental Quality (CEQ) Regulations (40 CFR Sections 1500-1508) and agency implementing regulations. The USFWS and WS prepare analyses of the potential environmental impacts of program activities to meet procedural requirements of NEPA and to facilitate planning, decision-making, and public and interagency involvement.

NEPA and its supporting regulations require that an EA be a concise public document that provides sufficient evidence and analysis to determine if an EIS should be prepared, aids in WS' compliance with NEPA, describes the need for action, alternatives, and environmental impacts, and includes a list of agencies/persons consulted.

Environmental documents pursuant to NEPA must be completed before work plans consistent with the NEPA decision can be implemented. Wildlife Services also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern.

1.8.2.2 Endangered Species Act (ESA). It is Federal policy, under the ESA, that all Federal agencies seek to conserve threatened and endangered (T&E) species and utilize their authorities in furtherance of the purposes of the Act (Sec.2(c); Sec.7(a)(1)). Where appropriate, WS conducts Section 7 consultations with the U.S. Fish & Wildlife Service

(USFWS) to ensure that "*any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency shall use the best scientific and commercial data available*" (Sec.7(a)(2)). Wildlife Services obtained a Biological Opinion (BO) from USFWS in 1992 regarding the potential effects of the National WS program on T&E species and prescribing conservation measures and Reasonable and Prudent Measures for avoiding jeopardy (USDA 1997 Revised, Appendix F). Wildlife Services is in the process of initiating formal consultation at the programmatic level to reevaluate the 1992 BO and to fully evaluate potential effects on T&E species listed or proposed for listing since the 1992 USFWS BO.

In addition to this programmatic consultation, Wisconsin WS has completed formal Section 7 consultations on May 9, 2001 and August 12, 2003 regarding potential effects of the proposed action for this EA (J. Smith, USFWS, August 12, 2003; L. Lewis, USFWS, WS, May 9, 2001). Furthermore, if USFWS issues a section 10(a)1(A) permit or 4(d) rule for depredation control, as described in this EA, the USFWS will complete an internal formal consultation on the issuance of that permit/rule. When this consultation is completed, WS and the WDNR will comply with all reasonable and prudent measures identified in the Biological Opinion (BO), and the extent practicable, any additional conservation recommendations.

1.8.2.3 National Historic Preservation Act (NHPA) of 1966 as amended. The National Historic Preservation Act (NHPA) of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that can result in changes in the character or use of historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian Tribes to determine whether they have concerns for traditional cultural properties in areas of these federal undertakings. Wildlife Services actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties. All Native American tribes in Wisconsin and GLIFWC were invited to be cooperating agencies in the production of this EA. The GLIFWC is a consulting agency in the preparation of this EA. The Lac Du Flambeau Band of Lake Superior Chippewa Indians and the Wisconsin Ho-Chunk Nation accepted the invitation to be cooperating agencies in the production of this EA. A copy of the draft EA is being provided to each American Indian tribe in the State to allow them opportunity to express any concerns that might need to be addressed prior to a decision.

A consultation occurred between WS and WSHPO on February 4, 2002 regarding the actions proposed in the 2004 WS EA on WDM in Wisconsin. It was determined that the "*Project as described will have no effect on significant cultural resources*" and the proposed action does not constitute a "Federal undertaking" as defined under Section 106 of the NHPA. Wisconsin WS would, as requested by WSHPO, halt work and contact the WSHPO if any cultural resources or human remains are discovered. The types of actions proposed in this EA are the same as for the 2004 WS wolf damage management EA, therefore, WS and the USFWS have determined that this finding is still valid.

1.8.2.4 Environmental Justice and Executive Order 12898 - “Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations.” Executive Order 12898, entitled, “Federal Actions to Address

Environmental Justice in Minority Populations and Low Income Populations” promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Environmental Justice is a priority for all Federal Agencies. Executive Order 12898 requires Federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898. Wildlife Services personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools and approaches. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low income persons or populations.

1.8.2.5 Executive Order 13045 - Protection of Children from Environmental Health and Safety Risks. Children may suffer disproportionately from environmental health and

safety risks for many reasons, including their development, physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, WS has considered the impacts that this proposal might have on children. The proposed WDM would occur by using only legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action.

1.8.2.6 Removal of Wild Animals and Authorization to Remove Wild Animals Causing Damage or Nuisance. Wisconsin regulations (Wis. Stat. 29.885) grants WDNR the authority to authorize the removal of wild animals causing damage or a nuisance. WDNR Code (WAC, Natural Resources (NR) 12.10) is established to administer Wisconsin regulations relating to the removal of wild animals causing damage or nuisance. This administrative rule defines criteria whereby landowner, lessees, or occupants may remove from lands under their control wild animals constituting a nuisance. WS assistance to those requesting assistance in reducing wolf damage, which could involve the removal of wolves, would be conducted under authority granted to WS, or landowners, lessees, or occupants, by the WDNR and USFWS.

1.8.2.7 Wildlife Damage and Nuisance Control – Subchapter III Wisconsin Administrative Code NR 12.5-12.55. This subchapter outlines the regulations for implementing and administering the payment of claims for damage associated with endangered and threatened species, especially gray wolves. Claimants for compensation must be in compliance with carcass disposal requirements of s. 95.50, Stats., for livestock claims and, for farm-raised deer claims, the farm-raised deer fencing requirements of ss. 90.20 and 90.21, Stats.

CHAPTER 2: ISSUES

2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues relevant to the analysis, including issues that received detailed environmental impact analysis in Chapter 4 (Environmental Consequences) and issues not considered in detail, with the rationale. Pertinent portions of the affected environment are included in this chapter in the discussion of issues to be addressed in detail. Additional information on the affected environment is incorporated into the discussion of the environmental impacts in Chapter 4 and the description of the current program.

2.1 ISSUES CONSIDERED IN DETAIL IN CHAPTER 4

The following are issues that have been identified as areas of concern requiring consideration in this EA and were used to develop alternatives:

- Effects on wolf populations in Wisconsin
- Effects on non-target species populations, including T&E species
- Effects on public and pet health and safety
- Impacts to stakeholders, including aesthetics of wildlife

2.1.1 Effects on Wolf Populations in Wisconsin

The federally protected gray wolf, which currently is listed as "endangered" in Wisconsin is targeted by the proposed action. Some persons may be concerned that WDM activities would result in the loss of local populations of wolves or have a cumulative adverse affect on the viability of Wisconsin's wolf population. As analyzed, WS and WDNR would remove only a small percentage of the wolf population in relation to the total Wisconsin wolf population. Additionally, natural dispersal and reproduction of wolves in Wisconsin, and wolf reproduction and dispersal from Minnesota and Michigan into Wisconsin would continue to aid in the recolonization and recovery of wolves. The Wisconsin wolf population is estimated to have increased five fold in the past 10 years. The USFWS, WS and WDNR anticipate that the Wisconsin wolf population will continue to increase, although this rate of increase is anticipated to slow as available habitat is occupied, and if wolf depredation events increase.

2.1.2 Effects on Non-target Species Populations, Including Threatened and Endangered Species

A common concern among members of the public and wildlife professionals, including WS, WDNR and USFWS personnel, is that the proposed action or any of the alternatives would result in removing individuals or adversely impact populations of native wildlife species, particularly State or federally listed threatened and endangered species. Special efforts are made to avoid jeopardizing threatened and endangered species through biological evaluations of the potential effects of the alternatives and the establishment of special restrictions or standard operating procedures. Measures intended to reduce the effects on non-target species populations are described in Sections 3.5, 4.2, and Appendix B.

Currently, there are 20 federally listed threatened, endangered and candidate plant and animal species and 239 state listed threatened and endangered plant and animal species in Wisconsin. In prior Section 7 consultations regarding WDM activities similar to those proposed in this EA, the USFWS concurred with WS that, with the exception of wolves, the target species, wolf damage management activities would have no effect or would be not likely adversely affect federally listed animal and bird T/E species in Wisconsin (J. Smith, USFWS, WS, August 12, 2003; L. Lewis, USFWS, WS, May 9, 2001). Likewise, the WDNR has also concurred that WDM actions similar to those proposed in this EA would have no effect or would be not likely to adversely affect State listed animal and bird T/E species (S. Holtz, WDNR, March 23, 2002).

If USFWS issues a section 10(a)1(A) permit or 4(d) rule for depredation control as described in this EA, the USFWS will complete an internal formal consultation on the issuance of that permit/rule. When this consultation is completed, WS and the WDNR will comply with all reasonable and prudent measures identified in the BO, and to the extent practicable, any additional conservation recommendations. The standard operating procedures include measures intended to reduce the effects on non-target species populations and are described in Sections 3.5, 4.2, and Appendix B.

2.1.3 Effects on public safety and pet health and safety

A common concern is whether the proposed action or any of the alternatives pose an increased threat to public and pet health and safety. In particular, there is concern that the methods of wolf removal (i.e., trapping, snaring, and shooting) may be hazardous to people and pets, or that continued increases in wolf populations might threaten public and pet health or safety. Wildlife Services will respond to complaints regarding wolf depredations on pets and concerns about human health and safety as outlined in the WWMP (WDNR 1999).

Firearm use is a very sensitive issue because of concerns relating to public safety and firearms misuse. To ensure safe use and awareness of firearms issues, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). Wildlife Services employees who use firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

2.1.4 Humaneness of methods to be used

The issue of humaneness, as it relates to the killing or capturing of wildlife is an important but complex concept. Kellert and Berry (1980) in a survey of American attitudes toward animals stated that 58% of their respondents, “. . . *care more about the suffering of individual animals . . . than they do about species population levels.*” Schmidt (1989) indicated that vertebrate pest control for societal benefits could be compatible with animal welfare concerns, if “. . . *the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*”. Suffering has been described as a “. . . *highly unpleasant emotional response usually associated with pain and distress.*” However, suffering “. . . *can occur without pain . . .*,” and “. . . *pain can occur without suffering . . .*” (American Veterinary Medical Association (AVMA) 2001). Because suffering carries with it the implication of a time frame, a case could be made for “. . . *little or no suffering where death comes immediately . . .*” (California Department of Fish and Game (CDFG) 1999), as in the case of shooting or drug-induced euthanasia.

Defining pain as a component of humaneness may be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and the causes that elicit pain responses in humans would ". . . *probably be cause for pain in other animals . . .*" (AVMA 1987). However, pain experienced by individual animals probably ranges from none to considerable (CDFG 1999). Wildlife Services acknowledges that some damage management methods, such as foot-hold traps and cable restraints, may cause varying degrees of pain in different animal species for varying lengths of time. However, at what point pain diminishes or stops under these types of restraint has not been measured by the scientific community.

Pain and suffering as it relates to tools used to capture animals, is often interpreted differently by professional wildlife biologists and lay people. People that receive damage or threats of damage may perceive humaneness differently, particularly if their pets or livestock are injured or killed and they contemplate the humaneness of having their pets or livestock killed by wolves. Wildlife managers and the public would both be better served to recognize the complexity of defining suffering, since ". . . *neither medical nor veterinary curricula explicitly address suffering or its relief*" (CDFG 1991, 1999). Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, which, in turn, is governed by the person's past experiences. Different people may perceive the humaneness of an action in different ways. The challenge in coping with this issue is how to achieve the least amount of suffering with the constraints imposed by current technology, funding, workforce and social concerns. Research suggests that with some methods, such as restraint in foot-hold traps, changes in the blood chemistry of trapped animals indicate "*stress*" (USDA 1997 Revised: 3-81). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in comparing the relative humaneness of WDM techniques.

The decision making process involves tradeoffs between the aforementioned aspects of pain from damage management activities and the needs of humans to reduce wildlife damage. An objective analysis of this issue must consider not only the welfare of wild animals but also the welfare of humans and prey animals if damage and losses are not stopped.

Wisconsin WS and WDNR personnel are trained professionals who strive to use the most humane methods available to them, recognizing the constraints of current technology, workforce, funding and social concerns. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy.

Wildlife Services has improved the selectivity and humaneness of many management devices through research and is striving to bring new, more humane tools and methods into use. Wildlife Services, through the combined efforts of the WS state programs and the USDA, APHIS, WS, National Wildlife Research Center, has been involved in the testing and development of a number of non-lethal WDM techniques including fladry (Section 3.3.1), pyrotechnics, livestock guarding animals, remote activated guard (RAG) devices, and light-siren devices (Appendix B). The NWRC has also been conducting research on tranquilizer devices to reduce stress and injuries to animals captured in traps. However, improved WDM methods are still needed. Until new methods and tools are developed, a certain amount of animal suffering could occur (e.g., when non-lethal damage management methods are neither practical, available, or effective). Whenever possible and practical, WS also employs euthanasia methods recommended by the AVMA (2001)

or the recommendations of a veterinarian, even though the AVMA euthanasia methods were developed principally for companion animals and slaughter of food animals, and not for free-ranging wildlife.

2.1.5 Sociological Issues Including Impacts on Aesthetic Values

2.1.5.1 Variations in Perception of Wildlife Damage

During the last 200 years, broad-scale changes in land-use patterns have occurred as the increasing human population settled North America. Notable is the large-scale conversion of natural landscapes to agricultural and urban environments. As humans encroach on wild habitats, they compete with wildlife for space and other resources, which increases the potential for conflicts. Concurrent with this growth and change is a desire by some segments of the public to completely protect all wildlife, which can create localized conflicts with resource managers and owners experiencing problems with some species. *The Animal Damage Control Programmatic Final Environmental Impact Statement (EIS)* (USDA 1997, Revised) summarizes the American perspective of the relationship between wildlife values and wildlife damage, as follows:

"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife is generally regarded as providing economic, recreational and aesthetic benefits . . . and the mere knowledge that wildlife exists is a positive benefit to many people. However . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and value is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural and economic considerations as well."

Biological carrying capacity is the limit of the land or habitat to support healthy populations of species without long-term degradation of either the health of the species or the associated environment (Decker and Purdy 1988). The wildlife acceptance capacity (also known as cultural carrying capacity) is the limit of human tolerance for wildlife, or the maximum number of a given species that can coexist compatibly with local human populations (Decker and Purdy 1988). These capacities are especially important in areas inhabited by humans because they define the sensitivity of a local community to a specific wildlife species/problem. For any given situation involving a wildlife conflict, individuals directly or indirectly affected by the damage will have varying degrees of tolerance for the damage and the species involved in the damage. This tolerance determines the "wildlife acceptance capacity," which is often lower than the "biological carrying capacity." For example, the biological carrying capacity of gray wolves (*Canis lupus*) in Wisconsin appears to be higher than their current population; however, for some individuals and groups, the state has as many or more wolves than can be tolerated (i.e., for these individuals, the wildlife acceptance capacity has been reached). Once the wildlife acceptance capacity of a species is reached or exceeded, humans will demand implementation of programs, both lethal and non-lethal to reduce damage or threats of damage.

The human attraction to animals has been well documented throughout history, an idea supported by prehistoric cave paintings and the domestication of wild animals. Today's

American public is no exception, as evidenced by the large percentage of households that have pets or observe wildlife. Some people also may consider individual wild mammals and birds as “pets” and exhibit affection toward these animals. They may also want to have more wild animals in their immediate environment. Some people feel a spiritual bond with wild animals. Conversely, some people have no emotional attachment to wildlife; some may even fear the presence of wild animals in their vicinity and demand their immediate removal. Conflicting wildlife values result in highly variable public opinions about the best ways to manage conflicts between humans and wildlife, making the implementation and conduct of wildlife damage management programs extremely complex.

Ideas about how these programs are implemented and conducted are as unique as the almost infinite combinations of philosophies, psyches, aesthetic values, personal attitudes, and opinions found in humans. These differences of opinion result in concerns that the proposed action or the alternatives would result in the loss of aesthetic or cultural/spiritual benefits to the general public and resource owners.

2.1.5.2 Aesthetic and Sociological Values of Wildlife

Wildlife generally is regarded as a source of economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is truly subjective, dependent on what an observer regards as beautiful. Wildlife populations provide a range of direct and indirect social and economic benefits (Decker and Goff 1987). Direct benefits are derived from a user’s personal relationship or direct contact with wildlife and may include either consumptive (e.g., using or intending to use the animal such as in hunting or fishing) or non-consumptive use (e.g., observing or photographing animals) (Decker and Goff 1987). Indirect benefits, or indirect exercised values, arise without a human being in direct contact with an animal and are derived from experiences such as looking at pictures or videos of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Two forms of indirect benefits exist according to Decker and Goff (1987): bequest and pure existence. Bequest benefits arise from the belief that wildlife should exist for future generations to enjoy; pure existence benefits accrue from the knowledge that the animals exist in the human environment (Decker and Goff 1987) or that they contribute to the stability of natural ecosystems (Bishop 1987).

Some people directly affected by problems caused by wolves insist on the lethal removal of the problem animal(s) from the area where the conflict occurs. Others have the view that all wildlife involved in conflicts should be captured and relocated to another area to alleviate the problem. Individuals not directly affected by a conflict may be supportive of affected humans, neutral, or totally opposed to any removal of wildlife from specific locations or sites.

Those who oppose removal of wildlife may do so because of emotional ties to the animals, which are similar to the bonds that may exist between a human and a pet. Some may totally oppose WDM, especially if lethal methods are used, and want WS, the USFWS and WDNR to teach tolerance of wolves causing conflicts.

The goal of IWDM is to provide relief from damage or threats of damage while minimizing the potential for negative impacts on the environment including aesthetic and social values. WS would only conduct WDM at the request of citizens, organizations, and others who are experiencing problems (i.e., where a need exists) and in coordination with the WDNR. When requests for WDM assistance are received, WS, the WDNR and tribes, as appropriate, and the person or agency with the damage problem consult, issues/concerns are addressed, an appropriate plan of action is developed, and reasons for selecting the action are explained. Management actions are carried out in a dedicated, humane and professional manner and as outlined in the WWMP (WDNR 1999).

2.2 ISSUES NOT CONSIDERED IN DETAIL AND RATIONALE FOR EXCLUSION

2.2.1 Impacts on Wisconsin's Biodiversity

No WS or WDNR project would be conducted to eradicate any native wildlife species or population, including wolves. Wildlife Services and the WDNR operate according to International, Federal, and State laws and regulations enacted to ensure species viability. The proposed action would be conducted on a relatively small percentage of the Wisconsin land mass. The take of any wildlife species analyzed in this EA is a small proportion of the total population and is probably insignificant to the viability and health of the population (see Section 4.3). In addition, any reduction in the local population is temporary because immigration from adjacent areas and reproduction by the remaining animals replaces the animals removed during damage management operations as long as suitable habitat exists. None of the alternatives proposed in this EA will affect the viability of wolf or non-target wildlife species populations, and, consequently, the impacts of the current WS program on biodiversity statewide and nationwide are expected to be very minor (USDA 1997 Revised).

2.2.2 Wolf Damage Should be Managed by Hunters and Trappers

Because wolves are federally protected, and because of the court-ordered reversion of wolves to endangered, private hunters and trappers cannot be authorized to conduct WDM in Wisconsin at the present time. If WS selects Alternatives 1-4, WS will be acting as agents of the WDNR when conducting WDM activities. Once wolves are removed from the Federal list of threatened and Endangered species in Wisconsin, the WDNR and the tribes will have authority to determine the role of hunters and trappers in WDM.

Wildlife Services provides professional wildlife damage management services at site-specific locations when requested by citizens experiencing a wildlife/human conflict. Wildlife Services personnel respond to requests for assistance in accordance with the Congressional direction provided to WS that authorizes the program. Hunters and trappers do not always have the time, resources, or training to respond to site specific problems with wolves.

2.2.3 Appropriateness of Preparing an EA Instead of an EIS for Such a Large Area

Some individuals might question whether preparing an EA for an area as large as the State of Wisconsin would meet the NEPA requirements for site specificity. If a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared in accordance with NEPA. In terms of considering cumulative impacts, a single EA analyzing impact for the entire State should provide a better analysis of cumulative impacts than multiple EAs covering several smaller areas. In addition, WS and WDNR would

only conduct WDM in a very small area of the state where damage is occurring or likely to occur, and damage may occur anywhere in Wisconsin.

CHAPTER 3: ALTERNATIVES

3.0 INTRODUCTION

This chapter consists of six parts: 1) an introduction, 2) description of alternatives considered and analyzed in detail including the Proposed Action (Alternative 2), 3) a description of IWDM, 4) WDM methods that could be used or recommended, 5) a description of alternatives considered, but eliminated from detailed analysis, and 6) a table of SOPs. Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992), “*Methods of Control*” (USDA 1997 Revised, Appendix J) and the “*Risk Assessment of Wildlife Damage Control Methods Used by the USDA Animal Damage Control Program*” (USDA 1997 Revised, Appendix P). Four alternatives were recognized, developed, and analyzed in detail; and six alternatives were considered but not analyzed in detail with supporting rationale.

Agency Decisions

These alternatives describe the actions available to the USFWS (issuing permits or developing special section 4(d) regulations for wolves⁷) and WS and WDNR (involvement in wolf damage management). Although the agencies have worked together to produce a joint document and intend to collaborate on WDM in Wisconsin, each of the lead agencies will be making its own decision on the alternative to be selected in accordance with the standard practices and legal requirements pertaining to each agency’s decision making process.

Although the agencies make independent decisions, the decisions made by the agency with regulatory authority can restrict the actions taken by the other agencies. For example, permitting decisions and 4(d) rules by the USFWS can limit the actions taken by the state and WS. WS may select an alternative that would give it access to all non-lethal and lethal WDM techniques but it would only be able to use methods allowed by the USFWS. Conversely, the USFWS may issue a permit/rule allowing for the use of non-lethal and lethal WDM techniques, but WS could select an alternative that only allowed non-lethal methods. In this instance, the permittee (WDNR) could use non-lethal and lethal WDM techniques but WS would only provide assistance with non-lethal methods.

WS would conduct WDM activities in Wisconsin as an agent of the WDNR and it is the WDNR that has applied for a permit from the USFWS. Therefore, management decisions by the state can also impact WS’ actions. The USFWS would approve or deny access to methods specifically requested by WDNR. If WDNR only asks for permission to use a limited set of WDM techniques, WS’ actions would be limited to that set of methods even if WS chose an alternative that allowed for the use of any WDM method. However, similar to the discussion above, WS is not obligated to use all methods permitted by WDNR. WS could select an alternative which restricted WS to using a subset of the total methods permitted by WDNR.

For simplicity and clarity of analysis, each of the alternatives below is described and its impacts are analyzed as if the lead agencies had selected the same alternative. If agencies make different decisions, the impact of the action will be intermediate to the impacts of the alternatives analyzed in the EA and would usually be most similar to the impact of the more restrictive of the various independent decisions, depending upon the relative authority of each agency.

⁷ The USFWS may develop 4(d) rules if wolves are federally reclassified as “threatened”.

The four alternatives analyzed in detail are:

Alternative 1 - Non-lethal WDM Only. Under this alternative, the USFWS would issue Section 10(a)(1)(A) permits or develop and implement section 4(d) regulations authorizing the use of non-lethal WDM techniques. This alternative may be selected with or without an option to restrict use of some non-lethal WDM techniques to WS and WDNR. WS and WDNR would only provide technical and operational assistance with non-lethal WDM. .

Alternative 2 - Integrated WDM (No Action / Proposed Action). The No Action alternative serves as the baseline against which the impacts of management alternatives can be compared and can be defined as being the continuation of current management practices (CEQ 1981). However, the current program of non-lethal WDM has only been in effect since the Federal Court Decision on September 13, 2005 (Sections 1.3.1 and 1.3.9). Insufficient data exist at this time to adequately use current management conditions as a baseline for analysis. In contrast, Alternative 2 was used from April 1, 2003 to September 13, 2005 and data are available on the environmental impacts of this alternative. Therefore, for purposes of analysis, we are using Alternative 2 as the “No Action” baseline when comparing the other alternatives to determine if the real or potential adverse affects are greater, lesser or the same (Table 4-4). Under this alternative, the USFWS would issue Section 10(a)(1)(A) permits or section 4(d) regulations authorizing the use of lethal and non-lethal WDM techniques. The State and WS would have access to the complete range of non-lethal and lethal WDM methods. This alternative may be selected with or without an option to restrict use of some non-lethal WDM techniques to WS and WDNR.

Alternative 3 - Technical Assistance Only. The USFWS would not issue any Section 10(a)(1)(A) permits or develop and implement section 4(d) regulations for wolf damage management. WS would not conduct operational WDM in Wisconsin but could provide technical assistance on WDM methods that do not require permits or other authorization from the USFWS (Appendix B). Wildlife Services would also be able to conduct evaluations of potential wolf depredation sites needed to administer the wolf damage compensation program. Because of the cooperative conservation agreement between the USFWS and WDNR, the state could still use and authorize others to use many non-lethal WDM techniques (Section 1.7.7, Appendix B).

Alternative 4 - No Federal WDM in Wisconsin (Preferred Alternative for Ho-Chunk Nation). Under this alternative, the USFWS and WS would provide no assistance with WDM. The USFWS would not issue any Section 10(a)(1)(A) permits for wolf damage management. Wildlife Services would not provide technical assistance or operational damage management services. Because of the cooperative conservation agreement between the USFWS and WDNR, the state could still use and authorize others to use many non-lethal WDM techniques (Section 1.7.7, Appendix B).

3.1 DESCRIPTION OF ALTERNATIVES

3.1.1 Alternative 1 - Non-lethal WDM Only

Under this alternative, the USFWS would only issue permits or develop and implement section 4(d) regulations for the use of non-lethal WDM techniques, and WS would only provide operational and technical assistance with non-lethal WDM methods. Wildlife Services would also assist the WDNR with radio-collaring and monitoring the Wisconsin wolf population.

Many non-lethal WDM techniques do not require “take” as defined by the ESA and its implementing regulations, and do not require a permit or authorization from the USFWS. These methods include but are not limited to animal husbandry practices, installation of fencing and use of livestock guarding animals (Section 3.2.1, Appendix B). The WDNR and their appropriately trained and designated agents have access to some non-lethal techniques involving harassment or handling of wolves without permits from the USFWS (Section 3.2.2). Authority for these methods is granted under (50 CFR 17.21) because of the wolf cooperative conservation agreement between the USFWS and WDNR (Section 1.7.7). However, some non-lethal methods require a permit or other authorization from the USFWS, specifically, dog training collars for aversive conditioning and non-lethal projectiles like rubber bullets and bean bags. In the permit/authorization the USFWS has the option of restricting the use of these methods to WS and the WDNR, or the USFWS may grant the WDNR and WS the authority to train and equip personnel outside their agencies to use these methods.

There are provisions within the regulations pertaining to the ESA that allow for the lethal take of an endangered species in response to a demonstrable (either immediate or non-immediate) threat to human safety. Response to less immediate threats and wolf predation on pets will be restricted to non-lethal methods. No lethal take of wolves for damage management could occur.

3.1.2 Alternative 2 - Integrated WDM (No Action/ Proposed Action)

Under this alternative, an IWDM program would be used in Wisconsin to protect livestock, pet and human safety from gray wolf damage and promote wolf conservation in accordance with the WWMP (WDNR 1999), the USFWS rules and/or permits for WDM, the Eastern Gray Wolf Recovery Plan (USFWS 1992) any WDNR guidelines for conducting depredation control (Appendix E), and all applicable policies, agreements and guidelines among WDNR, WS, USFWS and the tribes. All WDM activities would also be consistent with other uses of the area and would comply with appropriate Federal, State and local laws and conducted in cooperation with other governmental agencies and tribal governments, as appropriate.

The IWDM strategy would encompass the use of the full range of legal, practical and effective methods of preventing or reducing damage and conserving the wolf population while minimizing harmful effects of damage management measures on humans, wolves, other wildlife species, domestic animals, and the environment. Under this action, WS and the WDNR would provide technical assistance and operational damage management, including non-lethal and lethal management methods selected after applying the WS Decision Model (Slate et al. 1992). Wildlife Services would be able to assist with wolf research and population monitoring. This alternative would be similar to Wisconsin WDM practices that were conducted under the 2003 section 4(d) rule and an April 2004 permit issued by the USFWS. This strategy for WDM was discontinued on September 13, 2005 when all WDM activities allowed under the USFWS permit were enjoined by the U.S. District Court in the District of Columbia.

Wolf damage management would be conducted on private or public property in Wisconsin when the resource owners/ managers (property owners/ land managers) request assistance to alleviate wolf damage, wolf damage is verified by WS, and an *Agreement for Control* or other comparable document has been completed. The WWMP (WDNR 1999) further establishes that in order for lethal WDM methods to be used, the producer/owner must sign a depredation management plan (farm plan) for the property which includes damage abatement recommendations. The cooperators are required to agree to (sign) the plan prior to receiving financial assistance with supplies for non-lethal WDM and before any operational WDM could be conducted. Individuals and agencies with wolf damage and/or concerns about wolves would receive technical assistance in the form of instructional sessions, demonstrations, equipment loans, and information on the availability and use of non-lethal and lethal methods (Section 3.3, Appendix B). In determining the damage management strategy, preference would be given to non-lethal methods when they are deemed practical and effective. Non-lethal methods used by landowners could include, but would not be limited to, changes in farm management practices and pet care/supervision, frightening devices, exclusion, guarding animals, habitat modification, and behavior modification of problem wolves. Non-lethal methods used operationally by WS and WDNR may include foot-hold traps and cable restraints (Olson & Tischaefer 2004) with “stops” (used to live capture wolves for relocation and/or attaching radio collars, and collars used to activate frightening devices), frightening devices and aversive conditioning (e.g., with modified dog training collars) and non-lethal projectiles (Appendix B). In its permit request, the WDNR has requested that USFWS grant the WDNR and WS the authority to train and equip landowners/managers to use non-lethal projectiles such as rubber bullets.

Lethal methods would be used to reduce damage after practical and appropriate non-lethal methods have been considered and determined to be ineffective or inappropriate in reducing damage to acceptable levels. In some instances, the most appropriate initial response to a wolf damage problem could involve concurrent use of a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. Lethal methods could include shooting, calling and shooting, cable restraints, and euthanasia of wolves live-captured in foot-hold traps, cable restraints or other live-capture devices.

The WDNR has also asked for authority for lethal take of up to 10% of the annual wolf population estimate each year.⁸ Actual annual lethal take of wolves for WDM is anticipated to usually be much lower than this level. The annual maximum value of 10% was estimated based on review of similar WDM program which has been in effect in Minnesota since 1986. For the period of 1993 to 2002 intentional take for WDM in Minnesota ranged from 3.9 to 9.4% (average 6.4%) of the estimated state population. During the period of 2003- 2005 when an integrated WDM approach was used in Wisconsin, annual lethal take was 17 wolves in 2003, 24 in 2004, and 29 in 2005. This level of take represents approximately 5.1, 6.4, and 6.8 percent of the late-winter Wisconsin wolf population for 2003, 2004, and 2005, respectively.

Wolves in Wisconsin are currently a federally protected "endangered" species. Except in situations of threat to human safety⁹ or to aid an individual wolf¹⁰, endangered wolves can only be

⁸ These estimates are derived from surveys conducted during late winter, prior to pup production, when population size is at an annual low.

⁹ While federally protected under the ESA, anyone can take a wolf in defense of human life, that is, when a wolf is attacking a person. Additionally, USFWS, Federal land management agencies, MDNR or their designated agents can take wolves in cases of non-immediate but demonstrable threats to human safety without a permit or other authorization from the USFWS.

taken by WDNR, or agents of the WDNR, using non-lethal means. Additional forms of take of endangered wolves, including lethal take, can be authorized by a permit from USFWS. Taking wolves by members of the public without a permit are subject to stiff penalties, including fines and imprisonment. If wolves are reclassified as a threatened species, the USFWS could grant limited authority for the take of depredating wolves in a 4(d) rule. The USFWS would issue permits or authorization via special rules under section 4(d) for the use of non-lethal (i.e., aversive conditioning and non-lethal projectiles) and lethal WDM techniques. The permits or authorizations would stipulate the number of animals that can be taken and the methods that can be used; requirements for reporting take and disposition of carcasses; and provides measures to operate under which would minimize the risk of or prevent the unintentional take of wolves; and annual reporting requirements (Section 3.5 and Chapter 4 discussions of impacts of each alternative on wolves and non-target species). The draft permit requires that all wolf mortalities be reported within 5 calendar days. The reporting requirements and close interagency coordination enable the use of an adaptive management approach which would be able to rapidly respond to unanticipated changes in the wolf population and impacts of the program. USFWS permits for the take of wolves would have to be renewed annually after an evaluation of the wolf population and impacts of the WDM program. If a permit is issued to the WDNR, WDNR and WS and tribal coordination regarding the use of lethal WDM methods would continue to be as described in the guidelines for conducting depredation control on wolves in Wisconsin (Appendix E).

Most wolf damage management activities are likely to be conducted on private land. Wolf damage management activities are only likely to be conducted on public land if that land is within the damage management perimeter (set by USFWS permits or other USFWS authorizations and the WWMP) around the site of a verified depredation event on private land or in the rare instance that a wolf poses a threat to human safety. However, wolf trapping and radio-collaring for wolf population monitoring is usually conducted on public land.

3.1.3 Alternative 3 - Technical Assistance Only

The USFWS would not issue any Section 10(a)(1)(A) permits or promulgate section 4(d) regulations for wolf damage management. WS would not conduct operational WDM in Wisconsin but could provide technical assistance on WDM methods that do not require permits from the USFWS (Appendix B). WS could also do site visits and evaluations of depredation events for compensation payments. Because of the cooperative conservation agreement between the USFWS and WDNR, the State could still operationally use and authorize others to use many non-lethal WDM techniques (Section 1.7.7, Appendix B). WS would not be able to operationally assist WDNR with wolf research and population monitoring.

Wolves in Wisconsin are currently a federally protected "endangered" species. Except in situations of threat to human safety¹⁰, or to aid an individual wolf¹¹, endangered wolves can only be taken by WDNR, or agents of the WDNR, using non-lethal means. Additional forms of take of endangered wolves, including lethal take, would not be authorized by the USFWS under this alternative. Taking wolves by members of the public without a permit are subject to stiff penalties, including fines and imprisonment. The technical assistance recommendations that WS and WDNR could provide would be limited to measures legally available without special authorization from the USFWS. Individuals might choose to implement these non-lethal WDM recommendations on their own, request non-lethal control actions from authorized agencies and

¹⁰ USFWS, MDNR, federal land management agencies, or their designated agents, may take a wolf to aid a sick, injured, or orphaned wolf.

entities other than WS, or take no action.

3.1.4 Alternative 4 - No Federal WDM in Wisconsin

This is the preferred alternative for the Ho-Chunk Nation for use in the central forest area (Zone 2). This alternative would result in no assistance from WS or the USFWS in reducing wolf damage in Wisconsin. The USFWS would not issue any Section 10(a)(1)(A) permits or other authorizations for wolf damage management. Wildlife Services would not provide technical assistance or operational damage management services. Because of the cooperative conservation agreement between the USFWS and WDNR, the state could still operationally use and authorize others to use many non-lethal WDM techniques (Section 1.7.7, Appendix B). All requests for WDM would be referred to the WDNR or the tribes as appropriate.

3.2 WOLF DAMAGE MANAGEMENT STRATEGIES AND METHODOLOGIES

Wildlife damage management is defined as the alleviation of damage or other problems caused by or related to the presence of wildlife (USDA 1997 Revised). A general description of the wildlife damage management approaches that could be used is provided below:

3.2.1 Integrated Wildlife Damage Management

During more than 80 years of resolving wildlife damage problems, WS has considered, developed, and used numerous methods for reducing wildlife damage problems (USDA 1997 Revised). Wildlife Services' efforts have involved the research and development of new methods, improvement of existing methods, and the implementation of effective strategies to resolve and prevent wildlife damage. The Wisconsin WS program works closely with the researchers with the USDA, APHIS, WS, National Wildlife Research Center (NWRC). The NWRC is the research arm of the WS program. The NWRC facility at Utah State University is the leading predator research complex in the world. Scientists assigned to the facility are dedicated to the WS operational program. Research at this facility has been critical to the testing and development of non-lethal methods of WDM, and has improved the selectivity, humaneness and efficacy of capture devices (Appendix B). State WS programs assist the NWRC with research projects and, because of the close collaboration between NWRC and the state programs, the latest research findings are rapidly incorporated into state damage management programs. The WDNR also conducts research on the efficacy and impacts of WDM methods.

Usually, the most effective approach to resolve wildlife damage is to integrate the use of several methods simultaneously or sequentially. Integrated Wildlife Damage Management (IWDM) is the implementation and application of safe and practical methods for the prevention and reduction of damage caused by wildlife based on local problem analyses and the informed judgment of trained personnel. The WS Program applies IWDM, commonly known as Integrated Pest Management (IPM), to reduce damage applying the Decision Model discussed in section 3.2.3 (Slate et al. 1992). The philosophy behind IWDM is to implement effective management techniques in the most cost-effective¹¹ manner possible while minimizing the potentially harmful effects to humans, target and non-target species, and the environment.

IWDM draws from the largest possible array of options to create a combination of techniques for

¹¹ The cost of control may be a secondary concern because of overriding environmental, health and legal considerations.

the specific situations. IWDM may incorporate cultural practices, habitat modification, animal behavior modification, removal of individual animals, local population reduction, or any combination of these, depending on the characteristics of the specific damage problems.

3.2.2 Integrated WDM Strategies

3.2.2.1 Technical Assistance Recommendations (implementation is the responsibility of the requester):

Technical assistance includes demonstrations on the proper use of some management devices (e.g., propane exploders, electronic guards, etc.) and information on animal husbandry, wildlife habits, habitat management and animal behavior modification. Technical assistance is generally provided following an on-site visit or verbal consultation with the requester. Typically, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need and practical application. Technical assistance may require substantial effort by agency personnel in the decision making process, but the actual implementation is the responsibility of the requester. Technical assistance also includes site visits and verification of the cause of damage as may be necessary for compensation and financial assistance (for WDM prevention equipment) programs.

Education is an important element of program activities because wildlife damage management is about finding "balance" or coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature is not in static balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures and demonstrations are provided to farmers, homeowners, and other interested groups. Wildlife Services frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are updated on recent developments in damage management technology, laws and regulations, and agency policies.

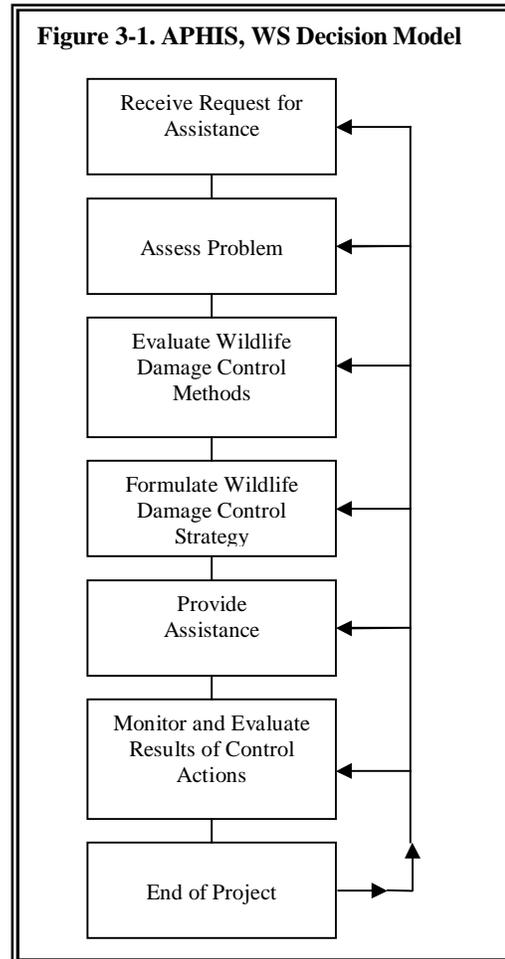
3.2.2.2 Operational Damage Management:

Operational damage management assistance is implemented when the problem cannot be resolved through technical assistance. The initial investigation defines the nature and history of the problem, extent of damage, and verifies whether or not the problem is caused by wolves. Professional assistance is often required to resolve problems effectively, especially if the problem is complex, or the management technique requires the direct supervision by or involvement of a wildlife professional. Wolf biology and behavior and other factors are considered (WS Decision Model; Slate et al 1992) when developing site specific damage management strategies.

3.2.3 Wildlife Services Decision Model used for Decision Making.

WS and WDNR personnel use a thought process for evaluating and responding to damage complaints that is depicted by the WS Decision Model described by Slate et al. (1992) (Figure 3-1). The Decision Model is not a written documented process, but a mental problem-solving process similar to that used by all wildlife management professionals including those in the lead and consulting agencies when addressing a wildlife damage problem. Trained personnel assess the problem; and evaluate the appropriateness and availability (legal and administrative) of damage management strategies and methods based on biological, economic and social considerations including:

- Species responsible for the damage (did wolves cause the problem or was it some other species?)
- Magnitude, geographic extent, frequency, historical damage and duration of the problem including review of animal husbandry practices and producer efforts at non-lethal WDM.
- Status of target and non-target species, including T/E species
- Local environmental conditions
- Potential biological, physical, economic, and social impacts
- Potential legal restrictions
- Costs of damage management¹²



Following this evaluation, methods deemed to be practical for the situation are incorporated into a management strategy. After this strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. When damage continues intermittently over time, WS and/or WDNR personnel and the requester monitor and reevaluate the situation. If one method or a combination of methods fails to stop damage, a different strategy is implemented. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of a continuous feedback loop between receiving the request and monitoring the results, with the damage management strategy reevaluated and revised periodically if necessary.

¹² The cost of management may sometimes be secondary because of overriding environmental, legal, public health and safety, animal welfare or other concerns

3.2.4 Local Decision Making Process

The WDM program in Wisconsin follows the “co-managerial approach” to solve wildlife damage or conflicts as described by Decker and Chase (1997). Within this management model, trained personnel provide technical assistance regarding the biology and ecology of wolves and effective, practical, and reasonable methods available to the local decision maker(s) to reduce wildlife damage. These decision makers may include community leaders, private property owners/managers, and public property owners/managers. This includes non-lethal and lethal methods. Technical assistance on alleviating damage caused by wolves is also available from other State, Federal, and private organizations. Wildlife Services and other State and Federal wildlife or wildlife damage management agencies may facilitate discussions at local community meetings when resources are available, and make recommendations. Resource owners and others directly affected by wolf damage or conflicts have direct input into the strategies to resolve the problem(s). They may implement management recommendations provided by WS or others, or may request management assistance from WS, other wildlife management agencies, local animal control agencies, or private businesses or organizations. Local decision makers compare the benefits versus the damage when deciding which methods would be implemented. Local decision makers must weigh the cost of implementing each methodology or a series of methodologies. These decision makers may include community leaders, private property owners/managers, and public property owners/managers.

3.3 WOLF DAMAGE MANAGEMENT METHODS

USDA (1997 Revised, Appendix J) describes some methods currently available for WDM. Several of these were considered in this assessment because of their potential use in reducing wolf damage to agricultural and natural resources, property and pets, and human health and safety. A listing and more detailed description of the methods used for WDM is found in Appendix B of this EA.

A farm plan would be developed upon the first investigation of depredation by wolves. The plan includes recommendations for suitable non-lethal methods and other practices which may reduce depredation on the farm. A signed plan is required before any operational WDM could be conducted on the farm. In Wisconsin, a compensation program is available to cover cost of livestock lost to wolf predation and veterinary bills for injured animals. A limited amount of financial assistance is available from WDNR to help producers pay for abatement practices when feasible. In some cases, financial assistance may also be available from private programs like the Bailey Wildlife Foundation Proactive Carnivore Conservation Fund.

3.3.1 Non-Lethal Methods Available to All Without a USFWS Permit

Some WDM methods are available to anyone without a permit. These consist primarily of non-lethal preventive methods such as cultural practices and habitat modification. Cultural practices and other management techniques are implemented by the livestock producer and property owners/managers. Livestock producers and property owners/managers may be encouraged to use these methods, based on the level of risk, need, and professional judgment on their effectiveness and practicality. Wildlife Services, WDNR and USFWS involvement in the use of these methods is usually limited to providing technical assistance. As noted above, a State compensation program pays for the cost of animals lost to wolf predation and veterinary bills for injured animals. The WSMP (WDNR 1999) requires that before compensation can be given or lethal control can be used to address confirmed depredation problems, the producer has to sign a

depredation management plan for the property and follow abatement /husbandry recommendations”.

Farm Management Practices implemented by livestock producers to prevent or reduce wolf damage might include: 1) maintaining healthy, well-fed animals, 2) pregnancy testing cattle, 3) properly disposing of dead livestock carcasses through rendering, burying, liming, or burning, 4) conducting calving or lambing operations in close proximity to the farmyard, when practical, 5) penning vulnerable livestock at night where practical, 6) monitoring livestock on a regular basis to detect any disease, natural mortality, or predation, and 7) incorporating non-lethal methods. Property owners and land managers could implement their own farm management practices or request the assistance of other agencies or private organizations to implement them, or take no action.

Exclusion may be used to prevent or limit access by predators to livestock pastures, calving or lambing areas, or livestock confinement areas. Several designs of anti-predator fencing have been developed and tested. Where practical and cost effective, sheep, calves or other vulnerable livestock may be penned near farm buildings at night.

Fladry involves installing waving flags hanging about every 20 inches from thin rope or cable stretched about 20 inches above the ground. Fladry may be used in addition to or in substitution of fences, as a new means to protect domestic animals from depredation by wolves.

Livestock guarding animals such as guarding dogs may be used to protect livestock from wolves. Livestock guarding animals may distract, deter, repel or attract wolves that could depredate on livestock.

Guarding and hazing involves guarding an area and then using pyrotechnics or other light/noisemaking devices to frighten wolves away from the site. It can be used as an aversive technique, but requires that the projectiles must be used every time the animal attempts to prey on the protected resource so they don't identify conditions when they can obtain prey without receiving a negative experience (Shivik 2004).

Frightening devices are methods that usually involve a light, sound, or motion device designed to deter wolves from a certain area. Strobe and flashing lights, propane exploders, sirens, and various combinations of these devices have all been used in attempts to reduce livestock losses to coyote, with wide ranging degrees of effectiveness (Linhart 1984a, Andelt 1987). Animal habituation (becoming accustomed) to the stimulus is one of the primary limiting factors for primary repellents. Moving the devices intermittently and randomly as well as alternating the stimuli (e.g. a different type of noise or light) may extend the effective period of the system (Shivik and Martin 2001). The period of efficacy may also be extended by using systems which are motion activated or only activated when a wolf wearing a transmitter collar comes into close proximity to the protected site (Appendix B). However, systems which require capturing the wolf and installing a special transmitter collar to activate the device are not included in the methods available to anyone without a permit (Section 3.3.2).

Compensation for wolf damage in the form of monetary payments to livestock producers for full or partial value for domestic animals killed. Such payments are made by State of Wisconsin for reimbursements for all verified wolf losses (confirmed or probable) on domestic animals. The Wisconsin wolf damage compensation program is funded by 3% of the state income tax return checkoff and 3% of license plate fees collected from the sale of endangered resources license plates. In some years the claims for wolf damage have exceeded the resources available from

license plate revenue. Because the WDNR has been directed by the legislature to provide full compensation for wolf depredations, the WDNR Bureau of Endangered Resources has been forced to use additional program funds to make compensation payments. When this occurs, these funds are made available at a cost to other endangered species programs.

3.3.2 Non-lethal Methods Available without Permits for States with Cooperative Conservation Agreements with the USFWS

Some non-lethal methods and research projects (e.g., population monitoring) involve harassment or handling wolves that is considered “taking” of an endangered species as defined by the ESA. These activities would ordinarily require a permit from the USFWS. However, Section 6 of the ESA allows the USFWS to establish cooperative conservation agreements with the states for the management of federally listed species (Section 1.7.7). Appropriately trained and authorized personnel or their designated agents from states with these agreements are authorized to use some non-lethal methods that would otherwise be considered take. Methods that require capture and handling of wolves would be conducted only by personnel from the WDNR or their appropriately trained and authorized designated agents.

Frightening Devices that require placing a transmitter collar on a wolf are available to the WDNR and their designated agents without a permit because of the cooperative conservation agreement. Overall efficacy and the period of efficacy of frightening devices may be improved by using systems which are motion activated or only activated when a wolf wearing a transmitter collar comes into close proximity to the protected site (e.g., a Radio Activated Guard; Appendix B). Methods that do not require placing a transmitter collar or similar device on the wolf are available to anyone without a permit (Section 3.3.1).

Capture and relocation of problem wildlife species is a technique that is sometimes used to alleviate wildlife damage problems. The success of a relocation effort, however, depends on the potential for the problem individuals to be captured efficiently and the existence of an appropriate relocation site (Nielsen 1988). While relocation may be appropriate in some situations when the species population is small, wolves are found in much of the suitable habitat in Wisconsin and relocation is not necessary for the maintenance of viable populations. Wolves relocated into suitable habitat are very likely to encounter other wolves with established territories. Wolves are highly territorial and the newly introduced wolves may trespass into already established wolf territories and be attacked and killed by the resident pack (Mech 1970).

Relocated wolves may also disperse long distances from the release site (Fritts 1983, Bradley et al. 2005). Relocated wolves can potentially return to the damage sites from which they were removed (Fritts et. al. 1984), or after dispersal movements, cause damage problems at the dispersal site (Bradley et al. 2005). In the Northern Rockies, 27% of translocated wolves again caused predations, and only 33% joined or formed new packs (Bradley et al. 2005). In this case, the original damage problem has simply been shifted from one property to another.

During winter 2001-2002, the Wisconsin DNR received a request from the Forest County Board of Supervisors, to stop relocating wolves into Forest County, where the Wisconsin DNR had traditionally relocated many problem wolves. Since that time, Florence, Iron, Langlade, Lincoln, Marinette, Oconto, Rusk, and Taylor Counties, and the Town of Mason in Bayfield County, have passed resolutions against release of problem wolves.

These resolutions are not legally binding on the WDNR, but do serve as an indication of public sentiment toward and tolerance of wolves. With most suitable wolf habitat occupied by wolf packs, the Wisconsin DNR now has limited places to relocate problem wolves.

Foot-hold traps can be effectively used to live capture wolves. When used as a live-capture device, wolves are either released on site (e.g., after receiving a radio-collar for research and monitoring) or may be relocated (see relocation above). Wolves live-captured by this method may also be euthanized (Section 3.3.4). Effective trap placement, pan-tension devices, and the selection and placement of appropriate lures by trained WS personnel contribute to the foot-hold trap's selectivity. WS policy requires that foot-hold traps used for WDM have offset and laminated jaws or padded jaws to reduce foot injury to captured wolves (WS Policy Manual, WS Directive 2.335-Wolf Damage Management).

Foot snares are devices consisting of a cable loop and a locking device that captures an animal around their foot or lower leg. The cable may be activated around the lower leg with a spring (Aldrich) or trap-type (Belisle) device. The foot snare can be modified with a stop on the cable. As with foot-hold traps, when foot snares are used as a live-capture device, wolves are either released on site (e.g., after receiving a radio-collar for research and monitoring) or may be relocated (see relocation above). Wolves live-captured by this method may also be euthanized (Section 3.3.2).

Dart guns are non-lethal capture devices that utilize a dart filled with tranquilizer fired from a specially designed rifle. Once tranquilized, the animal may be handled safely for research or relocation purposes. Under special situations, a tranquilized animal could also be euthanized if lethal removal is warranted. Use of dart guns would have no effect on non-target species because positive target species identification is made before animals are shot. Thus, WS use of dart guns is expected to continue to be virtually 100% selective for target individuals and species, and would not pose a risk to non-target species and individuals. Use of dart guns may sometimes be the only control option available if other factors preclude the setting of equipment. All WS staff involved in darting wolves or delivering immobilizing drugs have attended a 3 day accredited training course on immobilizing wildlife and they are required to receive 16 hours of continuing education every 5 years.

Cable restraints are snare-like devices designed to live-capture animals (Olson & Tischaefter, 2004). Cable restraints are being developed for live-trapping wolves and other carnivores (Olson & Tischaefter, 2004). These devices can be fairly selective due to loop size, height placement, and bait types. Presently in Wisconsin, WS is only allowed to use cable restraints that meet the following criteria: constructed of 1/8" diameter, 7x7 cable, 10 feet or less in length, incorporate a reverse-bend lock with a minimum outside diameter of 1 1/4 inches, incorporate an inline swivel, have a fixed stop 14 inches from the cable end and are staked in such a manner to prevent the captured animal from entangling in rooted vegetation greater than 1/2 inch in diameter.

3.3.3 Non-lethal Methods which Require Permits from the USFWS

Some animal behavior modification systems involve capturing wolves and fitting wolves with collars used to deliver or trigger repellent stimuli (i.e., aversive conditioning). Other systems involve shooting wolves with non-lethal projectiles like rubber bullets. These non-lethal

techniques involve intentionally using painful stimuli to manage wolf behavior, and the USFWS has determined that, while wolves are federally protected as a threatened or endangered species, permits or other authorizations are required to use these methods. Methods that require capture and handling of wolves would be conducted only by personnel from the WDNR, WS or the tribes.

Aversive Stimuli are stimuli that cause discomfort, pain and/or an otherwise negative experience paired with specific behaviors to achieve conditioning against these behaviors. One example would be using something like a dog training shock collar that is activated when wolves came into close proximity to a protected area such as livestock pens (Schultz et al. 2005).

Non-lethal Projectiles This involves guarding an area and then using rubber bullets or other non-lethal projectiles to prevent a predation event. It can be used as an aversive technique, but requires that the projectiles must be used every time the animal attempts to prey on the protected resource so they don't identify conditions when they can obtain prey without receiving a negative experience (Shivik 2004). Methods which require around-the-clock presence of a person to guard the resource are most efficiently used when the landowner/resource manager assists with the implementation. The USFWS may choose to allow the WDNR and WS to train and authorize private individuals to use this method.

3.3.4 Lethal Methods¹³:

These methods are specifically designed to lethally remove wolves in certain situations to stabilize, reduce, or eliminate damage. The use of lethal control would require a permit from the USFWS or the establishment of special 4(d) rules, and these techniques could only be used by qualified and authorized personnel from WS, WDNR, the tribes and other entities specified in the permits or special rules. The amount of removal necessary to achieve a reduction in wolf damage varies according to the effectiveness of other damage management strategies, the damage situation, and the level and likelihood of continued depredations.

If permits or other authorizations are issued by the USFWS, the WDNR would use the criteria established by the USFWS and the WWMP to determine when lethal control can be used. WS would only use lethal WDM methods with the consent of the WDNR. Under the WWMP (WDNR 1999), lethal control can be used when: 1) there have been documented, confirmed losses at a site. 2) the producer/owner has a signed depredation management plan (farm plan) for the property which includes damage abatement recommendations. 3) WS Specialists recommend euthanizing, and the WDNR approves (WDNR approval process varies depending upon the wolf management zone; Appendix E). Permits or other authorizations from the USFWS, the WWMP and the "*Wisconsin Guidelines For Conducting Depredation Control on Wolves in Wisconsin While Federal Listed as "Threatened" or "Endangered" Status*" (Appendix E) would provide restrictions on the timing and location of lethal WDM methods.

Shooting is selective for the target species and may involve the use of either a shotgun or rifle and night vision equipment, or a pistol to euthanize live-captured wolves.

¹³ No toxicants are currently registered by the United States Environmental Protection Agency for wolf damage management in Wisconsin.

Cable restraints and Snares are devices consisting of a cable loop and a locking device that are placed in travel ways. Cable restraints are a specialized form of snare designed specifically to live-capture animals (see above).

Foot-hold traps and foot snares are discussed in Section 3.3.2. When used as a lethal damage management technique, captured wolves are euthanized via shooting or administration of sodium phenobarbital.

Dart guns are non-lethal capture devices that utilize a dart filled with tranquilizer fired from a specially designed rifle (see also Section 3.3.2). Under special situations, a tranquilized animal could also be euthanized if lethal removal is warranted.

Sodium Pentobarbital (Beuthanasia-D) is registered for euthanasia of dogs, but legally may be used on other animals if the animal is not intended for human consumption. Barbiturates depress the central nervous system in descending order, beginning with the cerebral cortex, with unconsciousness progressing to anesthesia. The primary advantage of barbiturates is the speed of action on the animal. Barbiturates induce euthanasia smoothly, with minimal discomfort to the animal (AVMA 1993) after an animal has been anesthetized.

3.4 ALTERNATIVES CONSIDERED BUT NOT IN DETAIL, WITH RATIONALE

3.4.1 Bounties

Payment of funds for killing wildlife (bounties) suspected of causing economic losses is not considered effective to reduce wolf damage at this time. This alternative will not be considered in detail because:

- A bounty program would not be allowed as long as wolves are a listed species.
- Bounties are generally not as effective in reducing damage because depredating individuals/local populations are not specifically targeted.
- Circumstances surrounding take of animals is largely unregulated.
- No effective process exists to prevent taking of animals from outside the damage management area for compensation purposes.

3.4.2 Eradication and Suppression

An eradication alternative would direct all WS program efforts toward planned, total elimination of wolves. However, this alternative will not be considered in detail because:

- The attempted eradication of established wolf populations is contrary to state and federal efforts to protect wolves and recover the species.
- Eradication of wolves is not acceptable to most members of the public. It is also not realistic, practical, or allowable under present WS policy to consider large-scale population suppression.

3.4.3 Damage Management through Birth Control

Under this alternative, wolf populations would be managed through the use of contraceptives. Wolves would be sterilized or contraceptives administered to limit their ability to produce offspring. A wolf contraceptive, chemosterilant or immunocontraceptive, if delivered to a sufficient number of individuals, could temporarily suppress local breeding populations by inhibiting reproduction. At present, efforts to reduce wolf populations would be contrary to state and federal wolf recovery efforts. Additionally, there are no approved chemical or biological contraceptive agents for wolves.

Reduction of local populations would result from natural mortality and inhibited reproduction. No wolves would be killed directly with this method; however treated wolves may continue to cause damage, but probably at a lower rate, because there would be no pups to feed.

Contraceptive measures for mammals can be grouped into four categories: surgical sterilization, oral contraception, hormone implantation, and immunocontraception (the use of contraceptive vaccines). These techniques would require that wolves receive either single, multiple, or possibly daily treatment to successfully prevent conception. The use of this method would be subject to approval by Federal and State Agencies. This alternative is limited because: (1) it may take a number of years of implementation before the wolf population would decline, and, damage may continue for a number of years; (2) surgical sterilization would have to be conducted by licensed veterinarians, which would therefore be extremely expensive; (3) it is difficult to effectively live trap or chemically capture the number of wolves that would need to be sterilized in order to effect an eventual decline in the population; (4) no chemical or biological agents for contracepting wolves have been approved for use by State and Federal regulatory authorities. (5) sterilization or other forms of fertility control have an unknown impact on wolf social structure (Haber 1996).

Sterilization may be useful as an experimental technique to reduce depredation in some highly specialized situations in the future. In coyotes, breeding pairs with pups are most likely to depredate on sheep (Till and Knowlton 1983, Till 1992, Bromley and Gese 2001, Blejwas et al. 2002), and the same may be true for wolves and cattle (A. P. Wydeven, WDNR, pers. comm. 2003). Sterilized coyote (Bromley and Gese 2001) and wolf (Mech et al. 1996) packs continue to maintain territories, and do not seem to adversely affect survival of sterilized adults. In chronic areas, sterilization may reduce the need to remove problem wolves by keeping the wolf population low, and eliminating pup production (Haight and Mech 1997). Sterilization continues to be experimental and would only be done after approval from State and Federal regulatory agencies and if it can be carefully monitored.

Sterilization is not being used for WDM at this time, and would normally only be done as part of an experimental procedure, in which careful monitoring is done of the treated wolves. Any attempts to sterilize wolves would be initiated by and coordinated with WDNR, and would need USFWS approval while wolves are federally protected as a threatened or endangered species.

3.4.4 Non-lethal before Lethal

Under this alternative, lethal techniques would not be used unless all reasonable non-lethal methods had been tried and failed to reduce damage. This alternative was not considered in detail because, the proposed alternative, Integrated Wolf Damage Management, as outlined in the EA is similar to a non-lethal before lethal alternative because WS and WDNR would encourage and consider the use of non-lethal methods before lethal methods (WS Directive 2.101, WDNR 1999) and because of the conditions that must be met before lethal control will be authorized by

WDNR. In accordance with the WWMP (WDNR 1999), lethal control can be used when: 1) there have been documented, confirmed losses at a site. 2) the producer/owner has a signed depredation management plan (farm plan) for the property which includes damage abatement recommendations. 3) WS Specialists recommend euthanizing, and the WDNR approves. The WWMP further states that lethal WDM methods can only be used if the producer has a signed depredation management plan for the property and follows abatement/husbandry recommendations. Therefore, adding a non-lethal before lethal alternative and the associated analysis would not add additional information to the analysis for the public or decision maker.

3.4.5 Provide Funding for Damage Prevention Supplies and Equipment

Under this alternative livestock producers would be given financial assistance with the acquisition of supplies for non-lethal wolf damage management. This alternative could work as a component of Alternatives 1, 2, and 3. This alternative was not considered in detail because funding currently only covers the current compensation program and operational wolf damage management efforts and is not sufficient to help producers purchase materials. Even if this alternative were selected, funds would likely still be needed for wolf population monitoring. Implementation of this alternative would not necessarily prevent all damage because it would be impossible to predict and equip all locations where wolves might come into conflict with humans, and non-lethal methods are not necessarily effective or applicable to all wolf conflicts. Therefore, unless the agencies were to choose to not respond to depredation events, funding will also be needed to provide operational or technical assistance to places where wolf depredation occurs. The funding remaining after these needs are met is unlikely to adequately address the potential demand for damage prevention materials. Under select circumstances, some producers may qualify for assistance from private programs like the Bailey Wildlife Foundation Proactive Carnivore Conservation Fund administered by Defenders of Wildlife. The Fund has provided donkeys, guard dogs, and alternate watering sources for Wisconsin livestock producers. Where applicable, cooperators can be provided with information on these opportunities.

3.4.6 Lethal Only Program

Under this alternative, the USFWS would only issue Section 10(a)(1)(A) permits or other authorizations for the use of lethal WDM techniques. WS would only provide technical and operational assistance with lethal damage management techniques. Prohibiting the USFWS and WS from permitting, using or providing technical assistance on effective and practical non-lethal WDM alternatives is not in the best interest of the recovery of the species, is contrary to agency policy and directives (WS Directive 2.101), and will not be discussed further.

3.5 STANDARD OPERATING PROCEDURES FOR WILDLIFE DAMAGE MANAGEMENT TECHNIQUES

Standard Operating Procedures (SOPs) improve the safety, selectivity and efficacy of wildlife damage management techniques. SOPs used by the WS program are discussed in detail in USDA (1997 Revised, Chapter 5). The following SOPs apply to some or all of the alternatives, as indicated in the columns.

- Alternative 1. Non-lethal Damage Management.
- Alternative 2. Integrated WDM (No Action/ Proposed Action)
- Alternative 3. Technical Assistance
- Alternative 4. No Federal WS WDM in Wisconsin

Standard Operating Procedures by Alternative	1	2	3	4
<i>General Procedures and Conditions for Conducting WDM</i>				
Wolf damage management would follow guidelines as specified and agreed upon in MOUs and depredation management plans and permits.	X	X	X	
Wolf damage management would be conducted only when and where a need exists. ¹	X	X		
Wolves may be taken by anyone if they pose an immediate and demonstrable threat to human safety	X	X	X	X
The USFWS, Federal land management agencies, WDNR or their designated agents can take wolves in cases of non-immediate but demonstrable threats to human safety without a permit or other authorization from the USFWS.	X	X	X	X
Lethal WDM will not be conducted unless wolf depredation on lawfully present domestic animals is verified by appropriately trained personnel and there is reasonable expectation that the depredation at the site is likely to continue if the depredating wolves are not removed ¹ .		X		
Lethal control may not be used when wolves kill dogs that are free-roaming, hunting, or training on public lands. ¹		X		
Lethal control efforts would not be initiated until a farm management plan has been signed by the producer.		X		
If a verified depredation has not occurred in the current calendar year, lethal control shall only proceed when all of the following conditions are met: 1) Verified depredation occurred at the site or in the immediate vicinity during the previous year; 2) There is strong evidence one or more members of the depredating pack has remained in the area since the verified depredation; 3) Based on wolf behavior and other factors, the depredation is likely to be repeated; and 3) Trapping is conducted in a location and in a manner to minimize the likelihood a wolf or wolves from a non-depredating pack is captured. ¹		X		
No lethal preventive damage management would be conducted by WS unless authorized by the WDNR and/or the USFWS as appropriate.		X		
Lethal depredation control activities must occur within distances specified by the USFWS or WDNR (depending upon status of wolves) of the depredation site.		X		
Young-of-year wolves trapped before August 1 must be released. ¹	X	X		
Lactating females trapped before June 1 may be released near the point of capture except those involved with chronic depredation problems where all adult wolves captured at depredation sites would normally be euthanized. ¹ WS will consult with the WDNR prior to euthanizing lactating females trapped prior to June 1.	X	X		

Standard Operating Procedures by Alternative	1	2	3	4
While wolves are federally listed, the accidental serious injury or mortality resulting from trapping activities to young of the year prior to August 1 may not exceed the number of individuals specified in the permit from the USFWS. In the event this number is met, all trapping activities shall cease. ¹	X	X		
While federally listed, all mortalities and serious injuries, whether intentional or incidental, shall be reported to the Service's Region 3 Endangered Species Permits Biologist, the Green Bay Field Office, and the Service's Law Enforcement Office within 5 calendar days. ¹	X	X		
While federally listed, an annual report of activities conducted under the authority of a USFWS permit is due on January 31. ¹	X	X		
On public lands, vehicle use would be limited to existing roads unless authorized by the land management agency.	X	X	X	
While federally listed, wolves, or wolf parts legally taken may be transferred to Native Americans for religious and/or cultural purposes, public educational use, or scientific research purposes. Specimens not suitable, or not needed, for such use must be destroyed.		X		
<i>Animal Welfare and Humaneness of Methods Used by WS</i>				
The use or recommendations of non-lethal methods such as guard dogs, scare devices, and other methods, would be encouraged when appropriate. ¹	X	X	X	
While wolves are federally listed, WDNR and WS could be authorized to train landowners and resource managers in the safe and effective use of non-lethal projectiles. These methods would not be available to landowners and resource managers without specific training from WDNR and/or WS personnel. ¹	X	X	X	
Wolf capture, handling, and euthanizing must be carried out in a humane manner which may include the use of foot-hold traps, cable restraints, shooting, calling and shooting and lethal injection. ¹	X	X		
Traps and cable restraints would be checked consistent with WDNR and USFWS requirements. At present, this includes a requirement that traps be checked at least once every 24 hours. ¹	X	X		
Research would continue to improve the selectivity and humaneness of management devices and these would be implemented into the WS Program.	X	X	X	X
Pan-tension devices are used to reduce the incidence of smaller non-target animal capture in foot-hold traps. ¹	X	X		
All trappers shall be trained in the trapping, chemical immobilization, and medical handling of animals, with emphasis on wolves, to minimize accidental injury and death of wolves. ¹	X	X		
Non-lethal projectiles (e.g., rubber bullets and bean bag projectiles) may be used.	X	X		
Non-lethal projectiles will not be used in a manner that would cause permanent physical damage or death to a wolf.	X	X		
Personnel will be trained in the safe and appropriate use of WDM techniques and equipment.	X	X	X	

Standard Operating Procedures by Alternative	1	2	3	4
<i>Safety Concerns Regarding Use of Traps and Cable Restraints</i>				
The WS' Decision Model, designed to identify the most appropriate wildlife damage management strategies and their impacts, is used.	X	X	X	
Traps and cable restraints would be placed so that captured animals would not be readily visible.	X ¹	X		
Warning signs would be posted on main roads and/or trails leading into any areas where traps or cable restraints were being used. These signs would be removed at the end of the damage management activities.	X	X		
No traps or cable restraints would be used by WS within one fourth mile of any residence, community, or developed recreation site, unless requested by the owner of a privately-owned property or an official from the appropriate land management agency.	X	X		
<i>Concerns About Impacts of WDM Activities on T/E Species, Other Species of Special Concern, and Cumulative Effects</i>				
Wildlife Services and WDNR consulted with the USFWS on the impacts of the program to federally listed T/E species in Wisconsin and will adopt all Reasonable and Prudent Measures established by the USFWS for the protection of threatened and endangered species.	X	X	X	X
Wildlife Services personnel are directed to resolve depredation problems by taking action against individual problem animals, or local populations or groups.	X	X	X	
Foot-hold traps or spring activated foot snares set near baits would incorporate tension devices to preclude capture of eagles and other non-target species.	X	X		
No foot-hold traps or cable restraints would be set within 30 feet of any exposed bait or animal carcass to prevent capture of raptors.	X	X		
No pesticides would be used by WS during WDM operations.		X		
The appropriate land manager and the USFWS would be notified as soon as possible, if a federally listed species is caught or killed.	X	X		
<i>Cultural Resources/Native American Concerns</i>				
This EA will be provided to the American Indian Tribes in a Pre-Decisional form to determine if all cultural issues have been addressed.	X	X	X	X
The Great Lakes Indian Fish and Wildlife Commission is a Consulting Agency in the preparation of this EA	X	X	X	X
Wildlife Services will comply with requirements for the notification of GLIFWC and the tribes agreed upon by the USFWS and WDNR	X	X	X	

¹ Items required in draft permit identified in the Conservation Measures or Terms and Conditions of the 2004 Biological Opinion on WDM from USFWS. Details may change slightly, depending upon the Alternative selected, and any permits and associated new Biological Opinions are completed

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions on the WDM objectives outlined in Chapter 1, the issues and affected environment discussed in Chapter 2, and the alternatives discussed in Chapter 3. This chapter analyzes the environmental consequences of each alternative and consists of 1) analysis of environmental consequences, 2) analysis of each alternative against the issues considered in detail, and 3) summary of impacts.

Under ordinary circumstance, impacts of the alternatives would be compared to the Current Program/ No Action alternative (CEQ 1981). CEQ guidance states that the “No Action” alternative can be defined as being the continuation of current management practices (CEQ 1981). However, the current program has only been in effect since the Federal Court Decision on September 13, 2005 (Sections 1.3.1 and 1.3.9). Insufficient data exist at this time to adequately use the impact of current management practices as a baseline for analysis. Alternative 2, the Proposed Action alternative was in effect for most of the period of April 1, 2003 to September 13, 2005 and is similar to the proposed action. Data are available on the environmental impacts of this earlier program. Therefore, for purposes of analysis we use Alternative 2, as the “No Action” baseline when comparing the other alternatives to determine if the real or potential adverse affects of the alternatives are greater, lesser or the same (Table 4-4).

4.1 SOCIAL AND RECREATIONAL CONCERNS, RESOURCE USE AND IMPACTS ON HISTORIC AND CULTURAL RESOURCES

4.1.1 Social and Recreational Concerns

Social and recreational concerns are discussed throughout the EA, in the WWMP (WDNR 1999), and in USDA (1997 Revised) whereby pertinent portions have been incorporated by reference. Social and recreational concerns are also addressed in the analysis of impacts on stakeholders, including aesthetics of wildlife, and impacts on humaneness for each of the alternatives analyzed in detail in Section 4.2 of this EA.

4.1.2 Irreversible and Irretrievable Commitments of Resources

The following resource values within Wisconsin would not be adversely impacted by any of the alternatives analyzed in this EA: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These will not be analyzed further.

Other than minor uses of fuels for motor vehicles and electrical energy for office maintenance, there are no irreversible or irretrievable commitments of resources. Based on these estimates, the Wisconsin WDM program produces very negligible impacts on the supply of fossil fuels and electrical energy.

4.1.3 Alternative Consistency with Forest Service LRMPs

Before an Alternative can be considered for implementation on Forest Service System lands, it must be consistent with the land management and/or resource management plans. These are termed Land and Resource Management Plans (LRMP) or more commonly “*Forest Plans.*” If

the Alternative is consistent with the LRMP, no additional action would be necessary by the Forest Service.

If an alternative that is inconsistent with the LRMP is selected in the decision process, the Forest Service could amend the LRMP to be consistent with the EA. The decision would not be implemented on the Forest until the inconsistency is resolved either through amendment of the LRMP or modification of the alternative(s). Any inconsistencies would be identified and resolved before the wolf damage management project is conducted. A work plan would be developed by WS with each National Forest before any wildlife damage management would be conducted, or in the rare instance, wolf damage management would be conducted under *emergency control only*. Wolf control trapping on USFS land in Wisconsin would only be considered, if such lands occurred within 1 mile of private land with depredation, if other suitable trapping locations are not available, and only after consultation with WDNR, WS and USFS that some such trapping will not jeopardize viability of wolf populations on the National Forest..

4.1.4. Impacts on Cultural, Archaeological and Historic Resources

A consultation occurred between WS and WSHPO on February 4, 2002 regarding the actions proposed in the 2004 WS EA on WDM in Wisconsin. It was determined that the “*Project as described will have no effect on significant cultural resources*” and the proposed action does not constitute a “Federal undertaking” as defined under Section 106 of the NHPA (Dexter 2002). Wisconsin WS would, as requested by WSHPO, halt work and contact the WSHPO if any cultural resources or human remains are discovered. The types of actions proposed in this EA are similar to those proposed in the 2004 WS wolf damage management EA (USDA 2004). The activities described under any of the proposed alternatives do not cause ground disturbances nor do they otherwise have the potential to significantly affect the visual, audible, or atmospheric elements of historic properties and thus are not undertakings as defined by the NHPA. Wildlife Services and the USFWS have determined that WDM actions are not undertakings as defined by NHPA because such actions do not have potential to result in changes in the character or use of historic properties. Each of the Wisconsin Native American Tribes and GLIFWC were invited to be a cooperating agency in the production of this EA. GLIFWC and Lac Du Flambeau Tribe agreed to be a consulting agencies and the Wisconsin Ho-Chunk Nation agreed to be a cooperating agency. These tribes have expressed concerns regarding the use of lethal WDM methods. The USFWS, WS, and WDNR are consulting with these tribes. Information from the tribes will be included in the final EA and/or the decision document for the EA.

4.2 ISSUES ANALYZED BY ALTERNATIVES

This section presents the expected consequences of each alternative on each of the issues analyzed in detail.

4.2.1 Alternative 1 - Non-lethal Damage Management Only

Effects on wolf populations. Under this alternative, the USFWS would not authorize the lethal take of wolves and WS would not use lethal methods for wolf damage management. The USFWS would authorize the use of non-lethal projectiles and aversive conditioning (e.g., dog training collars). Most non-lethal methods included in this alternative have been and are currently being utilized to reduce wolf predation on livestock in Wisconsin and do not require authorization from the USFWS (Section 1.7.7, Appendix B). Improvements in animal husbandry practices and the utilization of other non-lethal WDM methods like livestock guarding animals

have the potential to reduce wolf damage, however, these methods have not always resolved the damage problem in other areas, including Minnesota and Michigan. There are also situations where some non-lethal methods are not appropriate (e.g., the use of some noise-making frightening devices may be incompatible with land uses on adjacent properties). Bangs and Shivik (2001) reported that while non-lethal methods can be effective, many were expensive to implement and none available at the time were widely effective. A State compensation program would continue to be a valuable method for reimbursing farmers for losses and in preventing the wolf population from being an economic burden on individuals. However, there are also some difficulties with compensation programs (Section 3.3.1, Appendix B, Wagner et al. 1997).

There will be no intentional take of wolves for predation management under this alternative. However, under the ESA, anyone can take a wolf in defense of human life (i.e., when a wolf is attacking a person). Additionally, USFWS, Federal land management agencies, WDNR or their designated agents can take wolves in cases of non-immediate but demonstrable threats to human safety without a permit or other authorization from the USFWS. USFWS, WDNR, federal land management agencies, or their designated agents, may take a wolf to aid a sick, injured, or orphaned wolf. Total annual intentional take for these types of wolf management are not expected to exceed 5 wolves per year.

Regular use of techniques like non-lethal projectiles, aversive conditioning (e.g., dog training collars), and disruptive stimuli (remote activated frightening devices and guarding-and-hazing) is likely to be higher if access to lethal WDM methods is prohibited. Use of capture and relocation may also increase, but this may be a method of last resort because of difficulties with relocation discussed in Section 3.1.2 and Appendix B. Any activity that involves the capture and handling of wolves involves a risk of unintentional death of the wolf. Additional incidental take associated with capture and holding of females with pups may also occur and is as discussed for Alternative 2. There is also a low chance that the use of non-lethal projectiles could result in the death or serious injury of a wolf. WDM would be conducted in accordance with all permit conditions and other regulations established by the USFWS for the protection of wolves, and protective measures and regulations set by the WDNR. The use of traps and cable restraints to capture wolves for non-lethal WDM projects may be higher under this alternative than for Alternative 2, so incidental take of wolves for this alternative is anticipated to be low but still higher than for Alternative 2.

As discussed above, non-lethal methods are not always effective. This alternative is expected to result in a reduction in the efficacy of services provided to resolve wolf depredation conflicts; and it is reasonable to conclude will result in a reduction in tolerance of wolves by the landowners and an increase in illegal kill (Section 1.3.10). Illegal lethal control actions by private individuals are less likely to be very specific or very humane, and could potentially have more adverse impacts on the wolf population we are trying to recover than focused lethal actions by trained, authorized professionals. Any illegal lethal control by individuals is also less likely to be effective in reducing depredation events, as it would be less likely to target the specific depredating animals.

Cumulative Impacts

In summary, the removal of wolves by authorized actions will be lower than Alternative 2 because there will be no intentional take of wolves for WDM by Federal agencies¹⁴. However, as

¹⁴ The USFWS, Federal land management agencies, WDNR or their designated agents (WA) have the authority to remove wolves that are a demonstrable threat to human safety.

discussed above, there is likely to be an increase in illegal take of wolves by frustrated private individuals. The level of illegal take is difficult to predict, and, because of the remote rural nature of much of the area used by wolves in Wisconsin, will be difficult to prevent. Furthermore, it is unlikely that this illegal take will remove the depredating wolves, thus additional illegal take may follow. It is possible that cumulative take may exceed that anticipated under Alternative 2. Attitudes of landowners in areas where wolves are present are also likely to impact attitudes of landowners in areas where the wolf population may expand and could adversely impact future growth and expansion of the Wisconsin wolf population.

As discussed for Alternative 2, WDM decisions made in Wisconsin will have impacts on public reaction to management decisions in Michigan and *vice versa*. If this alternative is selected in Wisconsin, but a less restrictive version is selected in Michigan without clear-cut reasons for the decision, it is likely to increase public dissatisfaction with wolf management in Wisconsin, and may increase the likelihood that frustrated individuals will engage in illegal killing of wolves. If the same alternative were selected for the wolf depredation permit submitted by the MDNR, the anticipated negative actions are likely to be enhanced. Those livestock owners inclined to take illegal actions would find support and justification from their counterparts in the adjacent state, potentially increasing the amount of illegal take.

Effects on public and pet health and safety. There would be no lethal WDM activities. However, WS and WDNR would be using traps and cable restraints to capture wolves for population monitoring. Use of non-lethal methods like aversive conditioning and remote activated frightening devices that require a collar on a wolf, and trap-and-relocate efforts may increase if access to lethal WDM is not permitted. This could increase the use of traps and cable restraints to capture wolves for non-lethal techniques over that anticipated for Alternative 2, but would likely not exceed the total agency use of traps and cable restraints (non-lethal and lethal WDM combined) anticipated for Alternative 2. As with Alternative 2, traps and cable restraints would be strategically placed to minimize exposure to the public and pets. WS and WDNR post appropriate warning signs on properties where traps or cable restraints are set to alert the public of their presence. Under this alternative, traps and cable restraints would only be used with the specific intent of keeping the captured animal alive. Measures to prevent injuries and keep wolves alive will also reduce potential risks to pets and non-target species. In general, agency impacts under this alternative are likely to be similar to or slightly lower than the risks from the Past Action/Proposed Action program (Alternative 2).

There are provisions within the regulations pertaining to the ESA that allow for the lethal take of an endangered species in response to a demonstrable (either immediate or non-immediate) threat to human safety, so response to these threats will be similar to Alternative 2. However, response to threats to and wolf predation on pets will be restricted to non-lethal methods. As discussed above, non-lethal methods are not always effective in reducing problems with wolves. If wolf populations continue to increase without an effective damage management program in place, there may be potential threats to public and pet health and safety from wolves that enter people's yards or attack their pets. Therefore, risks to human and pet safety from wolves would likely be similar to or higher for this alternative than Alternative 2 because fewer WDM methods would be available. Additionally, frustrated individuals may attempt to solve wolf damage problems through illegal shooting, trapping, snaring, or poisoning. As a result of these illegal actions, there could be increased risks to public and pet safety from improper or unscrupulous efforts to resolve perceived problems with wolves. Poisons, especially, have high risks of severe adverse impacts on public and pet health and safety, as well as on non-target wildlife species.

Humaneness of methods to be used. While wolves are federally listed, this alternative would be considered more humane than Alternative 2 by many people that are opposed to lethal WDM techniques. However, because of personal beliefs that foot-hold traps and cable restraints are inherently inhumane, their use to capture wolves for research and non-lethal WDM projects, will cause some individuals to consider this alternative inhumane. When capturing wolves for population monitoring and non-lethal WDM efforts, wolves would be humanely captured by experienced WS and WDNR personnel using the best methods available. Tranquilizer trap devices (TTDs) can be used on wolf traps to reduce the incidence of self-inflicted injuries by captured animals (Appendix B). All activities would be conducted in accordance with USFWS permit requirements and Wisconsin wolf trapping guidelines which require that traps be checked at least once every 24 hours. Daily trap checks minimize the amount of time target and non-target animals remain in traps, and improve the likelihood that a non-target animal may be released unharmed. Some individuals would prefer that cage traps be used to capture wolves and would perceive this method as being more humane than traps and cable restraints. Unfortunately, the use of cage traps to capture wolves is usually impractical and ineffective because it is extremely difficult to get a cage trap big enough for an adult wolf into remote locations, and because it is rare to capture an adult wolf in a cage trap.

Even though wolves are federally protected as a threatened or endangered species, some property owners may take illegal action against localized populations of wolves out of frustration with continued damage and lack of legal access to the full range of WDM methods. Some illegal methods, like poisons, may be less humane than methods used by experienced agency personnel.

Impact to stakeholders, including aesthetics of wildlife. The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife and relationship to the problem. For example, individuals directly impacted by wolf predation may be less tolerant of wolves than individuals whose property and pets are not at risk. While wolves are federally protected individuals experiencing damage from wolves would likely oppose this alternative because they would likely feel that their access to an effective management alternative was being unduly restricted. They would probably be less opposed to this alternative once wolves are removed from the Federal list of threatened and endangered species because access to lethal WDM techniques would likely be available from entities other than WS in accordance with the WWMP (WDNR 1999).

Some individuals would prefer this alternative because they believe it is morally wrong to kill animals for any reason. However, there may still be concern about the use of traps and cable restraints to capture wolves for population monitoring and/or attachment of collars required for some non-lethal WDM methods. If wolves are removed from the Federal list of threatened and endangered species, lethal WDM techniques may be available in accordance with the WWMP and perceptions of this alternative by individuals opposed to lethal WDM would likely be the same as Alternative 2. However, this alternative may still be preferable to Alternative 2 for individuals who are specifically opposed to federal (WS) involvement in the operational use of lethal WDM techniques.

Some people would support this alternative because they enjoy seeing wolves, or having wolves nearby, and while wolves are federally listed, this alternative would prohibit the lethal removal of wolves. However, they might still be affected by relocation of depredating wolves. As discussed above, there is strong evidence from previous years and actions in other states that this alternative will not result in a decline in wolf density in Wisconsin and any difference in wolf viewing opportunities is likely to be negligible. Other opportunities to view, call and aesthetically enjoy

wolves will be available to people who make the effort to visit sites with adequate habitat adjacent to the immediate area where the wolf relocation occurred.

Effects on non-target species populations, including T&E species. While federally listed, there would be no lethal WDM activities. However, WS and the WDNR would use traps and cable restraints to capture wolves for wolf population monitoring and some non-lethal WDM methods. Lack of access to lethal WDM techniques may result in increased use of traps and cable restraints associated with non-lethal techniques over that anticipated for Alternative 2, but would likely not exceed the total agency use of traps and cable restraints (non-lethal and lethal WDM combined) anticipated for Alternative 2. As with Alternative 2, trap and cable restraint selection, settings (stops on cable restraints, pan tension devices, etc.), placement and lures will be designed to minimize risks to non-target species. Unfortunately, despite these precautions, traps and cable restraints may occasionally capture non-target species such as white-tailed deer (*Odocoileus virginianus*), black bear, bobcat (*Lynx rufus*), coyote and dogs (Table 4-3). Overall risks to non-target species from legal WDM actions would be similar to or slightly lower than Alternative 2 (no action / proposed action). Under this alternative, traps and cable restraints would only be used with the specific intent of keeping the captured animal alive. Measures to prevent injuries and keep wolves alive will also reduce risks to non-target species. These risks are very low and take is anticipated to be well below the sustainable harvest level for non-target species populations. Measures to reduce risks to non-target species are included in the SOPs described in Chapter 3 and discussed in Appendix B. All actions would be conducted in accordance with USFWS permit requirements and Wisconsin wolf trapping guidelines which require that traps be checked at least once every 24 hours. Daily trap checks minimize the amount of time target and non-target animals remain in traps, and improve the likelihood that a non-target animal may be released unharmed.

Some individuals frustrated with wolf management policies might attempt to illegally shoot, trap, snare, or poison wolves with potential detrimental effects on non-target species including T/E species (Schueler 1993, USDA 1997, Revised). Illegal use of toxicants represents one of the cheapest forms of predator removal, but it also presents the greatest environmental risks (Allen et al. 1996). Under this alternative and while wolves are federally listed, risks to T/E and other non-target species from illegal actions would probably be greater than Alternative 2.

The USFWS has concurred that the WS WDM methods are not likely to adversely affect the bald eagle (*Haliaeetus leucocephalus*), will not jeopardize the continued existence of Canada lynx (*Lynx canadensis*) and are not anticipated to result in the incidental take of lynx (J. Smith, USFWS, August 12, 2003; L. Lewis, USFWS, May 9, 2001). WS has determined that the proposed action will have no effect on all other federally listed non-target species and critical habitat in Wisconsin with the exception of wolves (target species discussed above). WS and WDNR will adhere to all Conservation Measures, Terms and Conditions and other provisions identified in the Biological Opinion currently being prepared by the USFWS for the protection of federally listed species. The WDNR is reviewing this EA to verify that WS' WDM activities would have no effect on or are not likely to adversely affect state listed T/E species. Any recommendations made by the WDNR to protect state listed species would be incorporated into WS' WDM and wolf population monitoring efforts. Standard Operating Procedures intended to reduce the risks to non-target species are provided in Chapter 3.

4.2.2 Alternative 2 - Integrated WDM (No Action / Proposed Action)

Effects on wolf populations. This alternative was used for most of the period of April 1, 2003 to September 13, 2005 (Section 1.3.9). However, since the September 13, 2005 court injunction

prohibiting WDM efforts that were covered under specific authorization from the USFWS, the WDNR, WS and USFWS have only been providing technical assistance on non-lethal methods that can be used in Wisconsin without a permit from the USFWS. Integrated wolf control management strategies and methods proposed for use under this alternative would ensure resolution of the highest number of damage incidents with minimal negative environmental impacts. A State compensation program would continue to be a valuable method for reimbursing farmers for losses to wolves to help prevent the wolf population from being an economic burden on individual livestock producers. However, there are some difficulties with compensation programs (Section 3.3.1, Appendix B, Wagner et al. 1997). Livestock producers would be provided information about farm management practices (animal husbandry) and non-lethal methods to help reduce the potential for wolf damage at farms or mitigate such damage. Wolf damage management actions would be conducted in accordance with all Federal and State requirements for the conservation of gray wolves including permit conditions and other regulations established by the USFWS in 10(a)(1)(A) permits and 4(d) rules, and requirements of the WWMP..

Environmental Baseline for Wisconsin Wolf Population

Throughout the range of the wolf, generally three factors dominate wolf population dynamics: food, people, and source populations (Fuller et al. 2003). These factors are likely to play the primary role regulating Wisconsin's wolf population, as well.

Food

Prey density and vulnerability are important in determining what areas wolves inhabit and at what level. It appears that, over time, absent severe human persecution, wolf numbers are mainly limited only by food (Fuller et al. 2003). Eventually in the core areas of wolf range in Wisconsin and Michigan, density of wolves will probably be limited by food availability (ungulate biomass). However, as wolf pack establishment occurs on the edge of the primary wolf range in more fragmented habitat the level of direct and indirect human related mortality is likely to increase (Jensen et al. 1986, Mech et al. 1988, and Mech 1989, Mladenhoff et al. 1999). Because the Wisconsin population continued to grow at approximately 12% annually over the last 5 years (Figure 1-2), it is unlikely that prey is currently limiting the expansion of the wolf population in the State.

People

The indirect or direct killing of wolves by humans also is important in determining the location and density of wolf populations (Fuller et al. 2003). Direct killing of wolves still occurs, however at much lower rates than was experienced in the past. In Wisconsin, there were 41 known wolves killed as a result of poaching from 2000 to 2004.

Wolf populations do not appear to be greatly affected by other human factors such as snowmobiles, vehicles, or logging activities, except when they result in accidental or intentional killing of wolves or changes to prey density (Fuller et al. 2003). If the wolf population is large enough, even when these factors have an adverse affect on individuals, these activities seem to have little effect on the wolf population (Fuller et al. 2003). From 2000 – 2004, 78 wolves are known to have been killed in Wisconsin as a result of vehicle collisions. This level of mortality has apparently not inhibited the continued increase of the Wisconsin wolf population over the same period (Figure 1-2).

Traditionally the landscape factor that seemed to correlate most closely to wolf pack presence in the Great Lakes region was road density (Thiel 1985, Fuller et al. 2003, Mladenoff et al. 1995, 1999, & 2005, Potvin et al. 2005). Early research suggested maximum road density of 0.6 km/ km² for suitable wolf habitat (Thiel 1985, Mladenoff et al. 1995), but recent research suggests road densities as high as 0.7 km / km² are suitable for wolf pack territories (Mladenoff et al. 1999, Potvin et al. 2005). Recent surveys in Minnesota indicate that road densities and forest cover appear to have stabilized the spread of the Minnesota wolf population (pers. comm. John Erb, April 2005). Human caused mortality tends to be higher near roads and in areas with higher road density (Wydeven et al. 2001). Wolves don't necessarily avoid roads, and in fact readily use forest and logging roads for travel corridors, but road density apparently provides a good measure of likely level of human contact. Higher levels of human contact apparently relate to higher levels of intentional and accidental killing of wolves by humans (Wydeven et al. 2001). Other measures of human contact/ presence such as human population densities also correspond well to areas occupied by wolf packs (Fuller et al. 1992, Mladenoff et al. 1995). Apparently structural or vegetation components do not predict wolf habitat as well as indices that measure human influence as long as prey is adequately abundant (Potvin et al. 2005).

Source Populations

Source populations are important in establishing new populations and maintaining populations that are heavily harvested or experience high mortality from other causes (Fuller et al. 2003). As Wisconsin has had a resident wolf population for over 20 years and is not presently subject to heavy harvesting or other forms of excessive mortality, connectivity with source populations in Michigan, Minnesota, and Canada is probably of lesser importance at this time. However, it is important to note that Wisconsin wolves are not an isolated population. Immigration and emigration of wolves among the Wisconsin, Michigan Upper Peninsula, Minnesota and Canada wolf populations occurs. Immigration from a source population in Minnesota was the basis for the re-establishment of the Wisconsin wolf population (Wydeven et al. 1995). Immigration may not have a large annual effect on the Wisconsin wolf population but it likely contributes to the long-term sustainability of the population.

Other Factors

Natural mortality is a factor affecting the Wisconsin wolf population. The two main sources of natural wolf mortality described by Fuller et al. (2003) were starvation and intraspecific strife. Natural mortality factors were responsible for an average of 48% of all known mortality in Wisconsin wolves from 200-2004 (Table 4-1). From 2000 to 2004, WDNR documented that natural mortality resulting from mange is the cause of 26% of all radio-collared wolf deaths in Wisconsin (Table 4-1). In Wisconsin, natural mortality of wolves does not seem to be adversely impacting the wolf population as it continues to increase by approximately 12% annually over the last 5 years.

Table 4-1. Natural mortality of radio collared wolves in Wisconsin 2000 – 2004 (Adrian Wydeven, WDNR, pers. comm. March 2005). Number in parenthesis is percentage of total mortality (natural and human caused) observed in radio collared wolves.

Mortality Factor	2000	2001	2002	2003	2004	Total¹
Mange	4	4	2	6	3	19 (26%)
Other disease	1	2	1	2	-	6 (7%)
Malnutrition	-	-	2	-	-	2 (2%)
Other wolves	3	2	1	1	1	8 (11%)
Accident	-	-	1	-	-	1 (1%)
Total	8	8	7	9	4	36 (48%)

¹ Proportion of all known mortality attributable to this cause.

It is unknown how the addition of human-caused mortality would affect natural mortality rates. However, as compensation operates in wolf populations as in other populations, an increase in human caused mortality likely would result in a decrease in natural mortality. In any case, the demonstrated annual rate of increase in the Wisconsin wolf population has occurred in spite of all causes of mortality and cumulative impacts on the population including WDM.

The Eastern timber wolf has exceeded the numerical recovery goals as listed in the Federal and State recovery plans (Section 1.3.2). The Federal plan requires that at least two viable wolf populations must exist within the eastern United States. One of these populations must be reestablished outside of Minnesota and Isle Royale. The Federal recovery plan provides two alternatives for reestablishing this second viable wolf population. If the wolf population is more than 100 miles from the Minnesota population, it must contain 200 wolves for at least 5 consecutive years (USFWS 2003). If the wolf population is less than 100 miles from the Minnesota population, it must contain at least 100 wolves for at least 5 consecutive years (USFWS 2003). The Michigan/Wisconsin wolf population is less than 100 miles from Minnesota and recent surveys indicate more than 800 wolves in these two states. A minimum population of at least 100 wolves has been exceeded for twelve consecutive years (Fig 1-3). Also, while no numerical individual state recovery criteria for Michigan and Wisconsin are listed in the Federal plan, State subgoals were incorporated. For Wisconsin and Michigan, the subgoals are 80 and 80 – 90 wolves, respectively (USFWS 1992). Current populations in both these States are more than four times these numerical subgoals. Recent data indicate that the wolf population in Wisconsin and Michigan continues to increase.

The Federal recovery plan also required that the wolf population in Minnesota be stable or growing, and that its continued survival must be assured. In Minnesota, the wolf population size is not surveyed or estimated annually, however during the winter of 2003-2004, the Minnesota Department of Natural Resources (MNDNR) conducted a new survey of wolf distribution and abundance in Minnesota (Erb and Benson 2004). The survey estimated that there could now be as many as 3,020 wolves (range 2,300 – 3,700) in the state, but cautioned that during 2001-2003 Minnesota's wolf population may have actually stabilized around 2,500 wolves due to wolf mortality from a significant outbreak of sarcoptic mange. A wolf depredation control program, similar to the preferred alternative for this EA, has been conducted in Minnesota since 1978 when wolves were reclassified as threatened and a 4(d) regulation was promulgated. After 25 years of wolf damage management including lethal removal of wolves, the Minnesota wolf population has still increased by 245%, or almost 2 ½ times the 1979 population and at present is believed to be relatively stable.

The primary factors influencing wolf recovery in Wisconsin are prey density, human related mortality, and natural mortality. The current rate of population increase will likely not continue into the foreseeable future. As the wolf population in Wisconsin expands to fill all available habitat, or as the cultural carrying capacity is approached, the rapid population growth rate is expected to slow and eventually stop. At that time we would expect to see negative growth rates (that is, wolf population declines) in some years, due to short-term fluctuations in birth and mortality rates. However, adequate wolf monitoring programs, as identified in the WWMP (WDNR 1999), should identify excessively high mortality rates or low birth rates and would trigger timely corrective action (e.g., reductions in allowable take for WDM, measures to address the source of the high mortality rates or low birth rates) when necessary.

Impact of Proposed Action

Intentional Take

For most of the period from 2003 until the court order in September 2005, the WDNR and Michigan Department of Natural Resources (MDNR) operated wolf damage management programs under the authority of a special 4(d) rule or a 10(a)(1)(A) permit. The level of intentional lethal take of wolves at depredation sites in Wisconsin ranged from 5.1 to 6.8% of the late winter wolf population (Table 4-2). Under this alternative, an annual maximum of 10% of the previous late-winter wolf population would be intentionally lethally taken for all types of WDM¹⁵. For a Wisconsin wolf population of 425 individuals, maximum annual lethal take would be 43 individuals. Actual annual take of wolves for WDM is anticipated to usually be lower than this level. However, as the wolf population in Wisconsin increases, WS, WDNR and the USFWS anticipate that requests for WDM assistance will also increase. The annual maximum value of 10% was estimated based on review of a similar program which has been in effect in Minnesota since 1986. For the period of 1993 to 2002 intentional take for WDM in Minnesota ranged from 3.9 to 9.4% (average 6.4%) of the estimated state population. As stated above, this level of WDM did not prevent the Minnesota wolf population from expanding to its current level.

Data from previous Wisconsin WDM activities indicates that some of the animals euthanized during the period of 2003-2005 were in fact young of the year taken after August 1, and, thus, were members of an age group not yet in existence at the time of the late winter count. Therefore calculations of the proportion of the wolf population taken by WDM that are calculated by dividing the total number of wolves taken by the previous late winter wolf population estimate are an over-estimate. The actual number of young of the year to adults lethally taken at Wisconsin depredation sites was 8 of 17 in 2003, 4 of 24 in 2004, and 9 of 29 in 2005. Therefore, the number of wolves greater than one year of age lethally taken in 2003 was 9, out of a late-winter population total of 335, or 2.7 percent. In 2004, this number was 20 out of 373, or 5.4 percent, and in 2005, 20 out of 425, or 4.7 percent. For the three years combined, lethal take represented approximately 4 percent of the individuals in the late winter population.

¹⁵ Includes take by designated agencies for the protection of human safety. Does not include euthanization of sick or injured wolves (injuries that are not related to actions proposed in this EA) that does not require a permit or other authorization from the USFWS because these wolves were likely to die even if agency action was not taken.

Table 4-2. Wisconsin estimated wolf population and known mortality from all causes and wolf mortality from wolf damage management.

Year	Estimated Wolf Population	Total Known Mortality (includes wolves euthanized for damage management)	Total % Known Mortality for Population	Mortality from Damage Management	% of Mortality from Damage Management
2000	248	25	10.1%	0	0%
2001	257	26	10.1%	0	0%
2002	323	59	18.3%	0	0%
2003	335	53	15.8%	17	5.1%
2004	373	66	17.7%	24	6.4%
2005	425	65	15.3	29	6.8%

Incidental Take

Incidental take is the unintentional injury or death of wolves as a result of management activities. Sources of incidental take from non-lethal WDM methods include death or serious injury of a wolf from a poorly placed or close range shot from a non-lethal projectile, potential injuries associated with aversive conditioning methods like dog shock collars, and injury or death of wolves captured for population monitoring or attachment of collars used for non-lethal WDM methods like Radio Activated Guard (RAG) boxes. Incidental take associated with lethal WDM methods includes injury or death of young of year taken prior to August 1; indirect injury or death of pups if lactating females are captured (prior to June 1) and die or are not released in a timely fashion; and indirect injury or death of pups if lactating females (repeat depredators) are euthanized. Implementation of the Conservation Measures and Reasonable and Prudent Measures permit conditions or other requirements that could be established in future 4(d) rules by the USFWS would minimize incidental take. The estimates provided below are based on past experiences combined with a prediction of future wolf depredation control needs and are the best estimates currently available.

Non-lethal projectiles (rubber bullets and bean-bag projectiles) are among the methods available under this alternative. Use of this method requires that the projectiles be used every time the wolf attempts to prey on the protected resource so the wolf does not identify conditions when they can obtain prey without receiving a negative experience (Shivik 2004). Consequently, this method is most effective when the landowner/resource manager(s) assist with the implementation. The USFWS may choose to allow the WDNR and WS to train individuals in the use of this method. Anyone using this method would be required to go through a training course on the safe and effective use of this technique. These projectiles can be deadly at very close range or if a vulnerable spot on the body is hit, although the likelihood of this type of injury is very low (Bangs, USFWS, pers. comm., Bangs et al. (2004) Appendix B). In the Western U.S., the USFWS has issued approximately 200 permits to landowners for the use of non-lethal projectiles after the landowner had received special training in the use of the method. In that time, only a few dozen wolves have been shot at and less than 5 have been hit. All of the wolves ran away, and none of the wolves appeared to have been seriously injured (Bangs, USFWS, pers. comm.). Based on past experience, risks to wolves from this technique are considered to be extremely low (<1 wolf death/5 years).

Some non-lethal techniques like frightening with RAG boxes and aversive conditioning with dog training collars (Appendix B) require the placement of a transmitter collar on the wolf. Wolves are also captured and transmitter collars installed as part of WDNR wolf research and population monitoring. WDNR estimates that about 15-30 wolves annually will be collared in Wisconsin. Wolves are typically captured using foot hold traps, anesthetized, collared, and then released. Use of cage-type live-capture devices is not very effective and, because of the size of the trap required and the remote location of many trapping sites, it is also impractical. Although this activity is similar to trapping for lethal control of wolves, the intent of this activity is not to harm, but rather to gather information and release the animal unharmed. Injury to or death of a wolf from the capture, handling and anesthesia process can occur but incidence of these occurrences is very low. From 1993 to 2004, the WDNR and their agents' trapping efforts resulted in the incidental death of eight wolves or an annual average of less than 1 wolf per year but has been as high as 2 wolves in one year. Based on past records and anticipated increases in the wolf population and associated efforts to capture and handle wolves for research and non-lethal WDM, total annual lethal incidental take of wolves for this factor is anticipated to be up to 5 wolves per year.

Although the occasional trapping of lactating females could cause incidental death of pups, if pups are near weaning age other pack members will help feed pups (Packard 2003). During early lactation, the female generally remains close to the den, reducing risk of capture (Packard 2003). Thus in general, incidental death of pups due to capture of lactating females would be a relatively rare mortality factor for Wisconsin wolf pups. Records indicate that during the last 3 years there have been 70 wolves euthanized during WDM efforts. Only two of these 70 wolves were lactating females. One was captured on June 19 when pups were likely to be able to survive without the female. One was captured on May 22 when the risk of pup mortality was higher.

Under the proposed action, females captured prior to June 1 would be released unless the female was believed to be involved in repeat depredation. The average litter size in Wisconsin is 5 pups. We anticipate that incidental take of these pups would usually be in the form of harm or minor injury, not necessarily death since most lactating females will be released within 24 hours. If a lactating female was captured and intentionally euthanized because of repeat involvement in depredation or is unintentionally killed during capture and release, up to 5 pups may be incidentally killed. Based on the WDM records for Wisconsin we anticipate that a maximum of 1 lactating female might be unintentionally killed per year before June 1 and that there will be years when no lactating females are lethally taken prior to June 1.

WDNR records indicate that for the interval of 2003-2005 0, 3, and 5 pups respectively were captured during WDM activities conducted before August 1. Incidental take associated with trapping young of year wolves would likely be in the form of harm and injury, but not death, as young would be released within 24 hours. Based on previous records of total annual take of young of the year (before and after August 1) and anticipated increases in the WI wolf population, we anticipate that no more than 15 young of year wolves may be captured prior to August 1 annually. Total annual take was used in this consideration because take of young of the year depends primarily on the location of the rendezvous site and not time of the year. Of the 15 young-of-the-year potentially captured prior to August 1, an incidental take via death or serious injury of up to 5 wolves would be allowed in the permit. Because of their smaller size, risks to young-of-the-year from WDM activities may be greater than those to adults. This represents a worst-case scenario and actual take of young-of-the year is likely to be

lower. In the past three years only 2 young-of-the-year were seriously injured or killed during WDM efforts. Even though not all of the 5 young-of-the-year are likely to be killed, for purposes of estimating cumulative impacts on the wolf population below, seriously injured wolves will be treated as if there were killed.

In summary, total incidental take in the form of death or serious injury (lethal take) to adult wolves from the proposed action would not exceed 6 adults (less than one female per year incidentally taken prior to June 1, less than one adult per year incidentally taken from normally nonlethal WDM methods like RAG boxes and nonlethal projectiles, and up to 5 wolves per year incidentally taken from research and relocation) and 10 young-of-the-year (5 associated with death of female prior to June 1 and 5 from capture prior to August 1).

Impacts on the Wisconsin Wolf Population

We anticipate that annual lethal take of wolves would be 10% of the wolf population estimate from the previous winter for intentional take and an additional 5 adults and 10 young-of-the-year via lethal incidental take. Using the 2005 population estimate and including the take of young-of-the-year that were not present during the late winter population survey, the maximum level of take (intentional and incidental) that could have occurred in 2005 under the proposed action would be 13.4% of the late-winter population (42 intentional plus 15 unintentional). From 2003 to 2004 the Wisconsin wolf population increased 11.3% even though 5.1% of the wolf population was taken for WDM. Similarly from 2004 to 2005, the Wisconsin wolf population increased 13.9% even though 6.4% of the population was taken for WDM. For the two years for which there has been lethal take at depredation sites in Wisconsin and population data for the subsequent year, the wolf population continued to grow and it is unclear if these depredating wolves had not been removed, whether there would have been greater increase in the population. Compensatory mortality factors may be affecting wolves, that is, as lethal controls increase other mortality factors decline. Wolves in agricultural areas occupy areas of higher road densities, where risk of human-caused mortality can be fairly high (Wydeven et al. 2001). Also without governmental lethal controls available, retaliatory and illegal kill may have been higher, possibly causing even greater mortality. It would not be reasonable to add the percentage wolves removed through depredation control activities to the subsequent year population and assume there would be that many more wolves in the population if not for lethal controls. The interactions and compensation factors affecting wolf mortality survival rates are too complex for making this kind of comparison. All that can be said with certainty is that while 5.1 to 6.4 % of the winter wolf population were removed, wolf numbers still increased by 11.3 and 13.9% in the following years. Overall rates as high as 13.4 % are not likely to negatively impact wolf populations that could potentially tolerate annual removals as high 30% or greater (Fuller et al. 2003)

The estimate that cumulative wolf mortality may be up to 13.4% of the population is probably an overestimate of the impact on the population because the estimate of the number of wolves that might be taken includes young-of-the-year, but the estimate of the population that the removal might impact does not include young-of-the-year. With pups included, the actual wolf population at the time WDM is conducted may be much higher than the count from the previous winter. Wolves normally undergo drastic fluctuations in their annual abundance. If the Wisconsin wolf population in 2004 with 373 wolves included 108 breeding females (108 breeding packs), and each female produced 5 pups, then the early spring population would have been about 913 wolves. But generally only 30 % of pups survive to the end of their first year, and annual adult survival is about 70% (Wydeven et al. 2003).

Using these calculations, the population would be expected to be 423 wolves by late winter. This compares closely to the actual estimation of 425 wolves. Early mortality rates for young-of-the-year are high and, but by late fall when the need for WDM is greatly diminished pup survival rates have usually stabilized to rates similar for adults. The addition of pup mortality as result of control actions is unlikely to substantially increase total pup mortality rates.

Many studies have examined various levels of mortality and harvest and the impacts these mortality levels have on gray wolf populations:

- Mech (1970) suggests that over 50% of wolves older than 5-10 months must be killed to “control” the wolf population, but other researchers have indicated declines may occur with human-caused mortality at 40% or less of fall wolf populations (Ballard et al. 1987, Peterson et al. 1984). Control in this instance means keeping the wolf population below the level to which it would rise without human caused mortality.
- Gasaway et al. (1983) recorded stable wolf populations after early winter harvests of 16 to 24%, and wolf population declines of 20 – 52% after harvests of 42 - 61%.
- Ballard et al. (1997) suggests that the wolf population remained stable at 53% winter mortality, which included both natural and human-caused mortality.
- Fuller (1989) observed stable or slight increases in the wolf population at an annual human caused mortality rate of 29%. It appears that 30 to 35 % human caused mortality of late fall or winter population can be tolerated by most wolf populations without causing population declines (Fuller et al. 2003).
- During the period of 1993-2002, the USDA WS program in Minnesota has lethally taken an average of 6.4% of the winter wolf population as part of implementing a depredation control program in Minnesota. Despite this level of take for WDM, the Minnesota wolf population increased from an estimated 1,500 wolves in 233 packs in 1988-98 to 2,445 wolves in 385 packs in 1997-1998 and 3,020 wolves in an estimated 485 packs in 2004. This increase occurred while the WS control program occurred, and while other natural and human caused mortality occurred and while this population provided most, if not all, of the source wolves for Wisconsin and Michigan.
- Haber (1996) reported that wolf populations may not be able to withstand repeated annual reductions of 25-50%. He believes these removals, in the form of hunting, trapping, and government control efforts, may have impacts on wolf population dynamics, social interactions, and the long-term health of the population. Haber also reported that it is difficult to fully understand the impacts of wolf exploitation because detailed comparative information on behavior from both exploited and protected wolf populations is scarce (Haber 1996).
- Haight et al. (2002) modeled the impacts of various wolf removal strategies for WDM including reactive removal (wolves removed after depredation occurs), preventive removal (wolves removed in winter from areas with a history of wolf conflicts); and population size management (wolves removed annually from all territories near farms). None of the strategies threatened wolf populations unless the wolf population was isolated because WDM was confined to the area near farms. For isolated populations, reactive removal was the only alternative that ensured damage reduction and population conservation. The model predicted that population could withstand a sustained harvest of 20-25%. The authors considered this to be a conservative estimate and that the model likely underestimated compensatory factors in wolf population biology.

As discussed previously, compensatory mortality operates within the wolf population. Compensatory mortality suggests that if more wolves are killed for depredation control purposes, fewer wolves will die from starvation, interspecific strife, or other natural causes. Therefore, based upon the various studies cited previously, it is the belief of WS, USFWS, and WDNR that the removal of 14% of the population annually will not increase total mortality by 14%, and will not greatly influence gray wolf numbers in Wisconsin. Even if a large portion of the 14% take is additive mortality, this additional mortality might result in a decreased rate of population growth, but is not expected to reduce the recovery or survival of the wolf population in Wisconsin.

A given wolf population's productivity is likely the most important factor in determining the annual percentage of a wolf population that can be killed by humans without reducing the population (Fuller et al. 2003). The higher the population's productivity, the higher the level of mortality the population may sustain. Currently, the Wisconsin wolf population is highly productive. Over the past 5 years the wolf population in Wisconsin increased at an average of 12% annually (Figure 1-2).

Furthermore, wolf mortality due to poaching may decrease with the implementation of the depredation compensation program. In the absence of a compensation program, it is more likely that wolves perceived to be causing depredation would be illegally killed. Illegal killing likely would be less selective and may remove more individuals than is necessary to curtail depredation activities. Hence, a reduction in poaching may off-set some of the mortality associated with the depredation control program.

Cumulative Impacts on the Wolf Population

One of the best predictors of the cumulative impact of WDM and all other factors on the Wisconsin wolf population is the impact of similar wolf damage management programs in Minnesota and Michigan. In Minnesota, the wolf population size is not surveyed or estimated annually, however in 2004 Minnesota Department of Natural Resources (MNDNR) estimated the wolf population had reached approximately 3,020 individuals. The previous estimate (for the winter of 1997-98) estimated a Minnesota wolf population of 2,445 wolves. A wolf depredation control program, similar to the one described for Wisconsin in this EA, has been conducted in Minnesota since 1978 when wolves were reclassified as threatened and a 4(d) regulation was promulgated. As discussed above, for the period of 1993 to 2002 intentional take for WDM ranged from 3.9 to 9.4% (average 6.4%) of the estimated state population. For most of the last 25 years of wolf damage management including lethal removal of wolves, the Minnesota wolf population increased and it is only in the last few years that the population has stabilized. This level of take does not appear to have hindered the recovery of the gray wolf in Minnesota or the establishment and recovery of the gray wolf populations in Wisconsin and Michigan.

In Michigan, the wolf population has also been increasing (Figure 1-3). For most of the period from early 2003 until the court order in September 2005, the WDNR and MDNR operated a wolf damage management program under the authority of a special 4(d) rule or a 10(a)(1)(A) permit. The level of intentional take of wolves at depredation sites in Michigan has been 1.2, 1.6, and 0.5% of the late-winter Michigan wolf population for 2003, 2004, and 2005, respectively. During this same period, the Michigan wolf population has experienced annual growth rates of 15.5%, 12.2% and 12.8%, respectively. The observed levels of population increase have occurred despite all known and unknown (cumulative) impacts on the wolf populations in these states.

Like WDNR, the MDNR has also sent the USFWS a request for permission to use non-lethal projectiles, aversive conditioning and lethal WDM methods. An analysis of alternatives for addressing wolf damage and conflict management in Michigan has been released for public comment. If the Integrated WDM Alternative (both non-lethal and lethal control) is selected for both states, management of the respective wolf populations would be similar to the management that has occurred in Minnesota for the past 25 years. Existing data strongly indicates that the wolf population in all three states would continue to increase, or at a minimum (i.e., in Minnesota), remain stable. At the same time, it is believed that if this alternative were implemented in both Michigan and Wisconsin, public acceptance of the wolf population would be greater than for any of the other alternatives because there would be an effective legal recourse to depredation problems and assurance that management agencies would be able to protect human safety and domestic livestock.

Although this alternative is not anticipated to result in a reduction in the state wolf population, this alternative could result in a localized decrease in the wolf population at the specific site where the damage management occurs. New wolves would likely recolonize removal sites as long as suitable habitat exists. Dispersing wolves can establish new territories if suitable areas and mates are available. Such areas are either unoccupied spaces or sections at the edge of existing territories. The amount of time until new wolves move into the area would vary depending on the habitat type, time of year, and the population density of wolves in nearby areas. Local population reductions as the result of depredation control activities would not result in a decline in the overall Wisconsin wolf population, but may decrease rates of growth. The cumulative and indirect impacts of this program are also discussed in the Eastern Timber Wolf Recovery Plan (USFWS 1992).

Wolf populations in Michigan, Wisconsin and Minnesota have exceeded state and federal recovery goals and are expected to continue to increase until suitable habitat has been saturated. Recovery criteria in the Federal Wolf Recovery Plan require that at least two viable wolf populations must exist within the eastern United States. Furthermore, these two populations must satisfy the following conditions. First, the survival of the wolf in Minnesota must be stable or growing, and its continued survival must be assured. Second, another population must be reestablished outside of Minnesota and Isle Royale. The Plan provides two alternatives for reestablishing this second viable wolf population. If the population is beyond 100 miles from Minnesota population, it must contain 200 wolves for at least 5 consecutive years (USFWS 1992, 2003a). If the population is within 100 miles of the Minnesota population, it must contain at least 100 wolves for at least 5 consecutive years (USFWS 1992). While the Plan identifies no numerical recovery criterion for Minnesota, the Plan does identify State subgoals for use by land managers and planners. For Minnesota, the Plan's subgoal is 1,251 to 1,400 wolves. The Minnesota wolf population currently is estimated to be more than double that numerical goal. The Michigan/Wisconsin wolf population is less than 100 miles from Minnesota and recent surveys indicate more than 830 wolves in these two states. The combined Michigan/Wisconsin population has contained over 100 wolves since 1994. Also, while no numerical individual state recovery criteria for Michigan and Wisconsin are listed in the Plan, State subgoals were incorporated. For Wisconsin and Michigan, the Plan's subgoals are 80 and 80 – 90 wolves, respectively (USFWS 1992). Current populations in both these States are more than four times these numerical subgoals.

Wolves in Michigan and Wisconsin have the same Federal recovery status; the wolf populations in both states have exceeded State and Federal recovery goals; and both States have requested permits for WDM. Management decisions made in one State will have impacts on public reaction to management decisions in the other State. For example, if the same management alternative is selected for both states, there is unlikely to be any public reaction other than that directly related to individual perceptions of the alternative. However, selection of differing alternatives without clear-cut reasons for the decision is likely to increase public dissatisfaction with wolf management, and, in the area with the most restrictive management alternative, may increase the likelihood that frustrated individuals will engage in illegal killing of wolves.

All indications from the literature and the analysis above indicate that, given that WDM would be conducted in accordance with all permit conditions and other regulations established by the USFWS for the protection of wolves, and Conservation Measures and Reasonable and Prudent measures proposed by the USFWS in the draft permit and associated Biological Opinion, implementation of this alternative is not likely to threaten the continued persistence of the wolf population, and would likely still allow for some level of population increase. Based on the rate of increase for the Michigan and Wisconsin wolf populations, the wolf population is large enough and healthy enough that even while the proposed action and all other mortality factors have adverse effects on individuals, they will not result in a reduction in the state wolf population. The following factors were of primary importance in this determination:

- 1) The wolf population in Michigan, Wisconsin, and Minnesota has surpassed recovery goals and the wolf population continues to increase in all three States.
- 2) The average annual rate of increase for the Michigan and Wisconsin wolf population over the last 5 years is approximately 12%.
- 3) Based on literature and experiences from the Minnesota and the Northern Rockies wolf depredation control programs and assessments above, the proposed level of take is unlikely to cause a decline in the wolf population. This rate represents only about 1/3 the potential human mortality that a wolf population could sustain (Fuller et al. 2003). The current rate of increase in the Wisconsin population may slow as a result of the proposed action.
- 4) In 2003 and 2004, WDNR employed the same lethal methods discussed here to resolve selected wolf depredations. Those measures appear to have had limited impact on the overall Wisconsin wolf population.
- 5) Implementation of the proposed action will help to preserve current levels of human tolerance for the species in Wisconsin, which is expected to reduce illegal take of wolves that may otherwise occur in the absence of lethal control of depredating wolves. This action is expected to stabilize or reduce that component of the current mortality rate, which will partially off-set the additional mortality that will occur as a result of the proposed action.
- 6) We believe that the proposed action is unlikely to cause a substantial decline in annual recruitment and will not appreciably reduce the survival or recovery of the wolf in Wisconsin.

Effects on public and pet health and safety. WS conducted a formal risk assessment of methods proposed for use in this EA (USDA 1997 Revised). The assessment concluded that when traps, cable restraints, firearms and frightening devices are used by appropriately trained and authorized personnel, in accordance with applicable laws, regulations and agency policy, the proposed WDM methods pose minimal or no risk to public health and safety. The greatest risks

to human health and safety from the use of WDM techniques are incurred by the specialists who use these methods. There have been no reported injuries to WS or WDNR personnel or the public from wolf management activities in Wisconsin.

Firearm use is a very sensitive issue and a public concern because of fears regarding the potential for misuse of firearms. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). All firearm safety precautions are followed by WS and WDNR when conducting damage management and WS and WDNR comply with all laws and regulations governing the lawful use of firearms. Shooting with shotguns or rifles would sometimes be used to reduce wolf damage when lethal methods are determined to be appropriate. Firearms would be used to euthanize captured wolves in a humane manner. Wildlife Services employees, who use firearms as a condition of employment, are required to certify that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. Shooting is virtually 100% selective for target species and may be used in conjunction with spotlights and night vision equipment.

Wildlife Services' traps and cable restraints are strategically placed to minimize exposure to the public and pets. Appropriate warning signs are posted on access routes to properties where traps or cable restraints are set to alert the public of their presence.

This alternative also could provide relief from damage or threats to public health and safety to people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. Many people directly affected by wolf depredations on domestic animals, especially pets that are killed in their yards, express concern for human safety and insist upon the removal of wolves from their property when they cause damage. Wolves that have become habituated to humans (bold) are especially unpredictable (Section 1.3.8). In many situations where wolves may pose a risk to human health and safety, management of human behavior and non-lethal techniques may be sufficient to resolve the problem (Section 1.3.8) however, in some situations, removal of the problem individual may be the most appropriate solution. In addition to authorizations required from the USFWS, the WDNR also requires that it review and approve use of lethal methods to address cases of wolf depredation on pets and non-immediate risks to human safety on a case-by-case basis. (See also Appendix E and the WWMP).

Table 4-3. Number of Non-target Species Taken by WS Personnel in Wisconsin Compared to Public Take (FY 03-FY 05).

Species	WS Take of Nontarget Species Killed(Released)			Fur Harvest / Public Take		
	2003	2004	2005	2002-2003	2003-2004	2004-2005
Black Bear	0	(2)	1(4)	2,798	3,063	2,940
Coyote	13 (2)	25(2)	61	13,597	17,837	23,148
Bobcat	0	0	(1)	253	371	364
Red Fox	1	0	2	5,196	7,743	7,527
Badger	0	(1)	(1)	-----	-----	-----
Striped skunk	0	1	1	214	562	581
Raccoon	3	4(5)	5(3)	150,861	214,043	203,374
Wild turkey	0	1	1	50,196	55,524	57,839
Common crow	0	0	1	74,080	74,007	59,218
Cow (calf)	0	0	(1)	-----	-----	-----
Feral cat	0	1	0	-----	-----	-----
Dog	0	0	(3)	-----	-----	-----

¹ Harvest seasons occur over 2 years for furbearers harvested in winter.

² Harvest estimates are from registered harvest for bear, bobcat, and turkey; Fur Trapper Harvest for furbearers; and Small Game Harvest for other species
<http://dnr.wi.gov/org/land/wildlife/harvest/harvest.htm>

Humaneness of methods to be used. Wildlife Services and WDNR personnel are experienced and professional in their use of WDM methods. Under this alternative, wolves would be trapped, captured by cable restraints, or shot by experienced personnel as humanely as possible using the best methods available. Tranquilizer trap devices (TTDs) can be used on wolf traps to reduce the incidence of self-inflicted injuries by captured animals. All activities would be conducted in accordance with USFWS permit requirements and Wisconsin wolf trapping guidelines which require that traps be checked at least once every 24 hours. Daily trap checks minimize the amount of time target and non-target animals remain in traps, and improve the likelihood that a non-target animal may be released unharmed.

Some individuals would consider this alternative inhumane because they oppose all lethal methods of damage management. Others will be opposed to this alternative because they object to specific lethal WDM methods like traps and cable restraints and perceive these methods as being unjustifiably cruel and inhumane. Some individuals would prefer that cage traps be used to capture wolves and would perceive this method as being more humane than traps and cable restraints. Unfortunately, the use of cage traps to capture wolves is both impractical and ineffective because it is extremely difficult to get a cage trap big enough for an adult wolf into remote locations, and because it is rare to capture an adult wolf in a cage trap. Individuals with animals that have been injured, threatened or killed by wolves may see this alternative as being more humane because it has the greatest likelihood of preventing further injuries to their livestock and pets.

Impacts to stakeholders, including aesthetics of wildlife. Public reaction would be variable and mixed because there are numerous philosophical, aesthetic, and personal attitudes, values,

and opinions about the best ways to reduce conflicts/problems between humans and wildlife. The impacts of this alternative to stakeholders would primarily depend on their values towards wildlife and their relationship to the damage problem. This alternative would likely be favored by property owners who are experiencing damage because this alternative has the greatest likelihood of successfully resolving wolf conflicts, but others would be saddened if the wolves were removed. Individuals not directly affected by the threats or damage may be supportive, neutral, or totally opposed to any removal of wolves from specific locations or sites. Some individuals would strongly oppose this alternative because they believe it is morally wrong to kill or use animals for any reason or they believe the benefits from wolves outweigh the associated damage. Individuals totally opposed to lethal WDM methods want agencies to teach tolerance for wolf damage and threats to public and pet health or safety, and that wolves should never be killed.

As discussed in Section 2.1.5.2, wolves have high nonconsumptive (viewing, calling, photographing) and indirect values (e.g., spiritual, and existence values) for many people. The ability to view and aesthetically enjoy wolves at a particular site could be temporarily limited if the wolves are removed. New animals would most likely use the site in the future, although the length of time until new wolves arrive is variable, depending on the habitat type, time of year, and population density of wolves in nearby areas. Given the increasing number of wolf packs in Wisconsin and that this action will not reduce the Wisconsin wolf population, other opportunities to view, call and aesthetically enjoy wolves will be available to people who make the effort to visit sites with adequate habitat outside of the damage management area.

The IWDM approach, which includes non-lethal and lethal methods as appropriate, provides relief from threats to public safety attacks on pets to people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. Many people directly affected by problems and threats caused by wolves insist upon their removal from the property or public location when the wildlife acceptance capacity is reached or exceeded. Some people will have the opinion that wolves should be captured and relocated to a rural area to alleviate damage or threats. Some people would strongly oppose removal of wolves regardless of the nature of the damage problem.

Effects on non-target species populations, including threatened and endangered species. Of the WDM methods proposed for use, foot-hold traps and cable restraints pose the greatest risk to non-target species. Some non-target wildlife species, such as raccoons, black bear, bobcat, and coyotes may be captured during WDM (Table 4-3). Wildlife Services does not expect the rate of non-target species take to substantially increase above current program levels. The take of non-target animals by WS is well below the sustainable harvest level for the wildlife species captured. The number of animals taken by WS relative to the number taken for sport harvest is negligible. Using available harvest data and the annual take by WS, the magnitude of impact for the proposed action is considered extremely low (USDA 1997, Revised).

Not all coyote reported as killed in Table 4-3 were unintentionally killed by the WDM method. Most coyotes were live captured and subsequently euthanized because the property also had a history of problems with coyote predation on livestock. In these instances, the livestock producer may request that WS euthanize all coyotes captured while WS is working to solve depredation problems with wolves.

The USFWS has concurred that WS' WDM methods are not likely to adversely affect the bald eagle, will not jeopardize the continued existence of Canada lynx and are not anticipated to result in the incidental take of lynx (J. Smith, USFWS, August 12, 2003; L. Lewis, USFWS, May 9,

2001). WS has determined that the proposed action will have no effect on all other federally listed non-target species and critical habitat in Wisconsin. Impacts on wolves (target species) are discussed above. WS and WDNR will adhere to all Conservation Measures, Terms and Conditions and other provisions for the protection of federally listed species provided in the 2001 and 2003 Section 7 consultations with the USFWS. The SOPs in Chapter 3 include measures intended to reduce the effects on non-target species populations and to avoid jeopardizing T/E species' populations. Measures to reduce risks to non-target species are also discussed in Appendix B. All activities would be conducted in accordance with USFWS permit requirements and Wisconsin wolf trapping guidelines which require that traps be checked at least once every 24 hours. Daily trap checks minimize the amount of time target and non-target animals remain in traps, and improve the likelihood that a non-target animal may be released unharmed.

4.2.3 Alternative 3 - Technical Assistance Only

Effects on wolf populations.

Under this alternative, the USFWS would not issue any Section 10(a)(1)(A) permits or other authorization for wolf damage management. Wildlife Services would not conduct operational WDM in Wisconsin but could provide technical assistance on WDM methods that do not require permits or other authorization from the USFWS (Appendix B). Wildlife Services would also be able to conduct evaluations of potential wolf depredation sites needed to administer the wolf damage compensation program. The WDNR would have access to non-lethal techniques that are allowed without a permit or which are permitted because of the cooperative conservation agreement between the WDNR and the USFWS (Section 1.7.7). As with Alternative 1, there could be limited intentional take of wolves for the protection of human safety and to aid a sick or injured wolf. Non-lethal techniques that require permits or other authorization from the USFWS would not be available so there would be no incidental take from these methods. Consequently, impacts of agency actions on the wolf population would be similar to or slightly lower than Alternative 1.

As discussed above, non-lethal methods are not always effective. This alternative is expected to result in a reduction in the efficacy of WDM efforts; and it is reasonable to conclude will also result in a reduction in tolerance of wolves by the landowners and an increase in illegal kill (Section 1.3.10). Illegal lethal control actions by private individuals are less likely to be very specific or very humane, and could potentially have more adverse impacts on the wolf population we are trying to recover than focused lethal actions by trained, authorized professionals. Any illegal lethal control by individuals is also less likely to be effective in reducing depredation events, as it would be less likely to target the specific depredating animals.

Cumulative Impacts

Authorized take will be much lower than Alternative 2. However, because of anticipated increases in illegal take discussed above, cumulative impacts on the wolf population from all sources of mortality are likely to be similar to or slightly higher than Alternative 2. As discussed for Alternative 2, WDM decisions made in Wisconsin will have impacts on public reaction to management decisions in Michigan and *vice versa*. If this alternative were selected for both Michigan and Wisconsin, the results are likely to be similar to that described for Alternative 1, only amplified because the frustration among livestock owners and others is likely to be even greater.

Effects on public and pet health and safety. Wildlife Services would not provide operational assistance with WDM, so there would be no risks to humans or pets from WS' use of WDM methods. The USFWS would not issue permits or other authorizations for WDM so WDM methods would be restricted to non-lethal techniques including those allowed because of the cooperative conservation agreement between the WDNR and the USFWS (Section 1.7.7). Under this alternative, there would be no use of non-lethal projectiles and no trapping to capture wolves and attach collars for aversive conditioning, so there would be no risk to the public or pets from these methods. However, even under Alternative 1, use of these methods is anticipated to be low, so the reduction in the already very low risk to public and pet health and safety from agency actions is likely to be negligible. Risks associated with actions of individuals dissatisfied with the program will be as described for Alternative 1. Cumulative impacts of WDM methods on public health and safety under this alternative are likely to be similar to Alternative 1.

There are provisions within the regulations pertaining to the ESA that allow for the lethal take of an endangered species that is a demonstrable (either immediate or non-immediate) threat to human safety and response to these issues will be as described for Alternative 2. Response to predation on pets will be restricted to non-lethal methods allowed without special authorization from the USFWS. As discussed above, non-lethal methods are not always effective in reducing problems with wolves. If wolf populations continue to increase without an effective damage management program in place, there may be potential threats to public safety and pets from wolves that enter people's yards or attack their pets. Therefore, risks to human and pet safety from wolves would likely be similar to or higher for this alternative than Alternative 2 because fewer WDM methods would be available. Additionally, frustrated individuals may attempt to solve wolf damage problems through illegal shooting, trapping, snaring, or poisoning. As a result of these illegal actions, there could be increased risks to public and pet safety from improper or unscrupulous efforts to resolve perceived problems with wolves.

Humaneness of methods to be used. WS would not provide operational assistance with WDM, so the issue of humaneness as it relates to WS use of control methods under this alternative is not applicable. However, operational WDM assistance with non-lethal WDM techniques allowed without permits or under the authorities of the cooperative conservation agreement between WDNR and the USFWS would still be available. These methods could involve the use of traps and cable restraints to live-capture wolves and public perceptions of the humaneness of these non-lethal WDM methods would be as described for Alternative 1. Some individuals may perceive this alternative as less humane than Alternative 1 because access to some non-lethal method would be prohibited. Others may perceive the use of non-lethal projectiles which cause pain in the animal struck and the shock administered by the modified dog training collars used for aversive conditioning as being inhumane. As with Alternative 1, frustrated individuals may attempt to solve wolf damage problems through illegal shooting, trapping, snaring, or poisoning. Some of these methods are likely to be less humane than the methods that could be used by agency personnel. Overall, the perceptions of the humaneness of this alternative will be as described for Alternative 1.

Impact to stakeholders, including aesthetics of wildlife. The impacts of this alternative to stakeholders would vary depending on individual values toward wildlife, and the relationship of the individual to the damage problem. Property owners who are experiencing damage from wolves may oppose this alternative because they may perceive it as restricting their access to WDM assistance. Some people would support this alternative because WS would not be using Federal resources for WDM and would have no direct impact on wolf populations. Others would oppose this alternative because they believe property owners would resort to illegal, inhumane, or environmentally unsafe wolf control methods.

As with Alternative 1, some individuals would prefer this alternative because they believe it is morally wrong to kill animals for any reason. However, there may still be concern about the use of traps and cable restraints to capture wolves for population monitoring and/or attachment of collars required for some non-lethal WDM methods. If wolves are removed from the Federal list of threatened and endangered species, lethal WDM techniques would be available in accordance with the WWMP and perceptions of this alternative by individuals opposed to lethal WDM would likely be the same as Alternative 2. However, this alternative may still be preferable to alternative 2 for individuals who are specifically opposed to federal (WS) involvement in the use of lethal WDM techniques.

Some people would support this alternative because they enjoy seeing wolves, or having wolves nearby, and while wolves are federally protected under the ESA, this alternative would prohibit the lethal removal of wolves except in the rare instance of demonstrable risks to human safety and to aid a sick or injured wolf. However, individuals might still be affected by relocation of depredating wolves. As discussed above, this alternative is not anticipated to result in a decline in wolf density in Wisconsin and any difference in wolf viewing opportunities is likely to be negligible. Other opportunities to view, call and aesthetically enjoy wolves will be available to people who make the effort to visit sites with adequate habitat outside of the damage management area.

Effects on non-target species populations, including T&E species

Wildlife Services would have no direct impact on non-target and T&E species from the use of control methods. This work would be likely be conducted by WDNR and risks to non-target and T/E species from WDM methods would be similar to Alternative 1. If and when wolves are no longer federally protected, management of wolf damage would depend upon the provisions of the state (WWMP) and tribal wolf management plans and policies. The state may choose to allow individual property owners/mangers or their designated agents to remove depredating wolves. In this instance, risks to non-target and T/E species would be variable, but could be higher than Alternative 2 if individuals with limited WDM experience attempt to manage wolf conflicts. Risks may be lower than Alternative 4 if individuals chose to seek and use technical assistance from the lead and consulting agencies.

Property owners who are experiencing damage from wolves may oppose this alternative because they may perceive it as restricting their access to WDM assistance. As discussed above, depending upon budget and personnel limitations, the state and tribes may not be able to provide the same level of prompt assistance as a WS program. Frustrated individuals may attempt to solve wolf damage problems through illegal shooting, trapping, snaring, or poisoning with potential detrimental effects on non-target species or T/E species. Use of illegal pesticides (Schueler 1993, Allen et al. 1996, USDA 1997 Revised), is a relatively cheap form of predation control that represents one of the greatest threats to the environment, T/E species, domestic animals, and public safety.

4.2.4 Alternative 4 - No Federal WDM in Wisconsin

This is the Preferred Alternative for the Ho-Chunk Nation for the central forest area (Zone 2). This alternative could be selected for the entire state; the management preference of the Ho-Chunk could be combined with one of the alternatives above, or another alternative could be selected for the entire state. If this alternative is selected for the central forest area and a separate alternative is selected for the rest of the state, impacts would be intermediate to this alternative

and the other alternative selected.

Effects on wolf populations. Under this alternative, the USFWS would not issue any permits or other authorizations for WDM and there would be no WS WDM program. While wolves are federally protected under the ESA there would be no lethal WDM in Wisconsin and use of non-lethal projectiles and aversive conditioning (dog training collars) would be prohibited. The WDNR would be restricted to the use of non-lethal techniques for wolf damage management that they can access via authorities granted under 50 CFR 17.21. While federally protected under the ESA, overall impacts of this alternative will be similar to Alternative 1 and identical to Alternative 3.

As discussed above, non-lethal methods are not always effective. This alternative is expected to result in a reduction in the efficacy of WDM efforts; and it is reasonable to conclude will also result in a reduction in tolerance of wolves by the landowners and an increase in illegal kill (Section 1.3.10). Frustration with wolf management and levels of wolf poaching may be highest for this alternative because of what individuals may perceive as a federal refusal to respond to problems caused by Federal [federally protected] wolves. Illegal lethal control actions by private individuals are less likely to be very specific or very humane, and could potentially have more adverse impacts on the wolf population we are trying to recover than focused lethal actions by trained, authorized professionals. Any illegal lethal control by individuals is also less likely to be effective in reducing depredation events, as it would be less likely to target the specific depredating animals.

Cumulative Impacts

Authorized take will be much lower than Alternative 2. However, because of anticipated increases in illegal take discussed above, cumulative impacts on the wolf population from all sources of mortality are likely to be similar to or slightly higher than Alternative 2. As discussed for Alternative 2, WDM decisions made in Wisconsin will have impacts on public reaction to management decisions in Wisconsin and *vice versa*. If this alternative is selected in Wisconsin, but a less restrictive version is selected in Michigan without clear-cut reasons for the decision, it is likely to increase public dissatisfaction with wolf management in Wisconsin, and may increase the likelihood that frustrated individuals will engage in illegal killing of wolves. If this alternative were selected for both Michigan and Wisconsin, the results are likely to be similar to that described for Alternative 1, only amplified because the frustration among livestock owners and others is likely to be even greater.

If WDNR wolf program personnel are forced to spend much more time on non-lethal control efforts on problem wolves, work on the state wolf population monitoring would suffer. Non-lethal control work by WDNR, without the aid of WS or other federal agents is likely to be very time consuming and very costly, and therefore may reduce flexibility of State wolf management. Thus the ability of the WDNR to determine wolf population size and distribution, changes in population growth rates, changes in mortality factors, and other characteristics of the wolf population would be reduced. If the WDNR does not maintain adequate surveys of the wolf population, proper management of wolves would be difficult and public confidence in wolf management by the WDNR would decline.

Effects on public and pet health and safety. No permits or other authorizations would be issued for the use of lethal WDM techniques, non-lethal projectiles or aversive conditioning (e.g. dog training collars). However, under the authority granted under 50CFR 17.21, WDNR would still be able to trap and relocate depredating wolves, conduct the wolf population monitoring program

and use all other non-lethal WDM techniques. As with Alternative 1 use of non-lethal methods like remote activated frightening devices that require a collar on a wolf, and trap-and-relocate efforts may increase if lethal WDM alternatives are not available. This could increase the wolf capture effort associated with non-lethal techniques over that anticipated for Alternative 2, but would likely not exceed the cumulative agency wolf capture effort (non-lethal and lethal WDM combined) anticipated for Alternative 2. As with Alternative 2, traps and cable restraints would be strategically placed to minimize exposure to the public and pets. Under this alternative, traps and cable restraints would only be used with the specific intent of keeping the captured animal alive. In general, while wolves are federally listed as a threatened or endangered species, risks to human and pet safety from the use of WDM techniques would be lower than Alternatives 2 and 3 because there would be no lethal WDM by any agency, no use of non-lethal projectiles, and no trapping effort to attach training collars. Wildlife Services would have no impact on public and pet safety from the use of control methods because WS would not be involved in any aspect of WDM.

Non-lethal WDM techniques are not always adequate to resolve conflicts with wolves. It is also possible that, depending upon budget and personnel limitations, the State and Tribes may not be able to provide the same level of prompt assistance as a WS program. Frustrated individuals may attempt to solve wolf damage problems through illegal shooting, trapping, snaring, or poisoning. As a result of these illegal actions, there could be increased risks to public and pet safety from improper or unscrupulous use of these methods.

Under this alternative, WS would not be able to assist with threats to public or pet health and safety. While wolves are federally protected, the WDNR would have access to most non-lethal WDM methods to reduce risks from wolves. However, depending upon budget and personnel limitations, these entities may not be able to provide the same level of prompt assistance as a WS program. These agencies would not have access to the full range of WDM methods and may not be as effective in reducing some wolf conflicts as with Alternative 2 or 3.

Humaneness of methods to be used. This alternative would be considered humane by many people that are opposed to lethal WDM. However, WDNR would still use traps and cable restraints to capture and relocate problem wolves, and to radio collar wolves for population monitoring and non-lethal WDM techniques which require a collar on the wolf (exclusive of dog training collars). When capturing wolves for population monitoring and non-lethal WDM efforts, wolves would be humanely captured by experienced WS and WDNR personnel using the best methods available. Tranquilizer trap devices (TTDs) can be used on wolf traps to reduce the incidence of self-inflicted injuries by captured animals (Appendix B). All activities would be conducted in accordance with USFWS permit requirements and Wisconsin wolf trapping guidelines which require that traps be checked at least once every 24 hours. Daily trap checks minimize the amount of time target and non-target animals remain in traps, and improve the likelihood that a non-target animal may be released unharmed. As explained for Alternative 1, cage traps are usually impractical and not effective in capturing wolves.

Even though wolves are federally protected under the ESA, some property owners may take illegal action against localized populations of wolves out of frustration with continued damage and lack of legal access to the full range of WDM methods. Some illegal methods, like poisons, may be less humane than methods used by experienced agency personnel.

Impact to stakeholders, including aesthetics of wildlife. Wildlife Services would have no impact on stakeholders, or the aesthetic value of wildlife. The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife and relationship to the

problem. Individuals directly impacted by wolf predation may be less tolerant of wolves that individuals who's property and pets are not at risk. While wolves are federally protected individuals experiencing damage from wolves would likely oppose this alternative because they would likely feel that their access to an effective management techniques and Federal (WS) assistance was being unduly restricted. Access to WDM methods would be even more restricted under this alternative than under Alternative 1 because non-lethal projectiles and aversive conditioning (dog training collars) could not be used. They would likely be less opposed to this alternative once wolves are removed from the Federal list of threatened and endangered species because access to lethal WDM techniques would likely be available from entities other than WS in accordance with the WWMP.

Some individuals would prefer this alternative because they believe it is morally wrong to kill animals for any reason. However, there may still be concern about the use of traps and cable restraints to capture wolves for population monitoring and/or attachment of collars required for some non-lethal WDM methods. If wolves are removed from the Federal list of threatened and endangered species, lethal WDM techniques would be available in accordance with the WWMP and perceptions of this alternative by individuals opposed to lethal WDM would likely be the same as Alternative 2. However, this alternative may still be preferable to alternative 2 for individuals who are specifically opposed to federal (WS) involvement in the use of lethal WDM techniques.

Some people would support this alternative because they enjoy seeing wolves, or having wolves nearby, and while wolves are federally listed, this alternative would prohibit the lethal removal of wolves. However, they might still be affected by relocation of depredating wolves. As discussed above, this alternative is not anticipated to result in a decline in wolf density in Wisconsin and any difference in wolf viewing opportunities is likely to be negligible. Other opportunities to view, call and aesthetically enjoy wolves will be available to people who make the effort to visit sites with adequate habitat outside of the damage management area.

Effects on non-target species populations, including T&E species.

No operational WS activities would be conducted pursuant to this alternative so there would be no risks to non-target or T/E species from WS. The Tribes and WDNR could provide assistance with most non-lethal WDM methods although access to non-lethal projectiles and training collars would be prohibited. Since capture and handling of wolves is required for the use of some aversive stimuli (e.g., attaching collars) so risks to non-target species will be similar to or slightly lower than Alternative 1.

Non-lethal methods are not always effective in resolving damage problems and, depending upon budget and personnel limitations, the Tribes and WDNR may not be able to provide the same level of prompt assistance as a WS program. Some individuals frustrated with wolf management policies might attempt to illegally shoot, trap, snare, or poison wolves with potential detrimental effects on non-target species or T/E species. Lacking professional assistance, some individuals might use illegal pesticides (Schueler 1993, Allen et al. 1996, USDA 1997 Revised), a cheaper form of predation control that represents one of the greatest threats to the environment, T/E species, domestic animals, and public safety.

4.3 SUMMARY OF IMPACTS

Table 4-4 highlights the potential impacts of each alternative for the issues that were analyzed in detail. Cumulative impacts are discussed in relationship to each of the wildlife species and the environmental impacts analyzed in this chapter. This EA recognizes that the total annual removal of individual animals from wildlife populations by all causes is the cumulative mortality. No single or cumulative adverse environmental consequences are expected to result from the proposed action. When used in accordance with all appropriate Federal, State and WS requirements and guidance, impacts on non-target species from the proposed methods would be extremely low. None of the federally protected threatened, endangered, or candidate species listed by the USFWS or WDNR in Wisconsin would be jeopardized by the proposed action (J. Smith, USFWS, August 12, 2003; L. Lewis, USFWS, May 9, 2001). Economic and social impacts would primarily be beneficial, although some segments of the human population might be opposed to the killing of wolves. Negative impacts to the physical environment would be non-existent.

Any localized reduction of wolf populations would likely soon be replaced and habitats reoccupied as IWDM would only be conducted in specific areas near the location where the specific conflict has occurred. All actions would be conducted in strict compliance with the requirements set by the USFWS for wolf management and associated policies and agreements between WDNR, WS, and USFWS. The proposed action may have negative effects on individual wolves but will not result in declines in the state wolf population, and in fact is expected to result in a net benefit to the Wisconsin wolf population. Based on past experience with IWDM programs in Minnesota, Wisconsin and Michigan, the Wisconsin wolf population will continue to grow even with the intentional and incidental take anticipated for the preferred alternative and all other cumulative impacts on the wolf population.

Table 4-3. Summary of Impacts

Issues/Impacts	Alternative 1: Non-lethal Only	Alternative 2: IWDM Program (Proposed Action/No Action)	Alternative 3: Technical Assistance	Alternative 4: No Program
Wolf populations	No lethal removal of wolves. Increased risk that frustrated individuals may use illegal WDM methods. Because of increased risk of illegal take, cumulative population impacts will be greater than for Alternative 2.	Possible temporary reduction in local populations, no reduction in statewide population. Risk of illegal action still possible but least likely for this Alternative. Evidence to date indicates State wolf population will continue to increase. Impacts similar with and without federal protection of wolves.	No impact by WS. Technical assistance available from WS. Operational assistance with non-lethal available from others. Increased risk that frustrated individuals may use illegal WDM methods. Because of increased risk of illegal take, cumulative population impacts will be greater than for Alternative 2.	No lethal removal of wolves. No WS involvement in WDM. Operational assistance with non-lethal available from others. Most non-lethal methods available to WDNR. Because of increased risk of illegal take, cumulative population impacts will be increased due to illegal take which will cause greater impacts to wolf population than Alternative 2. The ability of WDNR to monitor wolf population may be reduced.
Non-target Species, Including T&E Species	Low risk to non-target species from use of traps and cable restraints for non-lethal WDM and wolf population monitoring. Risks from authorized WDM lower than Alternative 2. Risks to non-target species from illegal actions likely higher than Alternative 2.	Low risks to non-target species from some WDM methods. No adverse impact to T&E or non-target species populations. Risk of illegal action still possible but least likely for this Alternative. Impacts similar with and without federal protection of wolves.	No effects by WS. Low risk to non-target species from use of traps and cable restraints for non-lethal WDM and wolf population monitoring. Risks from authorized WDM lower than Alternative 2. Risks to non-target species from illegal actions likely higher than Alternative 2.	No effects by WS. Low risk to non-target species from use of traps and cable restraints for non-lethal WDM and wolf population monitoring by authorized agencies. Risks from authorized WDM lower than Alternative 2. Risks to non-target species from illegal actions likely higher than Alternative 2.

Public and Pet Safety	Risk from agency use of WDM methods similar to or lower than Alternative 2. Variable risks from illegal lethal WDM methods used by others. Overall risk from WDM methods similar to Alternative 2. Risks from wolves would likely be slightly higher than Alternative 2 because of restrictions in WDM methods	Very low risk from WDM methods. Best reduction of risks from wolves. Impacts similar with and without federal protection of wolves.	No effect by WS. Variable risks from illegal lethal WDM methods used by others. Risks from wolves would likely be slightly higher than Alternative 2 because of restrictions in WDM methods.	No effect by WS. Risk from WDM methods and wolves dependent upon actions of other agencies.
Humaneness of Method	Agency actions probably considered more humane by most people than lethal measures. There will still be concerns about the use of traps and cable restraints for live capture of wolves. Illegal use of lethal methods by others may increase. These methods may be less humane than methods proposed under Alternative 2.	Agencies will use the most humane methods available. Some will perceive lethal methods and the use of traps and cable restraints for live capture of wolves as inhumane. Perceptions of humaneness similar with and without federal protection of wolves.	No WS involvement in operational WDM but non-lethal methods including the use of traps and cable restraints for live capture can be conducted by others. Alternative may be perceived as more humane by people opposed to lethal measures and Federal involvement in WDM. Illegal use of lethal methods by others may increase. These methods may be less humane than methods proposed under Alternative 2.	No WS involvement in WDM but non-lethal methods including the use of traps and cable restraints for live capture can be conducted by others. Alternative may be perceived as more humane by people opposed to lethal measures and Federal involvement in WDM. Illegal use of lethal methods by others may increase. These methods may be less humane than methods proposed under Alternative 2.
Impact to Stakeholders, Including Aesthetics	Variable. Those with wolf conflicts may be glad to have some assistance but frustrated by lack of access to all WDM methods. Some may prefer this Alternative to Alternative 2 because no lethal WDM.	Variable. Those receiving damage would probably favor this alternative. Some animal advocates would oppose this alternative because it includes use of lethal methods and WS (Federal) involvement in lethal WDM.	Variable. Those receiving damage probably oppose this alternative because of restrictions in access to WDM methods. Some animal advocates may prefer this alternative because there will be no use of lethal WDM and very limited WS involvement in WDM.	Variable. Those receiving damage probably oppose this alternative because of restrictions in access to WDM methods. Some animal advocates may prefer this alternative because there will be no use of lethal WDM and no WS involvement in WDM.

CHAPTER 5: LIST OF PREPARERS AND PERSONS CONSULTED

5.1 Preparers

Ritchie Brown	Wisconsin Ho-Chunk Nation
Peter Fasbender	U.S. Fish and Wildlife Service – Region 3
Jeff Gosse	U.S. Fish and Wildlife Service – Region 3
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David Ruid	USDA Wildlife Services – Wisconsin
Jason Suckow	USDA Wildlife Services – Wisconsin
Joel Trick	U.S. Fish and Wildlife Service – Wisconsin
Kimberly K. Wagner	USDA Wildlife Services – Wisconsin
Robert Willging	USDA Wildlife Services – Wisconsin
Adrian Wydeven	Wisconsin Department of Natural Resources

5.2 Persons Consulted

Peter David	Great Lakes Indian Fish and Wildlife Commission
Christie Deloria	U.S. Fish and Wildlife Service – Michigan
William Paul	USDA Wildlife Services – Minnesota
Carl Edwards	Lac Du Flambeau Tribe of Lake Superior Chippewa Indians

APPENDIX A

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APPENDIX B

METHODS EMPLOYED OR RECOMMENDED FOR WOLF DAMAGE MANAGEMENT

NON-LETHAL METHODS

While wolves are federally listed as endangered some non-lethal WDM techniques can be used by anyone while other techniques will require special permits from the USFWS or a cooperative conservation agreement between the USFWS and WDNR. The list of non-lethal methods provided below describes the non-lethal methods available and the requirements for the method to be used by the public or agency personnel. Modifications to these requirements may be made through the establishment of a 4(d) rule if the Federal classification of wolves changes from endangered to threatened. If WS personnel are involved in the operational use of methods, an *Agreement for Control on Private Property* and/or similar document for public lands must be signed by the landowner or administrator authorizing the use of each damage management method. The WWMP (WDNR 1999) establishes that upon the first reported instance of conflicts with wolves, the landowner/manager must sign a depredation management plan (farm plan) for the property which includes damage abatement recommendations prior to obtaining operational or financial assistance with WDM.

Non-Lethal Methods Available to All Without a USFWS Permit

Some WDM methods are available to anyone without a permit. These consist primarily of non-lethal preventive methods such as cultural practices and habitat modification. Cultural practices and other management techniques are implemented by the livestock producer and property owners. Livestock producers and property owners may be encouraged to use these methods, based on the level of risk, need, and professional judgment on their effectiveness and practicality. WS and USFWS involvement in the use of these methods is usually limited to providing technical assistance. Technical assistance includes providing advice, recommendations, and information regarding wildlife damage management methods and techniques to individuals and groups. It also involves providing presentations or demonstrations on management techniques. These methods include:

- **Animal husbandry practices** involve the basic management practices used by farmers and ranchers in the care and production of livestock. The modification or use of certain animal husbandry practices has been reported to have some effectiveness in reducing depredations by coyotes (Robel et al. 1981, Linhart 1984b). These practices may include use of shed lambing, clearing of woody or brushy pastures, modifications to lambing or calving schedules, and proper dead animal disposal procedures. Fritts (1982) reported that many instances of wolf depredation on livestock in Minnesota were related to animal husbandry practices, such as the pasturing of cattle in extensive woodlots and allowing calving in woodlots or remote pastures. Fritts also wrote that improper carcass disposal may encourage or perpetuate depredations. Animal husbandry practices include, but are not limited to, the use of:

Guarding animals include the use of dogs, donkeys, and llamas. These animals can effectively reduce coyote predation losses in some situations (Meadows and Knowlton 2000, Cavalcanti and Knowlton 1998, Green and Woodruff 1996). Several breeds of large dogs have been used for centuries by rural societies in the Old World to guard livestock from predators (Linhart 1984b). Studies conducted in the U.S. have shown the use of Old World guarding dog breeds, such as Great Pyrenees, Kangal, and Komondor, to be effective in the protection of livestock from coyote predation (Linhart et al. 1979,

Coppinger et al. 1988, Andelt 1992). In most situations guarding dogs provide protection from coyote depredations by “warning” or chasing the coyote away (McGrew and Blakesley 1982). The effectiveness of guarding dogs for protection from wolves in the U.S. has been questioned (Coppinger and Coppinger 1995), and may be complicated by the nature of farming and ranching practices in wolf habitat (i.e. large, remote, woody or brushy pastures) (Fritts et al. 1992). In addition, wolves may perceive guard dogs as “new” wolves and may kill these intruders into their territories (Shivik 2001).

Success in using guard dogs is highly dependent on proper breeding and bonding with the type of livestock the dog is to protect. Effective use of guard dogs depends on training, obedience, care, and feeding (Green and Woodruff 1996). The efficacy of guard dogs is affected by the amount of predation loss, size and topography of the pasture, acceptance of the dog by the livestock, training, compatibility with humans, compatibility with other predator damage management methods, and the species of predator. Guard dogs breeds mature at about 2 years of age and may begin protecting livestock at this age. Guard dogs generally have an effective working life of less than 3 years because of accidents, disease, and people misidentifying the guard dog as a threat to the livestock and shoot the dog (Lorenz et al. 1986, Green 1989). Guard dogs may kill, injure, harass, or try to breed sheep and goats (Green and Woodruff 1983).

Wolves avoided livestock guarding dogs initially, but over a period of a few weeks came closer and closer until near contact was made (Smith et al. 2000). The wolves eventually showed dominance over the dogs in direct confrontations. In addition, wolves have killed guarding dogs, including Anatolian Shepherds in Minnesota and Montana (Fritts and Paul 1989). Bangs et al. (1989) also identified guard dog mortalities attributed to wolves during the last five years of wolf recovery in the Rocky Mountains.

Guard donkeys have been used to protect livestock with mixed results. The reported most effective guard donkey is a jenny with a foal. Guard donkeys are probably more effective at deterring dog and coyote predation than wolf predation.

Guard llamas have also been used with mixed success to protect livestock. Some producers believe guard llamas are better at defending livestock from dogs than coyotes. Llamas are typically aggressive toward dogs and appear to readily bond with sheep (Cavalcanti and Knowlton 1998). Llamas are able to reduce coyote predation on sheep initially (Meadows and Knowlton 2000). Dogs and coyotes adapt to the protective nature of llamas thereby reducing their effectiveness over time (Meadows and Knowlton 2000). Further, in Montana during the last five fiscal years, wolves killed 12 llamas (Montana MIS unpubl. data FY98, FY99, FY00, FY01, FY02 (annual reports).

Guard animals may have more potential in the Great Lakes region because wolves are smaller, and occur in smaller packs. In the Northern Rockies where large wolves occur in large packs, guard animals are more likely to be attacked. Pack size seems to be an important factor in wolf attacks on dogs in Wisconsin (Wydeven et al. 2004).

Carcass removal is burying, liming or incinerating dead livestock to remove an attractant for predators. However, Mech (1999) could find no clear relationship between the application of carcass removal and a reduction in wolf predation on livestock in Minnesota, but left open the possibility that larger farms tend to attract wolves by providing a more reliable food source in the form of carcasses.

Pasture selection is placing or moving cattle in pastures believed less likely to expose livestock to predation. Usually, moving livestock to pastures near human habitation is believed to expose livestock to fewer predators. Livestock producers eventually must move livestock to distant pastures to graze, however, they may wait until calves are larger and older in the hope to reduce their vulnerability to predation.

- **Habitat modification** is used whenever practical to attract or repel certain wildlife species or to separate livestock from predators. For example, clearing brush from calving pastures or near residences reduces available cover for predators.
- **Physical exclusion** or fencing to protect livestock from wolf depredations is one of the earliest methods used to deal with wolf problems, and was used in early Europe as well as by American colonists (Wade 1978, Cluff and Murray 1995). Woven wire fencing with buried wire aprons were used in Texas sheep pastures to exclude coyotes but cost of materials and labor were generally prohibitive (Linhart 1984b). Electric fencing has shown some success in reducing coyote depredation on sheep (Gates et al. 1978, Linhart 1984b), but tests on wolves have not been reported (Cluff and Murray 1995). Widespread use of fencing as a non-lethal control technique for wolves has not occurred (Cluff and Murray 1995). Predator proof fencing may be effective in small, confined situations, or justified when protecting extremely high value animals. Wolves have the ability to jump over or dig under fences, so the fencing design must be of sufficient height and bottom repellency to deter wolves. Where practical, sheep or other vulnerable livestock may be penned near farm buildings at night to reduce the likelihood of wolf depredations. However, WS personnel have documented a number of instances where wolves have killed livestock in barnyards near farm buildings or entered open-sided barnyard shelter/loafing buildings. A predator-proof fence is possible to construct, but the initial cost of constructing such a fence usually keeps them from being built (Shivik 2001). If economically feasible, fencing is most appropriate in small areas, such as calving grounds and bedding areas (Shivik 2001).

Fladry consists of attaching waving flags about every 20 inches from thin rope or cable stretched about 20 inches above the ground. Fladry may be used in addition to or in substitution of fences, as a new means to protect domestic animals from depredation by wolves. Fladry seems to work because it may be “novel” to wolves (Musiani and Visalberghi 2001), however, the length of time it may work is undetermined and variable (Shivik 2001). Fladry is likely to be limited to small and medium-sized fenced areas because the flags require maintenance, especially in areas with high winds (Shivik 2004).

Compensation involves reimbursing individuals for the losses caused by wolves. Reimbursement provides producers monetary compensation for losses, it does not remove the problem nor does it assist with reducing future losses from predation. A compensation program may be helpful in reducing animosity towards wolves and in preventing the wolf population from being an economic burden on individuals. However, Naughton-Treves et al. (2003) reported on a public attitudes survey regarding the compensation program for wolf damage in Wisconsin. They found no difference in tolerance for wolves between compensated and non-compensated individuals, but the majority of people surveyed felt compensation should be provided for wolf depredation on domestic animals, especially livestock. The authors hypothesized that compensation programs may not improve individual tolerance of wolves but may be important for establishing broader political support for wolf conservation. Additional difficulties with compensation programs (Wagner et al. 1997, USDA 1997 Revised) include:

- Compensation is not practical for public health and safety problems.

- In addition to the money required to reimburse livestock producers, compensation programs also require expenditures of staff time and money to investigate and validate all losses, and to determine and administer appropriate compensation.
- In Wisconsin the compensation program only pays for confirmed or probable losses. In some cases it is not possible to conclusively ascertain that wolves caused the death of the animal or the animal/carcass is missing. Producers may feel that they are not being adequately compensated for the full value of their losses.
- Compensation may not be a satisfactory solution for individuals who feel responsible for the well-being of their livestock or in situations where there is an emotional attachment to the animal.

The Wisconsin wolf damage compensation program is funded by 3% of the state income tax return checkoff and 3% of license plate fees collected from the sale of endangered resources license plates. In some years the claims for wolf damage have exceeded the resources available from license plate revenue. Because the WDNR has been directed by the legislature to provide full compensation for wolf depredations, the WDNR Bureau of Endangered Resources has been forced to use additional program funds to make compensation payments. When this occurs, these funds are made available at a cost to other endangered species programs.

- **Animal Behavior Modification** refers to tactics that deter or repel predators and thus, reduce predation. Unfortunately, many of these techniques are only effective for a short time before wildlife habituate to them (Pfeifer and Goos 1982, Conover 1982, Shivik 2001). These non-lethal methods¹⁶ have been described as consisting of two stimuli: disruptive stimuli and aversive stimuli (Shivik 2001). Disruptive stimuli are novel or otherwise undesirable stimuli that prevent or alter behavior of animal. Disruptive stimulus devices will usually be limited to the protection of small areas. Aversive stimuli interfere with behaviors by capitalizing on animal's innate dislike of novel, disagreeable stimuli and the more noxious the stimuli, the more aversive the stimuli are likely to be. With disruptive stimuli, learning decreases effectiveness, but with aversive techniques, effectiveness is dependent on learning. Aversive stimuli are noxious stimuli that are paired with a specific behavior to condition an animal not to perform that behavior.

Disruptive Stimuli Including Frightening Devices are methods that usually involve a light, sound, or motion device designed to deter wolves from a certain area. Strobe and flashing lights, propane exploders, sirens, and various combinations of these devices have all been used in attempts to reduce livestock losses to coyote, with wide ranging degrees of effectiveness (Linhart 1984a, Andelt 1987). Animal habituation (becoming accustomed) to the stimulus is one of the primary limiting factors for primary repellents. Moving the devices intermittently and randomly as well as alternating the stimuli (e.g. a different type of noise or light) may extend the effective period of the system (Shivik and Martin 2001). Coyotes readily adapt to most repellent devices (Wade 1978), and the response of wolves is probably similar (Cluff and Murray 1995). Blinking highway safety lights and flagging were used to reduce wolf predation at cattle farms in Minnesota but the effectiveness of these methods could not be adequately measured (Fritts 1982). Electronic guards (siren strobe-light devices) are battery powered units operated by a photocell. The unit emits a flashing strobe light and siren call at regular intervals throughout the night. Efficacy of strobe-sirens is highly variable and less than three weeks (Linhart 1984a). The device is a short-term tool used to deter predation until

¹⁶ Chemical repellents, projectile repellents, visual and acoustic devices generally show little promise in reducing livestock depredation on a large-scale or long-term basis (Smith et al. 2000a).

livestock can be moved to another pasture, brought to market, or other predator damage management methods implemented. Lights and flagging (fladry) may be most useful in wolf depredation situations where other control methods such as trapping are prohibited or impractical (Fritts et al. 1992).

Guarding and Hazing involves guarding an area and then using pyrotechnics, crackershells or other light/noisemaking devices to frighten wolves away from the site. It can be used as an aversive technique, but requires that the projectiles must be used every time the animal attempts to prey on the protected resource so they don't identify conditions when they can obtain prey without receiving a negative experience (Shivik 2004).

Non-lethal Methods Available to States with Cooperative conservation agreements with the USFWS

Some non-lethal methods involve harassment or handling wolves that is considered "taking" of an endangered species as defined by the ESA. These activities would ordinarily require a permit from the USFWS. However, Section 6 of the ESA allows the USFWS to establish cooperative agreements with the states for the management of federally listed species. Under such agreements, any qualified and authorized employee or similarly qualified and authorized agent of the state conservation agency may take an endangered species without a permit from the USFWS so long as the taking cannot be reasonably expected to result in: 1) the death or permanent disabling of the specimen; 2) the removal of the specimen from the state where the taking occurred; 3) the introduction of the specimen to an area outside the historical range of the species; or 4) holding the species in captivity for a period of more than 45 days. (50 CFR 17.21 (a)(5)). The WDNR has a cooperative conservation agreement with the USFWS for the management of wolves. Consequently, the state or WS, as qualified and authorized agents of the state, may use the following WDM techniques without a permit from the USFWS.

- **Animal Behavior Modification** (General description provided above.)

Remote Activated Frightening Devices. These devices are frightening devices like those described above under "Disruptive Stimuli Including Frightening Devices". The difference is that these devices work because a transmitter on a wolf collar or a motion detector activates frightening devices when wolves approach a protected area. It should take longer for wolves to habituate to these devices because they are only activated when a wolf, or in the case of motion detectors, another animal activates the system. Breck et al (2002) experimented with a Radio Activated Guard (RAG) device to protect livestock in small pastures. Results indicate the RAG device was effective for protecting livestock in small pastures. In addition, wolves exhibited no signs of habituation to the device. Limitations of the scare device include electronic complexity, area coverage, and price (Breck et. al. 2002). A similar Movement Activated Guard (MAG) device was effective in reducing consumption of deer carcasses by wolves (Shivik et al. 2003).

- **Capture, Collar and/or Relocate** includes capturing wolves and attaching a radio collar or collar that works as a part of a behavior modification system (discussed above). It also includes the practice of capturing a wolf or wolves and moving them to another location for release. Relocation may be effective in some situations, but success will vary depending on the trapping history of a problem wolf. Capture and relocation would only be conducted by authorized, specially trained personnel within the USFWS, WDNR or WS. Eventually relocation may be limited as the number of suitable release sites are occupied by wolves and lethal removal should be considered (Linnel et al. 1997). Identification of release sites and agreements with appropriate

land owners/managers must be done before relocation efforts can be initiated. While federally listed, relocation sites would be agreed upon by the State.

Shivik (2001) and Linnel et al. (1997) stated, however, that the truth is that most predators that are relocated either return (even when displaced hundreds of miles), get into the same or worse trouble than they were already in, or die. Relocated wolves, after being taken out of their element, often die, either slowly by starvation, brutally by another pack or killed on a highway (Shivik 2001), and some resume depredation at the relocation site (Bangs et al. 1995, Bradley et al. 2005). The rate at which repeated depredation problems would occur is likely dependent on the conflict potential at the release site and the area through which the relocated animal(s) traveled after release. Bradley (2004) reported that in the greater Yellowstone area most translocated wolves did not form or join other packs, and 27% of translocated wolves resumed depredation activities. Translocated wolves also had lower survival rates than non-translocated wolves.

During winter 2001-2002, the Wisconsin DNR received a request from the Forest County Board of Supervisors, to stop relocating wolves into Forest County, where the Wisconsin DNR had traditionally relocated many problem wolves. Since that time, Florence, Iron, Langlade, Lincoln, Marinette, Oconto, Rusk, and Taylor Counties, and the Town of Mason in Bayfield County, have passed resolutions against release of problem wolves. These resolutions are not legally binding on the WDNR, but do serve as an indication of public sentiment toward and tolerance of wolves. With most suitable wolf habitat occupied by wolf packs, the Wisconsin DNR now has limited places to relocate problem wolves.

The following methods could be used during the process of capturing and collaring or relocating wolves

Foot-hold traps can be utilized to live-capture a variety of mammals, and are effectively used within Wisconsin to capture wolves. Three advantages of the foot-hold trap are: 1) they can be set under a wide variety of conditions, and 2) pan-tension devices can be used to reduce the probability of capturing smaller non-target animals (Turkowski et al. 1984, Phillips and Gruver 1996), and 3) non-target wildlife can be released. Effective trap placement and the use of appropriate lures by trained WS personnel also contribute to the foot-hold trap's selectivity. Foot-hold traps are difficult to keep operational during inclement weather and they lack selectivity where non-target species are of a similar or heavier weight than the target species. The use of foot-hold traps also requires more time and labor than some methods, but they are indispensable in resolving many depredation problems. Foot-hold traps are constantly being modified and tested to improve the welfare of captured animals. Additionally, the NWRC has developed a Tranquilizer Tab Device (TTD) that can be used in conjunction with traps and cable restraints which can help reduce stress and injury of captured individuals (See TTD below). WS in Wisconsin only use offset laminated jaw traps which have been found to reduce injury in captured coyotes (Phillips et al. 1996).

Cable restraints may be used as live-capture devices. Cable restraints are a specialized type of snare intended to live capture wolves (Olson and Tischaefter 2004). Careful attention to details when placing cable restraints and the use of a "stop" on the cable can allow for live-capture of animals and can allow some non-target animals to pull out of the device. Spring-activated foot snares could also be used to capture depredating wolves. As with traps, snare placement and, in the case of leg snares, the use of trigger tension systems reduce the risks to non-target species. Size and height of the cable restraint loop

above the ground can also reduce non-target species risks. Presently in Wisconsin, WS is only allowed to use cable restraints that meet the following criteria: constructed of 1/8" diameter, 7x7 cable, 10 feet or less in length, incorporate a reverse-bend lock with a minimum outside diameter of 1 1/4 inches, incorporate an inline swivel, have a fixed stop 14 inches from the cable end and are staked in such a manner to prevent the captured animal from entangling in rooted vegetation greater than 1/2 inch in diameter.

Chemical Immobilization and handling of live-captured wolves could be conducted by using several drugs approved and authorized for this purpose. These methods would only be used by personnel who have received training in the safe use of authorized immobilization/ euthanasia chemicals and are certified by WS or WDNR. This training involves hands-on application of state-of-the-art techniques and chemicals. Immobilization drugs approved for use by WS and the WDNR include:

Ketamine hydrochloride is a cyclohexamine (dissociative) type drug that produces immobilization and analgesia by selective depression of the central nervous system. Ketamine produces a state of unconsciousness that interrupts association pathways to the brain and allows for the maintenance of the protective reflexes, such as coughing, breathing, swallowing, and eye blinking. It is supplied as a slightly acidic solution (pH 3.5 to 5.5) for intramuscular injection. Ketamine is detoxified by the liver and excreted by the kidney. Following administration of recommended doses, animals become immobilized in about 5 minutes with anesthesia lasting from 30 to 45 minutes. Depending on dosage, recovery may be as quick as 4 to 5 hours or may take as long as 24 hours. Recovery is generally smooth and uneventful. Ketamine is rarely used in a pure state due to possible negative side effects. For wolf immobilizations, Ketamine would be used in combination with Xylazine in order to minimize side effects.

Xylazine hydrochloride is a sedative which produces central nervous system depression and moderate analgesia and muscle relaxant properties. Xylazine HCL is most often used in combination with drugs such as Ketamine. Ketamine/Xylazine combinations can be used to effectively and safely immobilize a variety of mammals. At high dose rates the margin of safety decreases greatly. Recommended dosages are administered through intramuscular injection allowing the animal to become immobilized in about 5 minutes and lasts for several hours, but can be reversed after 30 to 45 minutes.

Yohimbine is a useful and readily available antagonist used to reverse the effects of Xylazine.

Telazol is a combination of equal parts of tiletamine hydrochloride and zolazepam hydrochloride. The product is generally supplied sterile in vials, each containing 500 mg of active drug, and when dissolved in sterile water has a pH of 2.2 to 2.8. Telazol produces a state of unconsciousness in which protective reflexes, such as coughing and swallowing, are maintained during anesthesia. Schobert (1987) listed the dosage rates for many wild and exotic animals. Before using Telazol, the size, age, temperament, and health of the animal are considered. Following a deep intramuscular injection of Telazol, onset of anesthetic effect usually occurs within 5 to 12 minutes. Muscle relaxation is optimum for about the first 20 to 25 minutes after the administration, and then diminishes. Recovery varies with the age and physical condition of the animal and the dose of Telazol administered, but usually requires several hours.

Capture-All 5 is a combination of Ketaset and Xylazine, and is regulated by the FDA as an investigational new animal drug. The drug is available, through licensed veterinarians, to individuals sufficiently trained in the use of immobilization agents. Capture-All 5 is administered by intramuscular injection; it requires no mixing, and has a relatively long shelf life without refrigeration, all of which make it ideal for the sedation of various species.

Tranquilizer Tab Devices (TTDs) were developed by the NWRC as a means of sedating animals captured in foot-hold traps to reducing the potential for self-inflicted injuries to animals while held in the trap. Used properly the sedative, propiopromazine hydrochloride (Investigational New Animal Drug #9528) does not render the animal unconscious. The drug is administered via a rubber nipple (trap tab) fastened to the jaw of the trap. Upon capture the animal will instinctively bite on the trap tab and ingest the tranquilizer.

Non-lethal Methods which Require Permits from the USFWS

Some animal behavior modification systems involve capturing wolves and fitting wolves with collars used to deliver or trigger repellent stimuli (i.e., aversive conditioning). An additional non-lethal method consists of shooting wolves with non-lethal projectiles like rubber bullets. These non-lethal techniques involve intentionally using painful stimuli to manage wolf behavior, and the USFWS has determined that, while federally protected as a threatened or endangered species, permits or other authorizations are required to use these methods. Methods that require capture and handling of wolves would be conducted only by personnel from the WDNR, or their designated agents (e.g., WS).

- **Aversive stimuli** are stimuli that cause discomfort, pain and/or an otherwise negative experience paired with specific behaviors to achieve conditioning against these behaviors. These types of repellents involve animal learning to be effective (Shivik et al. 2002, 2003). Electric shock from a modified dog training collar that was activated when wolves came into close proximity to livestock was tested by Shivik et al. (2002). Testing indicated potential, but numerous logistical obstacles to research design and operational must be overcome before this technique is likely to have operational value. Training collars did not result in a statistically significant reduction in wolf predation in a subsequent study by Shivik et al. (2003). The authors reported numerous difficulties in use of the training collars.

Shultz et al. 2005 reported the results of using dog training collars on 2 different wolves over a 4 year period. Their observations indicated that remote-activated training collars do appear to deter predation by wolves. Shocking did not appear to reduce den or rendezvous site attendance but did appear to result in an increase in distances moved during the period immediately after the shock was administered. Long-term avoidance of the farms did not seem possible unless the aversive stimulus (shock) was linked to a signal, like the beepers which sounded before the shock was administered. When training collars were placed on wolves after depredations had started, it appeared to affect the behavior of the collared wolf but seemed less likely to affect other wolves in the pack. Authors concluded that under specific circumstances, use of collars to condition wolves to avoid certain sites may be preferable and more cost-effective than traditional removal efforts. However, additional information is needed on the long-term physical and behavioral impacts of the collars on wolves.

- **Non-lethal Projectiles** This involves guarding an area and then using rubber bullets or other non-lethal projectiles to prevent a predation event. It can be used as an aversive technique, but

requires that the projectiles be used every time the animal attempts to prey on the protected resource so the animal doesn't identify conditions when it can obtain prey without receiving a negative experience (Shivik 2004). In general, this method is intended for use on wolves that spend time around houses/farms repeatedly trying to get livestock and pets, and wolves that are acting too bold around humans (E. Bangs, USFWS, pers. comm.).

Methods which require around-the-clock presence of a person to guard the resource are most efficiently used when the landowner/resource manager assists with the implementation. The USFWS may choose to allow the WDNR and WS to train individuals in the use of this method. It is possible, although unlikely that this method could result in the death of or injury to a wolf if used at close range or if a shot unintentionally hits a vulnerable spot on the wolf. There is some concern that use of this method by private citizens could result in greater risk to wolves than if its use is restricted to WS and WDNR personnel. However, Bangs et al. (2004) reported that over 100 permits were issued for this method and, although several wolves were hit, none seemed seriously injured. Individuals using the method reported that wolves did seem more wary after the technique was used.

LETHAL WOLF DAMAGE MANAGEMENT METHODS

Lethal removal of depredating wolves can resolve damage problems (Bradley 2004). While federally listed, lethal WDM techniques always require a permit from the USFWS. Lethal control can be used to address wolf damage problems in Wisconsin when: 1) there have been documented, confirmed losses at a site and the WS or WDNR specialist on the site recommends removal, 2) while federally listed, a permit or similar authority has been granted to WDNR by the USFWS, 3) the WDNR has determined that the removal is consistent with the provisions of the WWMP (WDNR 1999) and approves the action, and 4) the producer/owner has a signed depredation management plan (farm plan) for the property which includes damage abatement recommendations. If WS is to conduct the removal an *Agreement for Control on Private Property* and/or similar document for public lands must be signed by the landowner or administrator authorizing the use of each damage management method.

- **Euthanization** of problem wolves caught or restrained by foot hold traps, cable restraints, or snares will normally be conducted with the use of appropriate type of firearm by trained personnel. This is the preferred method of euthanasia to reduce handling and stress to the animal. Euthanasia may also be accomplished through the administration of approved and authorized chemical euthanasia agents, such as sodium pentobarbital for properly immobilized animals.
- **Cable Restraints/Snares** may be used as either lethal or live-capture devices. Cable restraints set to catch an animal by the neck are usually lethal, unless there is a "stop" on the cable to regulate the minimum size of the loop and the devices are set so that the animal cannot become entangled in surrounding vegetation. The specialized snares used for live-capturing are called "Cable Restraints" (Olson and Tischaefer 2004). Spring-activated foot snares could also be used to capture depredating wolves. Wolves captured by non-lethal restraint devices may be euthanized as described above.
- **Shooting** is selective for a target species and may involve the use of spotlights, night-vision, and predator calling. Removal of one or two specific animals by calling and shooting in the problem area can sometimes provide immediate relief from a predation problem.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within

3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). Wildlife Services employees, who carry firearms as a condition of employment, are required to certify that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

- **Dart guns** are non-lethal capture devices that utilize a dart filled with tranquilizer fired from a specially designed rifle. Once tranquilized, the animal may be handled safely for research or relocation purposes. Under special situations, a tranquilized animal could also be euthanized if lethal removal is warranted. Use of dart guns would have no effect on non-target wolves because positive target species identification is made before animals are shot. Thus, use of dart guns is expected to continue to be virtually 100% selective for target individuals and species, and would not pose a risk to non-target species and individuals. Use of dart guns may sometimes be the only control option available if other factors preclude the setting of equipment.

APPENDIX C

FEDERALLY LISTED ENDANGERED, THREATENED AND CANDIDATE SPECIES IN WISCONSIN

MAMMALS

Canada lynx (*Lynx Canadensis*) – Threatened
Gray wolf (*Canis lupus*) – Endangered

BIRDS

Bald eagle (*Haliaeetus leucocephalus*) - Threatened
Kirtland's warbler (*Dendroica kirtlandii*) - Endangered
Piping plover (Great Lakes population - *Charadrius melodus*) - Endangered
Whooping crane (*Grus americanus*) - Non-essential Experimental Population

REPTILES

Eastern Massasauga (*Sistrurus catenatus*) – Candidate

CLAMS (Freshwater Mussels, Unionids)

Higgins eye pearl mussel (*Lampsilis higginsii*) - Endangered
Sheepnose (*Plethobasus cyphus*) - Candidate
Spectaclecase (*Cumberlandia monodonta*) - Candidate
Winged mapleleaf (*Quadrula fragosa*) - Endangered

INSECTS

Hine's emerald dragonfly (*Somatochlora hineana*) - Endangered
Karner Blue Butterfly (*Lycaeides melissa samuelis*) - Endangered

PLANTS

Dwarf lake iris (*Iris lacustris*) - Threatened
Eastern prairie fringed orchid (*Platanthera leucophaea*) - Threatened
Fassett's locoweed (*Oxytropis campestris* var. *chartacea*) - Threatened
Mead's milkweed (*Asclepias meadii*) - Threatened
Northern wild monkshood (*Aconitum noveboracense*) - Threatened
Pitcher's thistle (*Cirsium pitcheri*) - Threatened
Prairie bush-clover (*Lespedeza leptostachya*) - Threatened

APPENDIX D

WISCONSIN LIST OF THREATENED AND ENDANGERED SPECIES

MAMMALS

ENDANGERED

American Marten *Martes americana*

THREATENED

Gray Wolf *Canis lupus*

BIRDS

ENDANGERED

Piping Plover *Charadrius melodus*

Trumpeter Swan *Cygnus buccinator*

Yellow-throated Warbler *Dendroica dominica*

Snowy Egret *Egretta thula*

Peregrine Falcon *Falco peregrinus*

Worm-eating Warbler *Helmitheros vermivorus*

Loggerhead Shrike *Lanius ludovicianus*

Red-necked Grebe *Podiceps grisegena*

Caspian Tern *Sterna caspia*

Forster's Tern *Sterna forsteri*

Common Tern *Sterna hirundo*

Bewick's Wren *Thryomanes bewickii*

Barn Owl *Tyto alba*

THREATENED

Henslow's Sparrow *Ammodramus henslowii*

Red-shouldered Hawk *Buteo lineatus*

Great Egret *Casmerodius albus*

Yellow Rail *Coturnicops noveboracensis*

Spruce Grouse *Dendragapus canadensis*

Cerulean Warbler *Dendroica cerulea*

Acadian Flycatcher *Empidonax virescens*

Yellow-Crowned Night-Heron *Nyctanassa violaceus*

Kentucky Warbler *Oporornis formosus*

Osprey *Pandion haliaetus*

Greater Prairie-Chicken *Tympanuchus cupido*

pinnatus

Bell's Vireo *Vireo bellii*

Hooded Warbler *Wilsonia citrina*

REPTILES & AMPHIBIANS

ENDANGERED

Blanchard's Cricket Frog *Acris crepitans blanchardi*

Slender Glass Lizard *Ophisaurus attenuatus*

Queen Snake *Regina septemvittata*

Massasauga Rattlesnake *Sistrurus catenatus*

Ornate Box Turtle *Terrapene ornata*

Western Ribbon Snake *Thamnophis proximus*

Northern Ribbon Snake *Thamnophis sauritus*

THREATENED

Wood Turtle *Clemmys insculpta*

Blanding's Turtle *Emydoidea blandingii*

Butler's Garter Snake *Thamnophis butleri*

FISHES

ENDANGERED

Skipjack Herring *Alosa chrysochloris*

Crystal Darter *Crystallaria asprella*

Gravel Chub *Erimystax x-punctata*

Bluntnose Darter *Etheostoma chlorosomum*

Starhead Topminnow *Fundulus dispar*

Goldeye *Hiodon alosoides*

Striped Shiner *Luxilus chrysocephalus*

Black Redhorse *Moxostoma duquensnei*

Pallid Shiner *Notropis amnis*

Slender Madtom *Noturus exilis*

THREATENED

Blue Sucker *Cycleptus elongatus*

Black Buffalo *Ictiobus niger*

Longear Sunfish *Lepomis megalotis*

Redfin Shiner *Lythrurus umbratilis*

Speckled Chub *Macrhybopsis aestivalis*

River Redhorse *Moxostoma carinatum*

Greater Redhorse *Moxostoma valenciennesi*

Pugnose Shiner *Notropis anogenus*

Ozark Minnow *Notropis nubilus*

Gilt Darter *Percina evides*

Paddlefish *Polyodon spathula*

INSECTS

ENDANGERED

Pecatonica River Mayfly *Acanthametropus*

pecatonica

Red-tailed Prairie Leafhopper *Aflexia rubranura*

Flat-headed Mayfly *Anepeorus simplex*

Swamp Metalmark *Calephelis mutica*

Northern Blue Butterfly *Lycaeides idas*

Giant Carrion Beetle *Nicrophorus americanus*

Powesheik Skipperling *Oarisma powesheik*

Extra-striped Snaketail Dragonfly *Ophiogomphus*
anomalous

Saint Croix Snaketail Dragonfly *Ophiogomphus*
susbehcha

Silphium Borer Moth *Papaipema silphii*

Phlox Moth *Schinia indiana*

Warpaint Emerald Dragonfly *Somatochlora*
incurvata

Hine's Emerald Dragonfly *Somatochlora hineana*
Regal Fritillary *Speyeria idalia*
Knobels Riffle Beetle *Stenelmis knobeli*
Lake Huron Locust *Trimerotropis huroniana*
THREATENED
Spatterdock Darner Dragonfly *Aeshna mutata*
Frosted Elfin *Incisalia irus*
Prairie Leafhopper *Polyamia dilata*
Pygmy Snaketail Dragonfly *Ophiogomphus howei*

SNAILS

ENDANGERED

Midwest Pleistocene Vertigo *Vertigo hubrichti*
Occult Vertigo *Vertigo occulta*

THREATENED

Wing Snaggletooth *Gastrocopta procera*
Cherrytone Drop *Hendersonia occulta*

MUSSELS

ENDANGERED

Spectaclecase *Cumberlandia monodonta*
Purple Wartyback *Cyclonaias tuberculata*
Butterfly *Ellipsaria lineolata*
Elephant-Ear *Elliptio crassidens*
Snuffbox *Epioblasma triquetra*
Ebonyshell *Fusconaia ebena*
Higgins Eye *Lampsilis higginsii*
Yellow/Slough Sandshell *Lampsilis teres*
Bullhead *Plethobasus cyphus*
Rainbow *Villosa iris*
Winged Mapleleaf *Quadrula fragosa*

THREATENED

Slippershell mussel *Alasmidonta viridis*
Rock-Pocketbook *Arcidens confragosus*
Monkeyface *Quadrula metanevra*
Wartyback *Quadrula nodulata*
Salamander Mussel *Simpsonaias ambigua*
Buckhorn *Tritogonia verrucosa*
Ellipse *Venustaconcha ellipsiformis*

PLANTS

ENDANGERED

Carolina Anemone *Anemone caroliniana*
Hudson Bay Anemone *Anemone multifida*
Lake Cress *Armoracia lacustris*
Purple Milkweed *Asclepias purpurascens*
Green Spleenwort *Asplenium trichomanes-ramosum*
Alpine Milk Vetch *Astragalus alpinus*
Prairie Plum *Astragalus crassicaulis*
Coopers Milk Vetch *Astragalus neglectus*
Prairie Moonwort *Botrychium campestre*
Moonwort *Botrychium lunaria*
Goblin Fern *Botrychium mormo*

Floating Marsh Marigold *Caltha natans*
Wild Hyacinth *Camassia scilloides*
Crow-spur Sedge *Carex crus-corvi*
Smooth-sheathed Sedge *Carex laevivaginata*
Hop-like Sedge *Carex lupuliformis*
Intermediate Sedge *Carex media*
Schweinitz's Sedge *Carex schweinitzii*
Brook Grass *Catabrosa aquatica*
Stoneroot *Collinsonia Canadensis*
Hemlock-parsley *Conioselinum chinense*
Beak Grass *Diarrhena americana*
Lanceolate Whitlow-cress *Draba cana*
Neat Spike-rush *Eleocharis nitida*
Wolf Spike-rush *Eleocharis wolfii*
Angle-stemmed Spikerush *Eleocharis quadrangulata*
Harbinger-of-Spring *Erigenia bulbosa*
Chestnut Sedge *Fimbristylis puberula*
Umbrella Sedge *Fuirena pumila*
Northern Comandra *Geocaulon lividum*
Pale False Foxglove *Agalinus skinneriana*
Bog Rush *Juncus stygius*
Prairie Bush Clover* *Lespedeza leptostachya*
Dotted Blazing Star *Liatris punctata*
Auricled Twayblade *Listera auriculata*
Fly Honeysuckle *Lonicera involucrata*
Smith Melic Grass *Melica smithii*
Large-leaved Sandwort *Moehringia macrophylla*
Mat Muhly *Muhlenbergia richardsonis*
Louisiana Broomrape *Orobanche ludoviciana*
Fassett's Locoweed* *Oxytropis campestris*
Small-flowered Grass-of- Parnassus *Parnassia parviflora*
Smooth Phlox *Phlox glaberrima*
Butterwort *Pinguicula vulgaris*
Heart-leaved Plantain *Plantago cordata*
Eastern Prairie White- fringed Orchid *Platanthera leucophaea*
Western Jacob's Ladder *Polemonium occidentale lacustre*
Pink Milkwort *Polygala incarnata*
Spotted Pondweed *Potamogeton pulcher*
Rough White Lettuce *Prenanthes aspera*
Great White Lettuce *Prenanthes crepidinea*
Pine-drops *Pterospora andromedea*
Small Shinleaf *Pyrola minor*
Small Yellow Water Crowfoot *Ranunculus gmelinii*
Lapland Buttercup *Ranunculus lapponicus*
Lapland Rosebay *Rhododendron lapponicum*
Wild Petunia *Ruellia humilis*
Sand Dune Willow *Salix cordata*
Satiny Willow *Salix pellita*
Hall's Bulrush *Scirpus hallii*
Netted Nut-rush *Scleria reticularis*
Small Skullcap *Scutellaria parvula*
Selago-like Spikemoss *Selaginella selaginoides*
Fire Pink *Silene virginica*

Blue-stemmed Goldenrod *Solidago caesia*
Lake Huron Tansy *Tanacetum bipinnatum* ssp.
hurone
Hairy Meadow Parsnip *Thaspium barbinode*
Foamflower *Tiarella cordifolia*
Purple False Oats *Trisetum melicoides*
Dwarf Bilberry *Vaccinium cespitosum*
Mountain Cranberry *Vaccinium vitis-idaea*
Squashberry *Viburnum edule*
Sand Violet *Viola fimbriatula*

PLANTS

THREATENED

Northern Monkshood* *Aconitum noveboracense*
Muskroot *Adoxa moschatellina*
Round Stemmed False Foxglove *Agalinus gattingeri*
Yellow Giant Hyssop *Agastache nepetoides*
Small Round-leaved Orchis *Amerorchis rotundifolia*
Prairie Indian Plaintain *Arnoglossum plantagineum*
Dwarf Milkweed *Asclepias ovalifolia*
Wooly Milkweed *Asclepias lanuginosa*
Prairie Milkweed *Asclepias sullivantii*
Pinnatifid Spleenwort *Asplenium pinnatifidum*
Forked Aster *Aster furcatus*
Kitten Tails *Besseyia bullii*
Sand Reed *Calamovilfa longifolia*
Large Water Starwort *Callitriche heterophylla*
Calypso Orchid *Calypso bulbosa*
Carey's Sedge *Carex careyana*
Beautiful Sedge *Carex concinna*
Coast Sedge *Carex exilis*
Handsome Sedge *Carex formosa*
Garbers Sedge *Carex garberi*
Lenticular Sedge *Carex lenticularis*
Michaux's Sedge *Carex michauxiana*
Drooping Sedge *Carex prasina*
Prairie Thistle *Cirsium hillii*
Dune Thistle* *Cirsium pitcheri*
Rams-head Ladys-slipper *Cypripedium arietinum*
Thickspike Wheatgrass *Elymus lanceolatus* ssp.
psammophilus

Western Fescue *Festuca occidentalis*
Blue Ash *Fraxinus quadrangulata*
Yellowish Gentian *Gentiana alba*
Cliff Cudweed *Gnaphalium saxicola*
Round Fruited St. John's Wort *Hypericum*
sphaerocarpum
Dwarf Lake Iris* *Iris lacustris*
Slender Bush Clover *Lespedeza virginica*
Bladderpod *Lesquerella ludoviciana*
Broad-leaved Twayblade *Listera convallarioides*
Brittle Prickly Pear *Opuntia fragilis*
White Ladys-slipper *Cypripedium candidum*
English Sundew *Drosera anglica*
Linear-leaved Sundew *Drosera linearis*
Pale Purple Coneflower *Echinacea pallida*
Beaked Spike Rush *Eleocharis rostellata*
Clustered Broomrape *Orobanche fasciculata*
Marsh Grass-of-Parnassus *Parnassia palustris*
Wild Quinine *Parthenium integrifolium*
Sweet Coltsfoot *Petasites sagittatus*
Tuberclad Orchid *Platanthera flava*
Bog Bluegrass *Poa paludigena*
Braun's Holly Fern *Polystichum braunii*
Prairie-parsley *Polytaenia nuttallii*
Algal-leaved Pondweed *Potamogeton confervoides*
Sheathed Pondweed *Potamogeton vaginatus*
Seaside Crowfoot *Ranunculus cymbalaria*
Bald Rush *Rhynchospora scirpoides*
Hawthorn-leaved Gooseberry *Ribes oxycanthoides*
Flat-leaved Willow *Salix planifolia*
Tussock Bulrush *Scirpus cespitosus*
Plains Ragwort *Senecio indecorus*
Snowy Campion *Silene nivea*
Dune Goldenrod *Solidago simplex* var. *gillmanii*
Clustered Bur Reed *Sparganium glomeratum*
False Asphodel *Tofieldia glutinosa*
Snow Trillium *Trillium nivale*
Spike Trisetum *Trisetum spicatum*
Marsh Valerian *Valeriana sitchensis*

APPENDIX E

WISCONSIN GUIDELINES FOR CONDUCTING DEPREDAATION CONTROL ON WOLVES IN WISCONSIN WHILE FEDERAL LISTED AS “THREATENED” OR “ENDANGERED” STATUS.

By the Wisconsin Department of Natural Resources

October 14, 2005

The gray wolf (*Canis lupus*) was listed as Endangered by the federal government in 1974, and listed as Endangered by the State of Wisconsin in 1975. In 1999 the State of Wisconsin reclassified wolves to threatened status, and in on August 1, 2004 was removed from the threatened species list, and classified as protected wild animal. The U. S. Fish and Wildlife Service federally reclassify wolves in Wisconsin as Threatened on April 1, 2003, but a district judge decision on wolf reclassification in Oregon on January 31, 2005, caused wolves to be relisted as endangered.

The 1999 Wisconsin Wolf Management Plan prescribes how wolves should be managed in the state following federal and state reclassified to Threatened and delisted status. The following, more specific, guidelines were developed by the Wisconsin Wolf Science Advisory Committee to determine appropriate depredation control activity when and while listed as a **Threatened or Endangered Species** by the federal government, but delisted by the state. These guidelines will need to be updated when wolves are federally de-listed.

Note: These guidelines will be reviewed annually with scientists and stakeholders, and will be revised as necessary.

Authority—Authority to control and manage problem wolves will be held by the Wisconsin Department of Natural Resources (DNR), USDA-APHIS-Wildlife Services (WS), U. S. Fish and Wildlife Service (USFWS), tribal agents on Indian reservations, and other federal, state and tribal agents authorized by DNR and USFWS.

Definitions

Abatement—Techniques for reducing risk of depredation by creating exclusions, establishing barriers, or using scare devices.

Aversive Conditioning—Conditioning of animals to eliminate undesired behavior by associating such behavior with a disagreeable stimulus.

Chronic Farm—Farm with verified wolf depredation in 2 or more years in the past 5 year-period.

Control—Attempt to capture or shoot problem wolves, and may include translocating, placing in captivity for study or research, euthanizing, or dispatching.

Depredation—Refers to predation on domestic animals.

Depredation Site----Location where depredation has occurred. On private land this includes contiguous property under the same ownership or lease of the affected landowner renter.

Dispatch—Attempting to humanely kill an animal in field situations.

Domestic Animal—Animal owned by people.

Euthanize—Humane killing of an animal.

Guard Animal----Use of one species of domestic animal to provide predator protection for another species of domestic animal, and may include Guarding dogs, llamas, donkeys, and other animals. Guarding dogs are dogs specifically bred for the protection of livestock, and have historically been used for this purpose; specific breeds include Maremma, Shar Planinetz, Anatolian shepherd, Komondor, Great Pyrenees, Akbash, and various crosses of these breeds.

Significant Loss—The killing or maiming of one or more domestic animals by wolves where the imminent threat of attacks on additional domestic animals is apparent. For poultry or other small animals, loss of \$250 or likely to exceed \$250 would be considered a significant loss.

Verified Depredation—Depredation verified by trained personnel from an authorized agency, and defined either as **Confirmed**, clear evidence that one or more wolves were responsible, or **Probable**, sign strongly suggesting that one or more wolves were responsible.

Wolf Depredation Management Guidelines

1) Use of Aversive Conditioning or Other Non-Lethal Methods----

- a) Where appropriate, WS will offer suitable non-lethal alternatives.
- b) Upon the first verification of depredation by wolves, a depredation management plan will be made for the farm, which will include recommended suitable nonlethal methods and other practices that may reduce depredation on the farm. A signed plan will be required before any control actions can proceed on any farm.
- c) If cost effective abatement is feasible, cost-shared abatements will be offered by DNR if money is available; DNR and WS will jointly determine suitable practices.
- d) A depredation management plan would be developed on farms before cost-share abatements are offered; DNR and USDA-WS will develop the plan in consultation with county and state livestock specialists.
- e) Experimental non-lethal abatement measures, such as the use of shock collars will be

done by DNR in consultation with WS; control trapping will normally not be conducted by WS in areas where DNR is conducting experimental abatement measures.

2) Verifications Necessary to Begin Wolf Control —

- a) Control may begin in any zone after one significant loss during the current grazing season if authorized by the USFWS.

3) Determination to Begin Wolf Control —

- a) On private land, WS determines when trapping will begin, and will notify the local DNR wildlife biologist or other DNR representative, and DNR will notify tribes where appropriate, that trapping has begun.
- b) On public lands, WS, the local DNR wildlife biologist or other DNR representative, and the manager of the public land to be trapped, will jointly determine if trapping will occur on such land, and will notify affected tribes.
- c) On private lands in Indian Reservations, and any area surrounding the reservation negotiated between tribes and State: WS and DNR will consult with the tribe before trapping and dispatching of wolves.
- d) On tribal lands will only be trapped by WS if requested by the tribe.

4) Maximum Distance Trapping Will Occur From Depredation Site:

- a) Trap to 0.5 or 1.0 mile or whatever distance from depredation site is permitted by the U.S. Fish and Wildlife Service throughout the state.

5) Duration of Trapping at a Depredation Site---

- a) WS will use its discretion to determine trapping effort needed to effectively resolve depredation problems and will generally trap up to 10 to 15 days for first time depredation, and up to 21 days for chronic farms.

6) Treatment of Special Sex/Age Group---

- a) Prior to August 1, all pups will be released at site.
- b) On certain areas of highly suitable wolf habitat, the local DNR wildlife biologist, after being notified by WS that depredation control trapping has begun, may request that lactating females be released nearby. Such actions would only be done with consultation with the affected landowner and if an effective abatement or aversive conditioning method is available to keep the wolf off the depredation site. Lactating females would not be released near chronic farms after June 15.

7) Treatment of Radio-Collared or Tagged Wolves---

- a) Radio-collared or tagged wolves will be treated as any other depredating wolf (dispatch or translocate as appropriate).
- b) Consult with tribal officials on any wolves that are clearly from an Indian reservation in areas near such reservations or near Indian lands.

8) Capture of Dogs or Wolf-Dog Hybrids---

- a) Dogs caught at depredation sites will be turned over to town chairman, dog owner, or animal shelter.
- b) Wolf-dog hybrids caught at depredation sites will be dispatched by USDA-WS or DNR if no collar or other identifying mark occur on the animal.

9) Wolf Control on Depredation to Dogs----

- a) Control could be conducted on wolves killing dogs leashed, confined, or under the owner's control on the owner's land if there is likeliness of additional depredation.
- b) No control trapping would be conducted on wolves killing dogs that are free-roaming, roaming at large, hunting, or training on public lands, and all other lands except land owned or leased by the dog owner.
- c) Other abatement and aversive conditionings will be considered on public lands where depredation occurs on dogs or other domestic animals.
- d) Guard animals would be treated as other domestic animals for verification and control purposes.

10) Wolf Control on Deer or Game Farms----

- a) Wolf control would be conducted on deer and game farms using the guidelines listed above.
- b) Normally, trapping would only be allowed within the fenced area of the game farm, unless unusual circumstances makes it necessary to trap up to 100 yards beyond. Trapping outside fence areas would only be considered following additional consultation among WS, DNR, and adjacent landowners.

11) Information Sharing-----

- a) DNR will share radio locations of potential depredating wolves with USDA-WS
- b) DNR will notify landowners and publish information of wolf depredation problems through local news releases when appropriate.
- c) DNR will share information with tribes on wolves that travel onto Indian reservation lands.
- d) USDA-WS will turn all wolves euthanized at depredation sites over to the U. S. Fish and Wildlife Service, who will normally turn these carcasses over to the Wisconsin DNR or Tribes for final designation. Wolf carcasses will be used for research, education, and cultural purposes.
- e) DNR will develop publications and educational materials on wolf depredation focused toward specific organizations or groups most affected by depredation by wolves.
- f) DNR will provide press releases to explain lethal and non-lethal forms of control.
- g) DNR will provide timely response to depredations with news releases.
- h) DNR will cooperate with USDA-WS and other organizations to test and research nonlethal methods of control, including methods of exclusion and aversive conditioning; results of such research will be published in scientific reports and in popular media.
- i) DNR will cooperate with USDA-WS and others to conduct cooperative research on wolf/livestock relationships and will attempt to determine means for preventing and educating landowners on wolf depredation on pets and livestock.