FINAL ENVIRONMENTAL ASSESSMENT

MAMMAL DAMAGE MANAGEMENT IN WISCONSIN

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US FOREST SERVICE CHEQUAMEGON – NICOLET NATIONAL FORESTS

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SUMMARY

Wisconsin wildlife has many positive values and is an important part of life in the state. However, as human populations expand, and land is used for human needs, there is increasing potential for conflicting human/wildlife interactions. This Environmental Assessment (EA) analyzes the potential environmental impacts of alternatives for United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) involvement in the reduction of conflicts by mammals in Wisconsin, including damage to property, agricultural and natural resources and risks to human and livestock health and safety. The proposed wildlife damage management activities could be conducted on public and private property in Wisconsin when the property owner or manager requests assistance and/or when assistance is requested by an appropriate state, federal, tribal or local government agency.

The preferred alternative considered in the EA, would be to continue and expand the current Integrated Wildlife Damage Management (IWDM) program in Wisconsin. The IWDM strategy encompass the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational assistance including non-lethal and lethal management methods, as described in the WS Decision Model (Slate et al. 1992). When appropriate, non-lethal methods like physical exclusion, cultural practices, habitat modification, repellents or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using shooting, trapping, snare / cable restraints, aerial shooting from aircraft (feral swine only), or registered euthanasia drugs. 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 often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy. Other alternatives examined in the EA include an alternative in which WS does not become involved in mammal damage management (MDM); an alternative in which WS is restricted to the use and recommendation of only non-lethal MDM methods; and an alternative in which WS provides technical assistance (advice) but does not provide operational assistance with implementing the recommendations (Chapter 3). WS involvement in mammal damage management in Wisconsin is closely coordinated with the Wisconsin Department of Natural Resources (WDNR). All WS activities are conducted in accordance with applicable state, federal, tribal, and local laws, and regulations.

The EA provides a detailed analysis of the impacts of each alternative on target mammal populations; non-target species including state and federally-listed threatened and endangered species; human health and safety; humaneness of the alternatives used; impacts on stakeholders, including impacts on aesthetic values, and impacts on regulated harvest of mammals.

ACRONYMS

ADC[1]	Animal Damage Control
AMDUCA	Animal Medicinal Drug Use Clarification Act
APHIS	Animal and Plant Health Inspection Service
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
AVMA	American Veterinary Medical Association
BO	Biological Opinion
CDC	Center for Disease Control
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DEA	Drug Enforcement Administration
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FMD	Foot and Mouth Disease
FMIA	Federal Meat Inspection Act
FY	Fiscal Year
HPS	Hantavirus Pulmonary Syndrome
IWDM	Integrated Wildlife Damage Management
MDM	Mammal Damage Management
MIS	Management Information System
MKE	General Mitchell International Airport
MOU	Memorandum of Understanding
MWC	Lawrence Timmerman Airport
NASS	National Agricultural Statistics Service
NEPA	National Environmental Policy Act
NHPA	Natural Historic Preservation Act
NOA	Notices of Availability
NRCS	Natural Resources Conservation Service
NWP	Nationwide Permit
NWRC	National Wildlife Research Center
SOP	Standard Operating Procedure
TB	Tuberculosis
T&E	Threatened and Endangered
US	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Department of the Interior, Fish and Wildlife Service

[1] On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The phrases Animal Damage Control (ADC), Wildlife Services (WS) are synonymous in this Environmental Assessment.

VITF	Voigt Intertribal Task Force
WAC	Wisconsin Administrative Code
WDACP	Wildlife Damage Abatement and Claims Program
WDATCP	Wisconsin Department of Agriculture, Trade and Consumer Protection
WDHS	Wisconsin Department of Health Services
WDM	Wildlife Damage Management
WDNR	Wisconsin Department of Natural Resources
WDOT	Wisconsin Department of Transportation
WS[1]	Wildlife Services
WNV	West Nile Virus
WWHC	Western Wildlife Health Committee

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CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with the needs of wildlife which increases the potential for conflicting human/wildlife interactions. This Environmental Assessment (EA) evaluates the potential environmental effects of alternatives for WS involvement in mammal damage management (MDM) in Wisconsin.

Wildlife damage management (WDM) is the science of reducing damage or other problems associated with wildlife, and is recognized as an integral part of wildlife management (The Wildlife Society 1992). The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program is the federal agency authorized to protect American resources from damage associated with wildlife (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)). Human/wildlife conflict issues are complicated by the wide range of public responses to wildlife and wildlife damage. What may be unacceptable damage to one person may be a normal cost of living with nature to someone else. The Final Environmental Impact Statement (FEIS) for the WS program (USDA 1997 Revised, page 1-1) summarizes the relationship in American culture of wildlife values and wildlife damage in this way:

> "*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 values 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*."

Wildlife Service's activities are conducted to prevent or reduce wildlife damage to agricultural, industrial and natural resources; property; livestock; and threats to public health and safety on private and public lands in cooperation with federal, state and local agencies, tribes, private organizations, and individuals. The WS program uses an Integrated Wildlife Damage Management (IWDM) approach (WS Directive 2.105[2]), in which a combination of methods may be used or recommended to reduce wildlife damage. These methods may include non-lethal techniques like alteration of cultural practices, habitat management, repellents, frightening devices, and physical exclusion to prevent or reduce damage. The reduction of wildlife damage may also require removal of individual animals, reducing the local animal populations through lethal means. In some instances, the goal may be to eradicate an invasive species. Program activities are not based on punishing offending animals but are conducted to reduce damage and risks to human and livestock health and safety, and are used as part of the WS Decision Model (Slate et al. 1992).

[2] The WS Policy Manual (http://www.aphis.usda.gov/wildlife_damage/ws_directives.shtml) 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 in the Literature Cited Appendix.

WS is a cooperatively funded, service-oriented program that receives requests for assistance with wildlife damage management from private and public entities, including tribes and other governmental agencies. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently in accordance with applicable federal, state, tribal, and local laws and Memoranda of Understanding (MOUs) between WS, other agencies and various Wisconsin Native American Tribes.

Normally, according to the APHIS National Environmental Policy Act (NEPA) implementing procedures, individual wildlife damage management actions may be categorically excluded {7 Code of Federal Regulation (CFR) 372.5(c), 60 Fed. Reg. 6,000 - 6,003 (1995)}. Wildlife Services chose to prepare this EA to facilitate planning, interagency coordination and the streamlining of program management, and to clearly communicate with the public the analysis of individual and cumulative impacts. In addition, this EA has been prepared to evaluate and determine if there are any potentially significant or cumulative impacts from the proposed and planned damage management program.

1.1 PURPOSE OF THIS EA

This EA addresses and evaluates the potential impacts on the human environment from alternatives for WS involvement in the protection of agricultural and natural resources, property, livestock, and public health and safety from damage and risks associated with mammals in Wisconsin. Damage problems can occur throughout the state. Under the Proposed Action, MDM could be conducted on private, federal, state, tribal, county, and municipal lands in Wisconsin upon request. Several mammal species have potential to be the subject of WS MDM activities in Wisconsin including: badger (*Taxidea taxus*), cottontail rabbits (*Sylvilagus floridanus*), coyotes (*Canis latrans*), feral cats (*Felix* sp.), feral swine (*Sus scrofa*), fox squirrel (*Sciurus niger*), gray fox (*Urocyon cinereoargenteus*), gray squirrel (*Sciurus carlolinensis*), weasels including - least weasel (*Mustela rixosa*), long-tailed weasel (*Mustela frenata*) and shorttail weasel (*Mustela ermine)*, mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), pocket gophers (*Geomys* spp.), raccoons (*Procyon lotor*), red fox (*Vulpes vulpes*), red squirrel (*Tamiasciurus hudsonicus*), river otter (*Lontra canadensis*), striped skunk (*Mephitis mephitis*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), woodchuck (*Marmota monax*), and Virginia opossums (*Didelphis virginianus*). This EA will also address limited take of miscellaneous mice, moles, shrews, and voles during small mammal surveys at airports. Management of damage caused by beaver (*Castor Canadensis*) and gray wolves (*Canis lupus*) is addressed in separate analyses.

This analysis also includes management of free ranging white-tailed deer (*Odocoileus virginianus*) and multiple species of captive cervids (including; white-tailed deer, elk (*Cervus Canadensis*), mule deer (*O. hemionus*), and other species in the Family Cervidae) as well as black bear (*Ursus americanus*) which are currently addressed in two independent and previously completed EAs (USDA 2002, 2003, 2011). Once completed, this analysis will replace the existing Wisconsin bear and deer EAs.

The issues and alternatives associated with mammal damage management were initially developed by WS with review by the cooperating and consulting agencies. Cooperating and consulting agencies assisted with the identification of additional issues and alternatives pertinent to managing damage associated with mammals in Wisconsin. This EA will be made available to the public for review and comment prior to the issuance of a decision regarding the alternative to be implemented and its environmental impacts.

1.2 NEED FOR ACTION

Conflicts between humans and wildlife are common in Wisconsin. The Wisconsin WS program has a long history of partnering with Wisconsin Department of Natural Resources (WDNR) and other agencies and cooperators on a wide variety of wildlife species causing damage to numerous resources (USDA 2013). Wildlife Services and the WDNR receive requests for assistance with wildlife damage from the public, tribes, and state, federal and local government agencies. Comprehensive surveys of mammal damage in Wisconsin have not been conducted, but WS does maintain a Management Information System (MIS) database to document assistance that the program provides. Table 1-1 summarizes technical assistance projects (advice/ recommendations) completed by the Wisconsin WS program for Fiscal Years 2007-2012 for species covered by this EA. Management Information System (MIS) data are limited to information that is collected from people who have requested services or information from WS. The data does not include requests received or responded to by local, state or other federal agencies or private companies. Consequently, the number of requests for assistance to WS does not reflect the full extent of need for action, but does provide an indication that needs exists.

In Wisconsin, the WDNR has state management responsibility for resident mammals, and conducts mammal management programs for furbearers, game species, and non-game mammals. The WDNR provides technical assistance and issues damage management permits, but rarely provides any operational assistance. Wildlife Services potential involvement in the area of mammal damage management in Wisconsin would be to provide basic recommendations, refer callers to the WDNR or private pest control companies as appropriate, and to provide direct management assistance with the implementation of mammal damage management programs upon request and as permitted or otherwise authorized by the WDNR or the Tribes. To date, some examples of operational programs conducted by WS in Wisconsin have included mammal damage management at aquaculture facilities, reduction of livestock predation by coyotes, management of crop and natural resource damage by feral swine, reduction of nuisance complaints and agriculture damage by black bears, natural resource protection from white-tailed deer, and mammal hazard management at Wisconsin airports. Wildlife Services also assists the WDNR with implementation of the Wisconsin Wildlife Damage Abatement and Claims Program (WDACP). Additionally, WS cooperates with state and federal agencies to assess and manage disease risks involving wild and feral mammals and captive wildlife.

Table 1.1 Annual number of requests for technical assistance involving mammals covered by this EA by resources for Wisconsin Wildlife Services during Fiscal Years 2007-2012.

Fiscal Year	Agriculture	Human Health and Safety	Property	Natural Resources	Total
2007	1024	966	122	18	2130
2008	1336	1,161	107	11	2615
2009	1161	1,026	181	10	2378
2010	1296	1,004	142	1	2443
2011	1275	806	97	2	2180
2012	1251	785	120	1	2157

1.2.1 Need for Mammal Damage Management to Protect Human Health and Safety

In Wisconsin human health and safety concerns and problems associated with mammals include, but are not limited to, the potential for transmission of zoonotic diseases to humans, mammal hazards at airports, and risks and actual instances of mammals injuring humans.

Zoonotic Diseases

Zoonotic diseases are diseases of animals which are communicable to humans. Some of the wild and feral mammals in Wisconsin may carry disease causing organisms or parasites including viruses, bacteria, fungi, protozoans and rickettsial organisms which pose a risk to humans. With the exception of arthropod-borne pathogens,disease transmission from wildlife to humans is uncommon with few documented occurrences. However, the infrequency of such transmission does not diminish the concerns of individuals requesting assistance that are fearful of exposure to a diseased animal because disease transmissions have been documented to occur. Usually, MDM is requested because of a perceived risk to human health or safety associated with wild animals living near humans, from animals acting out of character in human-inhabited areas during the day, or showing no fear when humans are present. WS actively attempts to educate the public about the risks associated with disease transmission from wildlife to humans through technical assistance and by providing technical leaflets on the risks of exposure. It is the goal of agricultural and human health programs to prevent disease/illness from occurring. Wildlife Services works with cooperators on a case-by-case basis to assess the nature and magnitude of the wildlife conflict regarding the health risks associated. It is the choice of the individual cooperator to tolerate the potential health risks or to seek to reduce those risks.

Wildlife Services' primary involvement in the management of zoonotic diseases would be to aid other federal, tribal, state, and local government and research entities in monitoring for the presence or absence of diseases in wildlife and advise on risk reduction methods. These data can be used to predict potential risks to human health and safety and aid agencies in directing management efforts. Most disease sampling occurs ancillary to other wildlife damage management activities (i.e., disease sampling occurs after wildlife have been captured or lethally taken for other purposes). For example, WS may sample deer harvested during the annual hunting season or during other damage management programs for tuberculosis, or may collect ticks from raccoons that were lethally taken to alleviate damage occurring to property. WS could sample feral hogs taken by hunters or during damage management activities to test for toxoplasmosis, swine brucellosis, or other diseases. In the unlikely event of a disease outbreak or an imminent realistic threat of an outbreak, WS could also be asked to conduct localized wildlife population reduction or removal of captive wildlife to prevent spread of disease to other areas.

This section includes examples of zoonotic diseases for which WS could provide surveillance or management assistance. This discussion on zoonoses is intended to briefly address the more common known zoonoses for those species specifically addressed in this EA but is not intended to be an exhaustive discussion of all potential zoonoses. The transmission of diseases from wildlife to humans is neither well documented nor well understood for most diseases. Determining a vector for a human infected with a disease known to occur in wildlife populations is often complicated by the presence of the known agent across a broad range of naturally

occurring sources. For example, a person with salmonella poisoning may have contracted salmonella bacterium from direct contact with an infected pet but may have also contracted the bacterium from eating undercooked meat or from other sources. Consequently, this list is not all-inclusive and new diseases may be identified in the future or may be introduced from foreign countries. Wildlife Services could provide assistance with diseases not listed here so long as the methods used and environmental impacts of WS' actions are within the parameters analyzed in this EA (Chapters 3 and 4).

Table 1-2. Wildlife Diseases That Pose Potential Human Health Risks in the United States (modified from Davidson and Nettles 2006).

Disease	**Causative Agent**	**Hosts**
Anthrax	bacterium (*Bacillus antracis*)	cattle, sheep, horses, swine, white-tailed deer, dogs, cats
Dermatophilosis	bacterium (*Dermatophilus congolensis*)	mammals (wild and domestic)
Demodectic mange	mange mite (*Demodex odocoilei*)	White-tailed deer
Sarcoptic mange	mite (*Sarcoptes scabiei*)	red foxes, coyotes, domestic dogs
Swine brucellosis	bacterium (*Brucella suis*)	Swine
Trichinosis	nematode (*Trichinella spiralis*)	swine, bears, raccoons, foxes, rats
Rabies	virus (Rhabidovirus)	all mammals (high risk wildlife: raccoons, fox, skunks, bats)
Visceral larval migrans	nematode (*Baylisascaris procyonis*)	raccoons
Leptospirosis	bacteria (*Leptospira interrogans*) over 180 different serovars	all mammals
Echinococcus infection	tapeworm (*Echinococcus multilocularis*)	foxes, coyotes
Bovine brucellosis	bacterium (*Brucela abortus*)	cattle & captive bison(evidence from Texas that organism has infected coyotes that scavenged aborted fetuses and placentas of infected cattle)
Toxoplasmosis	protozoan parasite (*Toxoplasma gondii*)	cats, such as bobcats, are definitive hosts, mammals and birds are intermediate hosts
Spirometra infection	tapeworm, (*Spirometra mansonoides*)	bobcats, raccoons, foxes, dogs, cats
Murine typhus	bacteria (*Rickettsia mooseri* = R. typhi)	rats, mice, as hosts for primary flea, louse or mite host
Giardiasis	protozoan parasite (*Giardia lambia*, *G. duodenalis*, and other *Giardia* sp.-taxonomy controversial)	beavers, coyotes, dogs, cats

Hantavirus Pulmonary Syndrome	Hantaviruses	Rodents
Tularemia	Bacterium	rodents, rabbits, hares
Histoplasmosis	fungus (*Histoplasma capsulatum*)	fungus occurs in bat guano
Lyme Disease	spirocheate (*Borelia burgdorferi*)	Rodents
Plague	*Yersinia pestis*	Rodents
Rocky Mountain Spotted Fever	bacterium *(Rickettsii rickettsia)*	dogs and rodents

Hantavirus Pulmonary Syndrome (HPS) is caused by infection from certain species of hantaviruses. Hantavirus Pulmonary Syndrome was first recognized in North America when a cluster of cases was diagnosed in the southwestern United States. Infection in humans causes acute, severe respiratory disease with a mortality rate of 38% (CDC 2013a). Rodents are the natural hosts for all known hantaviruses, and the virus can be found in their urine, feces, and saliva (CDC 2006). Once these substances have dried, humans can become infected by inhaling the dried materials as dust particles. This is the most common way the infection is acquired in the United States. People can also become infected by a rodent bite, and possibly by ingesting food or water contaminated by rodents. There is no evidence that people can become infected with the North American strains of hantavirus from other humans, other animals, or from biting insects. A small percentage of mice in Wisconsin have been found to have antibodies against the hantavirus strain that causes hantavirus pulmonary syndrome. The risk of acquiring this infection in the upper Midwest is extremely low. As of August, 2013 the CDC reports one case of confirmed HPS known to have been contracted in Wisconsin. Hantavirus has also been confirmed for six cases contracted in Iowa and two cases each in Illinois and Minnesota (CDC 2013a).

Tularemia, also known as "rabbit fever", is a disease caused by the bacterium *Francisella tularensis* (CDC 2013b). Tularemia typically infects animals such as rodents, rabbits, and hares. Usually, people become infected through the bite of infected ticks or tabanid flies, by handling infected sick or dead animals, by eating or drinking contaminated food or water, or by inhaling airborne bacteria. About 120 human cases of tularemia are reported each year in the U.S (CDC 2013b). Most cases occur in the south-central and western states; however cases have been reported in every state except Hawaii. Cases have also resulted from laboratory accidents. Without treatment with appropriate antibiotics, tularemia can be fatal (CDC 2003). The causative agent of tularemia is one of the most infectious pathogenic bacteria known, requiring as few as 10 organisms to cause disease. The Working Group on Civilian Biodefense considers tularemia to be a dangerous potential biological weapon because of its extreme infectivity, ease of dissemination, and substantial capacity to cause illness and death (Dennis et al. 2001). Many wild animal species may be infected, (hares, rabbits, squirrels, muskrats, beavers, deer), and occasionally certain domestic animals can also be infected (sheep and cats). The rabbit is the species most often involved in disease outbreaks. The bacteria can also be found in ticks and deerflies. Tularemia in humans is relatively rare in Wisconsin, averaging less than one case per year since 1980 (CDC 2013b).

Rabies is an acute, fatal viral disease of mammals most often transmitted through the bite of a rabid animal. Rabies is preventable, but it is fatal without prior vaccination or post-exposure

treatment. All mammals including man are susceptible to rabies. Over the last 100 years, the vector of rabies in the United States has changed dramatically. About 90% or greater of all animal cases reported annually to CDC now occur in wildlife (Krebs et al. 2000, CDC 2013c). Before 1960, the majority of cases were reported in domestic animals. The principal rabies hosts today are wild omnivores and bats. The number of rabies-related human deaths in the United States has declined from more than 100 annually in the early 1900s to an average of one or two people per year in the 1990s. Modern day prophylaxis, which is the series of vaccine injections given to people who have been potentially or actually exposed, has proven nearly 100% successful in preventing mortality when administered promptly (CDC 2013c). In the United States, human fatalities associated with rabies occur in people who fail to seek timely medical assistance, usually because they were unaware of their exposure to rabies. Although human rabies deaths are rare, the estimated public health costs associated with disease detection, prevention, and control have risen, exceeding $300 million annually. Those costs include the vaccination of companion animals, maintenance of rabies laboratories, medical costs such as those incurred for exposure case investigations, rabies post-exposure prophylaxis (PEP), and animal control programs (CDC 2013c).

Accurate estimates of the aforementioned expenditures are not available. Although the number of PEPs given in the United States each year is unknown, it has been estimated to be as high as 40,000. When rabies becomes epizootic or enzootic (i.e., present in an area over time but with a low case frequency) in a region, the number of PEPs in that area increases. Although the cost varies, a course of rabies immune globulin and five doses of vaccine given over a 4-week period typically exceeds $1,000 (CDC 2013c) and has been reported to be as high as $3,000 or more (Meltzer 1996). As epizootics spread in wildlife populations, the risk of "mass" human exposures requiring treatment of large numbers of people that contact individual rabid domestic animals infected by wild rabid animals increases. One case in Massachusetts involving contact with, or drinking milk from, a single rabid cow required PEPs for a total of 71 persons (CDC 2001). The total cost of this single incident exceeded $160,000 based on a median cost of $2,376 per PEP in Massachusetts. Likely the most expensive single mass exposure case on record in the United States occurred in 1994 when a kitten from a pet store in Concord, New Hampshire tested positive for rabies after a brief illness. As a result of potential exposure to the kitten or to other potentially rabid animals in the store, at least 665 persons received post-exposure rabies vaccinations costing more than $1.1 million (Noah et al. 1995). Total costs for this specific incident, including investigation, laboratory testing, and rabies immunoglobulin and vaccines was more than $1.5 million (AVMA 2004).

The primary reservoirs of the rabies virus in Wisconsin are bats and skunks. Domestic animals become infected from exposure to these wildlife reservoirs. Historically, skunks have been the predominant species infected by rabies, but for the past decade the number of positive bats has exceeded that of skunks. The last four cases of human rabies in Wisconsin occurred in 1959, 2000, 2004, and 2010. Animal rabies cases are widely dispersed in Wisconsin, and occur in both rural and urban areas. During 2006-2010, 125 animals were diagnosed with rabies; 121 were bats, 2 skunks, and two domestic dogs. (WDHS 2013a)

In areas of the country where dog rabies has been eliminated, but rabies in wildlife has not, cats often are the most significant domestic animal contracting rabies and presenting a subsequent risk of transmission to humans (Eng and Fishbein 1990, Krebs et al. 1996, Vaughn 1976).

Tuberculosis (TB) is a contagious disease of both animals and humans and can be caused by two specific types of the *Mycobacterium* bacteria. Tuberculosis in humans is caused by ***M. tuberculosis***. The bacteria usually attack the lungs, but TB bacteria can attack any part of the body such as the kidney, spine, and brain. If not treated properly, TB disease can be fatal. It was once the leading cause of death in the United States. Tuberculosis is spread through the air from one person to another. The bacteria are put into the air when a person with active TB disease of the lungs or throat coughs or sneezes. People nearby may breathe in these bacteria and become infected. In rare instances, TB can also be caused by a species of *Mycobacterium* called ***M. bovis*** which primarily infects cattle and other bovine-like animals (e.g., bison, deer, and goats). Humans most commonly become infected with this strain of TB through consumption of unpasteurized milk products from infected cows. For example, from 2001-2005, 35 ***M. bovis*** cases were identified in New York City. Preliminary investigations indicate that the cases were contracted from the consumption of unpasteurized milk products from Mexico (CDC 2013d). Human TB caused by ***M. bovis*** in the U.S. is rare because of milk pasteurization and culling of infected cattle herds. In January 2005, the first-known case of transmission of TB from deer to humans was reported in Michigan. The hunter was infected when he cut his hand while field dressing an infected deer. The hunter was treated with special antibiotics and made a full recovery (Wilkins et al, 2008).

In 1917, the federal government established a bovine TB eradication program. Most states in the U.S. have been declared free of the disease (CDC 2013d), however, bovine TB is found in wild white-tailed deer and in dairy herds in the Northern Lower Peninsula of Michigan. It was also discovered in cattle and wild deer near Skime, Minnesota, in 2005. However, after eight years of monitoring and aggressive management, bovine tuberculosis (TB) is undetectable in wild deer in northwestern Minnesota, according to the Minnesota Department of Natural Resources (MDNR 2013). The disease is still found in cattle elsewhere in the U.S.

Infection in deer begins with either inhalation or ingestion of infectious organisms. Transmission is aided by high deer densities and prolonged contact, as occurs at supplemental feeding sites. The bacilli commonly invade the tonsils first, later spreading to other cranial lymph nodes. If the infection is contained, it spreads no further. In some animals, however, the infection spreads to the thorax where it may disseminate throughout the lungs. These animals may then shed the bacteria by aerosol or oral secretions. The most susceptible animals develop infections throughout their abdominal organs, and can even shed bacilli through their feces or through milk to their fawns.

Tuberculosis has not been detected in wild cervids in Wisconsin. In the late 1990's, Wisconsin detected bovine TB in several captive elk herds. Since that time Wisconsin implemented TB testing requirements for any movement of cervids in Wisconsin other than to slaughter. Bovine TB has not been detected in Wisconsin since the last known positive elk herd was depopulated in 2000, but, bovine TB has been detected in captive herds around the country the past several years (P. McGraw, WDATCP, pers. comm., 2012).

Tick Borne Diseases. The Wisconsin Department of Health Services (WDHS) documents and tracks several tick-borne diseases, in addition to Lyme disease, including babesiosis, ehrlichiosis (both human granulocytic anaplasmosis and human monocytic ehrlichiosis) and Rocky Mountain spotted fever. The number of cases of these diseases is much smaller in comparison to the cases of Lyme disease, but their numbers are also increasing. The same tick that carries the Lyme disease bacterium also carries these pathogens. The tick infests a wide variety of animals, but is

most commonly found on meadow voles, mice, and deer. Increases in cases of babesiosis have been reported during spring, summer and fall, primarily acquired in northwestern Wisconsin. A new species of Ehrlichia is now also known to occur in Wisconsin, Minnesota, and certain northeastern states.

Research has shown a direct correlation between infected ticks, deer numbers, and Lyme disease cases (Deblinger et al. 1993, Magnarelli et al. 1984). Deer are an important reservoir for Lyme disease and are the primary host for adult deer tick (Conover 1997). Lyme disease incidence has also been linked to landscape features such as urban developed areas versus wooded residential areas (Montgomery County Health Department 2000). More than 20,000 cases of Lyme disease have been reported in Wisconsin since surveillance for the disease began in 1980. (WDHS, 2013b).

Raccoon Roundworm.. Raccoon Roundworm (*Baylisascaris procyonis*, BP) is a common roundworm found in the small intestine of raccoons which causes severe or fatal encephalitis in a variety of birds and mammals, including humans (CDC 2011). *Baylisascaris procyonis*, also can cause eye and organ damage in humans. Humans become infected with BP by ingesting soil or other materials (e.g., bark or wood chips) contaminated with raccoon feces containing BP eggs. Young children are at particular risk for infection as a result of behaviors such as placing potentially contaminated fingers and objects like toys into their mouths (CDC 2011). Raccoons are the primary host for the roundworm, but other animals including birds and small mammals can also be infected. Predator animals including dogs may also become infected by eating animals that are infected. In some dogs, *Baylisascaris* may develop to adult worms and pass eggs in the dogs' feces (CDC 2011).

Raccoons infected with BP inhabit most of the United States; the highest prevalence of BP infection in raccoons occurs in the Midwest and Mid-Atlantic States, northeast and parts of California. Despite the prevalence of infection in raccoons, infection of humans is rare and less than 25 cases have been documented in the U.S. Cases have been reported in California, Illinois, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, New York, and Pennsylvania. As of 2008, there were 15 reported human neurological cases in the US; five of the infected persons died (CDC 2011).

The risk for BP infection is greatly reduced by avoiding direct contact with raccoons and their urban habitats, by removing raccoon access to food and potential denning sites, excluding raccoons from children's play areas, and by limiting human exposure to areas and materials that might be contaminated by raccoon feces.

Foreign Animal Diseases. International trade and travel and the popularity of exotic pets have resulted in an ongoing risk of foreign animal disease introduction. In some cases, these diseases may be transmissible to humans. For example, in 2003, 39 individuals in Wisconsin and 42 individuals in five other Midwestern states were reported as having contracted monkeypox from pet prairie dogs and/or other exotic rodents (CDC 2009a). Symptoms of monkeypox in humans included fever, cough, rash and swollen lymph nodes. The prairie dogs were believed to have contracted the disease from African rodents imported for sale as pets. As part of the investigation of the incident, Wisconsin WS was requested to conduct surveillance in wild rodent populations around the residences of individuals with infected prairie dogs to see if native rodents had been exposed to the virus. In the event of a foreign animal disease outbreak in Wisconsin, WS could

be requested to provide similar assistance and/or aid USDA Veterinary Services or state animal and human health authorities in the management of animals involved in the outbreak.

Diseases Associated with Feral Animals. Diseases and parasites affecting feral cats and dogs can have particularly serious implications to human health given the close association of those animals with humans and companion animals. The topic of feral animals and their impacts on native wildlife and human health elicits a strong response in numerous professional and societal groups with an interest in the topic. Feral cats are considered by most professional wildlife groups to be a non-native species that has detrimental impacts to the native ecosystems especially in the presence of a human altered landscape. However, a segment of society views feral animals to be an extension of companion animals that should be cared for and for which affection bonds are often developed especially when societal groups feed and care for individual feral animals. Of special concern are those cats and dogs considered companion animals that are not confined at all times but are allowed to range for extended periods of time. Those companion animals are likely to encounter and become exposed to a wide-range of zoonoses that are brought back into the home upon return where direct contact with humans increases the likelihood of disease transmission, especially if interactions occur between companion animals and feral animals of the same species. Feral animals that are considered companion animals are also likely to impact multiple people if disease transmission occurs since those animals are likely to come in direct contact with several members of families and friends before diagnosis of a disease occurs.

Several known diseases that are infectious to humans, including rabies, have been found in feral cats. Another common zoonoses found in cats is ringworm. Ringworm (*Tinea* spp.) is a contagious fungal disease contracted through direct interactions with an infected person, animal, or soil. Other common zoonoses of cats are pasteurella, salmonella, cat scratch disease, and numerous parasitic diseases, including roundworms, tapeworms, and toxoplasmosis.

Most of the zoonoses known to infect cats that are infectious to humans are not life threatening if diagnosed and treated early. However, certain societal segments are at higher risks if exposed to zoonoses. Women who are pregnant, people receiving chemotherapy for immunologic diseases and organ transplants, and those with weakened immune systems are at increased risk of clinical disease if exposed to toxoplamosis (AVMA 2004). In 1994, five Florida children were hospitalized with encephalitis that was associated with cat scratch fever (AVMA 2004). The daycare center at the University of Hawaii in Manoa was closed for two weeks in 2002 because of concerns about potential transmission of murine typhus (*Rickettsia typhi*) and flea (*Ctenocephalides felis*) infestations afflicting 84 children and faculty. The fleas were from a feral cat colony that had grown from 100 cats to over 1,000, despite a trap, neuter, and release effort (AVMA 2004).

A study in France determined that stray cats serve as major reservoirs for the bacterium *Bartonella* spp. Consequently, stray cats and their fleas are the only known vectors for infecting house bound cats and humans with this bacterium. Humans are not infected via the flea, but pet cats often are infected by flea bites. Human infections that may result from exposure of this bacterium via stray cats include: cat scratch disease in immunocompetent patients, bacillary angiomatosis, hepatic peliosis in immunocompromised patients, endocarditis, bacteremia, osteolytic lesions, pulmonary nodules, neuroretinitis, and neurologic diseases (Heller et al. 1997). In areas where canine rabies has been eliminated, but rabies in wildlife has not, cats often are the most significant animal transmitting rabies to humans (Vaughn 1976, Eng and Fishbein 1990, Krebs et al. 1996).

Feral swine are potential reservoirs for at least 30 viral and bacterial diseases (Davidson 2006, Samuel et al. 2001, Williams and Barker 2001) and 37 parasites (Forrester 1991) that are transmissible to humans. Brucellosis, salmonellosis, toxoplasmosis, trichinosis, tuberculosis, and tularemia are some of the common diseases that can be carried by feral swine that are also known to infect humans (Stevens 1996, Hubalek et al. 2002, Seward et al. 2004).). Infection may result from direct exposure to swine (e.g., hunters handling carcasses), through contamination of food crops (California Food Emergency Response Team 2007), or through secondary infection of a third host (West et al. 2009). When diseases are transmitted through a third host, feral swine transmit the diseases to other wild mammals, birds, and reptiles, which in turn may transmit them to domestic livestock or humans. Although incidence of disease transmission from feral swine to humans is relatively uncommon, some diseases like brucellosis, tuberculosis and tularemia can be fatal.

Mammal Hazards to Public Safety at Airports

Airports provide ideal conditions for many wildlife species due to the large grassy areas adjacent to brushy, forested habitat used as noise barriers. Access to most airport properties is restricted so wildlife living within airport boundaries are protected during hunting and trapping seasons and are insulated from many other human disturbances.

The civil and military aviation communities have acknowledged that the threat to human health and safety from aircraft collisions with wildlife is increasing (Dolbeer et al. 2012,). Collisions between aircraft and wildlife are a concern throughout the world because wildlife strikes threaten passenger safety, result in lost revenue, and repairs to aircraft can be costly (Linnell et al. 1996). Aircraft collisions with wildlife can also erode public confidence in the air transport industry as a whole (Conover et al. 1995).

Although a greater number of wildlife strikes with aircraft involve birds, the most hazardous wildlife species in terms of damage to aircraft, cost of collisions, and effects on flight, is white-tailed deer (Dolbeer et al. 2012). The presence of white-tailed deer is a commonly encountered problem at airfields in Wisconsin. Wisconsin has more than 130 public use airports, 10 of which are subject to Federal Aviation Administration (FAA) Federal Aviation Regulations Part 139. Airports that are certified under Part 139 are designated based on the size of passenger aircraft that use the airport. This more typically includes larger airports with commercial service. Part 139 airports are held to much higher standard to reduce wildlife strikes to be able to maintain their certification.

Animals such as deer, coyotes, skunks and raccoons often venture onto airfields and become a direct threat to planes both landing and taking off. Other mammals which pose hazards to aircraft and public safety include but are not limited to feral dogs, fox, woodchucks, opossums, muskrat, gophers (damage to underground cables), and small rodents (mice and voles). The primary difficulty with mice and voles at airfields is not that they are a direct threat to aircraft, but that they attract predators (e.g., raptors, coyotes) that are a direct threat to aircraft.

WS receives requests for assistance with mammal damage management at civil airports and military airfields in Wisconsin. WS assists airports in Wisconsin with the management of wildlife problems including the removal of mammals from the airfields, under buildings, and

from common areas where people work or congregate. WS commonly follows procedures recommended in the "Wildlife Hazard Management at Airports: a Manual for Airport Personnel" (Cleary et al 2005). Since 1991, more than 40 airports in Wisconsin have contacted WS for assistance in reducing deer threats to aviation safety. This may involve consultation and technical assistance (e.g., identification of hazards, recommendations for habitat management or exclusion) or operational (e.g., sharp shooting deer). Additional examples of wildlife damage management at airports include the removal of skunks from hangers and around buildings, as well as coyotes that have crossed runways and taxiways while foraging for rodents. Airports throughout the state of Wisconsin have reported a total of 46 mammal strikes from 2002-2012, involving nine different species of mammals (FAA Wildlife Strike Database 2013). Out of those 46 mammal strikes eight of those involved coyotes and 15 involved white-tailed deer (FAA Wildlife Strike Database 2013). It is estimated that only 20 to 25% of all bird strikes are reported (Conover et al. 1995, Dolbeer et al. 2012, Linnell et al. 1996, Linnell et al. 1999), and it's likely that mammal strikes are also underreported. Consequently, the number of mammal strikes in Wisconsin is most likely much higher than FAA records indicate.

Other Mammal Hazards to Public Health and Safety

As stated previously, a common concern among people requesting assistance is the threat to human health and safety from disease transmission, but requests are also received for assistance from a perceived threat of physical harm from wildlife especially from predatory wildlife. Wisconsin WS may be requested to provide assistance with reduction of risk of bites and injuries from animals that appear to have lost their fear of humans and/or are behaving aggressively toward people.

Human encroachment into wildlife habitat increases the likelihood of human-wildlife interactions. Several predatory and omnivorous wildlife species thrive in urban habitat due to the availability of food, water, and shelter. Many people enjoy wildlife to the point of purchasing food specifically for feeding wildlife despite laws prohibiting the act in many areas. The constant presence of human created refuse, readily available water supplies, and abundant rodent populations found in urban areas often increases the survival rates and carrying capacity of wildlife species that are adaptable to those habitats. Often the only limiting factor of wildlife species in and around urban areas is the prevalence of diseases, which can be confounded by the overabundance of wildlife congregated into a small area that can be created by the seemingly unlimited amount of food, water, and shelter found within urban habitats.

As people are increasingly living with wildlife, the lack of harassing and threatening behavior by humans toward many species of wildlife, especially around urban areas, has led to a decline in the fear wildlife have toward humans. When wildlife species begin to habituate to the presence of humans and human activity, a loss of apprehension occurs that can lead to threatening behavior toward humans. Threatening behavior can be in the form of aggressive posturing, a general lack of apprehension toward humans, or abnormal behavior. Though wildlife attacking humans occurs rarely, the number of attacks appears to be on the increase. Timm et al. (2004) reported that coyotes attacking people have increased in California and highly publicized coyote attacks have only heightened people's awareness of the threat of such encounters. Often these coyote attacks have occurred where coyotes have become habituated to humans (Timm et al. 2007). Coyote attacks on pets and brazen behavior towards humans during early 2009 in Madison, Wisconsin caused public safety concerns among citizens, and resulted in a public meeting to address the issue. Wisconsin WS was asked by public officials to present coyote damage abatement options and potential methods for managing coyote populations at the community meeting.

Often, wildlife exhibiting threatening behavior or a loss of apprehensiveness to the presence of humans is a direct result and indication of an animal inflicted with a disease. So, requests for assistance are caused by both a desire to reduce the threat of disease transmission and from fear of aggressive behavior either from an animal that is less apprehensive of people or induced as a symptom of disease. For example, increasing populations of raccoons have been implicated in the outbreak of distemper in certain areas (Majumdar et al. 2005). Distemper has not been identified as transmissible to humans. However, cooperators who feel threatened by the possibility of disease transmission often request assistance after observing sick raccoons on their property. Symptoms of distemper often lead to abnormal behavior in raccoons that are similar to symptoms associated with rabies. Raccoons with distemper often lose their fear of humans and can act aggressively which increases the risk that people, livestock, or companion animals may be bitten. Distemper is also known to occur in coyotes, red fox, and gray fox with symptoms that are similar to those exhibited by animals infected with the rabies virus.

Black bears occasionally threaten human health and safety. Herrero (1985) documented 500 injuries to humans resulting from encounters with black bears from 1960 to 1980. Of those, 90% were minor injuries (minor bites, scratches, and bruises). At least 63 people were killed in 59 incidents by non-captive black bear during 1900 -2009 (Herrero 2011). Fatal black bear attacks occurred in Canada and Alaska (n=49) and in the lower 48 states (n=14).The number of bear attacks could be considered low considering the number of years taken into consideration and the geographic overlap of human and black bear populations in two countries. There have been no documented fatalities to humans caused by black bears in Wisconsin. However, situations could arise where WS is requested to assist with addressing bears that have posed a threat to human safety or could pose a threat in the state.

Feral swine can pose a threat to human safety from disease transmission, from aggressive behavior, and from being struck by vehicles and aircraft. Feral swine may act as reassortment vessels for such viruses as the highly pathogenic H5N1 influenza virus found throughout Europe, Asia, Africa and the Middle East (Hutton et al 2006). The reassortment of viruses could lead to new strains of influenza viruses that would become easily transferrable from mammals to humans (Brown 2004). Hutton et al. (2006) stated that feral swine can be the location for the reassortment of the H5N1 virus into a virus that is easily transmitted from human to human.

Emergency Response Efforts

Both large-scale natural disasters (e.g., hurricanes, tornadoes, and floods) and small-scale localized emergencies (e.g., release of exotic animals, traffic accidents involving animal transport vehicles) may occur in which WS' personnel could be requested to assist federal, state, and local governments in charge of responding to those situations. Those requests for assistance would be on extremely short notice and rare emergencies that would be coordinated by federal, state, and local emergency management agencies. For example, WS' personnel may be requested to participate in the lethal removal of cattle that were injured or were released from their transport vehicle at the scene of an accident to prevent those animals from endangering other drivers. WS could be asked to corral those animals that were uninjured and euthanize those animals that have been injured to reduce their suffering. In another example, WS' personnel may be requested to assist local and state law enforcement in immobilization or lethal control of exotic animals that have been accidentally released in the aftermath of a hurricane or tornado.

1.2.2 Need for Mammal Damage Management to Protect Agricultural Resources

Wisconsin is an agricultural state with 15 million acres in agricultural production (NASS 2012). Wisconsin cash receipts from farm marketing's totaled $11.74 billion in 2011. Livestock and dairy production in Wisconsin contribute substantially to the State's economy. As of January 1st, 2012 there were an estimated 3.4 million head of beef and dairy cattle on Wisconsin farms. In 2011, Wisconsin's milk cows produced 26.1 billion pounds of milk. Additionally, in 2011 an estimated 6.03 million laying hens produced 1.28 billion eggs, and 340,000 hogs, 84,000 sheep and lambs were on Wisconsin farms (NASS 2012). The state produces many agricultural commodities that are in the top ten ranking for production in the nation such as ginseng, cranberries, and oats (NASS 2012).

Wisconsin is also rich in wildlife resources. These resources provide abundant recreational opportunities, but also require Wisconsin agricultural producers to contend with wildlife damage to crops. The WDNR and WS receive requests for assistance from Wisconsin citizens experiencing agricultural damage caused by mammals, including, but not limited to the following: 1) predation on livestock, including poultry, by bears, coyotes and foxes; 2) threat and occurrence of damage to crops and stored feed due to mammals such as white-tailed deer, bear, raccoons and rodents; and 3) risk of disease transmission, and 4) other problems. WS could conduct and assist in management efforts with various mammals, coordinated by or with the WDNR, Wisconsin Department of Agriculture Trade and Consumer Protection (WDATCP), USDA/APHIS/Veterinary Services (VS) and/or other Federal, Tribal and State agencies, to study, monitor and/or control the occurrence and spread of animal diseases to protect livestock and other agricultural resources throughout the state.

Damage to Crops

Deer and bear damage to crops is a major concern to the agricultural community. In 2011, deer damage totaling more $1.4 million and $309,000 for bear was verified and reported through the WDACP (WDNR 2012). Many factors determine the amount of agricultural damage caused by bear and deer in Wisconsin. Bear and deer population sizes, farm location, and growing conditions are just a few of these factors. In Wisconsin, the WDATCP and the University of Wisconsin – Madison conducted a survey of agricultural growers in 1984 and found that the increasing deer herd was causing a perceived loss of about $36.7 million (WDATCP 1984). In 1997, it was estimated that deer caused up to $28 million worth of crop losses to about 14 major agricultural crops to Wisconsin agricultural producers (Wisconsin Conservation Congress, 2000).

In the interest of promoting landowners' tolerance for wildlife, Wisconsin has operated various wildlife damage programs through time, and since 1931 provided assistance to agricultural growers whose crops are damaged by wildlife. Wisconsin statute (Stat. 29.889) and Wisconsin Administrative Code NR 12 authorize the WDNR to operate the WDACP (WDNR 1998). Damage abatement or the reduction of crop damage or loss is the emphasis of the WDACP. This program currently provides assistance to commercial agricultural growers for damage caused by free-ranging white-tailed deer, wild turkeys (*Meleagris gallopavo*), Canada geese (*Branta canadensis*), elk (*Cervus canadensis*), cougar (*Puma concolor*), and black bear. The WDACP only provides damage and/or compensation assistance for damage to agricultural crops; not for damage to landscaping, family/residential gardens or vehicle/property damage. The program is funded by hunter dollars and administered by each County that chooses to enroll into the WDNR

program. Some of the county agencies have requested Wisconsin WS to enter into an agreement to conduct the operational work associated with the WDACP on their behalf. Currently, WS assists 49 Wisconsin counties with the program. The WDNR provides oversight for WDACP and all enrolled counties provide various approvals for the program. The WDACP is currently implemented in 70 of 72 Wisconsin counties. County WDACP administrators are reimbursed by the WDNR for all program expenditures. Abatement tools most commonly used in the program include fences, local population reduction, scare devices and repellents.

During 2011, WS verified damage to 60 different agricultural crops (including livestock) by white-tailed deer, black bear, Canada Geese, or Wild Turkeys. Of all the agricultural crops reported to WS, 49 were verified as deer damage and 18 bear. In 2011, WS received deer damage complaints in all 49 counties where WS provides assistance, enrolling 506 farms in the WDACP. In response to these damage complaints, WS distributed 32 gallons of deer repellent, loaned 144,330 feet of temporary woven fence, 310,980 feet of temporary electric fence, and 3 propane cannons. Wildlife Services recommended 327 shooting permits which resulted in the harvest of 1,923 deer, and conducted annual inspections on 103 permanent high-tensile woven wire fence projects totaling 603,520 linear feet of fence. Wildlife Services also recommended and provided oversight on the installation of (4) permanent woven wire fences (26,079 linear feet of fence) during 2011 (USDA 2012).

Also in 2011, WS received agricultural bear damage complaints in 32 of 49 administered counties, enrolling 171 farms in the WDACP. In response to these damage complaints, WS loaned 84,408 feet of temporary electric fence, 412 energizers (electrical devices that power the fence), and 1 propane exploder, distributed 100 rounds of pyrotechnics (Table 3), and captured 165 bears (162 relocated, 2 freed on location and 1 euthanized). Shooting permits were recommended for 13 cooperators, which resulted in the harvest of 16 bears. Additionally, WS received 74 requests for bear trapping assistance to reduce agricultural damage from eight WDACP counties in which the USDA-WS does not administer the program. In these counties, WS captured and relocated 172 bears from agricultural sites (USDA 2012).

The WDACP also supports the Wisconsin Deer Donation Program. This donation program continues to receive support at the local level since its start in 2000. Annually, the WDACP county committees approve participation in the program; hunters voluntarily donate their deer; and those in need continue to utilize the venison provided by their local food pantries. The program, primarily funded through the WDACP, allows hunters to donate deer to participating processors free of charge. Those processors are reimbursed through the WDACP at a rate of $55/deer. The donated venison is then distributed to local food pantries to help feed those in need. (An additional $10 is paid to processors through the Target for Hunger program in CWD zones).

Wildlife Services coordinated the administration of the Deer Donation Program on behalf of 38 of 49 counties that chose to participate through the WDACP. In 2011, 63 processors agreed to participate in the program. These processors took in 1,931 deer for the program, resulting in 79,698 pounds of processed ground venison. Statewide 4,890 deer were donated during 2011. Since the program's inception, 12 years ago, nearly 80,000 deer have been donated by hunters, resulting in slightly less than 3.6 million pounds of venison for food pantries throughout Wisconsin (USDA 2012).

Wisconsin has long recognized damage bears cause to agriculture, and has had an agriculture damage compensation program since 1931 (Hyngstrom and Hauge 1989). Bears can present

problems concerning property damage, threats to public safety and nuisance situations anywhere in Wisconsin, but are most common in the northern part of the State. In the early years of damage programs compensation claims averaged less than $50 per claim (Stowell and Willging 1992). Black bear problems in Wisconsin intensified in the 1980's, with increased human development, agricultural expansion in northern Wisconsin, apiaries (beehives), and crops (Massopust and Anderson 1984); this increase has continued. An increasing bear population, coupled with an expansion of corn production in northern Wisconsin due to the development of shorter maturing corn varieties, has caused bear damage to agriculture to rise sharply in recent years (Stowell and Willging 1992).

Wild and feral mammals can cause damage to growing and stored crops. Raccoons commonly feed on a variety of garden as well as agricultural crops. DeVault et al. (2007) reported 87% of the crop depredation in northern Indiana was attributed to raccoons. The majority of raccoon damage to corn crops occurs during the milk stage of maturity as the plants are pulled down and the ears are fed upon. Cornfields in Wisconsin are frequently interspersed among forests and waterways which make them more susceptible to raccoon depredation, because fields adjacent to wooded and riparian areas often sustain higher rates of damages from raccoons (Beasley and Rhodes 2008). Damage also occurs to stored crops, such as corn silage, when raccoons tear open silage bags and/or burrow into silos resulting in losses from spoilage, and contamination with feces.

Feral swine are responsible for large scale destruction of crops, hay meadows, and pasture primarily by rooting and wallowing. Rooting is a common activity and is done year-round in search of food (Stevens 1996). The feral hog's rooting and wallowing activities damage pastures and hay meadows, spoil watering holes and can severely damage riparian habitats. Damage to crops results from direct consumption of crops and feeding related activities (i.e., trampling and rooting).

Voles and rabbits damage orchard trees by gnawing on bark and small branches. Trees are badly damaged or the bark is girdled and trees die when feeding is severe. Similar damage occurs in nurseries which grow landscape ornamentals and shrubs.

Risk of Disease Transmission

Several diseases including pseudorabies, tuberculosis, and potentially, foot-and-mouth disease, affect domestic animals and wildlife. Monitoring for and containment or eradication of these diseases to protect Wisconsin agricultural and natural resource interests could include wildlife damage management activities conducted by WS in cooperation with the VS program, WDNR, WDATCP, or other governmental agencies. As with WS' activities to protect human health and safety, WS could play an important role in the surveillance for diseases transmissible between livestock and wildlife including foreign animal diseases. Samples provided by WS can serve to establish important baseline data on the presence or absence of diseases in the state and can help identify areas where cooperators can focus disease management efforts.

Toxoplasmosis. The domestic cat has been found to transmit the protozoan parasite, *Toxoplasma gondii* to both domestic and wild animal species. Cats have been found to be important reservoirs and the only species known to allow for the completion of the life cycle for *T. gondii* (Dubey 1973; Teutsch et al. 1979). Both feral and domesticated cats may be infected by this protozoan, but this infection is more common in stray cats. Fitzgerald et al. (1984) documented that feral and free-ranging cats transmitted *T. gondii* to sheep in New Zealand, resulting in abortion in

ewes. Dubey et al. (1986) found cats to be a major reservoir of *T. gondii* on swine farms in Illinois. The main sources for infecting cats are thought to be birds and mice.

Tuberculosis (TB) in livestock caused by *Mycobacterium bovis*. *M ycobacterium bovis* has been reported in a wide variety of mammals including cattle, bison, elk, deer and various zoo animals (Davidson and Nettles 2006). Non ruminants including cats, dogs, coyotes and feral swine can also be infected however the ability of some of these species to subsequently shed and spread the virus is unclear. In addition to white-tailed deer and cattle, studies in Michigan have identified TB antibodies in elk, coyotes, raccoons, black bears, bobcats, red foxes and Virginia opossums (Schmidt et al. 2002). In Michigan, free-ranging white-tailed deer are believed to be the primary risk of TB infection in cattle. However, research has also indicated that raccoons may also be a potential vector for TB in livestock. Raccoons live and thrive in close proximity to livestock and their home ranges are large enough that single individuals may access multiple farms and livestock sources (Vercauteren et al. 2005).

In 1917, the federal government established a bovine TB eradication program. Livestock in most states in the U.S. have been declared free of the disease (USAHA 2004). However, TB was found in wild white-tailed deer and dairy herds in Northern Minnesota in 2005 and the state lost its TB free status. Loss of TB free status had resulted in restrictions on interstate trade and increased testing requirements which had a serious economic impact on the livestock industry in the affected area. The presence of TB in wildlife populations can complicate and delay efforts to eradicate TB in livestock (Davidson and Nettles 2006). A result of a multi-agency effort to eradicate the disease from the state, the Minnesota Board of Animal Health announced that the U.S. Department of Agriculture (USDA) approved Minnesota's application for statewide bovine Tuberculosis (TB) Free status, effective October 4, 2011. After eight years of monitoring and aggressive management, bovine tuberculosis (TB) is undetectable in wild deer in northwestern Minnesota, according to the Minnesota Department of Natural Resources (MDNR 2013).

Foot and Mouth Disease (FMD) is a severe, highly contagious vesicular viral disease of cloven-hoofed animals, including, but not limited to, cattle, swine, sheep, goats, and deer. The disease is rarely fatal in adult animals, although mortality in young animals may be high. Foot and Mouth Disease is endemic in Africa, Asia, South America, and parts of Europe, but the United States has been free of FMD since 1929. Although it is often not fatal, FMD causes severe losses in the production of meat and milk and therefore has grave economic consequences. Foot and Mouth Disease does not infect humans or horses, however, both could potentially transmit the virus.

While FMD is primarily an economically devastating disease of livestock, experimental studies have clearly demonstrated that it also threatens wildlife. North American wildlife that are known to be susceptible to FMD include white-tailed deer, feral pigs, bison, moose, antelope, musk ox, caribou, sheep, and elk. However, most free-living North American wildlife have not had previous viral exposure to FMD, and there is little information available about their vulnerability (USGS NWHC 2001). Feral swine are known to be vulnerable to FMD and could be an important carrier/reservoir of the disease in the event of an outbreak in the U.S. Each state in the U.S. is or has developed its own FMD emergency response plan. The Wisconsin Foreign Animal Disease Response Plan details the response protocol should a foreign animal disease such as FMD or other animal disease threaten domestic animal health (WDATCP 2010). In the event of disease outbreak in Wisconsin, state officials would contact WS to request assistance in management and surveillance efforts.

Chronic Wasting Disease (CWD) is a disease of the nervous system of cervids. The disease is similar to a group of diseases referred to as transmissible spongiform encephalopathies. This group of diseases includes scrapie of sheep, bovine spongiform encephalopathy (Mad Cow Disease) and Creutzfeld-Jakob Disease of humans. The agents that cause these infections are called prions, an abnormal form of a naturally occurring nervous system protein. The disease was first recognized in 1967 at a Colorado wildlife research facility. It has now been diagnosed in free-ranging deer and elk in Colorado, Wyoming, Nebraska, Illinois, South Dakota, Wisconsin, West Virginia, New York, New Mexico, Kansas, Maryland, Minnesota, Missouri, North Dakota, Texas, Utah, and Virginia (CDC 2013e).

Wisconsin WS has assisted in CWD management efforts with infected and potentially infected animals, coordinated by the WDNR, WDATCP and/or other Federal and State agencies, to control the occurrence and spread of CWD throughout the state. These efforts included helping the appropriate regulatory agency(ies) depopulate local herds of wild and captive cervids and general surveillance.

Disease Risks from Feral Swine.. Feral swine are potential reservoirs for 30 viral and bacterial diseases as well as 37 parasites that threaten the health of livestock and humans (Hutton et al 2006). Of greatest concern is infection of swine production facilities with diseases like swine brucellosis and pseudorabies. A study (Corn et al, 1986) conducted in Texas found that feral swine do represent a reservoir of diseases transmissible to livestock. Swine harvested in this study tested positive for pseudorabies, brucellosis, and leptospirosis. Other diseases carried by feral swine include hog cholera, tuberculosis, bubonic plague, and anthrax (Beach 1993). A study in Oklahoma (Saliki et al. 1998) found samples also positive for antibodies against porcine parvovirus, swine influenza and the recently emerged porcine reproductive and respiratory syndrome virus. Porcupine reproductive and respiratory syndrome is a highly infectious virus, requiring only a few viral particles to initiate infection (Henry 2003). Cholera, trichinosis, and African swine fever are additional diseases that can be transmitted between livestock and feral swine. Disease transmission is likely to occur where domestic livestock and feral swine have a common interface, such as at water sources and livestock feeding areas. The WS program in Wisconsin could conduct disease surveillance in the feral swine population as part of the National Wildlife Disease Surveillance Program or other research surveillance projects.

Pseudorabies is a disease of swine that can also affect cattle, dogs, cats, sheep, and goats; and is often fatal in these other species. The disease is caused by the pseudorabies virus, an extremely contagious herpes virus that causes reproductive problems, including abortion, stillbirths, and even occasional death in breeding and finishing hogs. The United States is one of the world's largest producers of pork and is the second largest exporter of pork. U.S. pork production accounts for about 10 percent of the total world supply. The retail value of pork sold to consumers exceeds $30 billion annually. In addition, the pork industry supports more than 600,000 jobs. In 2004, domestic swine in all 50 states had attained Stage V pseudorabies free status. However, pseudorabies is still found in feral swine and these animals serve as a potential source of infection for domestic animals. In 2007, pseudorabies was detected in two swine herds in Wisconsin. All swine at the two properties were killed and swine in the surrounding area were tested and quarantined for several weeks until the end of the testing period. The infected domestic swine are believed to have contracted the disease from the second premises. This second herd included non-domestic pigs (European type) that were purchased from a game farm that had gone out of business several years before. The domestic swine are believed to have contracted the disease from feral swine.

Similar to pseudorabies, the USDA has been involved in a multi-year, multi-million dollar effort to eradicate brucellosis in swine and cattle and the presence of infected feral swine may complicate and delay the final success of that program (Hutton et al. 2006). Brucellosis is a bacterial disease that can also have negative effects on reproduction in swine. Witmer et al. (2003) summarized surveillance studies of feral swine populations in the United States and reported infection rates of 0-53% for swine brucellosis. Feral swine serve as a reservoir for disease reintroduction and pose a constant threat to the progress of disease eradication programs in domestic livestock.

Foreign Animal Diseases. International trade and travel and the popularity of exotic pets have resulted in an ongoing riskof foreign animal disease introduction. Introduction of a disease such as Classical Swine Fever, Foot and Mouth Disease, or other foreign animal disease could have tremendous adverse impacts on the American livestock industry. State and federal agriculture and animal health agencies, and state wildlife agencies would have primary responsibility. However, these agencies may request WS assistance in conducting surveillance for the disease in wildlife populations, and/or capture and removal of animals in order to aid in management of the disease outbreak.

Predation and Livestock

In 2010, the NASS (2011) reported cattle and calf losses from animal predation totaled 219,900 head in the United States according to livestock producers. Animal predation represented 5.5% of the total cattle and calf losses reported by livestock producers in 2010 totaling $98.5 million in economic losses. Coyotes were indicated as the primary predator of livestock with 53.1% of cattle and calf losses attributed to coyotes. Livestock losses were also attributed to bobcats, bears, and dogs. Producers spent nearly $188.5 million dollars on non-lethal methods to reduce cattle and calf losses from predation by animals in 2010 (NASS 2011). In Wisconsin, for the same period, there were an estimated $1,786,000 in cattle and calf losses, and in 2009, Wisconsin livestock producers reported $108,000 in sheep and lamb losses to predation. The primary non-lethal method employed by cattle and calf producers in Wisconsin in 2010 was the use of fencing with a reported 41.3% of producers using fences designed to reduce predation. Wisconsin producers also reported using guard animals, night penning, frequent checking, culling, carcass removal, frightening devices and herding to reduce predation (NASS 2011). In a 2004 survey, shed lambing was the most common method Wisconsin sheep producers reported to reduce predation (36.5%) although producers also reported using fencing, culling of sick/injured animals, night penning, frequent checks, changing bedding, carcass removal, guard dogs, guard llamas, guard donkeys, herding, and frightening devices (NASS 2005).

A variety of trout species and other types of fish are raised in Wisconsin for both commercial purposes and for conservation / restoration. In 2011, the total value for all trout sold and distributed was more than 4 million dollars (NASS 2012). River otters, mink and to a lesser extent raccoons may prey on fish and other cultured species at hatcheries and aquaculture facilities (Bevan et al. 2002). The Wisconsin WS program has received requests for operational assistance in the past to reduce predation incidents at aquaculture facilities.

1.2.3 Need for Mammal Damage Management to Protect Property

In Wisconsin, during Fiscal Year (FY) 2006-2012, WS received reports of mammal damage to property by the following species: badgers (burrowing), bears, coyote (predation threat to pets), cottontail rabbits (browsing landscaping), feral hogs (burrowing in turf), gray squirrel (gnawing residential buildings), raccoons (damage to residential buildings), skunks (burrowing in turf), and woodchucks (burrowing/digging). The WS data only reflect a portion of the property damage issues in the state. The WDNR receives the majority of requests from the public in situations where other mammals are causing property damage.

Most of the damage caused by muskrats involves burrowing in dikes, dams, ditches, ponds, and shorelines (Perry 1982, Miller and Yarrow 1994, Linzey 1998). Muskrats dig burrows with underwater entrances along the shoreline which may not be readily evident until serious damage has occurred. When the water level drops, muskrat holes are often expanded to keep pace with the retreating water level. Additionally, when water levels rise muskrats expand the burrows upward. Muskrat burrows can collapse when walked upon by people or animals or crossed over with heavy equipment (i.e. mowers, tractors). Muskrat burrowing activity can seriously weaken man-made dams and levees (Perry 1982). Leaks and failure of water control structures can result in water damage in the areas neighboring the man-made dam or levee and can cause loss of crops due to lack of water in areas where water should be retained (Wade and Ramsey 1986). Restoring recreational fisheries and rebuilding damaged dams and levees can be extremely costly. Muskrat burrowing in waterfront lawns and yards creates cave-ins and shoreline degradation. Muskrat damage often can be more difficult to detect on farm ponds with heavy vegetation than on aquaculture ponds. Aquaculture reservoirs often lack aquatic vegetation which makes muskrat runs and burrows, remains of mussels, crawfish, and fish from muskrat feeding, and other muskrat sign easier to observe.

Browsing by free-ranging deer damages and destroys landscaping and ornamental trees, shrubs and flowers. As rural areas are developed, deer habitat may actually be enhanced because fertilized lawns, gardens, and landscape plants can serve as high quality food sources for deer (Swihart et al. 1995). Furthermore, deer are prolific and adaptable, characteristics which allow them to exploit and prosper in most suitable habitats near urban areas, including residential areas (Jones and Witham 1995). Free ranging deer in Wisconsin have been using urban areas, nature preserves, and parks, and causing damage to shrubs and trees in these areas more frequently. Although damage to landscaping and ornamental plants has not been quantified in and around parks, deer have caused severe and costly property damage to homeowner's properties and common areas. In addition to browsing, male deer damage trees and shrubs by antler rubbing which results in broken limbs and bark removal. While large trees may survive antler rubbing, smaller saplings often die or become scarred to the point that they are not acceptable for landscaping.

Deer-vehicle collisions are a serious concern nationwide because of losses to property and the potential for human injury and death (Conover et al. 1995, Romin and Bissonette 1996, Conover 1997). The economic costs associated with deer-vehicle collisions include vehicle repairs, human injuries and fatalities, and picking up and disposing of deer (Drake et al. 2005). The Insurance Institute for Highway Safety (2005) estimated that 1.5 million deer-vehicle collisions occur annually in the United States causing approximately 150 fatalities and $1.1 billion in damage to property. In 1995, the damage to vehicles associated with vehicles striking deer was estimated at $1,500 per strike in damages (Conover et al. 1995). Damage costs associated with deer collisions in 2011 were estimated at $3,171 per incident, which was an increase of 2.2% over the 2010 estimate (State Farm Mutual Automobile Insurance Company 2011). Often, deer-vehicle

collisions in which a deer carcass was not recovered or little vehicle damage occurred go unreported. A Cornell University study estimated that the actual number of deer-vehicle collisions could be as high as six times the reported number (Decker et al. 1990).

Motor vehicle-deer crashes continue to be cause for concern in Wisconsin highway safety. Deer are the third most commonly reported struck object in the state (behind striking another vehicle and striking a fixed object). For almost 20 years, nearly 15 % of all motor vehicle crashes in Wisconsin involve deer (WDOT 2010a). In 2010, 14 people died in 13 fatal motor vehicle-deer crashes. In addition, 65 people suffered incapacitating injuries; less serious injuries totaled 204: and 120 people were possibly injured (as claimed by individual or suspected by investigating officer), (WDOT 2010b). There were 26,595 reported vehicle killed deer removed from Wisconsin roadways from July 1, 2009 through June 30, 2010 (WDNR 2010). Based on the 2011 average repair costs reported by State Farm Mutual Automobile Insurance Company, associated with each vehicle strike at an estimated $3,171, and the number of strikes that have been reported in Wisconsin from July 2008 through June 2009 (26,595 strikes), deer-vehicle collisions resulted in more than $84 million in damage to property in Wisconsin during that timeframe.

Wisconsin has long history of black bears causing damage to property. Bears can present problems anywhere, but are most common in the northern part of the State. Massopust and Anderson (1984) reported that bear nuisance problems in Wisconsin intensified in the 1980's, with increased human development, recreational activity, and agricultural expansion in northern Wisconsin, and included complaints about bears feeding on garbage (at residences, restaurants, and campgrounds), apiaries (beehives), crops, livestock and property damage, and general nuisance. The Wisconsin WS program has been directly assisting the WDNR, through a cooperative agreement, to help resolve bear conflicts through a technical and operational program since 1990. More detailed information regarding black bear complaints by year can be found in Table 4-2 and Table 4-3.

Rooting by feral swine can cause damage to roadbeds, dikes and other earthen structures. Feral swine have broken through livestock and game fences to consume animal feed and mineral supplements. In some areas, foraging swine have damaged landscaping, golf courses and other ornamental plantings.

In addition to the risks to human health and safety discussed in Section 1.2.1, mammals can also cause considerable damage to property at airports. Coyotes, skunks, and raccoons venture onto airfields and become a direct threat to planes both landing and taking off. Nationwide, during the period of 1990-2011 there have been 2,754 strikes involving civil aircraft and terrestrial mammals resulting in more than $41million in damage (Dolbeer et al. 2012). Damage to aircraft was reported for 35% of the terrestrial mammal strikes. Thirty two species of terrestrial mammal were reported as being involved in strikes. Airports throughout the state of Wisconsin have experienced a total of 46 mammal strikes from 2002-2012, involving nine different species of mammals. Out of those 46 mammal strikes eight of those involved coyotes and 15 involved white-tailed deer. Not all documented strikes have corresponding damage costs associated. However, during the 2002 – 2012 time frame there were three separate white-tailed deer strikes that were reported to cost on average approximately $75,000 each (FAA Wildlife Strike Database 2013).

1.2.4 Need for Mammal Damage Management to Protect Natural Resources

Natural resources may be described as those assets belonging to the public which are usually managed and held in trust by government agencies for citizens. Such resources may be plants, animals and their habitats, including threatened and endangered species and historic properties. Examples of natural resources in Wisconsin are historic structures and places; parks and recreation areas; natural areas, including unique habitats or topographic features; threatened and endangered plants or animals; and any plant or animal populations which have been identified by the public as a natural resource.

One example of mammal damage to natural resources is ground-nesting game bird populations which low and/or declining productivity and survivorship because of predation by species like raccoons, coyotes, or foxes. For example, raccoons are considered a major predator of ground-nesting upland bird nests and poults (Speake 1980, Speake et al. 1985, Speake et al. 1969). Balser et al. (1968) recommended that predator damage management programs target the entire predator complex or compensatory predation may occur by a species not under control, a phenomena also observed by Greenwood (1986). Trautman et al. (1974) concluded that a single species predator damage management program showed some promise for enhancing ring-necked pheasant (*Phasianus colchicus*) populations.

Mink, otter, and raccoon are widely distributed furbearers that occur throughout Wisconsin that occasionally depredate aquaculture resources. Wildlife Services receives requests for assistance from aquaculture facilities to minimize predation and protect physical barriers from damage by mink, otter, and raccoon and to a lesser extent minimize the risk of disease transmission. Aquaculture facilities across Wisconsin are varied; however, requests for assistance are received mostly from State owned salmonid hatcheries. Hatcheries propagate fish at artificially high densities which often attracts predators.

Muskrats and other burrowing rodents can also damage natural resources by burrowing into earthen dams and dikes used to manage/retain ponds and riparian areas used by other wildlife species, by excessive foraging on riparian and wetland vegetation and cutting/girdling timber, seedlings, and other vegetation in natural areas, and parks, especially in riparian restoration sites. When muskrats become over-populated, generally an "eat-out" occurs and the feeding area is ruined for a number of years (O'Neil 1949). An "eat-out" occurs when vegetation and soil binding roots are consumed which results in loss of vegetation, food, and cover for muskrats and other wildlife. Marsh damage from muskrats is inevitable when areas heavily populated by muskrats are under-trapped (Lynch et al. 1947). "Eat-outs" are beneficial to some fish eating bird species because they reduce cover for prey creating easier access to food sources. "Eat-outs" are also beneficial by increasing the amount of loafing areas for shorebirds and some species of ducks; however, "eat-outs" also result in stagnate water which predisposes the same birds to diseases (Lynch et al. 1947) like West Nile Virus, St. Louis encephalitis, La Crosse encephalitis, and Western Equine encephalitis.

Wisconsin WS has been assisting the U.S. National Park Service (NPS), Apostle Islands National Lakeshore, with white-tailed deer management efforts on Sand and York Islands since 2009 to protect rare Canada yew (*Taxus Canadensis*), from over browsing. Deer management within the park is complex. The park's 21 islands have a diverse deer history. A few islands were not historically impacted by browsing and contain rare forest communities dominated by Canada yew a species nearly extirpated on the mainland. Hunting is permitted in the park's enabling

legislation and deer management is closely coordinated with both the State and local tribes. A Wildlife Management Plan and EA for Harvestable Species was completed in 2007 (USDI 2007). Consistent with the plan, the park has been implementing aggressive culling activity to reduce the number of deer on islands that are being heavily impacted by over browsing. It is an important goal for the NPS to restore this unique habitat.

Feral swine can compete with and prey upon native wildlife and severely damage wildlife habitats. Feral swine are omnivorous and feed on a wide variety of items, many of which are staples for native fauna. One of the more important seasonal food resources used by feral swine is wild fruit and nut crops, especially oak mast (Wood and Roark 1980). Oak mast is also an important food source for deer and wild turkey. When feral swine actively compete for mast, resident deer and wild turkey may enter the winter with inadequate fat reserves, thus threatening the viability of these native wildlife species (Beach 1993). Feral swine also predate native wildlife, especially young animals and ground nesting birds, their nestlings and eggs (Beach 1993).

Also, in Wisconsin, feral swine may also be adversely impacting hunting of native species of wildlife and wildlife watching opportunities. Landowners report shifts in white-tailed deer movement patterns and disturbance of wild turkey roosting and feeding sites which have negatively impacted hunter success. Feral swine have also damaged wildlife food plots intended for native species.

In addition to competition for food discussed above, feral swine foraging also causes problems for forest regeneration through consumption of hard mast (e.g., acorns and hickory nuts and uprooting and consumption of seedlings (Campbell and Long 2009, West et al. 2009). Areas disturbed by feral swine rooting are also vulnerable to colonization by non-native invasive plant species. Rooting also accelerates plant decomposition and loss of soil nutrients (Campbell and Long 2009). The rooting and foraging behavior of feral swine can completely destroy the understory in forests and make trees less stable during windstorms.

1.2.5 Need to Protect T&E Species

Some of the species listed as threatened or endangered under the Endangered Species Act of 1973 and Wisconsin's Endangered and Threatened Species Laws, (State Statute 29.415 and Administrative Rule NR 27), are preyed upon or otherwise adversely affected by certain mammal species. Piping plovers (*Charadrius melodus*, Federally threatened, State endangered), Caspian terns (*Sterna caspia*, State endangered), Forster's terns (*Sterna forsteri*, State endangered), and Common terns (*Sterna hirundo*, State endangered) can be negatively affected by raccoons, opossums, striped skunks, coyotes, weasels, mink and other mammals that prey on birds, eat eggs, and cause disturbances at nesting sites. A WS predation management program to protect rare species can be one component of integrated programs that also include nest exclosure, management of public access and impacts, and other methods.

The US Fish and Wildlife Service (USFWS) recovery plan for the Great Lakes piping plover (*Charadrius melodus*) population identifies predation as an important limiting factor for the plover population (USDI 2003). The establishment of predator control/removal protocols is identified as a priority one action for species recovery. There is evidence that various predators such as coyotes, raccoons and red fox negatively impact piping plover nests on Long Island in the

Apostle Islands National Lakeshore. The Apostle Islands National Lakeshore, NPS, Bad River Band of Lake Superior Tribe of Chippewa Indians, and the USFWS have requested assistance from WS to remove coyotes and raccoons that have negatively impacted nesting and fledging piping plovers since 2009. In the past, the WDNR has requested assistance from WS to remove mink that predated common tern nests. In Massachusetts, predators destroyed 52-81% of all active piping plover nests from 1985-1987 (MacIvor et al. 1990). Red foxes accounted for 71-100% of the nests destroyed by predators at the site.

Wallowing and foraging by feral swine can significantly damage wetlands riparian areas, which may be important for threatened and endangered (T&E), and other sensitive species such as fish and mussels (Campbell and Long 2009, West et al. 2009). In Louisiana, feral swine have been implicated as the cause of elevated waterborne bacteria levels in streams, including levels which exceeded thresholds for the protection of human health (Kaller et al. 2007). Results from DNA fingerprinting indicated that feral swine were the primary source of the *Escherichia coli* bacteria in the stream. Freshwater mussel and insects declined in stream reaches with swine activity. There are 5 species of mussel federally-listed as endangered in Wisconsin (USFWS 2013). The snuffbox mussel is of particular concern as it occurs in small streams and could be impacted by feral swine if swine become established.

1.3 DECISION TO BE MADE

This EA evaluates the environmental impacts of alternatives for WS involvement in mammal damage management in Wisconsin. Based on agency relationships, MOUs, and legislative authorities, WS is the lead agency for this EA, and therefore, responsible for the scope, content, and decisions made. Wildlife management is a complex issue requiring coordination among state and federal agencies and the tribes. The preparation of this EA was done in cooperation with the Forest County Potawatomi Community. The USDA Forest Service (USFS), Wisconsin Department of Natural Resources, Wisconsin Department of Agriculture Trade and Consumer Protection, Wisconsin Department of Health Services - Division of Public Health, Wisconsin Department of Transportation – Bureau of Aeronautics, Bad River Band of Lake Superior of Chippewa Indians, and the Red Cliff Band of Lake Superior Chippewa and the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) were consulting agencies in the preparation of this EA. The WDNR provides for the control, management, restoration, conservation, and regulation of birds, game and all other wildlife resources for the state of Wisconsin. The USFS has responsibility for management of natural resources in lands under their jurisdiction. The Wisconsin Department of Health Services has technical expertise on diseases in wildlife transmissible to humans. The Bad River Band of Lake Superior Tribe of Chippewa Indians, the Forest County Potawatomi Community, and the Red Cliff Band of Lake Superior Chippewa have management authority for natural resources on tribal lands. In accordance with applicable treaties, the Bad River Band of Lake Superior Tribe of Chippewa Indians and the Red Cliff Band of Lake Superior Chippewa also have the right to hunt, fish, and gather in the ceded territories. The GLIFWC is an agency of 11 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.

As the authority for the state management of mammal populations in Wisconsin, the WDNR was involved in the development of the EA and provided input throughout the EA preparation process

to ensure an interdisciplinary approach according to the NEPA and agency mandates, policies, and regulations. The WDNR is responsible for managing wildlife in the State, including those mammal species addressed in this EA. The WDNR establishes and enforces regulated hunting and trapping seasons in Wisconsin. WS' activities to reduce and/or prevent mammal damage would be coordinated with the WDNR which ensure WS' actions are incorporated into population objectives established for mammal populations in Wisconsin.

WS also recognizes the Wisconsin Native American authorities to manage wildlife on tribal properties. The WI WS program is committed to working with all Tribes in the state and would not conduct any mammal damage activities on Tribal land without appropriate consultation and authorization.

Based on the scope of the EA, the lead, cooperating and consulting agencies worked together to address the following questions in the EA:

- Should MDM as currently implemented by the WS program be continued in Wisconsin?
- If not, how can WS best respond to the need to reduce mammal damage in Wisconsin?
- What are the potential impacts of the alternatives for addressing mammal damage?
- Do the alternatives have significant impacts meriting an Environmental Impact Statement (EIS)?

1.4 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

1.4.1 Actions Analyzed

This EA evaluates mammal damage management by WS to protect: 1) property; 2) agricultural resources; 3) natural resources; and 4) public health and safety in Wisconsin wherever such management is requested from the WS program. Protection of other resources or other program activities would be addressed in additional NEPA analysis, as appropriate.

1.4.2 Native American Lands and Tribes

WS would only conduct MDM activities on Tribal lands with the consent of the affected tribe(s) and after appropriate authorizing documents were completed. Wildlife Services has a program-wide MOU with the Forest County Potawatomi Community and the Lac du Flambeau Band of Lake Superior Chippewa. WS also has a recurring CSA with the Bad River Band of Lake Superior Chippewa for protecting nesting Piping plovers from predation. This EA analyzes the potential impacts of WS MDM to Tribal resources including ceded territory resources cooperatively managed by the state of Wisconsin and the Wisconsin Tribes included in the Voigt Decision. Currently, WS has a limited number of MOUs with Wisconsin Native American tribes. If WS enters into an agreement with a tribe for MDM, this EA would be reviewed and supplemented if needed, prior to initiating the project.

WS recognizes that wildlife is a key component of Native American culture and beliefs. The exact nature of this relationship and role varies among Tribes and individuals within Tribes. The Forest County Potawatomi Community previously provided information on the role of black bears in Potawatomi culture. The Great Lakes Indian Fish and Wildlife Commission also provided information on the role of black bears in Ojibwe culture. We have included this information below.

Traditionally, the black bear has served as a protector to the Potawatomi. Bear Clan members have served as the medicine collectors and the "police force" of Potawatomi bands. Bears are seen as culturally sacred, and many members of the Potawatomi abstain from harvesting and consumption of bear. Accordingly, the Potawatomi Tribe has requested that all practical and possible non-lethal management options be considered prior to lethal take of a bear.

The representative from GLIFWC noted that Makwa, or black bear, is a revered animal for the Ojibwe people. It is recognized as one of the original clans. People of the Makwa Clan were considered the police of the village patrolling the outskirts of the village so as to ward off any unwelcome visitors. Bear clan members are known for their knowledge of plants because of the large amounts of time they spend close to nature (Benton-Banai 1988). Members of the Makwa Clan are charged with protecting their clan's symbol. For many this means that the harvest or killing of a Makwa is forbidden. For others this means caring for bears so that they remain healthy and plentiful.

The GLIFWC notes that bears cause problems in and around Indian communities just like around non-Indian communities. Bears get into garbage, investigate bird feeders, tip over grills, raid apple trees and disturb pets. Several Ojibwe Tribes have on-going programs to try to reduce these problems. The challenge facing Tribes is how to address the concern about bears in their communities while at the same time acknowledging the role that Makwa plays in their culture. Tribes try to find the balance between respect for Makwa while reducing the negative consequences of the bear's presence.

Many species of mammals listed in this EA represent clans (families) of the Potawatomi. Otters (gdede), mink (sha ngweshi), cottontail rabbits (wa boso), bears (mko), weasels (shgwes), and wolves (mo ewe or ma'ingan) are all clan animals important to Potawatomi culture. The people and families represented by some of these clan animals have all but disappeared from northern Wisconsin, however the Tribe maintains a vested interest in ensuring the animals that embody the spirit of these departed peoples do not meet a similar fate .

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 WS program in Wisconsin and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA adequately addresses current and anticipated future program activities.

1.4.4 Site Specificity

As mentioned previously, WS would only conduct damage management activities when requested by the appropriate resource owner or manager. In addition, WS' activities that could involve the take of mammals under the alternatives would only occur when authorized by the WDNR (or the Tribes).

This EA analyzes the potential impacts of mammal damage management based on previous activities conducted on private, public, and Tribal lands in Wisconsin, where WS and the appropriate entities have entered into a MOU, cooperative service agreement, or other comparable document. Because the need for 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 mammal damage management efforts could occur. Thus, this EA anticipates the potential expansion and analyzes the impacts of such efforts as part of the alternatives.

Many of the mammal species addressed in this EA can be found statewide and are active throughout the year; therefore, damage or threats of damage can occur wherever those mammals occur. Planning for the management of mammal damage must be viewed as being conceptually similar to other federal or agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they would 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, and insurance companies. Although some of the sites where mammal damage could occur can be predicted, all specific locations or times where such damage would occur in any given year cannot be predicted. The threshold triggering an entity to request assistance from WS to manage damage associated with mammals is often unique to the individual; therefore, predicting where and when such a request for assistance would be received by WS is difficult. This EA emphasizes major issues as those issues relate to specific areas whenever possible; however, many issues apply wherever mammal damage and the resulting management actions occurs and are treated as such.

Chapter 2 of this EA identifies and discusses issues relating to mammal damage management in Wisconsin. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS in the State (see Chapter 3 for a description of the Decision Model and its application). Decisions made using the model would be in accordance with WS' directives[3] and Standard Operating Procedures (SOPs) described in this EA as well as relevant laws and regulations.

The analyses in this EA are intended to apply to any action that may occur in any locale and at any time within Wisconsin. In this way, WS believes it meets the intent of the NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with the NEPA and still be able to accomplish its mission.

1.4.5 Public Involvement

Issues related to mammal damage management as conducted by WS in Wisconsin were initially developed by WS with assistance from the cooperating and consulting agencies and tribes. As

[3] At the time this EA was prepared, WS' Directives could be found on the web at http://www.aphis.usda.gov/wildlife_damage/ws_directives.shtml.

part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS' NEPA implementing regulations, this document is being made available for public review and input through a legal notice published in the *Wisconsin State Journal*, through direct mailings to parties that have requested to be notified or have been identified to have an interest in the reduction of threats and damage associated with mammals in the State, and by posting the EA on the APHIS website at http://www.aphis.usda.gov/regulations/ws/ws_nepa_environmental_documents.shtml.

WS will provide for a minimum of a 30-day comment period for the public and interested parties to provide new issues, concerns, and/or alternatives. Through the public involvement process, WS will clearly communicate to the public and interested parties the analyses of potential environmental impacts on the quality of the human environment. New issues or alternatives raised after publication of public notices would be fully considered to determine whether the EA should be revisited and, if appropriate, revised prior to issuance of a final Decision or publication of a notice of intent to prepare an EIS.

1.5 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

Environmental Assessment: Integrated wildlife damage management to reduce cervid damage in Wisconsin. WS completed an EA that covered white-tailed deer and captive cervid damage management in the state of Wisconsin in 2003. This Mammal Damage Management EA will include white-tailed deer and captive cervid management and will replace the 2003 deer EA.

Environmental Assessment: Management of wolf conflicts and depredating wolves in Wisconsin. WS completed an EA that covered the potential impacts of wolf damage management in the state of Wisconsin in 2008. Management of damage by and conflicts with gray wolves will not be addressed in this EA. An EA Supplement to the 2008 wolf EA was completed in July 2013.

Environmental Assessment: Beaver damage management to protect wildlife habitat, forest resources and property in Wisconsin. WS completed an EA that covered beaver damage management in the state of Wisconsin in 2013. Beaver conflicts and associated damage management will not be addressed in this EA.

Environmental Assessment: Black bear nuisance and damage management in Wisconsin. WS completed an EA that covered black bear damage management in the state of Wisconsin in 2002. An EA Supplement to the 2002 bear EA was completed in 2011. This Mammal Damage Management EA will include black bear and will replace the 2002 bear EA and the 2011 Supplement.

1.6 AUTHORITY AND COMPLIANCE

1.6.1 Wildlife Services Legislative Authority

WS is the Federal program authorized by law to reduce damage caused by wildlife (the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended and the Act of December 1987

(101 Stat. 1329-331, 7 U.S.C. 426c).

The mission of the USDA/APHIS/WS program is to provide federal leadership in managing conflicts with wildlife. Wildlife Services' vision, developed through its strategic planning process (USDA 2013), is: "To improve the coexistence of people and wildlife." 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's Strategic Plan reflects the program mission and provides guidance for engaging in wildlife damage management through six core values:*

- Integrity: WS employees base their action on sound scientific and biological principles and strive to achieve the highest ethical and professional standards. In conducting their work they seek to minimize risks to humans, non-target wildlife species, and the environment.

- Balance: WS values the needs of wildlife and the public and strives to balance those needs in formulating environmentally safe prevention and control plans to minimize impacts.

- Dedication to Public Service: WS employees provide assistance on a regular basis and are dedicated to resolving wildlife damage conflict while taking into consideration the needs of resource owners, cooperators, and stakeholders, as well as the welfare of the animals involved.

- Performance-based Mission Focus: Because wildlife can pose significant threats to the public, their property, and the nation's natural resources, WS employees must be responsive and highly effective in developing and implementing solutions to wildlife damage. The solutions also need to promote tolerance toward wildlife and assure that management actions are conducted in a responsible and professional manner.

- Safety: By nature of the work, WS employees operate in a dangerous environment. WS is strongly committed to the safety of its employees and provides extensive policies, procedures, and training to ensure their safety.

- Collaboration/Accountability: Because wildlife is a public resource, WS recognizes the need for collaboration with other Federal and State agencies, public and private institutions, and private individuals to successfully resolve issues when wildlife comes into conflict with human interests.
- Innovative: WS seeks to further develop practical and effective, science-based strategies and techniques by encouraging creativity and ingenuity from all employees.

Additionally, MOU's among WS and other governmental agencies also define WS responsibilities in wildlife damage management. For example, a MOU between the Federal Aviation Administration (FAA) and WS recognizes WS role and expertise in providing wildlife hazard management assistance to the aviation community. It states, that the "FAA or the certificated airport may request technical and operational assistance from WS to reduce wildlife hazards."

1.6.2 Wisconsin Department of Natural Resources Legislative Authority

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.

1.6.3 Wisconsin Department of Agriculture, Trade, and Consumer Protection

The WDATCP, under the direction of a Governor appointed nine member Board of private citizens and Secretary of the WDATCP, is specifically charged by the legislature with providing consumer and business information, handling complaints, providing agricultural development and marketing services, assisting agricultural production and much more. The mission of WDATCP is to serve the citizens of Wisconsin by assuring:
The safety and quality of food

- Fair business practices for the buyer and seller
- Efficient use of agricultural resources in a quality environment
- Consumer protection
- Healthy animals and plants
- The vitality of Wisconsin agriculture and commerce

WDATCP administers many laws. Most of them are found in chapters 88 to 100, 126, and 136 of the Wisconsin Statues. WDATCP has adopted rules to implement these laws. WDATCP rules are found in the WAC, Chapters ATCP 1 to ATCP 162. DATCP rules have the full force and effect of law.

1.6.4 Wisconsin Department of Transportation

The Secretary of the Wisconsin Department of Transportation is charged by the Wisconsin State Legislature to cooperate with federal agencies for the acquisition, construction, improvement, maintenance, and operation of airports and other air navigation facilities in the State of Wisconsin. As part of that authority, the Secretary is empowered to support federal agencies in the protection of airports and aircraft using Wisconsin airports and enter into arrangements with such agencies to further advance safe aviation in the State of Wisconsin. Wisconsin Statutes further provide for the protection of the navigable airspace over the State and the aerial approaches to any airport or spaceport in the State.

Wisconsin Administrative Code requires the maintenance of clear and safe approaches to public use airports in the State. As part of the receipt of federal aid to airports, airport owners must agree to grant assurances that include operation and maintenance requirements, hazard removal and mitigation, and compatible land use. WIDOT is charged with enforcing the compliance of airports with these grant assurances. Under Section 114.32(1), Wisconsin Statutes, the Secretary of WIDOT may cooperate with the government of the United States and its agencies to secure safe operation at airports to meet the grant assurances required of airport owners.

1.6.5 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. It exercises powers delegated by its member tribes. GLIFWC assists its member bands 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; 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.

1.6.6 Federally Recognized Native American Tribes in Wisconsin

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.

Forest County Potawatomi Community

The Forest County Potawatomi Community exercises jurisdiction over its lands and the wildlife therein pursuant to the Tribe's inherent sovereign authority and its Constitution. To help protects its land and resources, the Tribe has established a Natural Resources Department, which has adopted the following Mission Statement: "The Forest County Potawatomi Natural Resources department has the mission to follow the guidance established by the Tribal Constitution "to conserve and develop our common resources and to promote the welfare of ourselves and our descendants." This is accomplished through research, monitoring, education, outreach, and compliance with environmental regulations. This protection and care of the Earth and her people occurs through the integration of western science and the traditional ecological knowledge of the Potawatomi people."

The FCPC Wildlife Program of the Natural Resources Department is designed to conserve, protect, monitor and enhance tribal wildlife resources while providing subsistence harvest opportunities to FCPC membership. Through on-going wildlife and habitat monitoring projects, research, inter-agency cooperation, and sound scientific management, the Wildlife Program works to ensure ample wildlife resources for future generations. Working with other area tribes as well as state, federal, and university co-operators, the FCPC Wildlife Resources Program builds capacity for the tribe to manage and maintain its important wildlife populations and necessary habitat.

1.6.7 Compliance with Federal Laws

Several federal laws regulate WS' wildlife damage management actions. WS complies with these laws and regulations, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act. All Federal actions are subject to NEPA (Public Law 91-190, 42 U.S.C. 4321 et seq.). WS follows the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500 et seq.), USDA NEPA implementing regulations (7 CFR 1b), and the APHIS Implementing Procedures (7 CFR 372) as a part of the decision-making process. NEPA sets forth the requirement that Federal actions with the potential to significantly affect the human environment be evaluated in terms of their impacts for the purpose of avoiding or, where possible, mitigating and minimizing adverse impacts. Federal activities affecting the physical and biological environment are regulated, in part, by CEQ through regulations in Title 40, Code of Federal Regulations, Parts 1500-1508. In accordance with CEQ and USDA regulations, APHIS NEPA Procedures, as published in the Federal Register (44 CFR 50381-50384) provide guidance to APHIS regarding the NEPA process.

Pursuant to NEPA and CEQ regulations, this EA documents the analysis of a proposed Federal action's impact, informs decision-makers and the public of reasonable alternatives, and serves as a decision-aiding mechanism to ensure that the policies and goals of NEPA are infused into Federal agency planning and decision making. An EA is prepared by integrating as many of the natural and social sciences as may be warranted based on the potential effects of the proposed action. The direct, indirect, and cumulative impacts of the proposed action are analyzed.

Endangered Species Act (ESA). It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act (Sec. 2(c)). WS conducts Section 7 consultations with the

USFWS, the agency with management authority for federally-listed threatened and endangered species, to ensure that any action authorized, funded or carried out by WS is not likely to jeopardize the continued existence of any endangered or threatened species. WS has consulted with the USFWS regarding potential risks from the proposed MDM program (Letter from USFWS September 18, 2013) and will incorporate all USFWS provisions for the protection of threatened and endangered species from that consultation in program activities.

Coastal Zone Management Act of 1972, as amended (16 USC 1451-1464, Chapter 33; P.L. 92-583, October 27, 1972; 86 Stat. 1280).

This law established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans. Funds were authorized for cost-sharing grants to states to develop their programs. Subsequent to Federal approval of their plans, grants would be awarded for implementation purposes. In order to be eligible for Federal approval, each state's plan was required to define boundaries of the coastal zone, to identify uses of the area to be regulated by the state, the mechanism (criteria, standards or regulations) for controlling such uses, and broad guidelines for priorities of uses within the coastal zone. In addition, this law established a system of criteria and standards for requiring that Federal actions be conducted in a manner consistent with the federally approved plan. The standard for determining consistency varies, depending on whether the Federal action involves a permit, license, financial assistance, or a federally authorized activity. Wildlife Services is consulting with the Wisconsin Department of State regarding the consistency of the proposed MDM program with the state coastal management plan.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The U.S. Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All chemical methods integrated into the WS program in Wisconsin are registered with and regulated by EPA and WDATCP and used by WS in compliance with labeling procedures and other requirements.

Executive Order 13112 of February 3, 1999. This order directs Federal agencies to use their programs and authorities to prevent the spread or to control populations of invasive species that cause economic or environmental harm, or harm to human health. To comply with Executive Order 13112, WS may cooperate with other Federal, Tribal, State, or Local government agencies, or with industry or private individuals to reduce damage to the environment or threats to human health and safety.

Occupational Safety and Health Act of 1970 and its implementing regulations (29CFR1910) on sanitation standards states that, "Every enclosed workplace shall be so constructed, equipped, and maintained, so far as reasonably practical, as to prevent the entrance or harborage of rodents, insects, and other vermin. A continuing and effective extermination program shall be instituted where their presence is detected." This standard includes mammals that may cause safety and health concerns at workplaces.

The Native American Graves and Repatriation Act of 1990. The Native American Graves Protection and Repatriation Act requires federal agencies to notify the Secretary of the Department that manages the federal lands upon the discovery of Native American cultural items

on federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

National Historic Preservation Act (NHPA) of 1966 as amended. The NHPA of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that have the potential to cause effects on historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the Advisory Council on Historic Preservation (i.e. State Historic Preservation Office, Tribal Historic Preservation Officers), as appropriate. WS 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.

Each of the MDM methods described in this EA that might be used operationally by WS do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property, wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

There is potential for audible effects on the use and enjoyment of a historic property when methods such as propane exploders, pyrotechnics, firearms, or other noise-making methods are used at or in close proximity to such sites for purposes of hazing or removing animals. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage or nuisance problem, which means such use would be to benefit the historic property. A built-in mitigating factor for this issue is that virtually all of the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary in those types of situations.

Fish and Wildlife Act of 1956 (section 742j-1) Airborne Hunting. This Act, approved in 1971 was added to the Fish and Wildlife Act of 1956 and is commonly referred to as the Airborne Hunting Act or Shooting from Aircraft Act. The Act allows shooting animals from aircraft for certain reasons including protection of wildlife, livestock and human life under conditions in the Act. The USFWS is responsible for implementation of the Airborne Hunting Act but has delegated implementation of the Act to the states. If an alternative which includes aerial hunting is selected WS would obtain all necessary permits. (Shooting from aircraft is only being considered for feral swine removal and would not involve any other species.)

Federal Meat Inspection Act. The Federal Meat Inspection Act (FMIA) applies to all meat or products obtained from any cattle, sheep, swine, goat, horse, mule, or other equines intended for distribution in commerce. Animals falling under jurisdiction of the FMIA must be inspected pre- and post mortem. Animals that are killed before they reach a slaughter facility are classified as "adulterated meat", and cannot be used for human food per the FMIA. Feral swine fall under

authority of the FMIA, and therefore could only be donated to charitable organizations for use as food by needy individuals if they are delivered alive to a USDA approved feral swine slaughter facility. Chapter 12, subchapter 1, section 623 of the FMIA provides an exemption for persons having animals of their own raising and game animals slaughtered for their own use without inspection. This provision allows landowners to utilize feral swine removed from their own property, with the understanding that meat derived from these feral swine will be consumed only by the farmer, his/her immediate family and/or nonpaying guests.

Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations." Executive Order 12898, 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 within APHIS and WS. 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.

WS personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. All chemicals used by WS are regulated by the EPA through FIFRA, the WDATCP, by the Drug Enforcement Agency (DEA), by MOUs with land managing agencies, and by WS Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997 Revised, Appendix P). The WS operational program properly disposes of any excess solid or hazardous waste. 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. In contrast, the proposed action may benefit minority or low-income populations by reducing mammal damage such as threats to public health and safety.

Protection of Children from Environmental Health and Safety Risks (Executive Order 13045). Children may suffer disproportionately from environmental health and safety risks for many reasons, including their developmental, 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 mammal damage management program would only occur by using 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.

Federal Food, Drug, and Cosmetic Act (21 U.S.C. 360). This law places administration of pharmaceutical drugs, including those used in wildlife capture and handling, under the Food and Drug Administration.

Controlled Substances Act of 1970 (21 U.S.C. 821 et seq.). This law requires an individual or agency to have a special registration number from the federal Drug Enforcement Administration (DEA) to possess controlled substances, including those that are used in wildlife capture and handling.

Animal Medicinal Drug Use Clarification Act of 1994 (AMDUCA). The AMDUCA and its implementing regulations (21 CFR Part 530) establish several requirements for the use of animal drugs, including those used to capture and handle wildlife. Those requirements are: (1) a valid "veterinarian-client-patient" relationship, (2) well defined record keeping, (3) a withdrawal period for animals that have been administered drugs, and (4) identification of animals. A veterinarian, either on staff or on an advisory basis, would be involved in the oversight of the use of animal capture and handling drugs under the proposed action. Veterinary authorities in each state have the discretion under this law to establish withdrawal times (i.e., a period of time after a drug is administered that must lapse before an animal may be used for food) for specific drugs. Animals that might be consumed by a human within the withdrawal period must be identified; the Western Wildlife Health Committee (WWHC) of the Western Association of Fish and Wildlife Agencies has recommended that suitable identification markers include durable ear tags, neck collars, or other external markers that provide unique identification (WWHC 1999). APHIS-WS establishes procedures in each state for administering drugs used in wildlife capture and handling that must be approved by state veterinary authorities in order to comply with this law.

1.7 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four (4) chapters and four (4) appendices. Chapter 2 discusses the issues relevant to the analysis. Chapter 3 contains a description of each alternative, alternatives not considered in detail, and SOPs that may be used by WS. Chapter 4 analyzes environmental consequences and the environmental impacts associated with each alternative considered in detail. Appendix A contains the list of preparers and those consulted during the EA process. Appendix B is a list of the literature cited during the preparation of the EA. Appendix C is a detailed description of the methods used for MDM in Wisconsin. Appendix D is a list of Federal and State protected Threatened and Endangered Species.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues relevant to development and comparison of MDM alternatives, including issues analyzed in detail in Chapter 4 (Environmental Consequences) and included in the development of SOPs. This chapter also includes a discussion of issues which were considered but not analyzed in detail for each alternative. Discussions of the affected environment are included in this chapter and in the evaluation of potential environmental impacts of the alternatives in Chapter 4.

2.1 AFFECTED ENVIRONMENT

Although the range and habitat used by individual species varies, at least some of the wild and feral mammals discussed in this analysis can be found in any location the state where suitable habitat exists for foraging and shelter. Consequently, damage or threats of damage caused by the mammal species addressed in this EA can occur statewide in Wisconsin wherever those mammals occur. However, mammal damage management would only be conducted by WS when requested by a landowner or manager and only on properties where a cooperative service agreement or other comparable document has been signed between WS and a cooperating entity.

Upon receiving a request for assistance, MDM activities could be conducted on federal, state, tribal, municipal, and private properties in Wisconsin. Areas where damage or threats of damage could occur include, but are not limited to, agricultural fields, vineyards, orchards, farmyards, dairies, ranches, livestock operations, aquaculture facilities, railroad yards, waste handling facilities, industrial sites, natural resource areas, park lands, and historic sites; State, county, and interstate highways and roads; railroads and their right-of-ways; property in or adjacent to subdivisions, businesses, and industrial parks; timberlands, croplands, and pastures; property where burrowing mammals cause damage to structures, dikes, ditches, ponds, and levees; public and private properties in rural/urban/suburban areas where mammals cause damage to landscaping and natural resources, property, and pose risks to human safety. The area would also include airports and military airbases where mammals are a threat to human safety and to property; and public property where mammals are negatively impacting historic structures, and cultural landscapes.

Environmental Status Quo

As defined by the NEPA implementing regulations, the "human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment" (40 CFR 1508.14). Therefore, when a federal action agency analyzes its potential impacts on the "human environment," it is reasonable for that agency to compare not only the effects of the federal action, but also the potential impacts that occur or could occur in the absence of the federal action by a non-federal entity. This concept is applicable to situations involving federal assistance to reduce damage associated with wildlife species.

Most resident mammal species are managed under Wisconsin code and statute without any federal oversight or protection. In accordance with applicable state or federal regulations, there are some species, such as most non-native invasive species that are not protected under state or federal law. In Wisconsin, the WDNR has the state authority to manage and authorize the taking of wild and feral mammals for damage management purposes.

Usually, when a non-federal entity (e.g., agricultural producers, municipalities, counties, private companies, individuals, or any other non-federal entity) takes a MDM action, the action is not subject to compliance with the NEPA due to the lack of federal involvement in the action. Under such circumstances, the environmental baseline or status quo must be viewed as an environment that includes those resources as they are managed or impacted by non-federal entities in the absence of the proposed federal action. Therefore, in those situations in which a non-federal entity has decided that a MDM action will occur and even the particular methods that will be used, WS' involvement in the action would not affect the environmental status quo because the requestor would have conducted the action in the absence of WS' involvement. Given that non-federal entities can receive authorization to use lethal MDM methods from the WDNR (depending on the species state classification), and since most methods for resolving damage are available to both WS and to non-federal entities, WS' decision-making ability is restricted to one of three alternatives: 1) WS can either take the action using the specific methods discussed in this EA upon request. 2) WS can provide technical assistance only. 3) Or WS can take no action, at which point the non-federal entity could take the action anyway, either without a permit, during the hunting or trapping season, or through the issuance of a permit by the WDNR. Under those circumstances, WS would have virtually no ability to affect the environmental status quo because the action would likely occur in the absence of WS' direct involvement.

Based on the discussion above, it is clear that in situations where a non-federal entity has obtained the appropriate permit or authority, and has already made the decision to remove or otherwise manage mammals to stop damage with or without WS' assistance, WS' participation in carrying out the action would not affect the environmental status quo. In some situations, however, certain aspects of the human environment may actually benefit more from WS' involvement than from a decision not to assist. For example, if a cooperator believes WS has greater expertise to selectively remove a target species than a non-WS entity; WS' management activities may have less of an impact on non-target species and human safety than if the non-federal entity conducted the action alone. Thus, in those situations, WS' involvement may provide some benefit to the human environment when compared to the environmental status quo in the absence of such involvement.

2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on target mammal species
- Effects on other wildlife species, including Threatened and Endangered species
- Effects on human health and safety
- Impacts on stakeholders, including aesthetics
- Humaneness and animal welfare concerns

2.2.1 Effects on Target Mammal Species

The lead, cooperating and consulting agencies, tribes, program recipients, and members of the public are concerned about the impact of MDM on the size and viability of target species populations. The target species selected for analysis in this EA include: badger, black bear, cottontail rabbits, coyotes, feral cats, feral swine, fox squirrel, gray fox, gray squirrel, weasels,, pocket gophers, mink, muskrat, raccoons, red fox, red squirrel, river otter, striped skunk, thirteen-lined ground squirrel, white-tailed deer, woodchuck, Virginia opossums, various captive cervids, and miscellaneous mice, shrews, and voles.

2.2.2 Effects on Other Wildlife Species, including T&E Species

There are concerns that the use of nonlethal and lethal MDM methods may have unintended adverse impacts on non-target species, including state and federally-listed threatened and endangered species. The use of non-lethal and lethal methods has the potential to inadvertently disperse, capture, or kill non-target wildlife. To reduce the risks of adverse effects to non-target wildlife, WS would select damage management methods that are as target-selective as possible or apply such methods in ways to reduce the likelihood of capturing or otherwise adversely impacting non-target species. Before initiating management activities, WS would select locations which are extensively used by the target species. Wildlife Services would also use Standard Operating Procedures (SOPs) that minimize the effects on non-target species' populations. SOPs are further discussed in Chapter 3. Methods available for use under the alternatives are described in Appendix C.

Concerns have also been raised about the potential for adverse effects to occur to non-target wildlife from the use of chemical methods immobilizing drugs, euthanizing drugs, reproductive inhibitors, fumigants, toxicants, and repellents. Wildlife Services only uses chemical methods that have been approved by the EPA, FDA, WDATCP and/or WDNR as appropriate and applies these in accordance with the label directions. Descriptions of the chemical methods which may be included in the management alternatives are discussed in Appendix C.

The ESA states that all federal agencies "...shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act" [Sec. 7(a)(1)]. Wildlife Services conducted a Section 7 consultation with the USFWS to ensure compliance with the ESA and to ensure that the proposed management actions are not likely to jeopardize the continued existence of any endangered or threatened species (Letter from USFWS, September 18, 2013). Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or minimization measures. Wildlife Services also consulted with the WDNR regarding potential risks to state-listed species from the proposed action (Letter from WDNR, November 12, 2013). Applicable SOPs and other measures for the protection of state and federally-listed species are discussed in Chapter 4, Section 4.1.2, of this EA.

2.2.3 Effects of Damage Management Methods on Human Health and Safety

Review of the potential impacts on human health and safety from MDM actions has two primary components: 1) the potential risk to human health and safety from MDM methods; and 2) the potential benefits to human health and safety when MDM actions are conducted to reduce risks

caused by wild and feral mammals. Wildlife Services' employees use and recommend only those methods which are legally available and are effective at resolving the damage associated with wildlife. Still, some concerns exist regarding the safety of WS' methods despite their legality. In addition to the potential risks to the public associated with WS' methods, risks to employees are also an issue. Selection of methods, as part of an integrated approach, includes consideration of public and employee safety.

Safety of Proposed Chemical Methods

Safety concerns pertaining to the use of chemical MDM methods include the potential for human exposure either through direct contact with the chemical or exposure to the chemical from wildlife that have been exposed (e.g., animals used for food). Under the alternatives identified, the use of chemical methods would include immobilizing drugs, euthanasia drugs, and repellents (Appendix C). Chemicals proposed for use under the relevant alternatives are regulated by the EPA through FIFRA, by Wisconsin laws, by the DEA, by the FDA, and by WS' Directives.

Safety of Proposed Non-Chemical Methods

Non-chemical methods employed to reduce damage and threats to safety caused by mammals, could potentially be hazardous to human safety through misuse or accident. Non-chemical methods may include but are not limited to firearms, live-traps, exclusion, cable restraints, body-gripping traps, pyrotechnics, and other scaring devices (Appendix C). Some people may be concerned that WS' use of firearms, traps, snares, cable restraints, and pyrotechnic scaring devices could cause injuries to people. There are also concerns regarding potential fire hazard to agricultural sites and private property from pyrotechnic use.

Firearm use is a very sensitive issue and a concern because of public fears regarding the risks associated with unsafe firearms use and the threat of misuse of firearms. WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within three months of their appointment and a refresher course every two years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are also 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.

WS works with cooperators to develop management strategies suited to the specific needs of each site. WS communicates the potential risks from the proposed methods to the cooperator during the development of the management strategy. The methods to be used are listed in a MOU, cooperative service agreement, or a similar document approved by the cooperator, property owner or managed by the cooperator.

Impacts on human health and safety from mammals

The concern addressed here is that the absence of adequate MDM would result in adverse effects on human health and safety, because mammal damage would not be curtailed or reduced to the minimum levels possible and practical. The potential impacts of not conducting such work could lead to increased incidence of injuries, illness, or loss of human lives.

2.2.4 Impacts to Stakeholders, Including Aesthetics

Aesthetics is a philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is subjective in nature and is dependent on what an observer regards as beautiful. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. There may be some concern that the proposed action or alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents.

Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987). Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography; Decker and Goff 1987). In 2011, an estimated 90 million U.S. residents 16 years old or older participated in wildlife-related recreation including hunting (13.7 million people), fishing (33.1 million people) and/or wildlife watching (71.8 million people; USDI and USDC 2011). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The American public is no exception, and today a large percentage of households have pets. Some people may consider individual wild animals and birds as "pets" or exhibit affection toward these animals. Others may experience anxiety or fear when wild animals come into close proximity to their homes and families. It is not surprising that the public reaction to wildlife damage management techniques is 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.

Many people, directly affected by problems and threats to public health or safety associated with mammals may insist upon removal of the animal(s) from the property or public location when they cause damage. Some members of the public believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety. Others, directly affected by the specific wildlife "problem", may not agree that there is a problem. They may perceive that the issue at hand is normal animal behavior and a consequence of living in proximity to nature and should be tolerated. Similarly, individuals not directly affected by the harm or damage caused by wildlife may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Individuals totally opposed to mammal damage management want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed. These people would strongly oppose removal of mammals regardless of the amount and type of damage. Some members of the public who oppose removal

of wildlife do so because of human-affectionate bonds with individual animals. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment. Advocates of the Animal Rights philosophy believe that animals are entitled to the same rights and protections as humans and that if an action is unacceptable treatment for a human it is unacceptable treatment for an animal.

Some individuals are concerned about the presence of mammal species that may be considered by them to be overabundant, such as bear, deer, coyotes, feral cats or introduced wild pigs, which they feel proliferate in such numbers that they cause ecosystem damage or human safety concerns. To such people those species represent pests which are nuisances, upset the natural order in ecosystems, damage crops and/or property and potentially carry diseases transmissible to humans or other wildlife or pose other threats to human safety. Their overall enjoyment of other animals is diminished by what they view as the destructive presence of such species.

The WS program in Wisconsin only conducts wildlife damage management at the request of the affected property owner or resource manager. If WS received requests from an individual or official for MDM, WS would address the issues/concerns and consideration would be made to explain the advantages and disadvantages of the available damage management actions. Management actions would be carried out in a caring, humane, and professional manner.

2.2.5 Humaneness and Animal Welfare Concerns of Methods Used

Humaneness, in part, is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important and very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management 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 is 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 . . . " (AVMA 1987). 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 . . . " (CDFG 1991), such as shooting.

Pain obviously occurs in animals, but assessing pain experienced by animals can be challenging (AVMA 2007, CDFG 1991). The AVMA defines pain as being, "that sensation (perception) that results from nerve impulses reaching the cerebral cortex via ascending neural pathways" (AVMA 2007). The key component of this definition is the perception of pain. The AVMA (2007) notes that "pain" should not be used for stimuli, receptors, reflexes, or pathways because these factors may be active without pain perception. For pain to be experienced, the cerebral cortex and subcortical structures must be functional. If the cerebral cortex is nonfunctional because of hypoxia, depression by drugs, electric shock, or concussion, pain is not experienced.

Stress has been defined as the effect of physical, physiologic, or emotional factors (stressors) that induce an alteration in an animal's base or adaptive state. Responses to stimuli vary among animals based on the animals' experiences, age, species and current condition. Not all forms of stress result in adverse consequences for the animal and some forms of stress serve a positive, adaptive function for the animal. Eustress describes the response of animals to harmless stimuli which initiate responses that are beneficial to the animal. Neutral stress is the term for response

to stimuli which have neither harmful nor beneficial effects to the animal. Distress results when an animal's response to stimuli interferes with its well-being and comfort (AVMA 2007).

The AVMA states "... euthanasia is the act of inducing humane death in an animal" and that "...that if an animal's life is to be taken, it is done with the highest degree of respect, and with an emphasis on making the death as painless and distress free as possible" (AVMA 2013). Additionally, euthanasia methods should minimize any stress and anxiety experienced by the animal prior to unconsciousness." Although use of euthanasia methods to end an animal's life is desirable, as noted by the AVMA, "For wild and feral animals, many of the recommended means of euthanasia for captive animals are not feasible. In field circumstances, wildlife biologists generally do not use the term euthanasia, but terms such as killing, collecting, or harvesting, recognizing that a distress- free death may not be possible." (AVMA 2001).

AVMA (2013) notes, "While recommendations are made, it is important for those utilizing these recommendations to understand that, in some instances, agents and methods of euthanasia identified as appropriate for a particular species may not be available or may become less than an ideal choice due to differences in circumstances. Conversely, when settings are atypical, methods normally not considered appropriate may become the method of choice. Under such conditions, the humaneness (or perceived lack thereof) of the method used to bring about the death of an animal may be distinguished from the intent or outcome associated with an act of killing. Following this reasoning, it may still be an act of euthanasia to kill an animal in a manner that is not perfectly humane or that would not be considered appropriate in other contexts. For example, due to lack of control over free-ranging wildlife and the stress associated with close human contact, use of a firearm may be the most appropriate means of euthanasia. Also, shooting a suffering animal that is in extremis, instead of catching and transporting it to a clinic to euthanize it using a method normally considered to be appropriate (e.g., barbiturates), is consistent with one interpretation of a good death. The former method promotes the animal's overall interests by ending its misery quickly, even though the latter technique may be considered to be more acceptable under normal conditions (Yeates 2010). Neither of these examples, however, absolves the individual from her or his responsibility to ensure that recommended methods and agents of euthanasia are preferentially used."

AVMA (2013) recognizes that there is "an inherent lack of control over free-ranging wildlife, accepting that firearms may be the most appropriate approach to their euthanasia, and acknowledging that the quickest and most humane means of terminating the life of free-ranging wildlife in a given situation may not always meet all criteria established for euthanasia (ie, distinguishes between euthanasia and methods that are more accurately characterized as humane killing). Because of the variety of situations that may be encountered, it is difficult to strictly classify methods for termination of free-ranging wildlife as acceptable, acceptable with conditions, or unacceptable. Furthermore, classification of a given method as a means of euthanasia or humane killing may vary by circumstances. These acknowledgments are not intended to condone a lower standard for the humane termination of wildlife. The best methods possible under the circumstances must be applied, and new technology and methods demonstrated to be superior to previously used methods must be embraced.

Multiple federal, state, and local regulations apply to the euthanasia of wildlife. In the United States, management of wildlife is primarily under state jurisdiction. However, some species (e.g., migratory birds, endangered species, marine mammals) are protected and managed by federal agencies or through collaboration between state and federal agencies. Within the context of

wildlife management, personnel associated with state and federal agencies and Native American tribes may handle or capture individual animals or groups of animals for various purposes, including research. During the course of these management actions, individual animals may become injured or debilitated and may require euthanasia; in other cases, research or collection protocols dictate that some of them be killed. Sometimes population management requires the lethal control of wildlife species, and, the public may identify and/or present individual animals to state or federal personnel because they are orphaned, sick, injured, diseased (e.g., rabid), or becoming a nuisance."

Analysis of this issue must consider not only the welfare of the animals captured, but also the welfare of humans, livestock and some T&E species if damage management methods are not used. For example, some individuals may perceive techniques used to remove a predator that is killing or injuring pets or livestock as inhumane, while others may believe it is equally or more inhumane to permit pets and livestock that depend upon humans for protection to be injured or killed by predators.

The challenge in coping with this issue is how to achieve the least amount of animal suffering with the constraints imposed by current technology. Wildlife Services personnel are concerned about animal welfare. WS is aware that techniques like snares and traps are controversial, but also believes that these activities are being conducted as humanely and responsibly as practical. Wildlife Services and the National Wildlife Research Center are striving to bring additional non-lethal damage management alternatives into practical use and to improve the selectivity and humaneness of management devices. Until new findings and products are found practical, a certain amount of animal suffering could occur when some methods are used in situations when non-lethal damage management methods are not practical or effective. Wildlife Services supports the most humane, selective, and effective damage management techniques, and would continue to incorporate advances into program activities.

Wisconsin WS personnel are experienced and professional in use of management methods to increase humaneness as much as possible under the constraints of current technology, workforce, and funding. SOPs used to maximize humaneness are listed in Chapter 3. Furthermore, state regulations require that traps be checked on a regular basis.

2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

2.3.1 No Wildlife Damage Management at Taxpayer Expense; Wildlife Damage Management should be Fee Based

An issue identified through the development of WS' programmatic FEIS is the concern that wildlife damage management should not be provided at the expense of the taxpayer or that activities should be fee-based. In Wisconsin, funds to implement wildlife damage management activities and programs are derived from a number of sources, including, but not limited to Federal, Tribal, state, county and municipal governments/agencies, private organizations, corporations and individuals, homeowner/property owner associations, and others, under Cooperative Service Agreements and/or other contract documents and processes. A minimal federal appropriation is allotted for the maintenance of a WS program in Wisconsin. The remainder of the WS program is mostly fee-based. (Wisconsin WS state report,

http://www.aphis.usda.gov/wildlife_damage/state_report_pdfs/2010/51-wisconsin_report.pdf). Technical assistance is provided to requesters as part of the federally-funded activities, but the majority of direct assistance in which WS' employees perform damage management activities is funded through cooperative service agreements between the requester and WS.

Federal, state, and local officials have decided that wildlife damage management should be conducted by appropriating funds. WS was established by Congress as the agency responsible for providing wildlife damage management to the people of the United States. Wildlife damage management is an appropriate sphere of activity for government programs, because aspects of wildlife damage management are a government responsibility and authorized by law.

2.3.2 Mammal Damage Should be Managed by Private Nuisance Wildlife Control Agents

Private nuisance wildlife control agents could be contacted to reduce mammal damage for property owners or property owners could attempt to reduce their own damage problems. Some property owners would prefer to use a private nuisance wildlife control agent because the nuisance wildlife agent is located in closer proximity and thus could provide the service at less expense, or because they prefer to use a private business rather than a government agency. However, some property owners would prefer to contract with a government agency. In particular, large industrial businesses and cities and towns may prefer to use WS because of security and safety issues and reduced administrative burden. The relationship between WS and private industry is addressed in WS directive 3.101 (http://www.aphis.usda.gov/wildlife_damage/directives/3101.pdf).

2.3.3 Appropriateness of Preparing an EA (Instead of an EIS) for Such a Large Area

A concern was raised that an EA for an area the size of the State of Wisconsin would not meet the NEPA requirements for site specificity. Wildlife damage management falls within the category of federal or other regulatory agency actions in which the exact timing or location of individual activities cannot usually be predicted well enough ahead of time to accurately describe such locations or times in an EA or EIS. Although WS can predict some of the possible locations or types of situations and sites where some kinds of wildlife damage will occur, the program cannot predict the specific locations or times at which affected resource owners will determine a damage problem has become intolerable to the point that they request assistance from WS.

Lead agencies have the discretion to determine the geographic scope of their analyses under the NEPA (Kleppe v Sierra Club, 427 U.S. 390, 414 (1976), CEQ 1508.25). Ordinarily, according to APHIS procedures implementing the NEPA, WS' individual wildlife damage management actions could be categorically excluded (7 CFR 372.5(c)). The intent in developing this EA is to determine if the proposed action would potentially have significant individual and/or cumulative impacts on the quality of the human environment that would warrant the preparation of an EIS. This EA addresses impacts for managing damage and threats to human safety associated with mammals in Wisconsin to analyze individual and cumulative impacts, provide a thorough analysis of other issues relevant to MDM, and provides the public an opportunity to review and comment on the analysis and alternatives.

In terms of considering cumulative effects, one EA analyzing impacts for the entire State of Wisconsin will provide a more comprehensive and less redundant analysis than multiple EAs covering smaller areas. If a determination is made through this EA that the proposed action or the

other alternatives might have a significant impact on the quality of the human environment, then an EIS would be prepared. Based on previous requests for assistance, the WS program in Wisconsin would continue to conduct mammal damage management in a very small area of the State where damage is occurring or likely to occur.

2.3.4 A Site Specific Analysis Should be Made for Every Location Where Mammal Damage Management Would Occur

The underlying intent for preparing an EA is to determine if a proposed action might have a significant impact on the human environment. Wildlife Services' EA development process is issue driven, meaning issues that were raised during the interdisciplinary process and through public involvement, were used to drive the analysis. The level of site specificity in the analysis must be appropriate to the issues. This EA emphasizes major issues as those issues relate to specific areas whenever possible; however, many issues apply wherever mammal damage and the resulting management actions occurs and are treated as such.

In addition to the analysis contained in this EA, WS' personnel use the WS Decision Model (Slate et al. 1992, USDA 1997 Revised pages 2-23 – 2-34) as a site specific tool to develop the most appropriate strategy at each location. The WS Decision Model is an analytical thought process used by WS' personnel for evaluating and responding to wildlife damage management requests.

As discussed in Section 1.4.4, one EA analyzing impacts for the entire State provides a more comprehensive and less redundant analysis than multiple EAs covering smaller areas and allows for a better cumulative impact analysis.

2.3.5 Cost Effectiveness of Management Methods

A formal, monetized cost benefit analysis is not required to comply with the NEPA requirements for EAs. Consideration of this issue may not be the driving factor when developing site-specific management strategy. The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns. Additionally, management operations may be constrained by cooperator funding and/or objectives and needs. However, the cost effectiveness of methods and the effectiveness of methods are linked. Methods determined to be most effective to reduce damage and threats to human safety caused by mammals and that prove to be the most cost effective would generally receive the greatest application. As part of an integrated approach, evaluation of methods would continually occur to identify those methods that are most effective at resolving damage for specific circumstance where mammals are causing damage or pose a threat.

2.3.6 Effectiveness of Mammal Damage Management Methods

The effectiveness of any damage management program could be defined in terms of losses prevented, risks potentially reduced, how accurately practitioners diagnose the problem, and how actions are implemented to correct or mitigate risks or damages. An effective program must be able to complete management actions expeditiously, minimize harm to non-target animals and the environment, while at the same time, using methods as humanely as possible within the limitations of current technology.

The efficacy of any given management method will vary depending upon the characteristics of each individual project including species involved, habitat, duration of the problem, landowner/manager objectives for the site and other factors. Consequently, the most effective approach to resolving any wildlife damage problem is to use an adaptive integrated approach which may call for the use of several management methods simultaneously or sequentially (USDA 1997 Revised pages 2-2 - 2-3, Courchamp et al. 2003). The goal of integrated management is to implement methods in the most effective manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment[4]. Efficacy is based on the types of methods employed, the application of the method, restrictions on the use of the method(s), the skill of the personnel using the method and, for WS' personnel, the guidance provided by WS' Directives and policies. Access to a wide range of management methods allows program personnel to develop management strategies best able to effectively address damage, minimize potential adverse environmental impacts and meet the management objectives of the landowner/manager.

Wildlife Services seeks to respond to request for assistance with the most effective methods and to provide for the long-term solution to the problem using WS' Decision Model. Managing damage caused by mammals can be divided into short-term and long-term approaches. Short term approaches address the immediate issue but often need to be repeated or continuously sustained to resolve the damage problem. Short-term approaches may include methods such as frightening devices, repellents, or removal or relocation of animals from the local population. Short-term approaches are often employed to provide immediate resolution to damage occurring until long-term approaches can be implemented or have had time to reach the desired result. No matter what strategy is used (nonlethal or lethal), mammals will return to damage sites if suitable conditions continue to exist at the location where damage was occurring and mammal densities are sufficient to occupy all available habitats. Long-term solutions to resolving mammal damage generally involve identifying the fundamental factors which are responsible for the damage. These factors may include site characteristics which attract mammals to a particular location or issues associated with the size of the mammal population and associated demands on available resources. Long-term methods may include strategies to make the site less attractive to the problem species, permanent exclusion systems and/or population management strategies.

A common issue raised is that the use of lethal methods is ineffective because additional mammals are likely to return to the area which creates a financial incentive to continue the use of only lethal methods. The goal is to reduce damage, risks, and conflicts with wildlife as requested and not to necessarily reduce/eliminate populations. Localized population reduction could be short-term and new individuals may immigrate or be born to animals remaining at the site (Courchamp et al. 2003). The ability of an animal population to sustain a certain level of removal and to eventually return to pre-management levels, however, does not mean individual management actions are unsuccessful, but that periodic management may be necessary. The return of wildlife to pre-management levels also demonstrates that limited, localized damage management methods have minimal impacts on species' populations.

As noted above, the use of non-lethal methods is also often temporary which could result in mammals returning to an area where damage was occurring once those methods are no longer

[4] The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

used. In some areas, use of non-lethal methods may pose the risk of additional complications which do not occur with lethal methods; specifically, nonlethal methods may move mammals to other areas where they could continue to cause damage. Dispersing and translocating mammals could be viewed as moving a problem from one area to another which would require addressing damage caused by those mammals at another location which increases costs and could be perceived as creating a financial incentive to continue the use of those methods because damage would have to be addressed annually and at multiple locations.

To be most effective, damage management activities should begin prior to or as soon as mammals begin to cause damage. Mammal damage that has been ongoing can be difficult to resolve using available methods since mammals are conditioned to an area and are familiar with a particular location. Consequently, methods which make areas or food items unattractive to wildlife are often less effective once damage has been ongoing. Under Alternatives 1-3, WS would work closely with entities requesting assistance, to identify situations where damage could occur and begin to implement damage management activities as early as possible to increase the likelihood of those methods achieving the level of damage reduction requested by the cooperating entity. WS would also continue to work with the WDNR, University of Wisconsin Extension Service, and other entities to produce and distribute materials and provide educational programs on methods for preventing damage from occurring.

2.3.7 A Loss Threshold Should Be Established Before Allowing Lethal Methods

Wildlife Services has received comments indicating that a threshold of loss should be established before employing lethal methods to resolve damage, and that wildlife damage should be a cost of doing business. Some damage and economic loss can be tolerated by cooperators until the damage reaches a threshold where damage becomes an economic burden. The appropriate level of damage which may be tolerated before employing lethal methods would differ among cooperators and damage situations. In addition, establishing a threshold would be difficult or inappropriate to apply to human health and safety situations.

In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied plaintiffs' motion for a preliminary injunction. In part, the court found that a forest supervisor needs only show that damage from wildlife is threatened, to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion such as a percentage of loss of a particular resource to justify the need for wildlife damage management actions.

2.3.8 Effects from the Use of Lead Ammunition in Firearms

Questions have arisen about the deposition of lead into the environment from ammunition used in firearms to lethally take mammals. As described in Appendix C, the lethal removal of mammals with firearms by WS to alleviate damage or threats would occur using a rifle or shotgun. In an ecological risk assessment of lead shot exposure in non-waterfowl birds, ingestion of lead shot was identified as the concern rather than just contact with lead shot or lead leaching from shot in the environment (Kendall et al. 1996).

The take of mammals by WS in Wisconsin using firearms occurs primarily from the use of rifles. However, the use of shotguns could be employed to lethally take some species. To reduce risks

to human safety and property damage from bullets passing through mammals, the use of rifles is applied in such a way (e.g., caliber, bullet weight, distance) to ensure the bullet does not pass through mammals. Mammals that are removed using rifles would occur within areas where retrieval of all mammal carcasses for proper disposal is highly likely (e.g., at an airport). With risks of lead exposure occurring primarily from ingestion of bullet fragments, the retrieval and proper disposal of mammal carcasses would greatly reduce the risk of scavengers ingesting or being exposed to lead that may be contained within the carcass.

However, deposition of lead into soil could occur if, during the use of a rifle, the projectile passes through a mammal, if misses occur, or if the mammal carcass is not retrieved. Laidlaw et al. (2005) reported that, because of the low mobility of lead in soil, all of the lead that accumulates on the surface layer of the soil is generally retained within the top 20 cm (about 8 inches). In addition, concerns occur that lead from bullets deposited in soil from shooting activities could lead to contamination of water, either ground water or surface water, from runoff. Stansley et al. (1992) studied lead levels in water that was subjected directly to high concentrations of lead shot accumulation because of intensive target shooting at several shooting ranges. Lead did not appear to "transport" readily in surface water when soils were neutral or slightly alkaline in pH (i.e., not acidic), but lead did transport more readily under slightly acidic conditions. Although Stansley et al. (1992) detected elevated lead levels in water in a stream and a marsh that were in the shot "fall zones" at a shooting range, the study did not find higher lead levels in a lake into which the stream drained, except for one sample collected near a parking lot where it was believed the lead contamination was due to runoff from the parking lot, and not from the shooting range areas. The study also indicated that even when lead shot is highly accumulated in areas with permanent water bodies present, the lead does not necessarily cause elevated lead contamination of water further downstream. Muscle samples from two species of fish collected in water bodies with high lead shot accumulations had lead levels that were well below the accepted threshold standard of safety for human consumption (Stansley et al. 1992).

Craig et al. (1999) reported that lead levels in water draining away from a shooting range with high accumulations of lead bullets in the soil around the impact areas were far below the "action level" of 15 parts per billion as defined by the EPA (i.e., requiring action to treat the water to remove lead). The study found that the dissolution (i.e., capability of dissolving in water) of lead declines when lead oxides form on the surface areas of the spent bullets and fragments (Craig et al. 1999). Therefore, the transport of lead from bullets or shot distributed across the landscape is reduced once the bullets and shot form crusty lead oxide deposits on their surfaces, which serves to naturally further reduce the potential for ground or surface water contamination (Craig et al. 1999). Those studies suggest that, given the very low amount of lead being deposited and the concentrations that would occur from WS' activities to reduce mammal damage using firearms, as well as most other forms of dry land small game hunting in general, lead contamination of water from such sources would be minimal to nonexistent.

Take of mammals can occur during regulated hunting seasons, through the issuance of kill permits by the WDNR, or without the need to obtain a permit for species that are classified as an "unprotected species", and through other authorizations granted to landowners/managers for some species. Consequently, WS' assistance with removing mammals would not be additive to the environmental status quo because animals removed by WS using firearms could be lethally removed by the entities experiencing damage using the same method in the absence of WS' involvement. The amount of lead deposited into the environment may be lowered by WS' involvement in mammal damage management activities due to efforts by WS to ensure projectiles

do no pass through but are contained within the mammal carcass which limits the amount of lead potentially deposited into soil from projectiles passing through the carcass. The proficiency training received by WS' employees in firearm use and accuracy increases the likelihood that mammals are lethally removed humanely in situations that ensure accuracy and that misses occur infrequently which further reduces the potential for lead to be deposited in the soil from misses or from projectiles passing through carcasses. In addition, WS' involvement ensures mammal carcasses lethally removed using firearms would be retrieved and disposed of properly to limit the availability of lead in the environment and ensures mammal carcass are removed from the environment to prevent the ingestion of lead in carcasses by scavengers. Based on current information, the risks associated with lead bullets that are deposited into the environment from WS' activities due to misses, the bullet passing through the carcass, or from mammal carcasses that may be irretrievable would be below any level that would pose any risk from exposure or significant contamination of water.

It is also import to note that the Wisconsin WS program is in the process of transitioning to lead free ammunition in situations where it is safe, practical, and effective.

2.3.9 Effects on Human Health from Consumption of Meat Donated by WS

Of recent concern is the potential for lead and other contaminants to be present in meat that has been processed for human consumption. The potential for the spreading of zoonotic diseases in animals processed and donated for human consumption is also a concern. Under the proposed action alternative, meat from wildlife lethally taken during damage management activities could be donated to charitable organization for human consumption. WS could recommend the donation or consumption of meat under the technical assistance only alternative, but would not be directly involved with damage management activities under that alternative.

If WS donates wild meat for human consumption, WS' policies pertaining to the testing or labeling would be followed in order to address potential health concerns. Wild game donated for human consumption may be tested for exposure to substances such as organophosphate and carbamate insecticides, lead, mercury, arsenic, organochlorines, and organic chemicals prior to distribution. The entity selecting the capture/euthanize and donation for charitable consumption program would be responsible for all costs associated with legal and appropriate donation for human consumption.

Stewart and Veverka (2011) documented that white-tailed deer that were shot with lead ammunition in the head or extreme upper neck in sharpshooting situations showed no deposition of lead fragments in the meat of the animals that would have been processed for human consumption. Lower neck shots do frequently experience lead fragmentation in the loin muscle and the authors recommend removing the loins prior to processing to ensure that these fragments were not ingested. WS' personnel are trained to shoot and target the head and upper neck of white-tailed deer when practical In addition, the WI WS program utilizes non lead ammunition (green ammo) for nearly all removal projects where animals may be donated for food.

Black bear and deer immobilized using immobilizing drugs or euthanasia chemicals would not be donated for human consumption with disposal of carcasses occurring by deep burial or incineration. Black bear, deer, and feral swine taken by any method for disease sampling or in an area where zoonotic diseases of concern are known to be prevalent and of concern to human health after consuming processed meat would not be donated for consumption and would be

disposed of by deep burial or incineration.

The Federal Meat Inspection Act (FMIA) applies to all meat or products obtained from any cattle, sheep, swine, goat, horse, mule, or other equines intended for distribution in commerce. Animals falling under jurisdiction of the FMIA must be inspected pre- and post mortem. Feral swine fall under authority of the FMIA, and therefore could only be donated to charitable organizations for use as food by needy individuals if they are delivered alive to a USDA approved feral swine slaughter facility which is not a logistically viable solution for the Wisconsin WS program. However, the FMIA provides an exemption for persons having animals of their own raising and game animals slaughtered for their own use without inspection. This provision allows landowners to utilize feral swine removed from their own property, with the understanding that meat derived from these feral swine will be consumed only by the farmer, his/her immediate family and/or nonpaying guests. The WS program may offer feral swine to the landowner/manager. Issues pertaining to the safety of the meat are similar to those addressed above for deer and bear.

It is also import to note that the Wisconsin WS program is in the process of transitioning to lead free ammunition in situations where it is safe, practical, and effective.

2.3.10 WS Impact on Biodiversity

Wisconsin WS MDM program is not conducted to eradicate native wildlife populations. Wildlife Services operates according to International, Federal, and appropriate State laws and regulations enacted to ensure species viability. In addition, any reduction of a local group of mammals is frequently temporary because immigration from adjacent areas or reproduction replaces removed animals. WS operates on a relatively small percentage of the land area of the State, and WS' take of any wildlife species analyzed in this EA is a small proportion of the total population and insignificant to the viability and health of the population (see Section 4.2.3). Reductions in non-native species like feral hogs are likely to be beneficial because non-native species disrupt ecosystems and compete for resources with native wildlife.

2.3.11 Effects of Mammal Damage Management Activities on the Regulated Harvest of Mammals

Some individuals are concerned that damage management activities conducted by WS would affect the ability of persons to harvest those species during the regulated hunting and trapping seasons either by reducing local populations through the lethal removal of mammals or by reducing the number of mammals present in an area through dispersal techniques. Those species that are addressed in this EA that also can be hunted or trapped during regulated seasons in the Wisconsin include: black bear, cottontail rabbits, coyotes, feral swine, fox squirrel, gray fox, gray squirrel, weasels, mink, muskrat, raccoons, red fox, river otter, striped skunk, white-tailed deer, and Virginia opossums.

Potential impacts could arise from the use of non-lethal or lethal damage management methods. Non-lethal methods used to reduce or alleviate damage reduce mammal densities by dispersing animals from areas where damage or the threat of damage is occurring. Similarly, lethal methods used to reduce damage could locally lower target species densities in areas where damage is occurring, resulting in a reduction in the availability of those species during the regulated harvest season. Where harvest information is available, WS assesses the impact of its MDM actions in

context of licensed harvest (Chapter 4). Analysis in Chapter 4 indicates that WS take is very low relative to licensed harvest (Table 4-1). Additionally, WS' MDM activities would primarily be conducted in areas where hunting access is restricted (e.g., airports, urban areas) or has been ineffective. The use of non-lethal (such as black bear relocation) or lethal methods often disperses mammals from areas where damage is occurring to areas outside the damage area which could serve to move those mammal species from those less accessible areas to places more accessible to hunters. In addition, in appropriate situations, WS commonly recommends recreational hunting and trapping as a damage management alternative for many of the species listed in this EA.

CHAPTER 3: ALTERNATIVES

3.0 INTRODUCTION

Chapter 3 contains a discussion of the alternatives which were developed to meet the need for action discussed in Chapter 1 and to address the identified issues discussed in Chapter 2. Alternatives were developed for consideration based on the need for action and issues using the WS Decision model (Slate et al. 1992). The alternatives which receive detailed environmental impacts analysis in Chapter 4 (Environmental Consequences) are described, as are alternatives considered but not analyzed in detail. This chapter also includes SOPs for mammal damage management in Wisconsin.

Four alternatives were recognized, developed, and analyzed in detail. An additional nine alternatives were considered, but not analyzed in detail. The four alternatives analyzed in detail are:

Alternative 1: Technical Assistance Only.
Alternative 2: Integrated Mammal Damage Management Program. (Proposed Action/ No Action)
Alternative 3: Non-lethal Mammal Damage Management Only By WS
Alternative 4: No Federal WS Mammal Damage Management.

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1: Technical Assistance Only

Under this alternative, WS would only provide technical assistance to cooperators requesting assistance. WS would not provide any operational damage management. Technical assistance could include providing information, demonstrations, and recommendations on available and appropriate methods available. In some instances, wildlife-related information provided to the requestor by WS results in tolerance/acceptance of the situation. In other instances, damage management options are discussed and recommended. Only those methods legally available for use by the appropriate individual would be recommend or loaned by WS. The implementation of methods and techniques to resolve or prevent damage would be the responsibility of the requester with no direct involvement by WS. In some cases, WS may provide supplies or materials that are of limited availability for use by private entities (e.g., loaning of propane cannons). Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Under a technical assistance only alternative, WS would recommend an integrated approach. Generally, several management strategies are described to the requester for short and long-term solutions to managing damage; these strategies are based on the level of risk, need, and the practicality of their application. Wildlife Services would use the Decision Model to recommend those methods and techniques available to the requestor to manage damage and threats of damage.

The WS program in Wisconsin regularly provides technical assistance to individuals, organizations, and other federal, tribal, state, and local government agencies for managing

mammal damage. Between FY 2007 and FY 2012, Wisconsin WS conducted more than 11,000 technical assistance projects that involved mammal species identified in this EA causing damage to agricultural resources, property, natural resources, and threats to human safety.

This alternative would place the immediate burden of operational damage management work on the resource owner, other governmental agencies, and/or private businesses. Cooperators receiving technical assistance from WS could implement those methods recommended by WS, could employ other methods not recommended by WS, could seek assistance from other entities, or take no further action. Property owners/managers frustrated by lack of operational WS' assistance with the full range of mammal damage management techniques, may try methods not recommended by WS or use illegal methods (e.g., poisons). In some cases, property owners or managers may misuse some methods or use some methods in excess of what is necessary.

3.1.2 Alternative 2: Continue the Current Adaptive Integrated Mammal Damage Management Program (Proposed Action/No Action)

The Proposed Action/No Action alternative would continue the current implementation of an adaptive integrated approach utilizing non-lethal and lethal techniques (Appendix C), identified through use of the WS Decision Model, to reduce damage and threats caused by mammals in Wisconsin. Under this alternative, WS, in consultation with the WDNR, would continue to respond to requests for assistance by: 1) taking no action if warranted, 2) providing only technical assistance to property owners or managers on actions they could take to reduce damages caused by mammals, or 3) providing technical assistance and direct operational assistance to a property owner or manager experiencing damage. Wildlife Services would also continue to work with the WDNR, University of Wisconsin Extension Service, and other entities to produce and distribute materials and provide educational programs on methods for preventing damage. Funding could occur through federal appropriations or from cooperative funding.

The No Action Alternative is a procedural NEPA requirement (40 CFR 1502.14(d)) and is a viable and reasonable alternative that could be selected and serves as a baseline for comparison with the other alternatives. The No Action Alternative, as defined here, is consistent with guidance from the CEQ (CEQ 1981). In this guidance, the No Action Alternative for situations where there is an ongoing management program may be interpreted as "no change" from current management direction or level of management intensity.

When a request for direct operational assistance is received to resolve or prevent damage caused by mammals, WS conducts site visits to assess damage or threats and identifies the cause of the damage. Wildlife Services applies the decision model described by Slate et al. (1992) to develop an effective site specific management strategy which minimizes risk of adverse environmental impacts and risks to human health and safety from MDM methods and is consistent with landowner/manager management objectives (Appendix C). The use of the Decision model by WS' employees under the proposed action is further discussed below in Section 3.2.3. Property owners or managers requesting assistance would be provided with information regarding the use of effective and practical non-lethal and lethal techniques. 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 often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy. Property owners or managers may choose to implement WS' recommendations on their own (i.e., use WS technical assistance), use

contractual services of private businesses, use volunteer services of private organizations, or use the services of WS (i.e., direct operational assistance). Property owners may also take management action themselves without consulting another private or governmental agency, or take no action.

The take of many of the mammal species native to Wisconsin can only legally occur through regulated hunting and trapping seasons or through the issuance of a permit by the WDNR and only at levels specified in the permit. However, owners or occupants of any land, and any member of his or her family, may hunt or trap coyotes, beavers, foxes, raccoons, woodchucks, rabbits, and squirrels year-round on their own property without license and subject to all other restrictions except seasons.[5] Landowners, occupants, and/or agents may trap or shoot muskrats that are causing damage to dikes, dams, shoreline or roadways without a permit. NR 12.10(1)(b)1(d). Landowners/occupants are also not required to have a hunting or trapping license to shoot or trap unprotected mammal species (Virginia opossum, skunk, weasel, feral swine and all other wild mammal not specifically mentioned in the hunting and trapping regulations NR 10.04) year-round, on their own property if these species are causing damage or nuisance. An agent of the land owner or occupant is required to have a valid hunting and/or trapping license when removing these animals.(NR 10.04 Note, NR 12.10(1)(b) & (3)(c)). Activities conducted under this alternative would occur in compliance with signed Cooperative Service Agreements and / or MOUs signed between WS, the WDNR, tribes, or other state agencies.

3.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would be restricted to only using or recommending non-lethal methods to resolve damage caused by mammals in Wisconsin (Appendix C). Lethal methods could continue to be used under this alternative by those persons experiencing damage by mammals without involvement by WS. In situations where non-lethal methods were impractical or ineffective to alleviate damage, WS could refer requests for information regarding lethal methods to the WDNR, local animal control agencies, or private businesses or organizations. Property owners or managers might choose to implement WS' non-lethal recommendations on their own or with the assistance of WS, implement lethal methods on their own, or request assistance (nonlethal or lethal) from a private or public entity other than WS. Property owners/managers frustrated by lack of WS' assistance with the full range of mammal damage management techniques may try methods not recommended by WS or use illegal methods (e.g., poisons). In some cases, property owners or managers may misuse some methods or use some methods in excess of what is necessary.

3.1.4 Alternative 4: No Mammal Damage Management Conducted by WS

Under this alternative WS would not be involved with any aspect of mammal damage management in Wisconsin. Information on MDM methods would still be available to producers and property owners through other sources such as WDNR, UW Extension Service offices, or pest control organizations. Currently, WDNR only provides direct MDM assistance in limited situations, but does provide technical assistance and issues permits for MDM activities as appropriate. Requests for information would be referred to these entities.

[5] Hunting is not allowed during the 24-hour period immediately preceding the gun deer season. s. 29.337(1).

In Wisconsin, persons experiencing damage caused by mammals could continue to resolve damage by employing those methods legally available. As discussed for Alternative 2, state regulations contain provisions which allow landowners and managers, and their designated agents to address certain types of wildlife damage with or without a permit from WDNR, depending on the species. All methods described in Appendix C would be available for use by persons experiencing damage or threats of damage except for the use of immobilizing drugs, euthanasia chemicals, culvert traps, and foot snares for bears. Immobilizing drugs and euthanasia chemicals can only be used by WS, licensed veterinarians, or those that are trained and working under the supervision of an appropriate DEA license holder. Culvert traps and foot snares for bear damage management would available for use by the WDNR unless the WDNR developed a system for authorizing others to use these methods for bear damage management. As with Alternatives 1 and 3, there is some risk that individuals who would otherwise use the services and advice of WS would intentionally or unintentionally misuse methods or take actions in excess of what is needed to effectively resolve damage.

3.2 MAMMAL DAMAGE MANAGEMENT STRATEGIES USED BY WS

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2 and 3 described above. Alternative 4 would terminate both technical assistance and operational MDM by WS. Appendix C is a more thorough description of the methods that could be used or recommended by WS.

3.2.1 Integrated Wildlife Damage Management (IWDM)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in the most cost-effective manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM may incorporate cultural practices (e.g., animal husbandry), habitat modification (e.g., exclusion), animal behavior modification (e.g., scaring), removal of individual offending animals, local population reduction, elimination of invasive species (e.g., feral hogs) or any combination of these, depending on the circumstances of the specific damage problem.

3.2.2 The IWDM Strategies Employed by WS

Technical Assistance Recommendations
"Technical assistance" as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods and approaches. The implementation of damage management actions is the responsibility of the requester. In some cases, WS provides supplies or materials that are of limited availability for use by non-WS entities. Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, 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 the practicality of their application. In some instances, wildlife-related information provided to the requestor by WS results in tolerance/acceptance of the situation. In other instances, management options are discussed and recommended.

Under APHIS NEPA implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving mammal damage problems.

From FY 2007 through FY 2012, WS has conducted more than 11,000 projects to reduce conflicts and damage to agricultural resources, property, natural resources, and threats to human safety associated. A summary of the types of damage situations WS helped to address through technical assistance is provided in Table 1-1.

Direct Damage Management Assistance (Direct Damage Management)
Direct damage management assistance includes damage management activities that are directly conducted or supervised by WS personnel. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone and when a *Work Initiation Document for Wildlife Damage Management* or other comparable instruments provide for direct damage management by WS. The initial investigation defines the nature, history, and extent of the problem; species responsible for the damage; and methods available to resolve the problem. The professional skills of WS personnel are often required to effectively resolve problems, especially if restricted use pesticides are necessary or if the problems are complex.

Educational Efforts
Education is an important element of WS program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures, courses, and demonstrations are provided to producers, homeowners, state and county agents, colleges and universities, 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 periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

Research and Development
The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. National Wildlife Research Center scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. National Wildlife Research Center scientists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management.

Examples of WS Technical Assistance and Direct MDM in Wisconsin
Milwaukee County has entered into a Cooperative Service Agreement with Wisconsin WS for the purpose of assessing, managing, and monitoring wildlife-related public safety and aviation hazards at General Mitchell International Airport (MKE) and Lawrence Timmerman Airport (MWC). Aircraft strikes and other interactions involving white-tailed deer, red fox, coyotes, and

other mammals have created safety hazards at the airports. Wildlife Services has implemented an IWDM approach consisting of technical assistance and direct damage management components including: WS review of airport development and landscaping plans, habitat management recommendations, providing training to MKE and MWC personnel, hazardous mammal species population management, and exclusion. WS involvement at MKE and MWC has considerably reduced or prevented strikes with hazardous mammal species at the airport.

Wildlife Services has entered into a Cooperative Service Agreement at the request of the WDNR to manage potential fish depredating mammals from three state-owned and operated fish hatcheries. Wildlife Services provides assistance to these aquaculture facilities to minimize predation, protect physical barriers, and to a lesser extent minimize the risk of disease transmission, by selectively trapping mink, muskrat, otter, and raccoons at three salmonid hatcheries. Hatcheries propagate fish at artificially high densities which attracts predators. Lethal control is site specific, occurs for short durations (<2 weeks), and is target specific.

Wildlife Services has provided technical assistance to a neighborhood community experiencing damage concerns with coyotes within a large urban area of the state. A number of coyotes have been depredating pets and appear to have lost their fear of humans and/or are behaving aggressively toward people and WS was requested to provide abatement and control options in managing at a public information gathering meeting. Potential direct management of coyotes by WS could result when the community leaders develop a plan to address the conflicts.

3.2.3 Wildlife Services Decision Making

WS personnel use a thought process for evaluating and responding to damage complaints which is depicted by the WS Decision Model and described by Slate et al. (1992) (Figure 3-1). Wildlife Services personnel are frequently contacted after requesters have tried or considered non-lethal methods and found them to be impractical, too costly, or inadequate to reduce damage. Wildlife Services personnel assess the problem then evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. 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. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a written documented process, but a mental problem-solving process common to most, if not all,

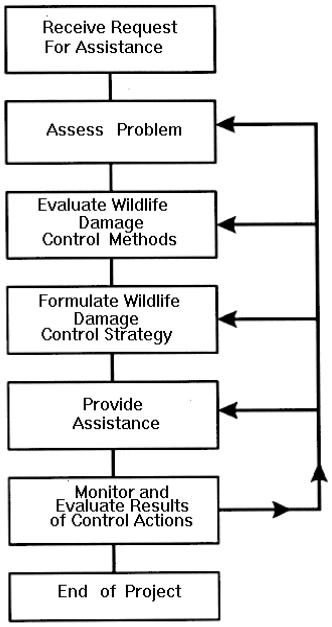

Figure 3.1 WS Decision Model as presented by Slate et al. (1992) for developing a strategy to respond to a request for assistance with human-wildlife conflicts.

professions.

Community-based Decision Making
The WS 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, WS could provide technical assistance regarding the biology and ecology of mammals and effective, practical, and reasonable methods available to the local decision-maker(s) to reduce damage or threats. This could include non-lethal and lethal methods depending on the alternative selected. Wildlife Services and other state, tribal and federal wildlife management agencies may facilitate discussions at local community meetings when resources are available.

Requests for assistance to manage damage caused by mammals often originate from the decision-maker(s) based on community feedback or from concerns about damage or threats to human safety. As representatives of the community, the decision-maker(s) are able to provide the information to local interests either through technical assistance provided by WS or through demonstrations and presentation by WS on mammal damage management activities. This process allows decisions on mammal damage management activities to be made based on local input. They may implement management recommendations provided by WS or others on their own, or may request management assistance from WS, other wildlife management agencies, local animal control agencies, or private businesses or organizations.

Community Decision-Makers
The decision-maker for the local community would be elected officials or representatives of the community. The elected officials or representatives are popularly elected residents of the local community or appointees who oversee the interests and business of the local community. This person or persons would represent the local community's interest and make decisions for the local community or bring information back to a higher authority or the community for discussion and decision-making. Identifying the decision-maker for local business communities is more complex because building owners may not indicate whether the business must manage wildlife damage themselves, or seek approval to manage wildlife from the property owner or manager, or from a governing Board. Wildlife Services could provide technical assistance and make recommendations for damage reduction to the local community or local business community decision-maker(s). Direct control could be provided by WS only if requested by the local community decision-maker, funding is provided, and if the requested direct control was compatible with WS' recommendations.

Private Property Decision-Makers
In the case of private property owners, the decision-maker is the individual that owns or manages the affected property. The decision-maker has the discretion to involve others as to what occurs or does not occur on property they own or manage. Due to privacy issues, WS cannot disclose cooperator information to others. Therefore, individual property owner or managers make the determinations regarding involvement of others in the decision-making process for the site. Direct control could be provided by WS if requested, funding is provided, and the requested management is in accordance with WS' recommendations.

Public Property Decision-Makers

The decision-maker for local, state, or federal property would be the official responsible for or authorized to manage the public land to meet interests, goals, and legal mandates for the property. Wildlife Services could provide technical assistance to this person and recommendations to reduce damage. Direct control could be provided by WS if requested, funding provided, and the requested actions were within the recommendations made by WS. Public involvement would be conducted by the agency responsible for managing the site in accordance with agency procedures.

Tribal Decision-Makers
The decision-makers for Tribal property and ceded territories would be the officials responsible for or authorized to manage the Tribal lands and the lands / and or resources identified under treaty rights, to meet interests, goals, and legal mandates for the property. Wildlife Services could provide technical assistance and recommendations to reduce damage. Direct control could be provided by WS if requested, funding provided, and the requested actions were within the recommendations made by WS. Involvement of tribal members or members of the surrounding community would be conducted in accordance with the established regulations and procedures for the affected tribe(s).

3.3 MAMMAL DAMAGE MANAGEMENT METHODS AVAILABLE FOR USE (See Appendix C for a more detailed description of each method or approach.)

3.3.1 Non-lethal Methods

Non-lethal methods are often used by the cooperators before and/or after requesting assistance from WS. It is not unusual for cooperators to have already tried non-lethal methods prior to requesting assistance from WS. For example, in a 2010 NASS Nationwide survey of cattle producers, Wisconsin cattle producers reported using frequent checking (31.4%), livestock guarding animals (27%), night penning (22.1%), exclusion fencing (41.3%), livestock carcass removal (19%), culling of sick or injured animals (22.4%), fright tactics (5%), herding (5%), and other methods (6.6%) to prevent predation losses (NASS 2011). In a similar 2004 survey, Wisconsin sheep producers, reported using fencing (35.7%), shed lambing (36.5%), culling of sick/injured animals (14.1%), night penning (27.9%), frequent checks (3.9), changing bedding (10.0%), carcass removal (18.4%), guard dogs (15.5%), guard llamas (11.8%), guard donkeys (6.2%), herding (3.8%), and frightening devices (3.1%), other (9.1) to prevent predation losses (NASS 2005).

Exclusion - (tree wraps, fencing, electrical barriers, etc.) involves physical exclusion of wildlife from protected resources and/or prevention of girdling, gnawing, and general damage.

Cultural methods and habitat modifications are typically implemented by agricultural producers or property owners. They consist primarily of non-lethal preventive methods which minimize exposure and/or reduce the amount or attractiveness of the protected resource to wildlife that would cause damage or pose a threat. A few examples of these types of techniques are: planting lure crops, providing alternate foods, changing animal husbandry practices, switching to short variety crops, picking less palatable varieties of landscape plants, picking up and containing rubbish in mammal resistant containers, not leaving pet food out at night, and keeping the vegetation around the protected resource short.

Animal behavior modification refers to tactics that alter the behavior of animals to reduce damage. Some of these tactics include:

Propane exploders
Pyrotechnics
Distress calls and sound producing devices
Visual repellents and other scaring tactics
Livestock guarding animals

Repellents are usually naturally occurring substances that are chemically formulated to be distasteful or to elicit pain or discomfort to target animals when they are encountered. In Wisconsin, wildlife repellents are registered with the WDATCP.

Non-lethal Capture Devices, including foot-hold traps, culvert traps, catch poles, cable restraints, nets, and box/cage traps are used to capture wildlife. These devices hold the animal until the Specialist arrives and relocates the animal. Alternatively, when monitoring for diseases in wildlife, samples may be collected and then the animal is released at the capture site. WS could also use these capture methods for animals to be outfitted with transmitters used for wildlife research. These same devices can be used as lethal methods if the specialist euthanizes the captured animals via gunshot or euthanasia chemicals discussed below.

Drugs such as anesthetics (Ketamine, Telazol), sedatives (analgesics; Xylazine), and accessory drugs (Yohimbine, antibiotics, etc.) are used to capture, sedate, and handle animals involved in wildlife damage or disease situations. They may also be used to capture animals to receive transmitters for research purposes. These and other drugs are available for WS use, pursuant to State and Federal regulations, and are identified as approved drugs by the WS program through its Immobilization and Euthanasia Committee.

Relocation is accomplished through use of nonlethal capture devices discussed above or tranquilizer chemicals designed to capture mammals alive. Captured mammals can then be relocated to other field locations or to animal shelters, pursuant to State laws and regulations as appropriate. Wisconsin law requires permission from the landowner prior to relocating animals to private property. In general, animals that have been live captured may not be relocated to WDNR controlled land. However, WS and WDNR may potentially work cooperatively to permit relocation of captured animals onto WDNR lands (e.g., bears).

3.3.2 Lethal Methods

Lethal Capture Devices, including body-gripping traps (Conibear), snap traps and some snares designed to kill the captured animal.

Non-lethal Capture Devices: Non-lethal capture devices as discussed above can also be used as lethal methods when the captured animal is killed via shooting or euthanasia chemicals discussed below.

Shooting is helpful in some situations to supplement and reinforce other dispersal techniques and to kill mammals that are legally trapped. It is selective for target species and may be used in conjunction with the use of spotlights, calling, and other techniques such as elevated positions, stands, etc. Shooting with firearms is sometimes used to manage mammal damage problems

when lethal methods are determined to be appropriate. The animals are killed as quickly and humanely as possible.

Aerial Surveillance and Sharpshooting
Surveillance and sharpshooting from helicopters to remove feral swine has proven to be very affective across the US. Aerial surveillance would be conducted throughout the year by low level helicopter flights to determining presence of feral hogs prior to initiating other control methods. Aerial sharpshooting would be conducted during the winter (approximately January through March) after leaves have fallen from trees and snow is present on the ground. Wildlife Services would not conduct aerial sharpshooting on a property without the consent of the landowner/manager. All aerial activities would be conducted in accordance with the policies established in WS Directive 2.62 – Aviation Safety and Operations and the WS Aviation Safety and Operations manuals. Aerial sharpshooting has been identified as a viable tool for feral swine management in the U.S. (Campbell et al. 2010, West et al. 2009). Reported removal rates for aerial removal of feral swine range from 9-39 swine per hour (Campbell et al. 2010, Saunders and Bryant 1988, Hone 1983). Differences in swine density, climate, terrain and plant cover account for most of the variation in capture rates. Sometimes individual feral swine may be live captured, fitted with radio transmitters, and released to be used to identify groups ("Judas pigs") which are subsequently removed using the aerial methods listed. Although aerial sharpshooting is an expensive method, WS' experience with feral swine removals indicates that the staff time, travel time and labor required to achieve similar results using ground-based methods will likely make aerial sharpshooting a cost-effective option.

Sport harvest through hunting and trapping is often an important part of MDM strategies and is recommended by WS to enhance the effectiveness of other damage management techniques and to accomplish population management objectives developed by the WDNR.

Gas Cartridges are incendiary devices designed to give off carbon monoxide and other poisonous gases and smoke when ignited. They are used to fumigate burrows of certain rodents and other mammals.

Carbon dioxide (CO_2) gas is an AVMA-approved euthanasia method (AVMA 2013) which is sometimes used to euthanize mammals that have been chemically immobilized or captured in live traps. Live animals are placed in an enclosed space into which CO_2 gas is released. The animals quickly expire after inhaling the CO_2.

Euthanasia agents (Sodium Pentobarbital and its derivatives, Potassium Chloride) are used euthanize animals involved in wildlife damage or disease situations. These and other drugs are available for WS use, pursuant to State and Federal regulations, and are identified as approved drugs by the WS program through its Immobilization and Euthanasia Committee.

3.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

In addition to those alternatives analyzed in detail, several alternatives were identified by WS but will not receive detailed analyses for the reasons provided. Those alternatives considered but not analyzed in detail include:

3.4.1 Lethal Mammal Damage Management Only By WS

Under this alternative, WS would not use or recommend any non-lethal MDM methods, but would only conduct lethal MDM. This alternative was eliminated from further analysis because some mammal damage problems can be resolved effectively through non-lethal means. Additionally, lethal methods may not always be available for use due to safety concerns, such as the discharge of firearms.

3.4.2 Exhaust All Feasible Non-lethal Methods Before Using Lethal Methods

This alternative would require that all non-lethal methods or techniques described in Appendix C be applied to all requests for assistance to reduce damage and threats to safety from mammals in Wisconsin. If the use of all non-lethal methods fails to resolve the damage situation or reduce threats to human safety at each damage situation, lethal methods would be employed to resolve the request. Non-lethal methods would be applied to every request for assistance regardless of severity or intensity of the damage or threat until deemed inadequate to resolve the request. This alternative would not prevent the use of lethal methods by those persons experiencing mammal damage but would only prevent the use of those methods by WS until all non-lethal methods had been employed.

People experiencing damage often employ non-lethal methods to reduce damage or threats prior to contacting WS. Verification of the methods used would be the responsibility of WS. No standard exists to determine requester diligence in applying those methods, nor are there any standards to determine how many non-lethal applications are necessary before the initiation of lethal methods. Thus, only the presence or absence of non-lethal methods can be evaluated. The proposed action (Alternative 2) and the technical assistance only alternative (Alternative 1) are similar to a non-lethal before lethal alternative because the use of non-lethal methods is considered and given preference where practical and effective (WS Directive 2.101). Adding a non-lethal before lethal alternative and the associated analysis would not add additional information to the analyses in the EA.

3.4.3 Compensation Only for Mammal Damage Losses

Reimbursement provides producers monetary compensation for losses, it does not remove the problem nor does it assist with reducing future losses. The compensation only alternative would require the establishment of a system to reimburse persons impacted by mammal damage. This alternative was eliminated from further analysis because it is not financially feasible or practical to provide compensation for all mammal damage. The WDNR does provide compensation for black bear and white-tailed deer damage to agriculture resources. An important part of the Wildlife Damage Abatement and Claims Program (WDACP) is the mandatory requirement to use available and appropriate abatement methods before a claim is paid. There is not any federal or state law that allows for only compensation to address mammal damage in Wisconsin.

Under such an alternative, WS would not provide any technical assistance or direct damage management. Aside from lack of legal authority, analysis of this alternative indicates that the concept has many drawbacks (Wagner et al. 1997, USDA 1997 Revised pages 2-40 – 2-42):

- It would require larger expenditures of money and labor to investigate and validate all damage claims to determine and administer appropriate compensation.

- Compensation would most likely be less than full market value. Responding in a timely fashion to all requests to assess and confirm damage would be difficult and certain types of damage could not be conclusively verified. For example, proving conclusively in individual situations that mammals were responsible for disease outbreaks would be impossible, even though they may actually have been responsible. Thus, a compensation program that requires verification would not meet its objective for mitigating such losses.

- In the case of predation on livestock or pets, 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.

- Compensation would give little incentive to resource owners to limit damage through improved cultural, husbandry, or other practices and management strategies.

- Not all resource owners would rely completely on a compensation program and unregulated lethal control would most likely continue as permitted by state law.

- Compensation would not be practical for reducing threats to human health and safety.

Based on the information above, a compensation-only alternative was eliminated from detailed analysis in Chapter 4.

3.4.4 Reproduction Control

Reproductive control is often considered for use where wildlife populations are overabundant and where traditional hunting or lethal control programs are not publicly acceptable (Muller et al. 1997). Use and effectiveness of reproductive control as a wildlife population management tool is limited by population dynamic characteristics (longevity, age at onset of reproduction, population size and biological/cultural carrying capacity, etc.), habitat and environmental factors (isolation of target population, cover types and access to target individuals, etc.), socio-economic and other factors. Population modeling indicates that reproductive control is more efficient than lethal control only for some rodent and small bird species with high reproductive rates and low survival rates (Dolbeer 1998). Additionally, the need to treat a sufficiently large number of target animals, requirements for repeated treatments with some contraceptive products, and population dynamics of free-ranging animal populations place considerable logistic and economic constraints on the adoption of reproduction control technologies as a management tool for some species. There are also considerable socio-cultural concerns pertaining to the use of reproductive control techniques. Research into reproductive control technologies, however, has been ongoing, and the approach will probably be considered in an increasing variety of wildlife management situations.

Reproductive control for wildlife could be accomplished either through sterilization (permanent) or contraception (reversible). Sterilization could be accomplished through:

- Surgical sterilization (vasectomy, castration, tubal ligation)
- Chemosterilization
- Gene therapy

Contraception could be accomplished through:

- Hormone implantation (e.g., synthetic steroids such as progestins)
- Immunocontraception (e.g., contraceptive vaccines)
- Oral contraception (e.g., progestin administered daily)

Research into the use of these techniques consists of laboratory/pen experimentation to determine and develop the sterilization or contraceptive material or procedure, field trials to develop the delivery system, and field experimentation to determine the effectiveness of the technique in achieving population reduction. Prior to implementation, the product must be registered and approved by the appropriate federal and state regulatory agencies. No chemical or biological agent to accomplish reproductive control for the free-ranging mammals targeted in this EA has been approved for operational use by Federal and Wisconsin authorities. The WDNR has developed a policy that does not permit the use of fertility control as a method of population management of nuisance wildlife until research demonstrates the activity to safe and effective. However, the WDNR does permit research into reproductive control methods if the proposed research meets established criteria.

Because this tool is not permitted in Wisconsin and due to considerable logistic, economic, and socio-cultural limitations to the use of fertility control on free-ranging mammals, this approach is not considered for further analysis in this EA. However research into this area of wildlife damage management continues. Wildlife Services will monitor new developments and, where practical and appropriate, could incorporate reproductive control techniques into its program after necessary NEPA review is completed.

Trap-Neuter-Release Program for Feral and Free Ranging Cats

This topic has undergone considerable debate in animal welfare and scientific communities for a number of years. The debate focuses on whether controlling feral, free-ranging, or invasive animal populations through Trap-Neuter-Release (TNR) programs are effective and alleviate problems (*i.e.*, diseases, predation, agricultural damage, and human safety).

Theoretically, TNR would work if all animals of one sex or both were sterilized. However, the probability of controlling invasive species in the wild with this technique is not currently reasonable, especially with the animals being self-sufficient and not relying on humans to survive. Additionally, some individuals within a population can be trap shy. Capturing or removing trap shy individuals often requires implementing other methods.

Many veterinarians and public health officials oppose TNR programs based on health concerns and disease threats. The potential for diseases and parasites transmission to humans either from direct contact during sterilization or the risk of exposure after the animal is released is a concern. Once live-captured, performing sterilization procedures during field operations on anesthetized feral cats would be difficult. Sanitary conditions are difficult to maintain when performing surgical procedures in field conditions. To perform operations under appropriate conditions, live-

captured feral cats would need to be transported from the capture site to an appropriate facility which increases the threat from handling and transporting. A mobile facility could be used but would still require additional handling and transporting of the live-captured feral cats to the facility. Once the surgical procedure was completed, the feral cat would have to be held to ensure recovery and transported back to the area capture occurred.

Trap-Neuter-Release programs are often not as successful as desired to reduce immediate threats to humans and long terms threats posed to wildlife (AVMA 2003, Barrows 2004, Levy and Crawford 2004, Jessup 2004, Winter 2004). Feral cats subjected to TNR would continue to cause the same problems[6] they caused before the TNR program was initiated because of slow attrition. Trap-Neuter-Release programs can take a decade or longer to reduce target species populations (Barrows 2004, Winter 2004) especially when acute issues need rapid solutions (Levy and Crawford 2004, Stokopf and Nutter 2004). Several studies report that target species populations often remain stable or increase following TNR programs due to immigration and reproduction from other members of the groups (Castillo and Clarke 2003, Levy and Crawford 2004, Winter 2004) with little to no resolution of threats to human safety or damages (Barrows 2004, Slater 2004, Winter 2004).

Other concerns arise when considering the legality of TNR programs given the documented damage caused by target species, especially to native wildlife (Barrows 2004, Levy and Crawford 2004, Jessup 2004). Some people have questioned whether TNR programs are violating the Migratory Bird Treaty Act and the ESA because released animals may continue to kill migratory birds and/or endangered species (Barrows 2004, Levy and Crawford 2004, Jessup 2004). As a result of the continued threat to human safety created by TNR programs and the continued threat to T&E wildlife and native wildlife in general, this alternative will not be considered further.

3.4.5 Short Term Eradication and Long Term Population Suppression

An eradication alternative would direct all WS' program efforts toward total long term elimination of mammal populations wherever a cooperative program was initiated in Wisconsin. Eradication of native mammal species is not a desired population management goal of state or federal agencies or WS and is not acceptable to most members of the public. Consequently, this alternative will not be addressed in detail. However, eradication could be considered as an option for management of non-native invasive mammals such as feral swine. Non-native invasive species can damage native ecosystems, serve as reservoirs for diseases transmissible to wildlife, and compete with native species for food and other resources. Removal of these species, up to and including eradication is generally perceived by wildlife professionals as having beneficial impacts on native species and ecosystems.

Suppression would direct WS' program efforts toward managed reduction of certain problem populations or groups. In areas where damage can be attributed to localized populations of mammals, WS can decide to implement local population suppression as a result of using the WS' Decision Model. It is not realistic or practical to consider large-scale population suppression as the basis of the WS' program. Problems with the concept of suppression are similar to those described above for eradication. Typically, WS' activities in Wisconsin would be conducted on a

[6] Brickner (2003), Levy et al. (2003), Barrows (2004), and Jessup (2004) reported that sterilized cats that do not spend any time on courting and mating are left with more time to hunt than non-sterilized cats and therefore, continue to remain as potential reservoirs of animal and human disease, a social nuisance, and continue to hunt and kill protected species.

very small portion of the sites or areas inhabited or frequented by problem species.

3.4.6 Bounties

Payment of funds (bounties) for killing some mammals suspected of causing economic losses have not been supported by natural resource agencies, such as WNDR, as well as most wildlife professionals for many years (Latham 1960). Wildlife Services concurs with those agencies and wildlife professionals because of several inherent drawbacks and inadequacies in the payment of bounties. Bounties are often ineffective at controlling damage over a wide area, such as the entire state of Wisconsin. The circumstances surrounding the take of animals are typically arbitrary and completely unregulated because it is difficult or impossible to assure animals claimed for bounty were not taken from outside the area where damage was occurring. In addition, WS does not have the authority to establish a bounty program.

3.4.7 Trap and Translocate Mammals Only

Under this alternative, all requests for assistance where removal of the problem animal(s) is identified as the preferred management strategy would be addressed using live-capture and relocation or the recommendation of live-capture and relocation. Mammals would be live-captured using immobilizing drugs, live-traps, or nets (*e.g.*, cannon nets, rocket nets, or drop nets) described in Appendix C and relocated. Translocation sites would be identified and have to be approved by the WDNR and/or the property owner where the translocated mammals would be placed prior to live-capture and translocation. Live-capture and translocation could be conducted as part of the alternatives analyzed in detail. However, all translocation of mammals by WS could only occur with the authorization of the WDNR.

The translocation of mammals that have caused damage to other areas following live-capture may not be effective or cost-effective for all situation. Translocation may be ineffective because some problem mammal species are highly mobile and can easily return to damage sites from long distances, habitats in other areas are generally already occupied, and/or translocation would most likely result in mammal damage problems at the new location. Sometimes, hundreds of mammals would need to be captured and translocated to solve damage problems (*e.g.*, deer confined within a perimeter fence); therefore, translocation would be logistically unrealistic. Translocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of the stress to the translocated animal, poor survival rates, and the difficulties that translocated wildlife have with adapting to new locations or habitats (Nielsen 1988). In some instances, there also may be a concern of spreading wildlife diseases by moving wildlife from one location to another. Given the limitations on translocation of wildlife, the exclusive use of translocation in situations where removal of problem mammals is warranted will nto be addressed in detail.

Although translocation of mammals is not feasible or suitable for all situations, it can be a valuable tool to address some types of wildlife damage such as damage by and conflicts with black bears in Wisconsin (See Section 4.1.1.2 - Black Bears and Appendix C). When requested by the WDNR, WS could translocate mammals or recommend translocation under any of the alternatives analyzed in detail, except under the no involvement by WS alternative (Alternative 4). However, translocation by other entities could occur under any of the alternatives, including Alternative 4 if permitted by the WDNR.

3.4.8 Use of Regulated Hunting and Trapping as a Management Tool

Sport hunting and trapping by private individuals regulated by wildlife management agencies can be an effective population management tool and can be one of the most efficient and least expensive techniques for managing populations over broad areas. However, regulated hunting with firearms and trapping is often not allowed in urban or suburban areas because of safety concerns and local ordinances. In agricultural areas, regulated hunting and trapping may not reduce the wildlife populations sufficiently to reduce damage or the regulated hunting or trapping season may not coincide with seasonal damage (*e.g.*, hunting normal occurs after the period when harvest of agricultural crops occur). Additionally, airports are often not accessible to the public for hunting and trapping.

In urban and suburban areas where traditional hunting with firearms is not applicable because of public safety concerns, state hunting laws, and local ordinances restricting the use of firearms, archery hunting may provide an alternative method for managing wildlife populations. Archery hunting may be used as an effective management tool to reduce urban deer populations (Kilpatrick and Walter 1999). However, it may be difficult to remove a sufficient number of deer using archery hunting alone. Ver Steeg et al. (1995) found that a controlled archery hunt did not sufficiently reduce the deer population in a suburban park in Illinois. Although some deer were removed by archery hunters, sharpshooting was used after the archery hunts were completed to ensure that the annual deer herd reduction goals were reached. Sharpshooting was nearly twice as efficient as archery hunting, with an overall removal rate of 3.76 deer per day for sharpshooting and 1.95 deer per day for archery hunting (Ver Steeg et al. 1995). None of the alternatives analyzed in detail would prevent regulated hunting and trapping, and regulated hunting could be used as an additional method of reducing certain wildlife in areas where hunting or trapping is legal and practical.

3.4.9 Supplemental Feeding

Supplemental feeding would involve providing acceptable foods (e.g. corn or a balanced ration diet) either during certain annual periods when deer browsing on ornamental plants and flowers is most severe, or on a year-round basis. This alternative was not considered in detail because deer numbers would most likely continue to grow, perhaps to a level even higher than what would occur without such feeding, requiring increased costs for supplemental feed, and increasing the occurrence of damage to property, agricultural and natural resources, and threats to human health and safety. Additionally, supplemental feeding may result in the spread of disease among wild deer populations. The congregation of deer and contact between deer at feeding sites may increase the transmission of diseases such as tuberculosis.

3.4.10 Repellents for Bear

Capsaicin or concentrated red pepper spray has been tested and used effectively on black bears. The spray range on most products is less than 30 feet, so capsaicin is only effective in close encounters. Counter Assault, a repellent pepper spray, is registered as a bear repellent under EPA Reg. No. 55541-2. However, pepper sprays for bear, are not registered or allowed to be used by the state of Wisconsin. Therefore, capsaicin pepper spray will not be discussed further.

3.5 STANDARD OPERATING PROCEDURES (SOPs) FOR MAMMAL DAMAGE MANAGEMENT

The current WS program, nationwide and in Wisconsin has developed SOPs for its activities that reduce the potential impacts of these actions on the environment. Some key standard operating procedures pertinent to the proposed action and alternatives of this EA include:

- The WS Decision Model thought process is used to identify effective wildlife damage management strategies and their effects.

Target, Non-target, and Threatened and Endangered Species

- Wildlife Services personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding non-target species.

- Wildlife Services has consulted with the USFWS and WDNR regarding potential impacts of the proposed alternatives on state and federally-listed T&E species (Letter from USFWS, September 18, 2013 and letter from WDNR, November 12, 2013). Reasonable and prudent measures or other provisions identified through consultation with the USFWS and WDNR will be implemented to avoid adverse effects on T&E species.

- Wildlife Services would initiate informal consultation with the USFWS following any incidental take of T&E species.

- Research is being conducted to improve MDM methods and strategies so as to increase selectivity for target species, to develop effective non-lethal control methods, and to evaluate and minimize non-target hazards and environmental effects of MDM techniques

- In the event that WS recommends habitat modification (e.g., modifying a wetland) as a damage management practice for the landowner/manager, WS will advise the landowner/manager that they are responsible for checking with state and federal authorities regarding regulations and endangered species protections that may be applicable to the proposed project.

- Wildlife Services uses chemical methods for MDM that have undergone rigorous research to prove their safety and lack of serious effects on non-target animals and the environment.

- U.S. EPA approved label directions are followed for all pesticide use. The registration process for chemical pesticides is intended to assure minimal adverse effects to the environment when chemicals are used in accordance with label directions.

- Traps and snares, except for those set for bear, will not be set within 30 feet of exposed animal carcasses to prevent the capture of scavenging birds. Pan tension systems used on traps set for bears should prevent birds from triggering traps set for bears.

- Foothold trap pan tension devices will be used to reduce hazards to nontarget species that weigh less than the target species.

- Captured non-target animals would be released unless it is determined by Wisconsin WS personnel that the animal would not survive.

- Where applicable annual WS take will be considered with the statewide "total harvest" (e.g., WS take and other licensed harvest) when estimating the impact on wildlife species.

- Management actions would be directed toward localized populations or groups and/or individual offending animals, dependent on the magnitude of the problem.

Health and Safety

- All WS personnel in Wisconsin using restricted chemicals and controlled substances (immobilization and euthanizing drugs) are trained and certified by, or operate under the direct supervision of, program personnel or others who are trained in the safe and effective use of chemical MDM materials.

- Wildlife Services uses MDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997 Revised, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazards to the public is even further reduced.

- Appropriate warning signs are posted on main entrances or commonly used access points to areas where foothold traps, cable restraints, snares or rotating jaw (conibear-type) traps are in use.

- All WS actions are conducted in accordance with applicable state, tribal, federal and local laws, including permit conditions and regulations mandating that land traps set for mammals be checked at least once each calendar day.

- Damage management projects conducted on public lands would be coordinated with the management agency.

- In most cases, live traps, culvert traps and snares set for black bears would be placed so that captured animals would not be readily visible from any designated recreation road or trail or from federal, state or county roads. Sometimes culvert traps are used in and near campgrounds, developments, dumpsters and other areas which attract bears. Trap warning signs are placed on each end of the trap. In certain instances when culvert traps are placed in areas with public access, they are cordoned off with warning tape to notify the public of the dangers associated with the trap.

- Pesticide use, storage, and disposal conform to label instructions and other applicable laws and regulations, and Executive Order 12898.

- Material Safety Data Sheets for pesticides would be provided to all WS personnel involved with specific damage management activities.

Humaneness and Animal Welfare Concerns of Methods Used

- All WS actions are conducted in accordance with applicable state, federal and local laws, including regulations mandating that land traps set for mammals be checked at least once each calendar day.

- Research on selectivity and humaneness of management practices would be monitored and adopted as appropriate.

- Management controls are in place within WS and its Immobilization and Euthanasia Committee to maintain personnel training and certification.

- Where practical, euthanasia procedures approved by the AVMA that cause minimal pain would be used.

- Use of newly-developed, proven, non-lethal methods would be encouraged when appropriate.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions when selecting an appropriate alternative for meeting the purpose of the proposed action. This chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. The environmental consequences of each alternative are analyzed in comparison with the no action alternative (Alternative 2) to determine if the real or potential effects would be greater, lesser, or the same.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, visual resources, air quality, prime and unique farmlands, timber, and range. These resources will not be analyzed further.

Cumulative Effects: Cumulative effects are discussed in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from methods employed, and including summary analyses of potential cumulative impacts to target and non-target species, including T&E species.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Effects on sites or resources protected under the National Historic Preservation Act: WS MDM actions are not undertakings that could adversely affect historic resources (See Section 1.6.6).

The activities proposed in the alternatives would have a negligible effect on atmospheric conditions including the global climate. Meaningful direct or indirect emissions of greenhouse gases would not occur as a result of any of the proposed alternatives. Those alternatives would meet the requirements of applicable laws, regulations, and Executive Orders including the Clean Air Act and Executive Order 13514.

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

This section analyzes the environmental consequences of each alternative to determine the extent of actual or potential impacts on the issues addressed in detail. The proposed action/no action alternative (Alternative 2) serves as the environmental baseline against which the impacts of all other alternatives are compared. The analysis also takes into consideration mandates, directives, and the procedures of WS and the WDNR.

4.1.1 Effects on Target Mammal Species Populations

4.1.1.1 Alternative 1: Technical Assistance Only

Under this alternative, WS would have no direct impact on target mammal populations because WS would not conduct any operational MDM activities. The program would be limited to providing advice only. It is likely that most landowners/resource managers would continue to attempt to do something about their mammal damage as permitted under Wisconsin state law. Cumulative impacts on target species populations would be variable depending upon actions taken by affected landowners/resource managers and the level of training and experience of the individuals conducting the MDM. Some individuals experiencing damage may take illegal or unsafe action against the problem species either unintentionally due to lack of training, or deliberately out of frustration with continued damage. In these instances, more animals from the target species may be taken than with a professional WDM program (Alternative 2). Use of WS technical assistance may decrease the risks associated with uninformed use of lethal management techniques and may increase the use of non-lethal alternatives over that expected in the absence of any WS involvement (Alternative 4). Overall impacts on target species populations would be similar to or slightly higher than Alternative 2 depending upon the extent to which resource managers use the technical assistance provided by WS. However, for the reasons presented in the population effects analysis in section 4.1.1.2, it is unlikely that target native mammal populations would be adversely impacted by implementation of this alternative.

4.1.1.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997 Revised pages 4-9 – 4-14) wherein magnitude is described as, ". . . a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage. Table 4-1 identifies lethal take of animals by WS, proposed maximum annual WS take, and estimated annual harvest by hunters and trappers within the Wisconsin for Calendar Years (CY) 2009 to 2012.

Table 4-1. Annual Wisconsin WS lethal targeted take of mammals addressed in this EA for the period for CY 2009 to CY 2012. Nontarget take listed in parenthesis.

Species	**Average Annual WS Take CY09-CY12**[1] Total / 4-year Average (4-year average Nontarget Take)[3]	**Maximum Proposed WS Annual Take**[1]	**WI Statewide Average Annual Estimated Season Harvest 2009-2012**[2] (averages three harvest seasons totals)	**% WS Proposed Annual Take compared to Average Annual WI Harvest**
13-Lined Ground Squirrel	105 / 26	300	NA	NA
Badger	0	10	NA	NA
Black Bear	55 / 14 (<1)	25	4,466	0.56%
Coyote	73 / 18 (<1)	150	52,390	0.29%
Feral Cat	0	20	NA	NA
Feral Swine	0	200	NA	NA
Gray Fox	0	10	8,943	0.11%
Mink	2 / > 1 (<1)	20	12,986	0.15%
Muskrat	34 / 9 (35)	200	335,678	0.06%
Pocket gophers	0	100	NA	NA
Rabbit, Cottontail	4 / 1	100	105,597	0.09%
Raccoon	27 / 7	100	118,347	0.08%
Red Fox	0	10	7,553	0.13%
River Otter	1 / >1 (79)	10	1,051	0.95%
Squirrel, Fox, Gray, & Red	0	20/each	349,510	0.02%
Striped Skunk	57 / 14 (1)	50	8,776	0.57%
Virginia Opossum	8 / 2	20	18,951	0.11%
Weasels	1 / >1	20 combined	8,326	0.12%
White-tailed deer	410 / 103 (2)	1,000	350,965	0.28%
Woodchuck	6 / 2	20	NA	NA
Misc. mice, shrews, moles & voles	180 / 45	1,000 combined	NA	NA
Captive Cervids	0	As requested	NA	NA

[1] Includes only lethal take, additional animals were targeted and relocated.
[2] Annual harvest from WDNR website for three seasons September 2009 to March 2012. http://dnr.wi.gov/topic/WildlifeHabitat/reports.htm
[3] Nontartget take associated with all Wisconsin WS wildlife damage management programs (USDA 2008, 2013) is provided here to facilitate cumulative impact analysis. Impact of nontarget take is also analyzed in the EAs for the programs where the take occurs (e.g., beaver and wolf damage management). Number does not include animals

captured and released.

Furbearers

In Wisconsin, fur bearing animals include: beaver, mink, muskrat, American marten, fisher, skunk, raccoon, fox, weasel, Virginia opossum, river otter, badger, wolf, coyote, bobcat, cougar, and Canada lynx (Wis. Stat 29.001(30)). General harvest seasons and bag limits are available for the following fur-bearers: muskrat, mink, beaver, otter, raccoon, fox, coyote, fisher and bobcat. (Wisconsin trapping regulations 2012, WDNR.). The following furbearers are protected at all times and have no open season: badger, Canada lynx, cougar, American marten, and wolverine. The WDNR may issue specific permits on a case-by-case basis for the take of badger. In nuisance situations, the landowner or occupant, and any member of his or her family may hunt or trap without license and subject to all other restrictions except seasons, hunt or trap on their property for coyotes, beavers, foxes, and raccoons (s. 29.337(1)). Unprotected furbearers in Wisconsin include: Virginia opossum, skunk, and weasels (NR 10.04, Wis. Admin. Code).

Based upon current requests for assistance and anticipated increases in future requests, WS anticipates that no more than 150 coyotes, 10 gray fox, 20 mink, 200 muskrats, 100 raccoons, 10 red fox, 10 river otter, 50 striped skunks, 20 Virginia opossums, and 20 weasels would be intentionally lethally removed for MDM annually. The proposed maximum targeted take of each of these species by WS is less than 1% of the annual harvest estimated by the WDNR in the state by licensed hunters and trappers (Table 4-1). Wildlife Services cumulative impact on furbearers (intentional take plus unintentional take associated with all other Wisconsin WS program activities; Table 4-1) is less than 1% of annual harvest for all species except river otter. The WDNR monitors and manages take of state native wildlife populations to ensure that licensed harvest and other take do not jeopardize state wildlife populations (Dhuey 2012, Dhuey and Olson 2012). The WS program reports take of native wildlife to the WDNR to aid the state in monitoring impacts on wildlife populations. Given that WS' MDM actions would only be conducted in small portions of the state and are <1% of licensed harvest permitted by the WDNR, the proposed action will have a low magnitude of impact on state populations of coyotes, gray fox, mink, muskrats, raccoons, red fox, striped skunks, Virginia opossums and weasels. While these actions could result in a reduction in the number of furbearers in a local area, the impact is likely to only be temporary because immigration and natural reproduction will result in re-colonization of the site.

Wisconsin WS has a program to reduce damage to property, agricultural and natural resources and risks to human health and safety from beaver (USDA 2013). Non-target take of river otter associated with this program for the period of 2009-2012 has ranged from 6.2 to 13.7% of licensed harvest and 0.86 to 1.1% of the estimated pre-harvest otter population. The intentional take of an additional 10 otter by WS as proposed in this EA would add 0.1 % to the total WS impact on the pre-harvest otter population. Wisconsin Department of Natural resources data indicated that the state otter population declined during the period of 1994-2007 (Rolley and MacFarland 2012). Modeling indicated that the decline was likely attributable to the rate of licensed harvest, so the level of allowable harvest was reduced for the 2008-09 – 2010-2011 harvest seasons. Otter population survey data indicates that the reduced harvest rates in 2007-2011 may be allowing the populations to recover (Rolley and MacFarland 2012). Wildlife Services reports all otter take to the WDNR to aid in population management. Based on the information above,

the WS program has a low level of impact on otter harvest and the river otter population in Wisconsin. While these actions could result in a reduction in the number of otters in a local area, the impact is likely to only be temporary because immigration and natural reproduction will result in re-colonization of the site.

Rabbits

There are nine species of cottontail rabbits in North America, north of Mexico. Wisconsin WS receives complaints about the eastern cottontail, the most abundant and widespread of the rabbits in the U.S. Population densities for cottontail rabbits vary with habitat quality, but one rabbit per 0.4 hectares (one acre) is a reasonable average (Craven 1994). Rabbits live only 12-15 months, but they can raise as many as six litters per year of one to nine young (usually four to six); (National Audubon Society 2000). Cottontails are a regulated game species in Wisconsin and the WDNR has established seasons and bag limits for this species. No statewide population estimates were available for cottontail rabbits, however the WDNR does estimate harvest via hunter surveys. The estimated annual average take of cottontails from 2009-2012 was 105,597 rabbits (Table 4-1).

WS estimates that no more than 100 cottontail rabbits may be taken per year for MDM. This maximum estimated take by WS is 0.09% of the estimated annual take by hunters in the state. Almost all of rabbits would be removed from urban, airport, commercial, or industrial habitats where hunting is not likely to occur. Cottontail rabbit damage management activities would target single rabbits or local populations of the species at sites where their presence was causing unacceptable damage to agriculture, human health or safety, natural resources, or property. Given the high productivity of cottontail rabbits and that WS actions will be confined to very small, scattered portions of the state that are usually not subjected to hunting, WS' limited lethal take of cottontail rabbits would have no adverse impacts on overall rabbit populations in the state.

Tree Squirrels

Fox squirrels, red squirrels, and eastern gray squirrels are the primary species involved in squirrel damage complaints in Wisconsin. For that reason only those three species will be treated in this section. Further reference to "squirrels" as a group in this section will be construed to mean these three species. Gray and fox squirrels are found throughout most of the eastern U. S., including Wisconsin, they inhabit mixed hardwood forests, especially those containing nut trees such as oak/hickory mix. Red squirrels inhabit pine, spruce, or mixed hardwood forests and swamps in the eastern and Rocky Mountain states of the U.S. In Wisconsin, red squirrels generally can be found in the northern two-thirds of state in conifers and mixed hardwoods. Red squirrels are primarily arboreal and agile on branches, however they can be seen walking on the ground as well as swimming in lakes. Mating occurs promiscuously from the mid-January until late September, with two breeding seasons. The gestation period is roughly 38 days, with a four to five young litter average (Jackson 1961).

Gray squirrels produce young during early spring, while fox squirrels have litters around February to early March, but may actually produce at any time until early September (National Audubon Society 2000). Older adults of these three species may produce two

litters per year (Burt and Grossenheider 1980, Jackson, 1994b). The gestation period is 42-45 days, and about three young comprise a litter for both gray and fox squirrels. Young begin to explore outside the nest at about 10-12 weeks of age (Jackson 1994b). Squirrel populations periodically rise and fall, and during periods of high populations they may go on mass emigrations, during which time many animals die. Squirrels are also prey for hawks, owls, snakes, and several mammalian predators. Predation seems to have little effect on squirrel populations. Typically about half the squirrels in a population die each year and wild squirrels over four years old are rare, while captive individuals may live 10 years or more (Jackson 1994b). Gray and fox squirrels are considered small game by the WDNR which has established seasons and bag limits for squirrel hunting. No statewide population estimates were available for squirrels, however, the WDNR does estimate harvest via hunter surveys. The estimated average annual take of gray and fox squirrels from 2009-2012 was 349,510 (Table 4-1).

Based upon an anticipated increase for requests for WS assistance, WS anticipates killing no more than 20 squirrels per species per year for MDM in Wisconsin. This maximum estimated take by WS is 0.02% of the estimated annual take of fox and gray squirrels by hunters in the state. These squirrels would almost always be removed from urban and suburban populations which are not hunted. Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a local project site. Given the widespread and abundant nature of this species, high productivity, low number of squirrels that could be taken by WS relative to the number likely taken by licensed hunters, and the limited amount of area in the state where WS would conduct squirrel damage management activities, WS' lethal take of squirrels would not adversely impact gray, fox, and/or red squirrel populations in Wisconsin.

Woodchucks

The WDNR is responsible for the management of the states woodchuck population but does not conduct population census for woodchucks. Woodchucks have one litter a year that ranges from two to six young. Woodchucks breed at age one and live four to five years Mating occurs March through April with a month long gestation period. Only one litter a year is produced with an average of five kits (Jackson 1961). Woodchucks may be found statewide (WDNR undated), and are a protected species in Wisconsin. However, when woodchucks cause damage or in nuisance situations, the landowner or occupant, and any member of his or her family may hunt or trap without license them year-round (s. 29.337(1)). WS does not anticipate taking more than 20 woodchucks per year. Given the productivity of the species and the limited and localized nature of WS' actions, WS lethal removal of woodchucks for MDM will not adversely impact woodchuck populations.

Badgers

Badgers are extremely efficient at digging after prey and creating burrows. The excavated holes can present potentially hazardous conditions for livestock in pasturelands. Additionally, badger diggings can cause unstable conditions in crop fields, turf and landscaping, dams, and/or airports. Information on the statewide population status of badgers is limited, however, WDNR field staff record field observations of badgers and road kills. In 2012, field personnel recorded 0.49 badgers per respondent,

below the long term average of 0.63 observations and there appears to be a slight decreasing trend in observations for the period of 1999-2011 (Kitchell 2012). Prior to protection in 1955, badgers were trapped with WDNR estimated harvests ranging from 128 to 4,597 animals.

The badger has been designated as the state animal for Wisconsin since 1957. Badgers are protected in the state, however, the WDNR may issue specific permits on a case-by-case basis for the take of badger. WS requests for assistance with badger management will give preference to live capture methods and coordination with the WDNR to relocate problem animals. However, in situations where live capture and removal is not practical or ineffective, lethal removal of a limited number of badgers may be needed to resolve a damage situation. Based upon an anticipated increase for requests for WS assistance, WS anticipates killing no more than 10 badgers per year for MDM in Wisconsin. Based upon the above information, WS limited lethal take of badgers may cause a temporary reduction at the specific local sites where WS works, but would have no adverse impacts on overall populations of the species in Wisconsin (Adrian Wydeven and John Olson, personal communication, November 5, 2009).

Black bear

During CY 2002-2012, WS received 13,277 requests for assistance, 8,649 (65%) were handled with technical assistance, and 4,628 (35%) were handled with direct operational assistance. A total of 6,870 bears were captured, relocated or freed, and 90 were euthanized (WS Management Information System [MIS] 2002-2012). Lethal removal was used for bears that were highly habituated to humans, aggressive, sick or injured, when bears entered inhabited dwellings, or depredated livestock. Technical assistance included personal consultations, written or telephone consultations, and literature on bear management. Direct control included capturing bears in culvert traps or foot snares, installation of non-lethal abatement equipment (e.g., electric fencing), and euthanasia of bears via shooting or euthanasia drugs.

Kapp (2005) summarized efficacy of translocating black bears in Wisconsin for conflict abatement. Of 587 marked individuals, 38 black bears were recaptured during the same year. Homing tendencies were a function of month captured, age, sex, and translocation distance. Kapp (2005) summarized that moving black bears more than 45 miles did not significantly decrease homing tendencies for black bears in Wisconsin. However, McLaughlin et al. (1981) stated that relocated black bears, regardless of distance moved, generally decreased their nuisance behavior. See Appendix C of the EA for additional review of black bear relocation efficacy.

Data on the number of bear damage and nuisance complaints received by WS and the type of assistance provided by WS is provided in Table 4-2. Bear complaints have been relatively stable, with WS placing emphasis on providing technical assistance to the public on how to resolve complaints without trapping and relocating or killing bears. However, there has been an increase in the number of bears captured annually to resolve agriculture damage (53%) and nuisance (39%) complaints (Table 4-3). Increased capture rates may be attributable to combination of factors which include variable crop prices, an increasing bear population, drought (limited natural forage production) or increased

density of human dwellings. The number of bears intentionally killed by WS per year (1-15 bears per year) has been very low relative to the number of complaints (997-1,383 complaints per year) and the number of bears relocated.

Table 4-2. Number of black bear damage and nuisance complaints in Wisconsin for 2002-2012 and Wildlife Services response to the complaints.

Calendar Year	Total Complaints Received by WS	Complaints that received only Technical Assistance (% of Total)	Complaints that received technical and operational assistance (% of Total)
2002	1,296	960 (74)	336 (26)
2003	1,339	914 (68)	425 (32)
2004	1,296	882 (68)	414 (32)
2005	1,003	664 (66)	339 (34)
2006	1,107	686 (62)	421 (38)
2007	1,193	699 (59)	494 (41)
2008	1,383	901 (65)	482 (35)
2009	1,301	852 (65)	449 (35)
2010	1,299	857 (66)	442 (34)
2011	997	609 (61)	388 (39)
2012	1,063	625 (59)	438 (41)
Total	**13,277**	**8,649 (65)**	**4,628 (35)**

Table 4-3. Black bears captured by Wildlife Services in Wisconsin to protect agricultural resources and property or to reduce nuisance complaints and risks to human health and safety, 2002-2012

Calendar Year	Agriculture	Property	Nuisance Human Health & Safety	Total
2002	220	42	137	399
2003	256	48	242	546
2004	276	29	287	592
2005	240	41	201	482
2006	479	54	196	729
2007	382	45	336	763
2008	359	49	320	728
2009	266	83	257	606
2010	481	53	276	810
2011	336	40	184	560
2012	355	48	275	678
Total	**3,650**	**532**	**2,711**	**6,893**

Wildlife Services estimates that no more than 25 bears would be intentionally killed per year while implementing the MDM program (Alternative 2). During the 2002 – 2012

timeframe, the most bears intentionally taken in a given year by WS was 14. Fourteen bears were intentionally euthanized each year by WS in 2009, 2010, and 2012. Including unintentional take (bears killed by WS while implementing other wildlife damage management projects), fifteen bears were killed in 2009. Comparing the year with the greatest number of bears killed by WS (both intentional and unintentional) to the estimated population in 2009, WS killed 0.07% of the estimated black bear population that year. During most years a percentage of bears euthanized have been struck by vehicles and would have died. Wildlife Services' total take has been less than 0.4% of the take by licensed hunters.

Published data indicates that relocation does not greatly increase natural mortality among bears ≥ 2 years old (Rogers 1986). Harger (1970) found a similar mortality pattern of relocated (41%) and non-relocated bears (38%), suggesting that relocation did not increase natural mortality of black bear in Michigan. Alt et al. (1980) and McLaughlin et al. (1981) in Pennsylvania, and Massopust and Anderson (1984) in Wisconsin reported similar results. Furthermore, Rogers (1986) indicated that relocated black bears typically leave release sites within a few days and move widely, whether they return home or not, indicating that they should impact resident bears similar to dispersing bears or bears foraging naturally outside of their usual ranges.

Black bear harvest and population information indicate that the black bear population in Wisconsin has been healthy and slowly increasing since the early 1990s. (Rolley and Worland 2009). The 2009 WDNR pre-hunt black bear population estimate was 21,500 bears, up from an estimated 21,450 bears in 2008 (Rolley and MacFarland 2012). The 2008 and 2009 population estimates are substantially higher than the bear population estimates used in the last USDA WS Bear Damage Management EA that was completed (11,300 bears in 2002). Much of this difference appears to be related to a change in the methods used to estimate the Wisconsin bear population. The University of Wisconsin-Madison (UWM) began a cooperative research project with the WDNR and the Wisconsin Bear Hunters Association in 2006 to assess the bear population using a Mark-Recapture technique. Preliminary analysis of these data suggests the black bear population was underestimated and a new population estimate using new data may double the black bear population (http://www.dnr.state.wi.us/news/DNRNews_article_Lookup.asp?id=748). After review of the study data the WDNR adjusted the 2008 bear population up from 13,050 bears to 21,450 bears. The Wisconsin black bear population appears to be expanding its range into southern Wisconsin and more populated areas. Consequently, the WDNR increased the number of harvest permits recently by >50% which is intended to stabilize or reduce the statewide bear population.

During 2012, the WDNR estimated that there were approximately 22,350 black bears in Wisconsin (Rolley and MacFarland 2012). During the 2012 black bear harvest season, 4,646 black bears were harvested in Wisconsin, (Dhuey et al. 2013). WS euthanized 1.9% of the black bears captured in CY2012. Compared to the WI black bear population 0.06% of the statewide black bear population was euthanized for damage management. In CY2012, WS may have captured approximately 3.0% of the statewide black bear population. There are no anticipated adverse effects to the statewide black bear population. WDNR black bear population survey data indicate the black bear population

in portions of northern Wisconsin has declined in response to higher harvests since 2009 while the population in central Wisconsin continues to increase (Rolley et al. 2013).

The WS maximum annual take of black bears of 25 bears per year is less than 1% of the statewide legal harvest of during 2008-12 and approximately 0.1% of the estimated statewide black bear population. Given the very small number of bears euthanized, WS activities would not adversely impact the state black bear population or black bear hunting opportunities.

Other Rodents and Insectivores

Native Species: Rodents (mice, voles, pocket gophers, thirteen-lined ground squirrels, etc.) and insectivores (shrews and moles) are taken by WS during wildlife hazard management, assessment, and monitoring at airports and airbases because these species serve as attractants to birds such as raptors and mammalian carnivores, which create direct hazards to aircraft. Additionally, these species may be taken in orchards and other cultivated areas to reduce damage to agricultural resources, such as apple trees and in or near parks, and other structures to protect human health and safety

Native rodents which may be the target of WS monitoring and operational activities at airports and other locations include the meadow vole, prairie vole, deer mouse, white-footed mouse, pocket gopher, and thirteen-lined ground squirrel. Insectivores which may be the target of WS activities at airports and other locations include Eastern mole, short-tailed shrew, and masked shrew. The following species are very prolific: meadow vole (up to 17 liters annually, typically 4-5 young per liter), white-footed mouse (multiple liters, five young each), deer mice (3-4 liters, 4-6 young each), and short-tailed shrews (two to three liters with 5 to seven young each) (Godin 1977). Eastern moles, thirteen-lined ground squirrels, and pocket gophers have one or two liters per year: Eastern mole (two to five young each), thirteen-lined ground squirrels (usually one litter per year, seven to 10 young), pocket gopher (usually one litter per year, with an average of three to four young) (Godin 1977, Burt and Grossenheider 1980, National Audubon Society 2000). Large population fluctuations are characteristic of many small rodent populations.

The primary method of lethal take for these species by WS would be trapping. Removal of these species by WS would be done at specific isolated sites (e.g., airports, orchards, etc.). Impacts of the levels of take listed in table 4-1 to rodent and insectivore populations would be minimal due to the species' relatively high reproductive rates and because rodent/insectivore damage management recommended and conducted by WS would be at a limited number of specific local sites within the range of these species. Based upon the above information, WS limited lethal take of small rodents may cause temporary reductions at the specific local sites where WS works, but would have no adverse impacts on overall populations of the species in Wisconsin.

Non-native Species: House mice are not native to North America and were accidentally released into this country. In the wild, the impact of this species is seen by many as entirely detrimental (Burt and Grossenheider, 1980). Executive Order 13112 B Invasive

Species directs Federal agencies to use their programs and authorities to prevent the spread of or to control populations of invasive species that cause economic or environmental harm, or harm to human health. Although removal of this species up to and including extirpation could be seen as desirable, because of the productivity and distribution of the species and the limited nature of WS work, WS is unlikely to ever do more than limit populations at specific local sites. In addition, WS working under the Rural Development, Agriculture Act of 1988, (Public Law 100 – 202, 7 USC 426c) states, " On and after December 22,1987, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreement….". Therefore, WS would not conduct any urban rodent control associated with private residences or businesses. "Urban" in this case is defined as various municipalities that are greater than 50,000 in population. Based on the above information and WS limited lethal take of rodents and insectivores in Wisconsin, WS should have minimal effects on statewide rodent populations.

Feral Swine

Feral swine are a non-native species primarily found in the southwestern portion of the state. The WDNR considers feral swine as an invasive species and does not track harvest or population densities of feral swine. However, the WDNR does track citizen observations and has received reports of feral swine scattered throughout Wisconsin. Feral swine are an unprotected species that the WDNR has deemed a threat to natural as well as agricultural resources. There is a continuous open hunting season and no harvest limits, however, hunters are required to possess a small game license while landowners may shoot feral swine on their own property without a license. The WDNR promotes the removal of feral swine wherever they may be encountered.

Currently, WS assists the WDNR, Wisconsin Department of Agriculture Trade and Consumer Protection, Division of Animal Health and USDA APHIS Veterinary Services with feral swine disease surveillance through the USDA APHIS Comprehensive Feral Swine Disease Surveillance Program. Samples are collected opportunistically from animals killed by hunters or limited agency trapping efforts. Management of conflicts associated with feral swine are being addressed in this EA so that WS may provide more comprehensive assistance to land managers and/or State of Federal agencies in minimizing the impacts of this non-native species on people, livestock, and ecosystems in the state. Wildlife Services could be requested to assist with the removal of feral swine either for the reduction of damage caused by feral swine to agricultural and natural resources, for reduction of risks to human health and safety, or for the purpose of disease surveillance and management. Based upon current and anticipated increases in future work, it is anticipated that not more than 200 feral swine would be killed annually by WS in Wisconsin. Feral swine often have negative impacts on the environment. Therefore, these animals are considered by many wildlife biologists to be an undesirable component of North American wild and native ecosystems. Any reduction in feral swine populations, including eradication, could be considered a beneficial impact to the environment. Executive Order 13112 - Invasive Species directs Federal agencies to use their programs and authorities to prevent the spread of or to control populations of invasive species that cause economic or environmental harm, or harm to human health. Although a reduction in the number of feral swine may be desirable, the proposed level of feral swine control is unlikely to result in more than a temporary reduction of feral swine

numbers at specific sites.

Feral Cats

Feral cats are house cats living in the wild. Cats are found in commensal relationships wherever people are found. In some urban and suburban areas, cat populations equal human populations. Feral cats produce two to 10 kittens during any month of the year. An adult female may produce three litters per year where food and habitat are sufficient. Cats are opportunistic predators and scavengers that feed on rodents, rabbits, shrews, moles, birds, insects, reptiles, amphibians, fish, carrion, garbage, vegetation, and leftover pet food (Fitzwater 1994). Where it has been documented, the impact of feral cats on wildlife populations in suburban and rural areas, directly by predation, and indirectly by competition for food, has been enormous (Coleman and Temple 1989). In the United Kingdom, one study determined that house cats may take an annual toll of some 70 million animals and birds (Churcher and Lawton 1987). Scientists with the Smithsonian Institution and the U.S. Fish and Wildlife Service estimate that cats kill 2.4 billion birds and 12.3 billion mammals in the contiguous United States every year (Nolen 2013). In addition, feral cats serve as a reservoir for human and wildlife diseases, including cat scratch fever, distemper, histoplasmosis, leptospirosis, mumps, plague, rabies, ringworm, salmonellosis, toxoplasmosis, tularemia, and various parasites (Fitzwater 1994). The International Union for Conservation of Nature, an environmental advocacy organization, lists the domestic cat among the world's 100 worst invasive alien species because of the danger they pose to native wildlife populations (Nolen 2013).

When conducting feral cat management projects, WS will give preference to live capture methods. Live-captured cats will be given to local animal shelters and/or animal control offices when practical. Lethal control will not be used on cats bearing obvious identification (e.g., collars). Although preference will be given to live-capture methods, based on current and anticipated requests for assistance with feral cat management, WS estimates that up to 20 feral cats may be lethally removed by WS per year. Wildlife Services will only use AVMA approved euthanasia measures for lethal removal of cats. Most nonlethal or lethal removal of cats would be conducted for projects protecting human health and safety, valuable wildlife, or captive birds and other animals. The proposed lethal take of cats is insignificant to the total population of this species in the state. In metropolitan areas of Wisconsin, animal control officers capture and remove many feral cats each year. Nationwide, the Humane Society of the United States estimates that between three and four million cats are euthanized in shelters each year. Any MDM involving lethal control actions by WS would be restricted to isolated individual sites. Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a specific site. In those cases this would be considered a beneficial impact on the environment because these species are not considered part of the native ecosystem. However, given the reproductive capacity of feral cats and the limited and localized nature of WS' proposed actions, WS' limited lethal removal of feral cats is unlikely to reduce overall populations of this species in Wisconsin.

White–tailed deer

The WDNR manages free-ranging white-tailed deer as a protected game species with many restrictions on their management and harvest WAC NR 10.10, WAC NR 10.103, WAC NR 10.104). The WDNR collects and compiles information on white-tailed deer population trends, sport harvest, and other known mortality, and uses this information to manage for sustainability and healthy deer populations. Free-ranging white-tailed deer populations have remained healthy and viable in Wisconsin and population monitoring continues to insure harvestable and viable populations. The WDNR uses a number of strategies to manage for a healthy deer herd (WDNR 2003) and this information has been considered in the analysis of potential impacts of WS' activities on Wisconsin's free-ranging deer herd.

The population of free-ranging deer in Wisconsin is continually fluctuating. It was conservatively estimated that there were 1.2 to 1.8 million huntable deer in each year from 2005 to 2012 (WDNR 2013). These estimates are determined by the WDNR using pre-harvest data and population modeling. The potential cumulative adverse effects from WS' current and proposed program to reduce damage/threats to human health and safety, crops, property and natural resources caused by free-ranging deer would be very minimal. Because white-tailed deer numbers are considered healthy across the state, the statewide population would not be substantially diminished by local WS damage management activities. A WS take of a 1,000 deer, as analyzed in this EA, would be 0.28% of the three year annual average of the Wisconsin deer harvest. In most years, average annual take is expected to be well below the maximum of 1,000 deer. For example, for the period of CY 2009-2012, average annual take of free-ranging white-tailed deer was 103 deer per year. Higher levels would be most likely to occur in situations where there is a disease outbreak such as the detection of bovine TB in deer in Minnesota, or where there is a need to remove/reduce high concentrations of deer from an island or fenced area.

Although the MDM program is not expected to have a substantial impact on deer populations, there may, situations such as deer removal from islands to protect native habitat or the take of deer from industrial facilities that have deer contained within a formidable fence, where very small and localized populations are substantially reduced. Such actions would only be conducted in accordance with landowner management objectives and authorization by the WDNR and tribes as appropriate.

Deer removal efforts may also be conducted for heard health. The removal of diseased free-ranging deer would ultimately make for a healthier population where deer would readily re-establish in locations where habitat exists. Successful suppression of deer diseases that are easily transmitted would benefit deer populations in the long term and would protect the interests of concerned groups (hunters, wildlife watchers, wildlife managers, and captive cervid owners; WDNR 2003).

During CY 2005-2012, WS received 5,680 requests for assistance, 1,425 (25%) were handled with technical assistance only, and 4,245 (75%) were handled with both technical and direct operational assistance (WS Management Information System [MIS] 2005-2012). Technical assistance included personal consultations, written or telephone consultations, and literature on deer management. The majority of the complaints involved agricultural damage and WS' involvement with the Wisconsin Wildlife Damage Abatement and Claims Program. Much of the operational work conducted involved

assessing crop damage. Deer complaints have been relatively stable. Data on the number of deer damage and nuisance complaints received by WS and the type of assistance provided by WS is provided in Table 4-4.

During 2005 -2012, white-tailed deer were primarily removed at airports to protect human health and safety, and to reduce natural resource damage, and for disease purposes (CWD) (Table 4-5).

Table 4-4. Number of deer damage complaints in Wisconsin for 2005-2012 and Wildlife Services response to the complaints.

Calendar Year	Total Complaints Received by WS	Complaints that received only Technical Assistance (% of Total)	Complaints that received technical and operational assistance (% of Total)
2005	840	195 (23%)	645 (77%)
2006	638	123 (19%)	515 (81%)
2007	641	138 (21%)	503 (79%)
2008	779	209 (27%)	560 (73%)
2009	699	208 (30 %)	491 (70%)
2010	691	193 (28%)	498 (72%)
2011	738	165 (22%)	573 (78%)
2012	654	194 (30%)	460 (70%)
Total	**5,680**	**1,425 (25%)**	**4,245 (75%)**

Table 4-5. White-tailed deer removed by Wildlife Services in Wisconsin to protect natural resources, disease related (captive cervids) and risks to human health and safety (airports), 2005-2012.

Calendar Year	Captive Cervides	Natural Resource Protection	Human Health & Safety (Airports)	Total
2005	52	0	9	61
2006	80	0	93	173
2007	0	0	26	26
2008	85	0	83	168
2009	0	59	31	90
2010	0	68	42	110
2011	0	26	79	105
2012	0	53	52	105
Total	**217**	**206**	**415**	**838**

WS estimates that no more than 1,000 white-tailed deer would be intentionally killed per year while implementing the MDM program (Alternative 2). During the 2005 – 2012 timeframe, the most deer intentionally taken in a given year by WS was 173. Including unintentional take (deer killed by WS while implementing other wildlife damage management projects Table 4-6), WS never exceeded 173. Comparing the year with the greatest number of free ranging deer killed by WS, 110 in 2010 and also in 2012 (both

intentional and unintentional) to the estimated population in 2012, WS killed 0.007% of the estimated pre-hunt free-ranging white-tailed deer population that year. A take of 1000 deer, as analyzed in this EA, would have totaled .06% of the population.

Captive cervids

The WDNR or WDATCP periodically contacts WS to request assistance in killing captive cervides for disease monitoring and management, law enforcement purposes, or human health and safety reasons. A variety of captive cervides have been removed from more than ten farms since 1999. Captive cervid damage management would only be conducted with written authorization from the resource owner and/or WDNR or WDACTCP. Removal of captive cervides would not have a negative impact on the native deer population or affect regular hunting opportunities.

4.1.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would not intentionally take any target mammal species because no lethal methods would be used. Although the methods employed by WS would not be intended to result in the death of the animal, some methods such as live capture and anesthesia can result in injury or death of target animals despite the training and best efforts of management personnel. This type of take is likely to be limited to a few individuals and would not adversely impact populations of any species.

Although WS lethal take of mammals would not occur, as with Alternative 1, it is likely that without WS conducting some level of lethal MDM activities for these species, private MDM efforts would increase. Cumulative impacts on target species populations would be variable depending upon actions taken by affected landowners/resource managers and the level of training and experience of the individuals conducting the MDM. Some individuals experiencing damage may take illegal or unsafe action against the problem species either unintentionally due to lack of training, or deliberately out of frustration of continued damage. In these instances, more target species may be taken than with a professional MDM program (Alternatives 2). Ready access to WS assistance with non-lethal MDM may decrease private efforts to use lethal techniques. Therefore, take of target species may be less than anticipated with Alternatives 1 and 4. Overall impacts on target species populations would be similar to or slightly higher than Alternative 2 depending upon the extent to which resource managers use the assistance provided by WS. However, for the reasons presented in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative.

4.1.1.4 Alternative 4: No Federal WS Mammal Damage Management

Under this alternative, WS would have no impact on target mammal populations in the State. Private efforts to reduce or prevent depredations would likely increase. As with Alternatives 1 and 3, cumulative impacts on target species populations would be variable, depending upon actions taken by affected landowners/resource managers, and the level of

training and experience of the individuals conducting the MDM. Impacts on target species are likely to be similar to or slightly higher than Alternative 2. Because resource owners/managers would not have access to WS direct MDM assistance or, at least, technical assistance, impacts may be greater than Alternatives 1 and 3. For the same reasons shown in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative.

4.1.2 Effects on Other Wildlife Species, including T&E Species

4.1.2.1 Alternative 1: Technical Assistance Only

Effects on Non-target (non-T&E) Species: Under this alternative, WS would not conduct direct MDM activities, and would not take any non-target species. Only technical assistance and self-help information would be provided. The WDNR or other natural resource management entities may have to re-allocate staff time and resources for any projects to protect threatened, endangered and rare birds that would otherwise be conducted by WS. Although technical support might lead to more selective use of control methods by private parties than that which might occur under Alternative 4, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods. This may result in greater risks to non-target wildlife than under the proposed action. It is hypothetically possible that frustration caused by difficulties in addressing wildlife damage problems could lead to use of illegal methods like chemical toxicants which could result in unknown primary (i.e., direct consumption) risks to non-target species populations and increased risks of secondary toxicity (e.g., feeding on animals that had eaten toxicants) to scavengers and predators.

Effects on T&E species: WS will not have any direct impact on T&E species. Risks to T&E species from increased private efforts to address damage management problems will vary depending upon the training and level of experience of the individual conducting the MDM. As stated above, frustrated individuals may resort to use of unsafe or illegal methods like poisons which may increase risks to other listed species. Risks to T&E species may be lower with this alternative than with Alternative 4 because WS could advise individuals as to the potential presence of state and federally - listed species in their area and could facilitate consultation with the appropriate agency.

4.1.2.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Effects on Non-target (non-T&E) Species: WS activities proposed under this alternative would not involve the destruction or alteration of wildlife habitat and will not impact critical habitat for any species. In the event that WS recommends habitat modification (e.g., modifying a wetland, removing trees attracting birds to an airport) as a damage management practice for the landowner/manager, WS will advise the landowner/manager that they are responsible for checking with state and federal authorities regarding regulations and endangered species protections that may be applicable to the proposed project.

Direct impacts on non-target species could occur if WS program personnel were to inadvertently kill, injure, or harass animals that are not target species. In general, these impacts result from the use of methods that are not completely selective for target species. Non-target species are usually not affected by WS's non-lethal management methods, except for the occasional scaring from harassment devices. In these cases, affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action.

Wildlife Services personnel are experienced and trained in wildlife identification, and to select the most appropriate methods for taking targeted animals and excluding non-target species. Shooting is virtually 100% selective for the target species; therefore no adverse impacts are anticipated from use of this method. Wildlife Services personnel use animal lures and set traps and snares in locations that are conducive to capturing target animals while minimizing potential impacts to non-target species. Any non-target species captured would be subsequently released on site unless it is determined by the WS Specialist that the animal will not survive.

Wildlife Services' SOPs would require compliance with pesticide label directions and use restrictions, and establish training requirements for all employees applying pesticides as built-in measures to assure that use of registered chemical products does not result in significant adverse effects on non-target species populations. The only pesticides proposed for use or recommendation under this alternative are nonlethal repellents. These products have undergone considerable environmental review through EPA and State registration processes, which means they have been found to present no unreasonable risk to the environment or human health and safety when used according to label directions. Standard operating procedures designed and implemented to avoid adverse effects on non-target species are described in Chapter 3.

Non-target species such as bobcats, raccoons, and skunks may occasionally be captured in traps and snares. Healthy, uninjured non-target animals that are captured would be released at the capture site. A small number of non-target animals have been captured and killed by Wisconsin WS annually (Table 4-4). This level of take is unlikely to adversely impact populations of these species. As stated above in the section on target species take, muskrat, mink, beaver, river otter, raccoon, fox, coyote, fisher and bobcat can be taken by licensed hunters and trappers (Table 4-1) and WS' take is low relative to the estimated licensed harvest of these species. Wildlife Services non-target take of muskrats and river otters occurs primarily as a result of WS beaver trapping activities and are addressed in the Beaver EA. Wildlife Services anticipates minimal non-target take of muskrats and/or river otter take during MDM activities addressed in this EA. Wildlife Services does not expect the rate of WS non-target species take to substantially increase above current or past program levels under the proposed action. Wildlife Services has concluded that the level of non-target animals killed by the Wisconsin WS program would have no adverse effects on any native wildlife species population in Wisconsin.

Under this alternative, WS would use helicopters to identify where feral swine exist and remove feral swine. There have been concerns that the use of aircraft might disturb other wildlife species populations to the point that their survival and reproduction might be adversely affected. White-tailed deer, wild turkey, and other wildlife may be seen during

aerial surveillance. When used for surveillance, helicopters are likely to make a single pass through an area on a given day. In areas with swine, aircraft would be in the area longer to remove feral swine than for surveillance but the time spent on any given property will be minimal and limited to several hours per year. Overall duration and frequency of flights in an area is not expected to be sufficient to constitute a "chronic" disturbance as discussed below. Wildlife Services would not conduct aerial sharpshooting in the vicinity of active Bald Eagle nests or eagle roosting and feeding congregations. Wildlife Services specialists must have a clear view of the animal before shooting, so the risk of shooting a non-target animal is negligible.

A number of studies have looked at responses of various wildlife species to aircraft overflights. The National Park Service (1995) reviewed studies on the effects of aircraft overflights on wildlife. The report summarized a number of studies have documented responses by certain wildlife species that suggest adverse impacts might occur. Few, if any studies, have proven that aircraft overflights cause significant adverse impacts on populations, although the report stated it is possible to draw the conclusion that impacts to wildlife populations are occurring. It appears that some species will frequently or at least occasionally show adverse responses to even minor overflight occurrences. In general, it appears that the more serious potential impacts occur when overflights are frequent such as hourly and over long periods of time which represents "chronic exposure." Chronic exposure situations generally involve areas near commercial airports and military flight training facilities.

Several examples of wildlife species that have been studied with regard to low-level flights are available in the literature. Grubb et al. (2010) evaluated golden eagle response to civilian and military (Apache AH-64) helicopter flights in northern Utah. Study results indicated that golden eagles were not adversely affected when exposed to flights ranging from 100 to 800 meters along, towards and from behind occupied cliff nests. Eagle courtship, nesting and fledging were not adversely affected, indicating that no special management restrictions were required in the study location.

It was reported that low level overflights of 2-3 minutes in duration by a fixed-wing airplane and a helicopter produced no "drastic" disturbance of tree-nesting colonial waterbirds, and, in 90% of the observations, the individual birds either showed no reaction or merely looked up (Kushlan 1979). Conomy et al. (1998) quantified behavioral responses of wintering American black ducks (*Anas rubripes*), American wigeon (*A. americana*), gadwall (*A. strepera*), and American green-winged teal (*A. crecca carolinensis*) exposed to low-level flying military aircraft in North Carolina and found that only a small percentage (2%) of the birds reacted to the disturbance. They concluded that such disturbance was not adversely affecting the time-activity budgets of the species. Krausman et al. (1986) reported that only 3 of 70 observed responses of mule deer to small fixed-wing aircraft overflights at 150 to 500 feet above ground resulted in the deer changing habitats. These authors felt that the deer may have been accustomed to overflights because the study area was near an interstate highway which was followed frequently by aircraft.

Krausman et al. (1983) reported that, in 32 observations of the response of bighorn sheep to low-level flights by small fixed-wing aircraft, 60% resulted in no disturbance, 21% in "slight" disturbance, and 19% in "great" disturbance. However, in this study, researchers

made up to 10 passes directly above the surveyed animal which is a much higher level of impact than the limited flights that WS would make focusing on the swine. When Krausman et al. (1986) evaluated the effects of simulated low-altitude jet aircraft noise on desert mule deer (*Odocoileus hemionus crooki*) and mountain sheep (*Ovis canadensis mexicana*), they found that heart rates of the ungulates increased according to the dB levels, with lower noise levels prompting lesser increases. When they were elevated, heart rates rapidly returned to pre-disturbance levels suggesting that the animals did not perceive the noise as a threat. Responses to the simulated noise levels were found to decrease with increased exposure. Fancy (1982) reported that only 2 of 59 bison (Bison bison) groups showed any visible reaction to small fixed-wing aircraft flying at 200-500 feet above ground. The study indicated bison are relatively tolerant of aircraft overflights. Andersen et al. (1989) conducted low-level helicopter overflights directly at 35 red-tailed hawk (*Buteo jamaicensis*) nests and concluded their observations supported the hypothesis that red-tailed hawks habituate to low level flights during the nesting period. Their results also showed similar nesting success between hawks subjected to such overflights and those that were not. White and Thurow (1985) did not evaluate the effects of aircraft overflights, but showed that ferruginous hawks (*B. regalis*) are sensitive to certain types of ground-based human disturbance to the point that reproductive success may be adversely affected. However, military jets that flew low over the study area during training exercises did not appear to bother the hawks, and neither were they alarmed when the researchers flew within 100 feet in a small fixed-wing aircraft (White and Thurow 1985). White and Sherrod (1973) suggested that disturbance of raptors by aerial surveys with helicopters may be less than that caused by approaching nests on foot. Ellis (1981) reported that 5 species of hawks, 2 falcons, and golden eagles were "incredibly tolerant" of overflights by military fighter jets, and observed that, although birds frequently exhibited alarm, negative responses were brief and never limiting to productivity. Further reassuring, the considerable analyses of the Air National Guard (1997a, 1997b) show that, despite considerable research on numerous wildlife species, no scientific evidence exists that indicates any substantive adverse effects on wildlife populations will occur as a result of any of the types of low-level or other overflights that do or may occur.

Table 4-6: Wisconsin WS non-target capture and take for FY2009-2012 associated with all mammal projects where the species is listed as intentional in this EA.

	FY 2009		**FY 2010**		**FY 2011**		**FY 2012**	
	Killed	**Freed**	**Killed**	**Freed**	**Killed**	**Freed**	**Killed**	**Freed**
Black bears	0	1	0	0	0	0	0	0
Bobcats	0	1	0	0	0	0	0	0
Fisher	1	0	0	0	0	0	0	0
Frog/toad	3	1	0	0	0	0	0	0

Gray catbird	1	0	0	0	0	0	0	0
Raccoons	2	20	0	31	0	34	0	42
Red squirrel	0	0	0	0	0	0	0	0
River Otter	0	1	0	0	0	0	0	0
Savannah sparrow	1	0	0	0	0	0	0	0
Striped Skunk	0	9	0	1	0	3	0	1
Virginia Opossum	0	1	0	1	0	0	0	0

Effects on T&E species: Wildlife Services' MDM activities will not have a substantive impact on wildlife habitats including areas designated as critical habitat for federally-listed species. The primary risk to state and federally-listed species from these methods is the risks of injury and death of animals accidentally caught in capture devices intended for other species and temporary disturbance associated with frightening devices and aircraft use. Wildlife Services has consulted with the WDNR and USFWS regarding the impacts of the proposed action on state and federally listed threatened and endangered species.

Mammals: American marten (*Martes americana*) and Canada lynx (*Lynx canadensis*) are listed as state and/or federally threatened or endangered in Wisconsin. Those methods utilized by WS which could result in incidental capture, injury or even death of American marten include foothold traps, foot snares, cable restraints, and body gripping traps (Conibears). Each of these methods has varying degrees of selectivity and each carries a differing likelihood of risk to non-target animals. The low likelihood of occurrence of the species in the action area, the fact that wildlife damage control activities are not generally conducted in habitats utilized by American marten and Canada lynx, and the targeted control methods utilized by WS, makes the likelihood of an incidental capture extremely low.

Birds: Piping plovers (*Charadrius melodus* - endangered) Wisconsin WS has previously been requested to provide assistance with predator removal to protect nesting plovers. These types of activities have the potential to disturb nesting birds. Wisconsin WS consults with the USFWS prior to initiating work and implement all recommendations for the protection of plovers. Consequently, the proposed MDM program may affect but is unlikely to adversely affect piping plovers.

The experimental non-essential population of whooping cranes (*Grus Americanus*) resides in Wisconsin during spring through the fall. The use of frightening devices in mammal damage management is not likely to disrupt Whooping cranes because of the infrequent use. Use of frightening devices may cause migrating cranes to choose other sites, but again, given that frightening devices are only used in a very rarely for mammal damage management there should not be any impact. However, WS will remain in contact with the USFWS regarding the status of whooping cranes in Wisconsin. Wildlife Services will adjust recommendations and use of frightening devices to avoid breeding cranes as needed. Based on this evaluation, WS' proposed MDM methods may affect but are unlikely to adversely affect whooping cranes.

Plants**:** Wildlife Services does not anticipate conducting habitat management in areas where state or federally-listed plants may occur. Risks of WS personnel trampling on or otherwise crushing state-listed plants are low. Where possible, WS personnel utilize available trails and roads to minimize impacts on vegetation. Feral Swine can cause substantial damage to native plants and ecosystems (Campbell and Long 2009, West et al. 2009). Removal of feral swine can have beneficial impacts on threatened and endangered plants. Given the above information, the proposed action may affect, but is unlikely to adversely affect state and federally listed plants.

The WS program in consultation with the USFWS and WDNR has determined that the

proposed action will have no effect on all other state and federally-listed Threatened and Endangered species.

Wisconsin WS will adhere to all applicable reasonable and prudent measures and terms and conditions for the protection of state and federally-listed Threatened and Endangered Species established in consultations with the WDNR and USFWS (Letter from USFWS, September 18, 2013 and letter from WDNR, November 12, 2013). Based on the above analysis, WS concludes that the proposed action will not adversely impact the state populations of T&E birds and reptiles.

Potential for Adverse Environmental Impacts from Aircraft Accidents.
In other environmental analyses, WS has received questions about the potential for adverse environmental impacts resulting from an aircraft accident. Although risk of an aircraft accident is very low, accidents have occurred. The following information was collected to address this issue.

Aviation fuel is extremely volatile and will evaporate within a few hours or less to the point that even its odor cannot be detected. Thus, there should be no environmental hazard from unignited fuel spills. The quantities involved in WS aircraft accidents are small (10-30 gallons). In some cases, not all of the fuel is spilled.

Regarding oil and other fluid spills, the aircraft owner or his/her insurance company is responsible for cleanup of spilled oils and other fluids if required by the owner or manager of the property on which the accident occurred. In the case of Bureau of Land Management, Forest Service, and National Park Service lands, the land managing agency generally requires that contaminated soil be removed and disposed of in accordance with state and federal regulations. In most accidents involving private property, the property owner is generally not concerned about the quantities of spilled oil involved in these types of accidents and has not requested or required clean-up. With the size of aircraft used by WS, the quantities of oil capable of being spilled in any accident are small and insignificant with respect to the potential for environmental damage from the 3-5 quarts of oil in turbine engines.

Petroleum products biodegrade through volatilization and bacterial action, particularly when exposed to oxygen (EPA 2000). Thus, small quantity oil spills on surface soils can be expected to biodegrade readily. Even in subsurface contamination situations involving underground storage facilities which would generally be expected to involve larger quantities than would ever be involved in a small aircraft accident, EPA guidelines provide for "natural attenuation" or volatilization and biodegradation in some situations to mitigate environmental hazards (EPA 2000). Thus, even where oil spills in small aircraft accidents are not cleaned up, the oil does not persist in the environment

For these reasons, the risk of ground fires or fuel/oil pollution from aviation accidents is considered to be low. Based on the history and experience of the program in aircraft accidents, it appears the risk of significant environmental damage from such accidents is exceedingly low.

4.1.2.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

WS efforts to protect rare, threatened or endangered species would not be as effective as the preferred alternative because WS would be unable to access lethal techniques if non-lethal techniques are ineffective. Lethal efforts to protect these species would have to be conducted by other natural resource management entities. Under this alternative, WS take of non-target animals would be less than that of the proposed action because no lethal control actions would be taken by WS. Non-target species are usually not affected by WS's non-lethal management methods, except for the occasional scaring from harassment devices. In these cases, affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. Capture and release (e.g., for disease monitoring) and capture and relocate would be allowed under this alternative. There is the extremely remote chance that the capture devices could result in the death of a non-target animal. However, given that these devices would be applied with provisions to keep the target animal alive, the risks to non-target species are very low and would not result in adverse impacts on non-target species populations.

If mammal damage problems were not effectively resolved by non-lethal control methods, members of the public may resort to other means of lethal control such as the use of shooting or the use of pesticides. This could result in less experienced persons implementing control methods and could lead to greater risks to non-target wildlife than the proposed action. For example, shooting by persons not proficient at mammal identification could lead to killing of non-target mammals. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including T&E species. Hazards to raptors, including bald eagles and peregrine falcons, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

Effects on T&E species: Wildlife Services will not have any direct negative impact on T&E species. Risks to T&E species from increased private efforts to address damage management problems will vary depending upon the training and level of experience of the individual conducting the MDM. As stated above, frustrated individuals may resort to use of unsafe or illegal methods like poisons which may increase risks to species like the bald eagle and peregrine falcon. Risks to T&E species may be lower with this alternative than with Alternative 4 because people would have ready access to assistance with non-lethal MDM techniques. Wildlife Services could advise individuals as to the potential presence of state and federally listed species in their area.

4.1.2.4 Alternative 4: No Federal WS Mammal Damage Management

Alternative 4 would not allow any WS MDM in the State; therefore WS would not take any non-target species under this alternative. The WDNR or other natural resource management entities may have to allocate staff time and resources for projects to protect threatened, endangered and rare birds because WS could no longer assist with these programs. Private efforts to reduce or prevent depredations could increase which could result in less experienced persons implementing

control methods and could lead to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could impact local non-target species populations, including some T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

Effects on T&E species: Wildlife Services will not have any direct impact on T&E species. Risks to T&E species from increased private efforts to address damage management problems will vary depending upon the training and level of experience of the individual conducting the MDM. As stated above, frustrated individuals may resort to use of unsafe or illegal methods like poisons which may increase risks to species like the state-listed Peregrine falcon. Risks to T&E species may be higher with this alternative than with the other alternatives because WS would not have any opportunity to provide advice or assistance with the safe and effective use of MDM techniques or have the opportunity to advise individuals regarding the presence of T&E species.

4.1.3 Effects on Human Health and Safety

4.1.3.1 Impacts on Human Safety from Chemical MDM Methods

Alternative 1: Technical Assistance Only

Alternative 1 would not allow any direct operational MDM assistance by WS. Concerns about human health risks from WS's use of MDM methods would be alleviated because no such use would occur. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and leading to a greater risk than Alternative 2. However, because some of these private parties would be receiving advice and instruction from WS, concerns about human health risks from chemical MDM methods use should be less than under Alternative 4.

Hazards to humans and pets could be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used. It is hypothetically possible that frustration caused by the inability to alleviate mammal damage could lead to illegal use of certain toxicants that could pose secondary poisoning hazards to pets. Some chemicals that could be used illegally could present greater risks of adverse effects on humans than those used under the Proposed Action Alternative.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

The only pesticides that might be used or recommended by WS would be nonlethal repellents such Hinder, Deer Away and others that are registered with the WDATCP. Such chemicals must undergo rigorous testing and research to prove safety, and low environmental risks before they would be registered by the EPA or FDA. Any operational use of chemical repellents would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations which are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in SOP that would assure that use of registered chemical products would avoid significant adverse effects on human health.

Drugs used in capturing, sedating, handling, and euthanizing wildlife for wildlife management purposes include ketamine hydrochloride, a mixture of tiletamine and zolazepam (Telazol), xylazine (Rompun), sodium pentabarbitol, potassium chloride, Yohimbine, antibiotics, and others. Wildlife Services would adhere to all applicable requirements of the AMDUCA to prevent any significant adverse impacts on human health with regard to this issue. Standard operating procedures for the use of drugs would include:

- All drugs used in capturing and handling wildlife would be under the direction and authority of state veterinary authorities, either directly or through procedures agreed upon between those authorities and WS. As determined on a state-level basis by these veterinary authorities (as allowed by AMDUCA), wildlife hazard management programs may choose to avoid capture and handling activities that utilize immobilizing drugs within a specified number of days prior to the hunting or trapping season for the target species to avoid release of animals that may be consumed by hunters prior to the end of established withdrawal periods for the particular drugs used. Animals that have been drugged and released would be ear tagged or otherwise marked to alert hunters and trappers that they should contact state officials before consuming the animal.

- Most drug administration would be scheduled to occur well before state controlled hunting/trapping seasons which would give the drug time to completely metabolize out of the animals' systems before they might be taken and consumed by humans. In some instances, animals collected for control purposes would be euthanized when they are captured within a certain specified time period prior to the legal hunting or trapping season to avoid the chance that they would be consumed as food while still potentially having immobilizing drugs in their systems.

- Activities involving the handling and administering drugs, drugs selected for use, animal marking systems, and the fate of any animals that must receive drugs at times during or close to scheduled hunting seasons would be coordinated with the WDNR.

By following these procedures, the proposed action would avoid any significant impacts on human health with regard to this issue.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Alternative 3 would not allow for any lethal mammal damage management by WS in Wisconsin. WS could only implement non-lethal methods such as harassment and exclusion devices and materials. Non-lethal methods could, however, include use and recommendation of repellents and could use capture and handling drugs for capture and release projects. Impacts from WS use of these chemicals would be similar to those described under the proposed action.

Excessive cost or ineffectiveness of non-lethal techniques could result in some entities rejecting WS's assistance and resorting to other means of MDM. Risks associated with non-WS use of toxicants will vary depending upon the training and experience of the individuals conducting the MDM. Such means could include illegal pesticide uses. Hazards to humans could be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used. Some chemicals that could be used illegally could present greater risks of adverse effects

on humans than those used under the proposed alternative. Overall risks to human health and safety from this alternative are likely to be equal to or greater than Alternative 2.

Alternative 4: No Federal WS Mammal Damage Management

Alternative 4 would not allow any WS MDM in Wisconsin. Concerns about human health risks from WS's use of chemical MDM methods would be alleviated because no such use would occur. Private efforts to reduce or prevent damage would be expected to increase. Risks to human health and safety from chemical MDM methods will be variable depending upon the training and experience of the individual conducting the MDM. Hazards to humans and pets could be greater under this alternative if other chemicals that are less selective or that cause secondary poisoning are used or if chemicals are used improperly by inexperienced personnel. It is hypothetically possible that frustration caused by the inability to alleviate mammal damage could lead to illegal use of certain toxicants that could pose secondary poisoning hazards to pets. Some chemicals that could be used illegally could present greater risks of adverse effects on humans than those used under the current program alternative.

4.1.3.2 Impacts on Human Safety from Non-chemical MDM Methods

Alternative 1: Technical Assistance Only

Under this alternative, WS would not engage in direct damage in Wisconsin. Risks to human safety from WS's use of firearms, traps, aircraft snares and pyrotechnics would not exist because WS would not be conducting direct damage management activities. However, WS would provide technical advice to those persons requesting assistance. Landowners/resource managers could use information provided by WS or implement damage reduction methods without WS technical assistance. Hazards to humans and property could be greater under this alternative if personnel conducting MDM activities using non-chemical methods are poorly or improperly trained. Negative impacts to public safety resulting from the improper use of control methods should be less than Alternative 4 when WS technical advice is followed.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Non-chemical MDM methods that might raise safety concerns include shooting with firearms, use of traps and snares, surveillance and hunting from aircraft and harassment with pyrotechnics. All WS personnel are trained in the safe and effective use of MDM techniques. The Wisconsin WS program has had no accidents involving the use of any of its non-chemical MDM techniques including firearms, pyrotechnics, traps, snares, or explosives in which any person was harmed, relative to any projects related to the mammals listed in this EA. However, there have been instances of individuals being bitten while releasing dogs from traps set for wolves in Wisconsin[7] A formal risk assessment of WS's operational management methods found that when used in accordance with all applicable, laws, regulations, policy and directives, risks to human safety from the proposed methods were low (USDA 1997 Revised, Appendix P). Therefore, no adverse effects on human safety from WS's use of these methods is expected. Standard operating procedures designed and implemented to avoid adverse effects on public and pet health and safety

[7] Wolf damage management and associated risks to human health and safety area addressed in USDA 2008 and 2013.

are described in Chapter 3. Therefore, no adverse effects on human safety from WS's use of these methods are expected.

Shooting and trapping are methods used by WS which pose minimal or no threat to public health and safety. Wildlife Services traps are strategically placed to minimize exposure to the public and pets. Appropriate signs are posted on all properties where traps are set to alert the public of trap presence.

Firearms and firearm misuse are a cause of concern because of issues relating to public safety and accidental injury or death. To ensure safe use of firearms, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within three months of their appointment and a refresher course every two years afterwards (WS Directive 2.615). Wildlife Services employees who use firearms as a condition of employment must comply with all applicable Federal State and local regulations, including 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, night vision, FLIR technology, and baiting. Wildlife Services may use firearms to humanely euthanize animals caught in live traps.

The low-level flights used for wildlife management including wildlife surveys like those conducted by the WDNR, USFWS, and other natural resource agencies are inherently higher risk than those for general aviation. Low-level flights introduce hazards such as power lines and trees, and the safety margin for error during maneuvers is diminished compared to high-level flights. Accidents have been associated with WS aerial operations and are a concern to WS. Some of WS's accidents have involved pilot error while others are directly related to mechanical failure. Wildlife Services developed the WS Aviation Training Center with the goal of reducing pilot error accidents to zero. The WS Aviation Training Center provides safety training, individual instruction and aviation consultation to all aviation programs in WS. The Center trains pilots to effectively respond to different types of mechanical failures and other safety concerns associated with low-level flight. Wildlife Services complies with all Federal Aviation Administration issued Service Bulletins, Airworthiness Directives, aircraft manufacturing recalls, and similar documents.

Wildlife Services' safety measures and training for aerial sharpshooting are the same as those for aircraft used in surveillance with the addition that the individuals conducting the shooting also have specialized training in the safe and effective use of sharpshooting from aircraft. Wildlife Services employees must have a clear view of the animal before shooting, so there is no risk of accidentally shooting a person. Overall risks to human health and safety are slightly higher to the flight crews because of the increased intensity and duration of the action but are still very low.

In 2007 and 2008, WS conducted a programmatic safety review to assess and improve employee safety (USDA 2008). The review covered nine WS program areas including the aviation program. The review of the aviation program was conducted by the Interagency Committee on Aviation Safety. The review team concluded that the WS aviation program is being operated in a safe, efficient and effective manner and that the program met the Interagency Committee on Aviation Safety requirements for the Gold Standard Certificate for Excellence. At the time of the report, the WS program was the only USDA aviation program to be awarded this certification. Wildlife Services' program pilots and contractors are highly skilled with commercial pilot ratings

and have passed proficiency tests in the flight environment encountered by WS. Wildlife Services' pilots are trained in hazard recognition and surveillance flights would only be conducted in safe environments. Federal aviation regulations require pilots to fly a minimum distance of 500 feet from structures and people, and all employees involved in these operations are mindful of this. Although the goal of the aviation program is to have no accidents, accidents may still occur. However, the protective measures implemented by WS keep the risk of aircraft accidents and injuries to the public and aircraft crew low.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, non-chemical MDM methods that might raise safety concerns include shooting with firearms when used as a harassment technique, cage traps, harassment with pyrotechnics and surveillance from aircraft. Risks to human health and safety from use of firearms as a harassment technique under this alternative are similar to risks discussed for firearms use (harassment and lethal removal of target animals) under Alternative 2 as are risks associated with aircraft use. As with Alternative 2, WS personnel would receive safety training on a periodic basis to keep them aware of safety concerns. A formal risk assessment of WS operational management methods including the non-lethal techniques that would be available under this alternative, found that risks to human safety were low (USDA 1997 Revised, Appendix P). Therefore, no adverse effects on human safety from WS's use of these methods are expected.

Some resource owners/managers may not feel that non-lethal techniques are adequate to resolve their wildlife conflict and may use lethal MDM methods without WS assistance. Risks to human safety from these actions will depend on the method selected and the experience and training of the individual using the technique.

Alternative 4: No Federal WS Mammal Damage Management

Alternative 4 would not allow any WS MDM in the State. Concerns about human health risks from WS's use of non-chemical MDM methods would be alleviated because no such use would occur. However, private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risk to human health and safety than the Proposed Action Alternative. Non-WS personnel would be able to use pyrotechnics, traps, snares or firearms in MDM programs and this activity would likely occur to a greater extent in the absence of WS assistance. Hazards to humans and property could be greater under this alternative if personnel conducting MDM activities using non-chemical methods are poorly or improperly trained.

4.1.3.3 Impacts on Human Health and Safety from Mammals

Alternative 1: Technical Assistance Only

With WS technical assistance but no direct damage management, entities requesting MDM assistance for human health concerns would either take no action, which means the risk of human health problems would likely continue or increase in each situation as mammal numbers are maintained or increased, or implement WS recommendations for non-lethal and lethal control methods. Potential impacts would be variable depending upon the training and experience of the individuals conducting the MDM. Individuals or entities that implement the recommendations

may lack the experience necessary to efficiently and effectively conduct an effective MDM program and risks could continue or increase. Therefore, the odds of successfully reducing wildlife risks to human health and safety may be similar to or lower than Alternative 2. The likelihood that individual efforts would reduce mammal conflicts would be higher under this alternative than Alternative 4 if people request and use WS technical assistance recommendations.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

An Integrated MDM strategy, a combination of lethal and non-lethal methods, has the greatest potential of successfully reducing human health and safety risks associated with the mammals addressed in this EA. Under this alternative, all legal MDM methods could possibly be implemented and recommended by WS. Efficacy of any given MDM method will vary depending on site specific conditions. Access to the full range of MDM methods results in the greatest possibility of alleviating risks to human health and safety by allowing WS specialists to pick the methods best suited to the particular situation.

In most cases, it is difficult to conclusively prove that mammals were responsible for transmission of individual human cases or outbreaks of mammal-borne diseases. However, the limited records of disease occurrence in Wisconsin does not necessarily mean absence of risk but may only mean lack of reliable research in this area. There are limited studies available on the occurrence and transmission of zoonotic diseases in wild mammals. Study of this issue is complicated by the fact that some disease-causing agents associated with wildlife, may also be contracted from other sources. Wildlife Services works with cooperators on a case-by-case basis to assess the nature and magnitude the wildlife conflict including providing information on the limitations about what we know regarding health risks associated with wild mammals. In most cases, the risk of contracting a disease from wild mammals is relatively low. It is the choice of the individual cooperator to tolerate the potential health risks or to seek to reduce those risks. Certain requesters of MDM service may consider even a low level of risk to be unacceptable. Many property owners/managers wish to eliminate risks before someone actually gets sick because of conditions at their site. In such cases, MDM, either by lethal or non-lethal means, would, if successful, reduce the risk of mammal-borne disease transmission at the site for which MDM is requested.

In some situations the implementation of non-lethal controls such as netting electric fences and harassment could actually increase the risk of human health problems at other sites by causing the mammals to move to other sites not previously affected. In such cases, lethal removal of the mammals may actually be the best alternative from the standpoint of overall human health concerns in the local area. If WS is providing direct damage management assistance in relocating mammals, coordination with local authorities would be conducted to assure they do not reestablish in other undesirable locations.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods when providing assistance with mammal damage problems. Non-lethal methods may not be effective at or suitable for all situations. The efficacy of some techniques may be limited by habituation (the ability of an animal to become accustomed to and not respond to an otherwise frightening sight or sound). Other techniques like fencing may not be suitable because

of zoning, visual impacts on the site, site use or because they may adversely impact other non-injurious species. In some situations the implementation of non-lethal controls such as netting barriers and harassment could actually increase the risk of human health problems at other sites by causing the mammals to move to other sites not previously affected. However, when WS is providing direct damage management assistance in relocating mammals, coordination with local authorities would be conducted to minimize the risk of problem animals relocating to other undesirable areas.

Alternative 4: No Federal WS Mammal Damage Management

With no WS assistance, cooperators would be responsible for developing and implementing their own MDM program. Success of cooperator efforts to reduce or prevent risks to human health and safety from wildlife will depend on the training and experience of the individual conducting the MDM. If less experienced persons attempt to implement control methods, risks of not reducing mammal hazards could be greater than under the proposed action. For example, in some situations the implementation of non-lethal controls such as electric fences and harassment could actually increase the risk of human health problems at other sites by causing the mammals to move to other sites not previously affected.

4.1.4 Impacts on Stakeholders, including Aesthetics

4.1.4.1 Effects on Human Affectionate Bonds with Individual Mammals and on Aesthetic Values of Wild and Feral Mammals

Alternative 1: Technical Assistance Only

Under this alternative, WS would not conduct any direct damage management MDM, but would still provide technical assistance or self-help advice to persons requesting assistance with mammal damage. Those who oppose assistance with wildlife damage management by the government, but favor government technical assistance, would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by WS's activities under this alternative because animals would not be killed by WS. However, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, which means the cumulative effects would be similar to the Proposed Action Alternative.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Those who routinely view or feed individual animals would likely be disturbed by removal of such mammals under the current program. WS is aware of such concerns and takes these concerns into consideration when developing site specific management plans. WS may be able to mitigate such concerns by leaving certain animals that have been identified by interested individuals.

Some members of the public have expressed opposition to the killing of any mammals during MDM activities. Under this Proposed Action Alternative, some lethal control of mammals would occur and these persons would be opposed. However, many persons who voice opposition have

no direct connection or opportunity to view or enjoy the particular mammals that would be killed by WS's lethal control activities. Lethal control actions of native species would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would, therefore, continue to remain available for viewing by persons with that interest.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would not conduct any lethal MDM, but may conduct harassment of mammals that are causing damage. Some people who oppose lethal control of wildlife by the government, but are tolerant of government involvement in non-lethal wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by the death of individual mammals under this alternative, but might oppose dispersal or translocation of certain mammals. WS may be able to mitigate such concerns by leaving certain animals that have been identified by interested individuals. Individuals opposed to any type of management of wildlife for human purposes (i.e., animal rights philosophy) will continue to be opposed to WS actions. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, which means the cumulative effects would be similar to the Proposed Action Alternative.

Alternative 4: No Federal WS Mammal Damage Management

Under this alternative, WS would not conduct any lethal removal of mammals nor would the program conduct any harassment of mammals. Those in opposition of any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by WS's activities under this alternative. However, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, which means the cumulative effects would then be similar to the Proposed Action Alternative.

4.1.4.2 Effects on Aesthetic Values of Property Damaged by Mammals

Alternative 1: Technical Assistance Only

Wildlife Services would provide technical advice to those persons requesting assistance. Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. When WS technical advice is requested and followed, impacts on those persons adversely affected by mammal damage should be less than Alternative 4. However, some resource owner's efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, mammal damage management could take longer to execute and may be less effective under this alternative than the Proposed Action Alternative depending upon the skills and abilities of the person implementing MDM control methods.

Relocation of mammals through harassment, barriers, or habitat alteration can sometimes result in the mammals causing the same problems at the new location. If WS has only provided technical assistance to local residents or municipal authorities, coordination with local authorities to monitor the mammal's movements to assure the mammals do not re-establish in other undesirable

locations might not be conducted, thereby increasing the potential of adverse effects to nearby property owners.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Damage to property would be expected to decrease under this alternative since all available damage management methods and strategies would be available for WS use and consideration. Access to the full range of MDM methods results in the greatest possibility of reducing damage to property by allowing WS specialists to pick the methods best suited to the particular situation.

Relocation or dispersal of mammals by harassment can sometimes result in the mammals causing the same or similar problems at the new location. If WS is providing direct damage management assistance in relocating such mammals, WS will relocate mammals to appropriate habitats and areas where there is less opportunity for human / wildlife conflicts.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with mammal damage problems. While this may improve the use of non-lethal methods over that which might be expected under Alternative 4, the efficacy of non-lethal methods can be quite variable. If non-lethal methods are ineffective at reducing damage, WS would not be able to provide any other type of assistance. In these situations, mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, mammal damage management could take longer to execute and may be less effective under this alternative than the Proposed Action Alternative depending upon the skills and abilities of the person implementing MDM control methods.

Relocation or dispersal of mammals by harassment can sometimes result in the mammals causing the same or similar problems at the new location. This alternative could result in mammals relocating to other sites where they could cause or aggravate similar problems for other property owners. Thus, this alternative could result in more property owners experiencing adverse effects on the aesthetic values of their properties than the Proposed Action Alternative. If WS is providing direct damage management assistance in relocating such mammals, WS will relocate mammals to appropriate habitats and areas where there is less opportunity for human / wildlife conflicts.

Alternative 4: No Federal WS Mammal Damage Management

Mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners could implement their own damage reduction program without WS assistance. Resource owner's efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, mammal damage management could be take longer to execute and may be less effective under this alternative than the Proposed Action Alternative depending upon the skills and abilities of the person implementing MDM control methods.

Relocation of mammals through harassment, barriers, or habitat alteration can sometimes result in the mammals causing the same problems at the new location. Coordination of relocation and dispersal activities by local residents with local authorities to monitor the mammal's movements to assure the mammals do not re-establish in other undesirable locations might not be conducted, thereby increasing the potential of adverse effects to nearby property owners.

4.1.5 Humaneness and Animal Welfare Concerns of Methods Used

4.1.5.1 Alternative 1: Technical Assistance Only

Under this alternative, WS would provide self-help advice only. Lethal methods viewed as inhumane by some persons would not be used by WS. Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. Many of the methods considered inhumane by some individuals and groups might still be used by resource owners. Overall impacts should be less than Alternative 4 when WS technical advice is requested and followed, but still similar to the proposed action.

4.1.5.2 Alternative 2: Implement an Integrated Mammal Damage Management Program (Proposed Action/No Action)

MDM methods viewed by some persons as inhumane would be employed by WS under this alternative. These methods would include shooting, trapping, toxicants/chemicals, and snares. Despite SOPs and state trapping regulations designed to maximize humaneness, the perceived stress and trauma associated with being held in a trap or snare until the WS employee arrives at the capture site to dispatch or release the animal, is unacceptable to some persons. Other MDM methods used to take target animals including shooting and body-gripping traps (i.e., Conibear) result in a relatively humane death because the animals die instantly or within seconds to a few minutes. These methods however, are also considered inhumane by some individuals.

WS may use EPA registered and approved chemicals to manage damage caused by some mammals in Wisconsin. Some individuals consider the use of such chemicals to be inhumane. WS personnel are experienced, professional and humane in their use of management methods. Under this alternative, mammals would be killed by experienced WS personnel using the best and most appropriate method(s) available.

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some MDM methods are used in situations where non-lethal damage management methods are not practical or effective.

4.1.5.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, lethal methods, viewed as inhumane by some persons, would not be used by WS. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the Proposed Action Alternative.

4.1.5.4 Alternative 4: No Federal WS Mammal Damage Management

Under this alternative, lethal methods, viewed as inhumane by some persons, would not be used by WS. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the Proposed Action Alternative.

4.2 CUMULATIVE IMPACTS

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time.

Under Alternatives 1, 2 and 3, WS would, to varying extents, address damage associated with mammals in a number of situations throughout the State. The WS MDM program would be the primary federal program with MDM responsibilities; however, some state, local, and tribal government agencies may conduct MDM activities in Wisconsin as well. Through ongoing coordination with these agencies, WS is aware of such MDM activities and may provide technical assistance in such efforts. WS does not normally conduct direct damage management activities concurrently with such agencies in the same area, but may conduct MDM activities at adjacent sites within the same time frame. In addition, commercial pest control companies may conduct MDM activities in the same area. The potential cumulative impacts analyzed below could occur either as a result of WS MDM program activities over time, or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

Cumulative Impacts on Wildlife Populations

As shown in Section 4.1.1, MDM methods used or recommended by the WS program in Wisconsin will have no cumulative adverse effects on target and non-target native wildlife populations. Wildlife Services limited lethal take of target mammal species is anticipated to have minimal impacts on target native mammal populations in Wisconsin. When control actions are implemented by WS the potential lethal take of non-target wildlife species is expected to be minimal and will not adversely affect populations of these native species. All WS take of mammals is coordinated with the WDNR to ensure that cumulative impacts of WS actions will not jeopardize native wildlife populations and are consistent with state management objectives for the species.

Cumulative Impact Potential from Chemical Components

Non-lethal chemicals, such as repellents, may be used or recommended by the WS MDM program in Wisconsin. Characteristics of these chemicals and use patterns indicate that no significant cumulative impacts related to environmental fate are expected from their use in WS MDM programs in Wisconsin.

Cumulative Impact Potential from Non-chemical Components

Non-chemical methods used by WS MDM program may include exclusion through use of various barriers, live trapping and relocation or euthanasia of mammals, harassment of mammals, trapping, snaring, and shooting. Based on analysis in Sections 4.1.1 and 4.1.2, no cumulative impacts from WS use of these methods to take animals are expected especially given that take would be authorized and/or permitted with WDNR oversight.

SUMMARY

No significant cumulative environmental impacts are expected from any of the four Alternatives. Under the Proposed Action, the lethal removal of mammals by WS would not have significant impacts on overall native mammal populations in Wisconsin, but some short-term local reductions may occur. Some efforts to reduce damage cause by non-native species could result in elimination of the species from local areas or the state (e.g., feral swine). No risk to public safety is expected when WS's services are provided and accepted by requesting individuals in Alternative 2 since only trained and experienced wildlife biologists/specialists would conduct and recommend MDM activities. There is a slight increased risk to public safety when persons who reject WS assistance and recommendations in Alternatives 1, 2 and 3 conduct their own MDM activities, and when no WS assistance is provided in Alternative 4. In all four Alternatives, however, the increase in risk would not be to the point that the impacts would be significant. Although some persons will likely be opposed to WS's participation in MDM activities on public and private lands within the state of Wisconsin, the analysis in this EA indicates that WS Integrated MDM program will not result in significant cumulative adverse impacts on the quality of the human environment. Table 4-7 summarizes the expected impact of each of the alternatives on each of the issues.

Table 4-7. Summary of Potential Impacts.

Issue	**Alternative 1** **Technical Assistance Only**	**Alternative 2** **Integrated Mammal Damage Management Program (Proposed Action/No Action)**	**Alternative 3** **Non-lethal MDM Only by WS**	**Alternative 4** **No Federal WS MDM Program**
1. Target Mammal Species Effects	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel variable but likely would not significantly affect local or state populations.	Low effect - reductions in local target mammal numbers; would not significantly affect local or state native populations.	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel variable but likely would not significantly affect local or state populations.	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel variable but likely would not significantly affect local or state populations.

2. Effects on Other Wildlife Species, Including T&E Species	No effect by WS. Impacts by non-WS personnel would be variable. WS would not provide operational assistance with T&E species protection.	Low effect - methods used by WS would be highly selective with very little risk to non-target species. WS would provide operational assistance with T&E species protection.	Low effect - methods used by WS would be highly selective with very little risk to non-target species. WS only able to provide limited operational assistance with T&E species protection.	No effect by WS. Impacts by non-WS personnel would be variable. WS would not provide operational assistance with T&E species protection.
3. Human Health and Safety Effects	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater risk of injuries and greater potential of not reducing mammal damage than under the proposed action.	The proposed action has the greatest potential of successfully reducing this risk. Low risk from methods used by WS.	Low risk of injuries from methods used by WS. WS less likely to resolve risks associated with animals than with Alt 2. Efforts by non-WS personnel to use lethal MDM techniques could result in less experienced persons implementing control methods, a greater risk of injuries and greater potential of not reducing mammal damage than under the proposed action.	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater risk of injuries and greater potential of not reducing mammal damage than under the proposed action.
4a. Aesthetic Values of Wild Mammal Species and Human Affectionate Bonds	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state target mammal populations.	Low to moderate effect at local levels; Some local populations may be reduced; WS mammal damage management activities do not adversely affect overall state target native mammal populations.	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase when non-lethal methods are ineffective unless non-WS personnel successfully implement lethal methods; no adverse affect on state target mammal populations.	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state target mammal populations.

4b. Aesthetic Values of Property Damaged by Mammals	Mammal damage may not be reduced to acceptable levels; mammal may move to other sites which can create aesthetic damage problems at new sites.	Low effect - mammal damage problems most likely to be resolved without creating or moving problems elsewhere.	Mammal damage may not be reduced to acceptable levels; mammals may move to other sites which can create aesthetic damage problems at new sites.	High effect - mammal problems less likely to be resolved without WS involvement. Mammals may move to other sites which can create aesthetic damage problems at new sites.
5. Humaneness and Animal Welfare Concerns of Methods Used	No effect by WS. Impacts by non-WS personnel would be variable.	Impact by WS low to moderate effect - methods viewed by some people as inhumane would be used by WS.	Impact by WS Lower effect than Alt. 2 since only non-lethal methods would be used by WS. Impacts by non-WS personnel would be variable.	No effect by WS. Impacts by non-WS personnel would be variable.

APPENDIX A

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APPENDIX B

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APPENDIX C

MAMMAL DAMAGE MANAGEMENT METHODS

Resource owners and government agencies use a variety of techniques as part of integrated mammal damage management programs. All lethal and non-lethal methods have limitations based on costs, logistics, practicality, or effectiveness. There are also regulatory constraints on the availability and use of some MDM techniques. Mammal damage management methods currently available to the Wisconsin WS program are described here. If other methods are proven effective and legal to use in Wisconsin, they could be incorporated into the Wisconsin WS program, pursuant to permits, other authorizations, agreements with landowners, NEPA compliance, and applicable laws, regulations, and policies.

Wildlife Services MDM efforts are not intended to reduce overall native mammal populations in the state or region although in some instances, reduction of local population densities may be conducted to address site specific damage problems. However, projects to address problems with non-native species such as feral hogs may be intended to reduce or eliminate the local, regional (within state), or state populations of these species. Depending upon the alternative selected, the specific control methods and techniques that could be used are as follows:

NON-LETHAL METHODS (NON-CHEMICAL)

Cultural Methods and Habitat Management includes the application of practices which seek to minimize exposure of the protected resource to damaging animals through processes other than exclusion. They may include animal husbandry practices such as employing guard dogs, herders, shed lambing, carcass removal, or pasture selection. Strategies may also include minimizing cover where damaging mammals might hide, manipulating the surrounding environment to deter animals from entering a protected area, removal of trees from around buildings to reduce access by squirrels and raccoons, or planting lure crops on fringes of protected crops. Some mammals which cause damage in urban environments are attracted to homes by the presence of garbage or pet food left outside and unprotected. Removal or sealing of garbage in tight trash receptacles, and elimination of all pet foods from outside areas can reduce the presence of unwanted mammals. Making trash, bird food, and garbage unavailable and removing all pet food from outside during nighttime hours can reduce the presence of bears, raccoons, and opossums when they become a problem. If tree squirrels are damaging property or causing a nuisance, care in preventing them from obtaining bird seed left in bird feeders can often greatly reduce their presence. This may mean hanging bird feeders by thin wire from tree limbs, or constructing mounting poles which cannot be climbed by these animals. In general, WS involvement in cultural methods and habitat management is limited to technical assistance (advice). Implementation of the methods and associated legal requirements are the responsibility of the landowner/manager. When WS makes habitat management recommendations, WS advises landowners/managers that they are responsible for compliance with all applicable state federal and local regulations including the ESA.

Animal Behavior Modification. This refers to tactics that deter or repel damaging mammals and thus, reduce damage to the protected resource. These techniques are usually aimed at causing target animals to respond by fleeing from the site or remaining at a distance. They usually employ extreme noise or visual stimuli (e.g., flashing lights). Unfortunately many of these techniques are only effective for a short time before animals habituate (i.e., learn there is not a real threat; Conover 1982). The position of such frightening devices should be changed frequently because over a period of time, animals usually become

used to scare devices (Pfiefer and Goos 1982). Using motion activated systems instead of systems which are activated on regular intervals may also extend the effective period for a frightening devices. Some devices used to modify behavior in mammals may include:

- Electronic guards (siren/strobe-light devices)
- Propane exploders
- Pyrotechnics
- Laser lights
- Human effigies

Black bears can also sometimes be frightened from an area (such as buildings, livestock pens, orchards, etc.) by using the methods previously listed or the extended use of night lights, loud music, scarecrows, and trained livestock guarding dogs. However, bears often become tolerant of human activity, too. At this point, scare devices are ineffective and human safety becomes a concern. Black bears are occasionally encountered on hiking trails or at campsites and can sometimes be frightened away by shouting, clapping hands, throwing objects, etc., but extreme care must be taken not to be put at risk of attack or injury from the bear attacking. In addition to the above tactics, if bears are encountered in campground or other similar settings, the noise of pots banging, gunfire, pyrotechnics, gas-propelled boat horns, and engines revving, etc. may be useful if allowed and legal in the area. Black bears can be deterred from land-fills, occupied buildings, and other sites by the use of 12-gauge plastic slugs or 38-mm rubber bullets. Aim for the large muscle mass in the hind quarters. Avoid the neck and front shoulders to minimize the risk of hitting and damaging an eye. Firearm safety training is recommended.

Wildlife Exclusion (Physical Exclusion) pertains to preventing access to resources through fencing or other barriers. Fencing of small critical areas can sometimes prevent animals which cannot climb from entering areas of protected resources. Electric fences of various constructions have been used effectively to reduce damage to various crops by raccoons and other species (Boggess 1994). In those applications, however, consideration must be given for the safety of the general public. Woven wire and other types of more permanent fencing, especially if it is installed with an underground skirt, can prevent and discourage access to areas for many mammal species which dig, including coyotes, foxes, badgers, and skunks. Areas such as airports, yards or hay meadows may be fenced. Hardware cloth or other metal barriers can sometimes be used to prevent girdling and gnawing of valuable trees and to prevent the entry of mammals into buildings through existing holes or gaps. Applying a mixture of sand in paint can also block squirrels from gnawing trees. Riprap can also be used on dams or levies to deter muskrats, woodchucks and other burrowing rodents.

Electric Fencing and Maintenance

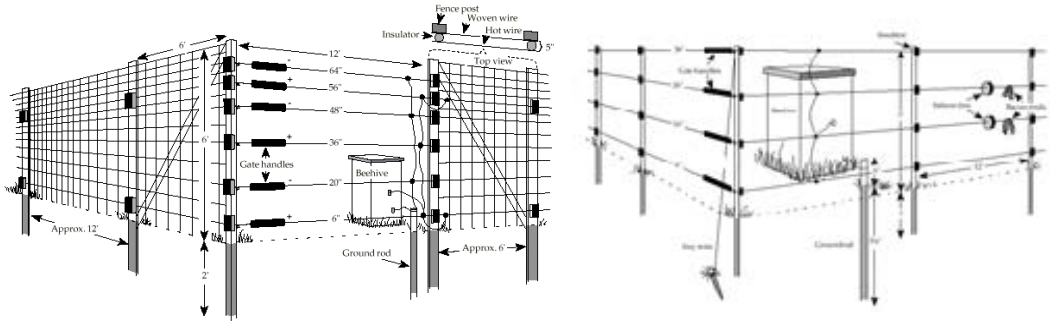
Electric fencing has proven effective in deterring a wide variety of mammal species. Bears have been dissuaded from landfills, trash dumpsters, apiaries, cabins, and other high-value properties. Electric fencing has also been effective in reducing crop damage from deer and also discouraging raccoons from gardens. Fencing, however, can be an expensive abatement measure. When developing a damage prevention program, consideration is given to the extent, duration, and expense of damage in relation to the expense of using fencing. Numerous fence designs have been used with varying degrees of success. Electric fence chargers increase effectiveness.

To energize the fences, a 110-volt outlet or 12-volt deep cell (marine) battery is connected to a high-output fence charger. The fence charger and battery should be protected against weather and theft.

Warning signs should be used to protect human safety. Electric fences must deliver an effective shock to repel the mammal that is interested in a particular resource. Animals can be lured into licking or sniffing the wire by attaching attractants to the fence, such as peanut butter, which is effective in attracting such species as bear, deer, and raccoons.

Fence voltage should be checked each week at a distance from the fence charger; it should yield at least 3,000 volts. To protect against voltage loss, the battery and fence charger should be kept dry and their connections free of corrosion. Make certain all connections are secure and check for faulty insulators (arcing between wire and post). Also clip vegetation beneath the fence. Each month, check the fence tension and replace baits or lures as necessary. Always recharge the batteries during the day so that the fence is energized at night.

Below are two common examples of electric fences used for bears. Electric fences for other species would be very similar with their overall height and wire spacing varying depending on the species that is causing the conflict.



(Figure C-1)

Relocation. In most situations, relocation of damaging mammals to other areas following live capture generally would not be effective or cost-effective. Relocation to other areas following live capture would not generally be effective because problem species are often highly mobile and can easily return to damage sites from considerable distances, habitats in other areas are generally already occupied, and relocation would most likely result in similar damage problems at the new location. Sometimes, relocated animals can have poor survival rates at the new site (Rosatte and MacInnes 1989, Wright 1978, Frampton and Webb 1974) although careful timing of relocation and selection of release site can markedly improve survival rates (Griffith et al. 1989). Relocating animals also runs the risk of spreading parasites and diseases to previously uninfected areas. For example, the spread of raccoon variant of rabies in the eastern U.S. was likely unintentionally accelerated through the translocation of infected raccoons (Krebs et al. 1999). Translocation of wildlife is discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats.

However, there are exceptions and situations where relocating damaging mammals might be a viable alternative solution, such as when the mammals are considered to have high value such as T&E species and certain big game species, such as black bears.

Live-trapping and relocation of problem bears is a component of most bear management programs in the U.S. (Alt 1980, Fies et a l 1987, Garner and Vaughn 1989, Vaughn and Scanlon 1990, O'Pezio et al 1984) including Wisconsin. The effectiveness of relocation to resolve bear nuisance and damage problems has sometimes been questioned by bear researchers and managers. There has been concern about the

percentage of relocated bears returning to their home ranges, percentage that cause damage again, and mortality of relocated bears.

In Virginia, only 10% of relocated nuisance bears returned to their home ranges (Fies et al 1987). Comly (1993) found that none of 43 relocated radio collared nuisance bears returned to capture areas during another Virginia study. In British Colombia, Rutherglen and Herbison (1977) found 23% of 236 relocated nuisance bears were recaptured or sighted at least once. Only 16% were recaptured at the original capture location.

In Minnesota, Rogers (1986) found that the majority of bears relocated greater than about 40 miles did not return. In Wisconsin, Massopust and Anderson (1984) found that 72% of relocated bear in their study area returned to their original home area. However, of 187 nuisance bear tagged by the WDNR, approximately 50% returned (B. Kohn, WDNR, pers. comm. 2002).

It is clear that some relocated bear exhibit strong homing tendencies. The degree to which a bear will home apparently varies with age and sex. The literature suggests that adult bears, particularly males, are more likely to return to their area of capture than females and/or sub adults (Rutherglen and Herbison 1977, Massopust and Anderson 1984, Rogers 1986). Also, adult females separated from cubs have an extremely strong homing instinct (Harger 1970, Alt 1980). According to McArthur (1981) the effectiveness of relocations can be enhanced through consideration of terrain, as well as distance between capture and release sites, and availability of natural foods.

Despite the tendency of some relocated nuisance bears to return to areas of capture, relocation remains an effective and beneficial means to address bear problems (Rogers et al 1976, Alt 1980, Fies et al 1987). Relocated nuisance bears often do not immediately resume nuisance activity, if at all (McLaughlin et al 1981, Alt 1980, Rogers 1986, Fies 1987, Garner and Vaughn 1989), perhaps due to the negative conditioning of the capture and the relocation, ripening of wild foods, or onset of hibernation (Rogers 1986).

In Virginia, Fies et al (1987) found that 3% of 99 relocated nuisance bears resumed nuisance activity, and Comly (1993) found that only 4% of 43 relocated nuisance bears resumed nuisance activity. In northeastern Pennsylvania, McLaughlin et al (1981) found 15% of 75 relocated nuisance bears resumed nuisance activity. In Wisconsin, though approximately 50% of relocated nuisance bears returned to their original home ranges, only 13% resumed nuisance activity (B. Kohn, WDNR pers. comm. 2002). More recently, of 190 nuisance bear relocated in Wisconsin during 1995, only 10% resumed nuisance activity.

Relocated bears that do resume nuisance activity may do so at a much later date. Rutherglen and Herbison (1977) observed delays as long as a year between translocation date and date of resumption of nuisance activity. Alt (1980) reported delays of possibly two or more years for some bears. Stowell and Willging (1992) reported that the delay between translocation and the return of the bear and resumption of damage activity was important for farmers experiencing crop damage as it allowed time for corn to mature past the vulnerable milk stage, making the corn less susceptible to bear damage.

Relocations preserve bears that may otherwise be killed on damage permits issued by the State, or killed illegally by frustrated landowners. Bears killed on damage permits by landowners provide little recreational sporting opportunity and are seldom used for meat (Rogers et al 1976, Fies et al 1987). Relocations preserve some adult females for additional reproductive cycles and preserve the majority of bears moved at least until fall hunting seasons (Rogers 1986).

The potential negative impact translocation has on individual bears may include increased mortality and injury. Translocation did not increase mortality from natural causes in Michigan (Harger 1970). A review of 32 relocations from Alberta, Minnesota, Pennsylvania, and Wisconsin by Rogers (1986) revealed no increase in natural mortality. Rogers (1986) also found no reports of injuries among recaptured relocated bears.

Relocation may increase mortality from hunting and vehicle collisions (Hughie 1982, Massopust and Anderson 1984, Stiver 1991, Comly 1993). However, Harger (1970), found no difference in human-induced mortality between relocated and non-relocated nuisance bears in Michigan. In Wisconsin, Kohn (1982) found no significant difference in harvest rates between bears trapped and tagged at damage sites and wild trapped bears.

Relocated bears could adversely impact individual bears at the release site by increasing competition for food, however evidence indicates that they should have little more effect on resident bears than do dispersing bears or bears foraging naturally (Rogers 1986). Bears typically range over large home range areas, and frequently forage extensive distances outside their usual ranges (Rogers 1977).

Under the right conditions, relocating wildlife can be a viable and effective wildlife management technique (Craven et al. 1998). Wisconsin WS would only relocate wildlife at the direction of and only after consulting as appropriate, with the USFWS and/or WDNR to coordinate capture, transportation, and selection of suitable relocation sites, as well as compliance with all proper guidelines.

Animal Capture Devices. WS specialists can use a variety of devices to capture mammals. For reasons discussed above under "Relocation", small to medium sized mammals captured are usually killed via gunshot, cervical dislocation, or one of the chemical euthanasia methods listed below. However there are occasions where captured animals are relocated, or, in the case of some disease surveillance projects, may be released on site.

Bow nets are small circular net traps used for small mammals. The nets are hinged and spring loaded so that when the trap is set it resembles a half moon. The net is often set over a food source and it is triggered by an observer using a pull cord or remote controlled electronic switch.

Cable restraints are traps made of light cable with a locking device, and are used to catch small and medium sized mammals. The cable is placed in the path of an animal in the form of a loop. When the target species walks into the cable restraint, the loop becomes smaller in size, holding the animal as if it were on a leash. When used as a live capture device, cable restraints are equipped with integrated stops that permit tightening, but do not choke the animal.

Cage traps are live capture devices used to catch a variety of small to medium sized mammals. Cage traps come in a variety of sizes and are generally made of galvanized wire mesh, and consist of a treadle inside the cage that triggers the door to close behind the animal being captured. Cage traps can range from the extremely small, intended for the capture of rodents and other small mammals to the large corral/panel traps fitted with a routing or saloon style repeating door, used to live-capture feral hogs.

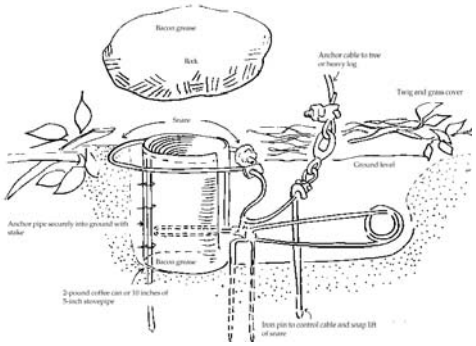
Catch poles consist of a long pole with a cable noose at one end. The noose end is typically encased in plastic tubing. Catch poles can be used to safely catch and restrain animals such as small bears (cubs) and raccoons.

Colony traps are multi-catch traps used to either live-capture or drown muskrats. There are various types of colony traps. One common type of colony trap consists of a cylindrical tube of wire mesh with a one-way door on each end (Novak et al. 1987). Colony traps are set at entrances to muskrat burrows or placed in muskrat travel lanes.

Culvert traps have been used by wildlife managers to safely capture wild bears at least since the 1950's (Erickson 1957, Black 1958). The trap itself rarely injures the animal and trap mortality is rare (Erickson 1957). Occasionally, non-target animals are caught in culvert traps, such as raccoons (*Procyon lotor*), fisher (*Martes pennanti*), and domestic dogs (*Canis familiaris*). Non-target animals would be released unharmed.

Foothold traps are devices that come in a variety of sizes that allows the traps to be species specific to some degree. Depending on the circumstances, pan-tension devices, trap placement and lure selection can also be used to reduce risks to nontarget species. These traps can be set on land or in water. They are made of steel with springs that close the jaws of the trap around the foot (and sometimes the leg) of the target species. These traps may have offset steel or padded jaws, which hold the animal.

Foot snares are spring activated (i.e., Aldrich-type) foot snares (Figure C-3) that would be used in situations that preclude the use of culvert traps. Foot snares are a safe and effective capture device when properly set and inspected (Miller et al 1973, Johnson and Pelton 1980). Bears captured in this manner can be tranquilized, released, relocated, or destroyed. WS uses bait as described previously to attract bears to foot snare sets.



(Figure C-2)

Hand nets are used to catch small mammals in confined areas such as homes and businesses. These nets resemble fishing dip nets with the exception that they are larger and have long handles.

Net guns are devices that project a net over a target animal using a specialized gun.

Sherman box traps are small live traps used to capture small mammals such as rodents. These traps are often made of galvanized steel or aluminum and fold up for easy transport. Sherman box traps also consist of a treadle towards the back of the trap that triggers the door to close behind the animal being captured.

NON-LETHAL METHODS (CHEMICAL)

Ketamine (Ketamine HCl) is a dissociative anesthetic that is used to capture wildlife, primarily mammals, birds, and reptiles. It is used to eliminate pain, calm fear, and allay anxiety. Ketamine is possibly the most versatile drug for chemical capture, and it has a wide safety margin (Fowler and Miller 1999). When used alone, this drug may produce muscle tension, resulting in shaking, staring, increased body heat, and, on occasion, seizures. Usually, ketamine is combined with other drugs such as xylazine. The combination of such drugs is used to control an animal, maximize the reduction of stress and pain, and increase human and animal safety.

Telazol (tiletamine) is another anesthetic used in wildlife capture. It is 2.5 to 5 times more potent than ketamine; therefore, it generally works faster and lasts longer. Currently, tiletamine can only be purchased as Telazol, which is a mixture of two drugs: tiletamine and zolazepam (a tranquilizer). Muscle tension varies with species. Telezol produces extensive muscle tension in dogs, but produces a more relaxed anesthesia in coyotes, wolves, and bears. It is often the drug of choice for these wild species (Fowler and Miller 1999).

Xylazine is a sedative (analgesic) that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with ketamine to produce a relaxed anesthesia. It can also be used alone to facilitate physical restraint. Because xylazine is not an anesthetic, sedated animals are usually responsive to stimuli. Therefore, personnel are even more attentive to minimizing sight, sound, and touch. When using ketamine/xylazine combinations, xylazine will usually overcome the tension produced by ketamine, resulting in a relaxed, anesthetized animal (Fowler and Miller 1999). This reduces heat production from muscle tension, but can lead to lower body temperatures when working in cold conditions.

Repellents are usually naturally occurring substances or chemicals formulated to be distasteful or to elicit pain or discomfort for target animals when they are smelled, tasted, or contacted. Many repellents are commercially available for mammals, and are registered primarily for herbivores such as rodents and deer. Repellents are not available for many species which may present damage problems, such as some predators or furbearing species. Repellents are variably effective and depend to a great extent on the resource to be protected, time and length of application, and sensitivity of the species causing damage. Acceptable levels of damage control are usually not realized unless repellents are used in conjunction with other techniques, as part of an integrated damage management program. In Wisconsin, repellents must be registered with Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP).

LETHAL METHODS (NON-CHEMICAL)

For reasons discussed above under “Relocation”, animals captured using the non-lethal capture methods are usually killed via gunshot, cervical dislocation, or one of the chemical euthanasia methods listed below. Other lethal mechanical methods are:

Body Gripping (Conibear) Traps are steel framed devices used to capture and quickly kill mammals, especially aquatic species. These traps come in a variety of sizes and may be used on land or in the water depending on trap size and state and local laws. The traps are made of two steel square frames that are hinged on two sides and have one or two springs.

Cervical Dislocation is sometimes used to euthanize small rodents which are captured in live traps and when relocation is not a feasible option. The animal is stretched and the neck is hyper-extended and dorsally twisted to separate the first cervical vertebrae from the skull. When done properly, the AVMA approves this technique as humane method of euthanasia and states that cervical dislocation is a humane technique for euthanasia of small rodents (Beaver et al. 2001). Cervical dislocation is a technique that may induce rapid unconsciousness, does not chemically contaminate tissue, and is rapidly accomplished (Beaver et al. 2001).

Shooting is selective for target species and may involve the use of spotlights, night vision, or thermal imagery. A handgun, shotgun or rifle may be utilized. Shooting is an effective method to remove a target number of mammals in damage situations. Removal of specific animals in the problem area can oftentimes provide immediate relief from a problem. Shooting is sometimes utilized as one of the first lethal damage management options because it offers the potential of resolving a problem more efficiently and selectively than some other methods. Shooting may sometimes be one of the only damage management options available if other factors preclude setting of damage management equipment. Firearm use may be a public concern because of issues relating to safety and 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 annually thereafter (WS Directive 2.615). WS employees, who carry firearms as a condition of employment, are required to meet criteria contained in the Lautenberg Amendment which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. WS activities where shooting is used include, but are not limited to, take of mammals in damage situations pursuant to WDNR authorization.

Surveillance and sharpshooting from helicopters has been a very effective method in removing feral swine across the US. Aerial surveillance would be conducted throughout the year by low level helicopter flight to determining presence of feral hogs prior to initiating other control methods. Aerial sharpshooting would be conducted during the winter (approximately January through March) after leaves have fallen from trees. Wildlife Services would not conduct aerial sharpshooting on a property without the consent of the landowner/manager. All aerial activities would be conducted in accordance with the policies established in WS Directive 2.62 – Aviation Safety and Operations and the WS Aviation Safety and Operations manuals. Aerial sharpshooting has been identified as a viable tool for feral swine management in the U.S. (Campbell et al. 2010, West et al. 2009). Reported removal rates for aerial removal of feral swine range from 9-39 swine per hour (Campbell et al. 2010, Saunders and Bryant 1988, Hone 1983). Differences in swine density, climate, terrain and plant cover account for most of the variation in capture rates. Although aerial sharpshooting is an expensive method, WS' experience with feral swine removals indicates that the staff time, travel time and labor required to achieve similar results using ground-based methods will likely make aerial sharpshooting a cost-effective option.

Snap traps are used to remove small rodents. The trap treadle is baited with peanut butter or other taste attractants and attached near the damage area. These traps pose no imminent danger to pets or the public. Snap traps are a commonly used to survey small rodent populations, such as mice and voles.

Sport Hunting/Trapping is sometimes recommended by WS as a viable damage management method when the target species can be legally hunted and/or trapped, and activities can meet site security and safety objectives. A valid hunting or trapping license and other licenses or permits may be required by the WDNR. This method provides sport, income and/or food for hunters/trappers and requires no cost to

the landowner. Sport hunting/trapping is occasionally recommended if it can be conducted safely for coyotes, feral hogs, bear, deer and other damage causing mammals.

LETHAL METHODS (CHEMICAL)

All chemicals used by WS are registered as required by US Department of Justice Drug Enforcement Administration (DEA) and DATCP. WS personnel that use restricted-use chemical methods are WS certified and are required to adhere to all certification requirements set forth in FIFRA and Wisconsin pesticide control laws and regulations. Chemicals are only used on private, public, or tribal property sites with authorization from the property owner/manager.

Potassium chloride, a common laboratory chemical, is injected by WS personnel as a euthanizing agent after an animal has been anesthetized.

Sodium Pentobarbital is a barbiturate that rapidly depresses the central nervous system to the point of respiratory arrest. There are DEA restrictions on who can possess and administer this drug. Some states may have additional requirements for personnel training and particular sodium pentobarbital products available for use in wildlife. Certified and trained WS personnel are authorized to use sodium pentobarbital and dilutions for euthanasia in accordance with DEA and state regulations.

APPENDIX D

STATE AND FEDERALLY-LISTED THREATENED AND ENDANGERED SPECIES IN WISCONSIN

* only on Federal list of Endangered Species
** also Federally Endangered
*** also Federally Threatened
**** only on Federal list of Threatened Species

MAMMALS

ENDANGERED

American Marten	*Martes americana*

THREATENED

Big brown bat	*Eptesicus fuscus*
Little brown bat	*Myotis lucifugus*
Northern long-eared bat	*Myotis septentrionalis*
Eastern pipistrelle	*Perimyotis subflavus*
Canada Lynx****	*Lynx canadaensis*

BIRDS

ENDANGERED

Upland Sandpiper	*Bartramia longicauda*
Piping Plover** (Critical Habitat*)	*Charadrius melodus*
Black Tern	*Chlidonias niger*
Yellow-throated Warbler	*Dendroica dominica*
Kirtland's Warbler**	*Dendroica kirtlandii*
Peregrine Falcon	*Falco peregrinus*
Worm-eating Warbler	*Helmitheros vermivorum*
Loggerhead Shrike	*Lanius ludovicianus*
Red-necked Grebe	*Podiceps grisegena*
Caspian Tern	*Sterna caspia*
Forster's Tern	*Sterna forsteri*
Common Tern	*Sterna hirundo*

FEDERAL EXPERIMENTAL NON-ESSENTIAL POPULATION

Whooping Cranes	*Grus americanus*

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*
Greater Prairie-Chicken	*Tympanuchus cupido pinnatus*
Bell's Vireo	*Vireo bellii*
Hooded Warbler	*Wilsonia citrine*

REPTILES & AMPHIBIANS

ENDANGERED

Blanchard's Cricket Frog	*Acris crepitans*
Slender Glass Lizard	*Ophisaurus attenuatus*
Queen Snake	*Regina septemvittata*
Massasauga Rattlesnake (Fed – Candidate)	*Sistrurus catenatus*
Ornate Box Turtle	*Terrapene ornata*
Western Ribbon Snake	*Thamnophis proximus*
Northern Ribbon Snake	*Thamnophis sauritus*

THREATENED

Wood Turtle	*Clemmys insculpta*

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	*Hybopsis 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 hyostoma*
River Redhorse	*Moxostoma carinatum*
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*
A Leafhopper	*Attenuipyga vanduzeei*
Swamp Metalmark	*Calephelis mutica*
Beach-dune tiger beetle	*Cicindela hirticollis rhodensis*
An Issid Planthopper	*Fitchiella robertsoni*
Ottoe skipper	*Hesperia ottoe*
Northern Blue Butterfly	*Lycaeides idas*
Karner blue butterfly *	*Lycaeides melissa samuelis*
Giant Carrion Beetle	*Nicrophorus americanus*
Powesheik Skipperling (Fed – Candidate)	*Oarisma powesheik*
Extra-striped Snaketail Dragonfly	*Ophiogomphus anomalus*
Saint Croix Snaketail Dragonfly	*Ophiogomphus susbehcha*
Silphium Borer Moth	*Papaipema silphii*
Phlox Moth	*Schinia indiana*
Warpaint Emerald Dragonfly	*Somatochlora incurvata*
Hine's Emerald Dragonfly** (Critical Habitat*)	*Somatochlora hineana*
Regal Fritillary	*Speyeria idalia*
Knobels Riffle Beetle	*Stenelmis knobeli*
Lake Huron Locust	*Trimerotropis huroniana*

THREATENED

Spatterdock Darner Dragonfly	*Rhionaeschna mutata*
Frosted Elfin	*Incisalia irus*
Prairie Leafhopper	*Polyamia dilata*

SNAILS

ENDANGERED

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

THREATENED

Wing Snaggletooth	*Gastrocopta procera*
Cherrystone 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 higginsi*
Yellow/Slough Sandshell	*Lampsilis teres*
Winged Mapleleaf**	*Quadrula fragosa*
Bullhead (Sheepnose) **	*Plethobasus cyphyus*
Fawnsfoot	*Truncilla donaciformis*
Rainbow	*Villosa iris*

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*
Early Anemone	*Anemone multifida* var. *multifida*
Large-leaved Sandwort	*Arenaria macrophylla*
Green Spleenwort	*Asplenium trichomanes-ramosum*
Lake Cress	*Armoracia lacustris*
Hoary Whitlow-cress	*Draba cana*
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	*Schoenoplectus hallii*
Netted Nut-rush	*Scleria reticularis*
Small Skullcap	*Scutellaria parvula*
Selago-like Spikemoss	*Selaginella selaginoides*
Fire Pink	*Silene viginica*
Blue-stemmed Goldenrod	*Solidago caesia*

THREATENED

Northern Monkshood***	*Aconitum noveboracense*
Muskroot	*Adoxa moschatellina*
Round Stemmed False Foxglove	*Agalinus gattingeri*
Small Round-leaved Orchis	*Amerorchis rotundifolia*
Dwarf Milkweed	*Asclepias ovalifolia*
Wooly Milkweed	*Asclepias lanuginosa*
Prairie Milkweed	*Asclepias sullivantii*
Pinnatifid Spleenwort	*Asplenium pinnatifidum*
Forked Aster	*Eurybia furcata*

Kitten Tails	*Besseya 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*
Prairie Thistle	*Cirsium hillii*
Dune Thistle (Pitcher's)***	*Cirsium pitcheri*
Rams-head Ladys-slipper	*Cypripedium arietinum*
White Ladys-slipper	*Cypripedium candidum*
English Sundew	*Drosera anglica*
Purple Milkweed	*Asclepias purpurascens*
Alpine Milk Vetch	*Astragalus alpinus*
Prairie Plum	*Astragalus crassicarpus*
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*
Hemlock-parsley	*Conioselinum chinense*
Obvate Beak Grass	*Diarrhena obovata*
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 Commandra	*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*
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*
Linear-leaved Sundew	*Drosera linearis*
Pale Purple Coneflower	*Echinacea pallida*
Beaked Spike Rush	*Eleocharis rostellata*
Thickspike Wheatgrass	*Elytrigia dasystachya ssp.psammophilus*
Western Fescue	*Festuca occidentalis*
Blue Ash	*Fraxinus quadrangulata*
Cliff Cudweed	*Pseudognaphalium 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*
Clustered Broomrape	*Orobanche fasciculata*
Marsh Grass-of-Parnassus	*Parnassia palustris*
Sweet Coltsfoot	*Petasites sagittatus*
Tubercled Orchid	*Platanthera flava*
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 oxyacanthoides* ssp. *oxyacanthoides*
Flat-leaved Willow	*Salix planifolia* ssp. *planifolia*
Tussock Bulrush	*Trichophorum cespitosum*
Plains Ragwort	*Packera indecorus*
Dune Goldenrod	*Solidago simplex* var. *gilmanii*
Clustered Bur Reed	*Sparganium glomeratum*
False Asphodel	*Triantha glutinosa*
Snow Trillium	*Trillium nivale*
Spike Trisetum	*Trisetum spicatum*
Marsh Valerian	*Valeriana sitchensis*
Mead's milkweed****	*Asclepias meadii*