ENVIRONMENTAL ASSESSMENT

MAMMAL DAMAGE MANAGEMENT IN PENNSYLVANIA

UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)
ANIMAL AND PLANT HEALTH INSPECTION SERVICE (APHIS)
WILDLIFE SERVICES (WS)

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ACRONYMS

ADC	Animal Damage Control
AMDUCA	Animal Medicinal Drug Use Clarification Act
APHIS	Animal and Plant Health Inspection Service
ATF	Bureau of Alcohol, Tobacco, and Firearms
AVMA	American Veterinary Medical Association
BMP	Best Management Practice
CDC	Centers for Disease Control and Prevention
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COE	U.S. Corps of Engineers
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ERO	Eastern Regional Office
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FEIS	Final Environmental Impact Statement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
GPRA	Government Performance Results Act of 1993
IPM	Integrated Pest Management
IWDM	Integrated Wildlife Damage Management
MDM	Mammal Damage Management
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOA	Notice Of Availability
NRCS	Natural Resources Conservation Service
NWRC	National Wildlife Research Center
ORV	Oral Rabies Vaccination
OSHA	Occupational Safety and Health Administration
PDA	Pennsylvania Department of Agriculture
PEP	Post - Exposure Prophylaxis
PETA	People for the Ethical Treatment of Animals
PGC	Pennsylvania Game Commission
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
TNR	Trap, Neuter, Release Program
USC	United States Code
USDA	U.S. Department of Agriculture
USDC	U.S. Department of Commerce

USDI	U.S. Department of Interior
USGS	U. S. Geological Survey
USFWS	U.S. Fish and Wildlife Services
WDM	Wildlife Damage Management
WS	Wildlife Service

1.0 CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

Across the United States, wildlife habitat has substantially changed as human populations have expanded and land has been transformed to meet varying human needs. These changes often compete with wildlife and have inherently increased the potential for conflicts between wildlife and people. Some species of wildlife have adapted to, and thrive in, the presence of humans and the changes that have been made. These species, in particular, are often responsible for the majority of conflicts between humans and wildlife. The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Animal Damage Control (ADC) Final Environmental Impact Statement (FEIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (USDA 1997):

> *"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife generally is 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."*

The United States Department of Agriculture is authorized to protect American agriculture and other resources from damage associated with wildlife. This function is carried out by the USDA, APHIS, Wildlife Services[1] (WS) program. The primary authorities for the WS program come from the Act of March 2, 1931, (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). WS activities are conducted in cooperation with other Federal, State, and Local agencies, as well as private organizations and individuals. This Environmental Assessment (EA) evaluates a portion of this responsibility, specifically, management of damage caused by mammals in Pennsylvania.

Wildlife damage management (WDM), or control, is defined as the alleviation of damage or other problems caused by wildlife (Leopold 1933, The Wildlife Society 1990, Berryman 1991). WS uses an Integrated WDM (IWDM) approach (sometimes referred to as "Integrated Pest Management") and is described in Volume 4, Chapter 1, pages 1-7 of the WS FEIS (USDA 1997). This includes nonlethal strategies such as the modification of habitat or the behavior of the offending animal(s), and lethal control of the offending animal(s) or local populations of the offending species. IWDM is not based on punishing animals, but provides a means of reducing future losses or damage.

[1] Wildlife Services was previously known as the Animal Damage Control program. The name change became effective in 1997. Throughout this document, the acronyms “ADC” and “WS” refer to the same federally authorized program.

This EA documents the analysis of the potential environmental effects of a proposed mammal damage management (MDM) program. This analysis relies on data contained in published documents (Appendix A), including the *Animal Damage Control Program Final Environmental Impact Statement* (USDA 1997). The FEIS contains detailed discussions of potential environmental impacts from methods that are used for MDM in Pennsylvania. The FEIS may be obtained by contacting the USDA, APHIS, WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

Wildlife Services' mission, developed through a strategic planning process, is to *"provide leadership in wildlife damage management for the protection of America's agricultural, industrial and natural resources, and to safeguard public health and safety"* (USDA 1989). This is accomplished through:

- training of wildlife damage management professionals;
- development and improvement of strategies to reduce economic losses and threats to humans from wildlife;
- the collection, evaluation, and dissemination of management information;
- cooperative wildlife damage management programs;
- informing and educating the public on how to reduce wildlife damage; and
- providing technical advice and a source for limited-use management materials and equipment such as pesticides, cage traps, and pyrotechnics.

Wildlife Services' Policy Manual[2] reflects this mission and provides guidance for engaging in WDM activities. Before WDM is conducted, *Agreements for Control* or *WS Annual Work Plans* must be signed by WS and the land owner / administrator / agency representative. WS cooperates with land managers and wildlife management agencies when appropriate and as requested, to combine efforts to effectively and efficiently resolve wildlife damage problems in compliance with all applicable Federal, State, and Local laws and Memoranda of Understanding (MOUs) between WS and other agencies.

1.2 PURPOSE

This EA analyzes effects of a MDM in Pennsylvania as it relates to the protection of agriculture, property, natural resources, and human health and safety. These problems are resolved on a case-by-case basis. Normally, according to the APHIS procedures for implementing NEPA, individual wildlife damage management actions may be categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6,000-6,003, 1995). We have decided 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 cumulative effects.

Mammal species addressed in this EA include: red foxes (*Vulpes vulpes*), raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), woodchucks (*Marmota monax*), feral cats (*Felis*

[2]**WS Policy Manual** - Provides guidance for WS personnel to conduct wildlife damage management activities through Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Section.

catus), little brown bat (*Myotis lucifugus*), Northern long-eared bat (*Myotis septentrionalis*), Indiana bat (*Myotis sodalisi*), small-footed bat (*Myotis leibii*), silver-haired bat (*Lasionycteris noctivagans*), Eastern pipistrelle (*Pipistrellus subflavus*), big brown bat (*Eptesicus fuscus*), red bat (*Lasiurus borealis*), and hoary bat (*Lasiurus cinereus*).

1.3 NEED FOR ACTION

1.3.1 Summary of Proposed Action

The proposed action is to continue the current portion of the WS program in Pennsylvania that responds to requests for MDM to protect agriculture, human health and safety, natural resources, and property in Pennsylvania. One component of MDM in the Pennsylvania WS program has the goal of minimizing human health and safety threats and property damage at airports and other urban and rural environments. Another component is aimed at reducing losses or the risk of loss to agricultural crops and any other agriculture-related resource. Damage caused by mammal species to natural resources, including threatened and endangered species, wildlife, natural flora, parklands, recreation areas, peculiar habitats, etc. may be addressed through programs conducted by WS. Elimination or alleviation of damage to property such as residential and non-residential buildings, landscape plantings, golf courses, grasses and turf, pets, zoo animals, or any other properties would be an objective of WS MDM programs contemplated under this EA.

To meet these goals, WS's objective would be to attempt to respond to all requests for assistance with, at a minimum, technical assistance or self-help advice, or, where appropriate and when cooperative or congressional funding is available, direct damage management assistance in which professional WS Wildlife Biologists or Specialists conduct damage management actions. An Integrated Wildlife Damage Management approach would be implemented which would allow use of any legal technique or method, used singly or in combination, to meet requester needs for resolving conflicts with mammals. Lethal methods include shooting, trapping, snaring, and FDA or EPA approved chemicals. Nonlethal methods include fencing, netting, deterrents/repellents, exclusion, harassment, habitat alteration, or live-capture and translocation. However, non-lethal methods would not always be applied as a first response to each damage problem. The most appropriate response would often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. In many situations, the implementation of nonlethal methods such as exclusion-type barriers would be the responsibility of the requester which means that, in those situations, WS's only function would be to implement lethal methods if determined to be necessary. Definitive objectives of the WS MDM program in Pennsylvania are discussed in Chapter 3 of this document. Appendix B provides a more detailed description of the methods that could be used or recommended by WS under the proposed action.

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

A considerable threat to human health is at times presented by disease organisms or parasites carried by some mammals which are transmissible or infectious to humans. These include

viral, bacterial, mycotic (fungal), protozoal and rickettsial diseases. Table1.1 shows the more typical diseases affecting humans that can be transmitted by mammals in addition to diseases which affect other animals, including domestic species.

Table 1.1. Wildlife Diseases That Pose Potential Human Health Risks in the Eastern United States (Davidson and Nettles 1997)

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, foxes, skunks, bats)
Visceral larval migrans	nematode (*Baylisascaris procyonis)*	raccoons, skunks
Leptospirosis	bacteria (*Leptospira interrogans*) over 180 different serovars	All mammals
Echinococcus infection	tapeworm (*Echinococcus multilocularis)*	foxes, coyotes
Bovine Brucellosis	bacterium (*Brucela abortus)*	cattle (evidence from Texas that organism has infected coyotes that scavenged aborted fetuses and placentas of infected cattle)
Toxoplasmosis	protozoan parasite (*Toxoplasma ondii)*	cats 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 lamblia, G. Duodenalis,* and other Giardia sp.-taxonomy controversial)	beavers, coyotes, dogs, cats

Individuals or property owners that request assistance with mammals frequently are concerned about potential disease risks but are unaware of the types of diseases that can be transmitted by these animals. In these types of situations, MDM is requested because of a perceived risk to human health or safety associated with wild animals living in close association with humans, from animals acting out of character by roving in human-inhabited areas during daylight, or from animals showing no fear when humans are present. Under the proposed action, WS could agree to assist in resolving these types of problems.

In many circumstances when human health concerns are the primary reason for requesting MDM there may have been no actual cases of transmission of disease to humans by mammals. Thus, it is the risk of disease transmission that is the primary reason for requesting and conducting MDM activities. Situations in Pennsylvania where the threat of disease associated with wild or feral mammal populations include:

- Exposure by residents to the threat of raccoon rabies due to high populations of raccoons in urban settings or from companion animals coming in contact with infected raccoons.
- Accumulated fecal droppings from denning or foraging raccoons resulting in subsequent human exposure to raccoon roundworms in a suburban community or at an industrial site where humans must work or live.
- Exposure of humans to threats of rabies posed by skunks denning and foraging in a residential community.
- Threats of parasitic infections to humans from *Giardia* spp. resulting from high feral cat populations in a park or recreation area.

Rabies is an acute, fatal viral disease of mammals most often transmitted through the bite of a rabid animal and poses a direct threat to humans. The disease can be effectively prevented in humans and many domestic animals species, but abundant and widely distributed reservoirs among wild mammals complicate rabies control. The vast majority of rabies cases reported to the Centers for Disease Control and Prevention (CDC) each year occur in raccoons, skunks (primarily *Mephitis mephitis*), and bats (Order *Chiroptera*) (USDA 2001).

Raccoons have been associated with the spread of rabies in states throughout the East, including states adjacent to Pennsylvania (USDA 2001, B. Dunlap, WS, pers. comm., 2003). Raccoon rabies was first reported in Pennsylvania in 1982 with the first documented cases occurring in Bedford, Fulton, and Franklin Counties. Twelve years later raccoon rabies had become enzootic throughout the Commonwealth's 67 counties (WS 2004). Since 1995, approximately 400 wild animals are positively diagnosed for rabies annually in Pennsylvania (WS 2004).

Skunks are also an important wildlife host for rabies virus in North America and are second only to raccoons in being the most commonly reported rabid wildlife species in the United States (Majumdar 2005). The skunk strain of rabies may be found in the Midwest and California, however skunks found throughout North America may be infected with different strains of rabies such as the raccoon strain. The distribution of rabies in skunks therefore extends from Georgia to Maine east of the Appalachians, Texas to the Canadian border, and

throughout the northern two thirds of California (Majumdar 2005). The fox is one of the four major maintenance hosts for rabies in North America. In the 1950's, rabies in red foxes spread throughout Canada, parts of New England, and Alaska. This range has since decreased, but fox rabies still persists in Alaska. Clinical signs of rabies in foxes often manifest as the "furious" form of rabies (Majumdar 2005).

Over the last 100 years, 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 2001a.). Before 1960 the majority of cases were reported in domestic animals. The principal rabies hosts today are wild carnivores and bats. The number of rabies-related human deaths in the U.S. has declined from more than 100 annually at the turn of the century to an average of one or two people per year in the 1990's. 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 2001a). In the U.S., 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. These 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 2001a).

Accurate estimates of the aforementioned expenditures are not available. Although the number of PEPs given in the U.S. each year is unknown, it is estimated to be about 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 2001a) 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 increase. One case in Massachusetts involving contact with, or drinking milk from, a single rabid cow required PEPs for a total of 71 persons (CDC 2001b). 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 U.S. occurred in 1994 when a kitten from a pet store in Concord, NH tested positive for rabies after a brief illness. As a result of potential exposure to this kitten or to other potentially rabid animals in the store, at least 665 persons received post-exposure rabies vaccinations at a total cost of 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 (JAVMA 2004).

Raccoon rabies presents a human health threat through potential direct exposure to rabid raccoons, or indirectly through the exposure of pets that had an encounter with rabid raccoons. Additionally, the number of pets and livestock examined and vaccinated for rabies, the number of diagnostic tests requested, and the number of post exposure treatments are all greater when raccoon rabies is present in the area. Human and financial resources

allocated to rabies-related human and animal health needs also increase, often at the expense of other important activities and services.

Rabies in raccoons was virtually unknown prior to the 1950's. It was first described in Florida and spread slowly during the next three decades into Georgia, Alabama, and South Carolina. It was unintentionally introduced into the Mid-Atlantic States, probably by translocation of infected animals (Krebs et al.1998). The first cases appeared in West Virginia and Virginia in 1977 and 1978. Since then raccoon rabies in the area expanded to form the most intensive rabies outbreak in the U.S. The strain is now enzootic in all of the eastern coastal states, as well as Alabama, Pennsylvania, Vermont, West Virginia, and most recently, parts of Ohio (Krebs et al. 2000). The raccoon rabies epizootic front reached Maine in 1994, reflecting a movement rate of about 30-35 miles per year. The westward movement of the raccoon rabies front has slowed, probably in response to both natural geographic and man-made barriers. The Appalachian Mountains and perhaps river systems flowing eastward have helped confine the raccoon variant to the eastern U.S. If the "immune barrier" is breached by raccoon rabies, research suggests that raccoon populations are sufficient (Sanderson and Huber 1982, Glueck et al. 1988, Hasbrouck et al. 1992, Mosillo et al. 1999) for rabies to spread westward along a front at a rate similar to or greater than the rate at which this rabies strain has spread in the eastern U.S.

In an effort to combat the raccoon variant of the rabies virus, the first oral rabies vaccine (ORV) baits (i.e. fishmeal polymer, containing Raboral V-RG® vaccine [Merial, Athens, Georgia, USA]) were distributed by WS in Pennsylvania during the fall of 2001. Over 138,600 baits were hand distributed across 1,875 km^2 within 2 counties, in the northwest corner of the Commonwealth. Pennsylvania expanded its baiting program in 2002 and 2003 to cover 25,189 km^2 in 18 western counties bordering Maryland, Ohio, and West Virginia. In 2004, Pennsylvania WS distributed baits across 24,016 km^2 in addition to the 543 km^2 naïve area in Cambria, Indiana, Somerset, and Westmoreland counties. The naïve area in Pennsylvania was baited in the spring of 2004 as a spring bait efficacy study coupled with a raccoon density study. Over 4.8 million ORV baits have been distributed in Pennsylvania since baiting began in 2001. The Pennsylvania Department of Agriculture (PDA) provided the state leadership for the baiting effort. WS provided wildlife management leadership and contributed considerable funding. Pennsylvania's baiting effort is part of a larger Appalachian Ridge ORV effort, which in 2004, included Maryland, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia.

Increased populations of raccoons have been implicated in the outbreak of distemper in certain areas (Majumdar 2005). Distemper has not been identified as transmissible to humans, but urban residents who observe sick raccoons on their property often feel threatened. There is an increased risk that people may be bitten because affected animals often lose their fear of humans and can act aggressively.

Diseases and parasites affecting feral cats can have human health implications. Pregnant women; people receiving chemotherapy for immunologic diseases and organ transplants; and those with HIV, AIDS, or other immunologic problems are at increased risk of clinical disease if exposed to toxoplamosis (JAVMA 2004). In 1994, 5 Florida children were

hospitalized with encephalitis that was associated with cat scratch fever (JAVMA 2004). The daycare center at the University of Hawaii in Manoa was closed for 2 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 has grown from 100 to over 1,000 cats, despite a Trap Neuter and Release effort (JAVMA 2004).

A study in France determined that stray cats serve as major reservoirs for the bacterium Bartonella spp. Consequently, stray cats and their fleas (*Ctenocephalides felis*) 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 dog rabies has been eliminated., but rabies in wildlife has not, cats often are the most significant animal transmitting rabies to humans (Eng and Fishbein 1990; Krebs et al. 1996; Vaughn 1976).

As part of the proposed program, WS could provide MDM assistance, upon request, involving target mammal species that poses a threat to human health and safety to any requester experiencing such damage throughout Pennsylvania.

1.3.3 Need for Mammal Damage Management at Airports

The risk that mammals pose to aircraft is well documented (USDOT 1997). Data kept by the Federal Aviation Administration (FAA) shows that civil aircraft nationwide incurred 1,272 strikes with mammals between 1990 and 2003 (http://wildlife-mitigation.tc.faa.gov). The number of mammal strikes actually occurring is likely to be much greater, since an estimated 80% of civil wildlife strikes go unreported (Cleary et al. 2000). Civil and military aircraft have collided with a diversity of mammal species, including raccoons, red fox, woodchucks, cats, and striped skunks (http://wildlife-mitigation.tc.faa.gov). Costs of these collisions vary, but FAA data reveals that mammal strikes in the U. S. cost the civil aviation industry approximately 121,272 hours of down time, and $23,276,153 in direct monetary losses between 1990 and 2001 (http://wildlife-mitigation.tc.faa.gov). Data indicates a much higher percentage of mammal strikes resulted in aircraft damage than did bird strikes. About 68% of mammal strikes resulted in damage compared to 19% for birds (USDOT 2000). In addition to damages caused by mammal strikes to aircraft, these incidents sometimes pose serious threats to human safety. From 1990-2001, one human death resulting from aircraft striking mammals was reported in the U. S. (http://wildlife-mitigation.tc.faa.gov).

According to the FAA, from 1990 to 2004, there were 7 aircraft strikes caused by woodchucks and 5 aircraft strikes caused by fox in Pennsylvania (http://wildlife-mitigation.tc.faa.gov).

WS receives requests for assistance regarding mammal damage management at airport facilities in Pennsylvania. These requests are considered serious because of the potential for

loss of human life and because damage to aircraft can be extremely expensive. As part of the proposed program, WS could provide operational MDM involving target mammal species that poses a strike hazard at the request of any aviation facility in the Commonwealth.

1.3.4 Need for Mammal Damage Management to Protect Agricultural Resources, including Crops, Livestock and Pets.

During 2001, crop and livestock losses from wildlife in the United States totaled $944 million, with field crop losses totaling $619 million, livestock and poultry losses totaling $178 million, and losses of vegetables, fruits and nuts totaling $146 million. These losses include destruction of or damage to crops in the field and death or injury to livestock. In 2001, it was reported that raccoons were responsible for 6%, 3%, and 6% of the total damage to field crops; livestock and poultry; and vegetables, fruits, and nuts, respectively, in the United States (NASS 2002).

The domestic cat has been found to transmit *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 the protozoan parasite, *Toxoplasmosis gondii* (Dubey 1973; Teutsch et al. 1979). Both stray and domiciled 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. The authors also found *Sarcocystis* spp. contamination in the musculature of sheep. Dubey et al. (1995) found cats to be 68.3% positive for seroprevalence of *Toxoplasma gondii* on swine farms in Illinois and the major reservoir for this disease. The main sources for infecting cats are thought to be birds and mice.

Diseases that may be communicable from free-ranging or feral cats to pet cats include feline panleukopenia (FPL) infection, feline calicivirus (FCV) infection, feline reovirus (FRV) infection, and feline syncytium-forming virus (FSV) infection (Gillespie and Scott 1973). Of the four feline diseases, feline panleukopenia is considered to be the most serious. Reif (1976) found that during the acute stages of feline panleukopenia, fleas were vectors of this disease to other cats. FPL infection is cyclic in nature, being more prevalent in the July to September time period.

1.3.5 Need for Mammal Damage Management to Protect Natural Resources Including Threatened and Endangered Species

Natural resources may be described as those assets belonging to the public and often managed and held in trust by government agencies as representatives of the people. Such resources may be plants or animals, including threatened and endangered species; historic properties; or habitats in general. Examples of natural resources in Pennsylvania 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.

Sometimes activities of mammals cause damage to natural resources. This most frequently occurs in relation to plants or animals, including but not limited to trees, natural vegetation, mammals, and birds. Mammals causing damage are frequently locally overabundant at the damage site and threaten the welfare of a species population identified as a natural resource. An example of this would be a local ground-nesting game bird population which is being decimated by the presence of mammalian carnivores, such as raccoons, feral cats, or foxes.

Some of the species listed as threatened or endangered under the Endangered Species Act of 1973 are preyed upon or otherwise adversely affected by certain mammal species. In Fiscal Year (FY) 2001, the WS program nationwide actively protected 144 Federal and State listed threatened and endangered (T&E) species. More than 95 percent of these projects resulted in the increase or maintenance of local threatened and endangered species populations. In 2001, Alaska's Aleutian Canada goose (*Branta canadensis leucopareia*) was officially removed from the list of federally threatened species, due in part to WS' efforts to prevent predation by the artic fox (*Alopex lagopus*). In Florida alone, WS protects 14 threatened and endangered species, including five species of sea turtles from raccoon, coyote, and skunk predation (B. Constantin, WS, pers. comm., 2003). Other instances where WS was requested to assist in developing programs to safeguard the survival of endangered species include protection of adult and young least terns and snowy plovers (*Charadrius alexandrinus*) in California from predation by raccoons, coyotes, and skunks (J. Turman, M. Jensen WS, pers. comm., 2003), protection of juvenile salmonoids (steelhead and salmon) in Washington from river otters (*Lutra canadensis*) (B. Dunlap, K. Gruver, WS, pers. comm., 2003), protection of Sierra Nevada Bighorn sheep (*Ovis canadensis*) from mountain lion (*Felis concolor*) predation in California (B. Dunlap, WS, pers. comm., 2003). Threatened and Endangered species, such as the Eastern woodrat, least shrew, and sedge wren have the potential to be adversely impacted by mammals, mainly feral cats, in Pennsylvania.

Woodchucks may cause damage to the grounds of historic sites. They can damage the earthworks of historic battlefields by their burrowing activity. The burrows create large tunnels that accelerate erosion and may lead to the collapse of these features. They allow rainwater to enter which further undermines the structures. The burrows themselves are also a trip hazard to visitors at these sites (T. Hogan, NPS, pers. comm., 2003).

Scientists estimate that nationwide cats kill hundreds of millions of birds and more than a billion small mammals, such as rabbits, squirrels, and chipmunks, each year. Cats kill common species such as cardinal, blue jay, and house wren, as well as rare and endangered species such as piping plover, Florida scrub-jay, and California Least Tern (ABC 2005). Some free-roaming cats kill more than 100 animals each year. One well-fed cat that roamed a wildlife experiment station was recorded to have killed more than 1,600 animals (mostly small mammals) over 18 months (ABC 2005). Researchers at the University of Wisconsin coupled their four-year cat predation study with the data from other studies, and estimated that rural free-roaming cats kill at least 7.8 million and perhaps as many as 217 million birds a year in Wisconsin. In some parts of the state, free-roaming cat densities reach 114 cats per square mile, outnumbering all similar-sized native predators (Coleman et al 1997). Churcher and Lawton (1989) observed 77 well fed free-ranging cats in a Britain village for 1 year. The authors estimated that 30% to 50% of a cat's catch was birds and that the cats had

significantly affected house sparrow populations within the village. Based on information acquired in this study, it was estimated that more than 20 million birds are killed by cats in Britain each year with more than 70 million animals overall being taken by cats annually.

The diet of feral and free-ranging cats varies depending on availability, abundance, and geographic location. In a survey of New Zealand scientific literature, Fitzgerald (1990) concluded that prey selection of feral and free-ranging cats is dependent on availability. The author found that cats on mainland situations fed most heavily on mammals; where as, cats on islands fed almost exclusively on birds (particularly seabirds). Feral and free-ranging cats are known to prey on birds as large as mallard ducks (Figley and VanDruff 1982) and young brown pelicans (Anderson et al. 1989) and mammals as large as hares and rabbits. Many of these cat populations rely heavily on humans, either for handouts and/or garbage. Pearson (1971) found that cats were serious predators of California voles and that the greatest pressure on voles occurred when vole numbers were lowest. Liberg (1984) found that cats in southern Sweden fed predominantly on native mammals. Prey use was based more on availability than abundance. Langham (1990) found that mammals made up 74% of diets of New Zealand farmland feral cats, while 24% were birds. Cats fed most heavily on the most abundant species and groups. A study on a southern Illinois farmstead concluded that well fed cats preferred microtine rodents, however, they also consumed birds (George 1978). Microtine rodents are particularly susceptible to over harvest by cats and other predators (Pearson 1964). Common and Burner (1972) found that small mammals were the primary food item for feral cats in Victoria, Australia. Prey selection was directly related to proximity of cats to human habitation. Pearson (1964) found rodents composed a large portion of a cat's diet. Some people view cat predation of rodents as beneficial, but native small mammals are important to maintaining biologically diverse ecosystems. Field mice and shrews are also important prey for birds such as great horned owls and red-tailed hawks (ABC 2005).

Reptiles are thought to provide an important food source to cats when birds and mammals are less abundant, and in some situations cats have been observed to prey on threatened species of reptiles. Domesticated cats have been identified as significant nest and/or hatchling predators of sea turtles. A study in Aldabra Atoll, Seychelles, found feral cat predation to have a significant impact on green turtle hatchlings. Seabrook (1989) found a positive correlation in cat activity and green turtle nesting at Aldabra Atoll ($r=646$, $d.f.=21$, $P<0.001$). Cats are known to have contributed to the near extirpation of the West Indian rock iguana (*Cyclura carinata*) on Pine Cay in the Caicos Islands (Iverson 1978).

Cats can have significant impacts on local wildlife populations, especially in habitat "islands" such as suburban and urban parks, wildlife refuges, and other areas surrounded by human development. The loss of bird species from habitat islands is well documented, and nest predation is an important cause of the decline of neotropical migrants (ABC 2005). A two year study was conducted in two parks with grassland habitat. One park had no cats but more than 25 cats were being fed daily in the other park. There were almost twice as many birds seen in the park with no cats as in the park with cats. California thrasher and California quail, both ground-nesting birds, were seen during surveys in the no-cat area, whereas they were never seen in the cat area. In addition, more than 85% of the native seer mice and

harvest mice trapped were in the no-cat area, whereas 79% of the house mice, an exotic pest species, were trapped in the cat area. The researchers concluded, "Cats at artificially high densities, sustained by supplemental feeding, reduce abundance of native rodent and bird populations, change the rodent species composition, and many facilitate the expansion of the house mouse into new areas." (Hawkins et al 1999).

Childs (1991) and Childs (1986) found that urban/city cats use of rats is size limiting. Few rats of reproductive size or age were preyed on by domesticated cats. In rural areas, rats were more vulnerable to cat predation for longer periods of time. The duration of susceptibility of rats to predation is attributed to abundance of garbage and artificial food sources in the urban/city environment. Artificial feeding of cats also reduces predation to non-native rodents because of size differences in urban rats. In rural setting, cats can control rat populations for longer durations but ultimate suppression of population growth is achieved via chemicals (poisons). Jackson (1951) found feral and free-ranging cats in Baltimore, Maryland urban areas were insignificant predators of Norway rats (*Rattus norvegicus*). The largest percentage of ingested food was comprised of garbage. It was estimated that a cat in the study area would consume roughly 28 rats per year.

Impacts from cat predation are not always direct, but indirect in the form of competition for food resources. George (1974) speculated that domestic cats were not a direct limiting factor on bird populations. However, the author did find evidence indicating cats indirectly could affect some birds-of-prey by competing for a limited resource (primarily microtine rodents).

WS has received requests in the past for assistance in resolving mammal damage and conflicts caused to natural resources in Pennsylvania. As part of the proposed program, WS could provide MDM assistance, upon request, involving target mammal species to any requester experiencing such damage throughout Pennsylvania.

1.3.6 Need for Mammal Damage Management to Protect Property

Mammals cause damage to a variety of property types in Pennsylvania each year. Woodchuck burrowing and gnawing can cause damage to underground wiring at electrical facilities and cause electronic targets to malfunction at military installations. Raccoons, skunks, and woodchucks can cause damage to property by digging under porches, buildings, homes, and many other places. WS has received requests in the past for assistance in resolving mammal damage and conflicts caused to property in Pennsylvania. As part of the proposed program, WS could provide MDM assistance, upon request, involving target mammal species to any requester experiencing such damage throughout Pennsylvania.

1.4 WS RECORD KEEPING REGARDING REQUESTS FOR MAMMAL DAMAGE MANAGEMENT ASSISTANCE

WS maintains a Management Information System (MIS) database to document assistance that the agency provides in addressing wildlife damage conflicts. MIS data is limited to information that is collected from people who have requested services or information from Wildlife Services. It does not include requests received or responded to by local, State or other Federal agencies,

and it is not a complete database for all wildlife damage occurrences. The number of requests for assistance does not necessarily reflect the extent of need for action, but this data does provide an indication that needs exist. The database includes, but is not limited to, the following information: species of wildlife involved, the number of individuals involved in a damage situation; tools and methods used or recommended to alleviate the conflict; and the resource that is in need of protection. Table 1.2 shows the number of people that requested information from PA WS regarding wildlife damage, the species that was involved in the damage, and the resource category being damaged.

Table 1.2. Technical Assistance Projects for PA WS from 2002-2005.

	Resource Category Damaged				
SPECIES	Agriculture	Health & Safety	Property	Natural Resources	TOTAL
Bats (All)	0	5	3	0	8
Feral Cats	0	5	1	0	6
Red Fox	1	3	2	0	6
Woodchucks	0	2	6	0	8
Raccoons	2	118	5	0	125
Striped Skunk	1	11	5	0	17

1.5 RELATIONSHIP OF THIS EA TO OTHER ENVIRONMENTAL DOCUMENTS

1.5.1 ADC Programmatic Environmental Impact Statement

WS has issued a Final Environmental Impact Statement (FEIS) on the national APHIS/WS program (USDA 1997). Pertinent information available in the FEIS has been incorporated by reference into this EA.

1.5.2 Environmental Assessment and Finding of No Significant Impact – Oral Vaccination to Control Specific Rabies Virus Variants in Raccoons, Gray Foxes, and Coyotes in the United States

This EA (USDA 2001) and its subsequent Finding of No Significant Impacts analyzed the environmental effects of APHIS/WS involvement in the funding of and participation in Oral Rabies Vaccination programs to eliminate or stop the spread of raccoon rabies in a number of eastern states (including Pennsylvania) and gray fox and coyote rabies in Texas. APHIS/WS determined the action would not have any significant impact on the quality of the human environment. Pertinent information from this document has been incorporated by reference into this EA.

1.6 DECISION TO BE MADE

Based on the scope of this EA, the decisions to be made are:

- Should MDM as currently implemented by the WS program be continued in the Commonwealth?
- If not, how should mammal damage in the Commonwealth be managed and what role should WS play in this management?
- Might the continuing of WS's current program of MDM have significant effects requiring preparation of an EIS?

1.7 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

1.7.1 Actions Analyzed

This EA evaluates mammal damage management by WS to protect agriculture; human health and safety; natural resources, including threatened and endangered species and other wildlife; and property on private land or public facilities within the Commonwealth wherever such management is requested from the WS program. Protection of other resources or other program activities would be addressed in other NEPA analysis, as appropriate.

1.7.2 Period for Which This EA is Valid

This EA will remain valid until WS determines that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document will be reviewed and revised as necessary. This process insures the EA is complete and still appropriate to the scope of Pennsylvania's MDM activities. Review of the EA would be conducted each year to ensure that the EA is sufficient.

1.7.3 Site Specificity

This EA analyzes the potential impacts of MDM and addresses activities on all lands in Pennsylvania under MOUs, Cooperative Agreements and in cooperation with the appropriate public land management agencies. It also addresses the impacts of MDM on areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional MDM efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

Planning for the management of mammal damage must be viewed as being conceptually similar to the actions of federal or other agencies whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, insurance companies, etc. Although some of the sites where mammal damage will occur can be predicted, all specific locations or times where such damage will occur in any given year cannot be predicted. This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever mammal damage and resulting management occurs, and are treated as such. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual

actions conducted by WS in Pennsylvania (see Chapter 3 for a description of the Decision Model and its application).

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

1.7.4 American Indian Lands and Tribes

Currently, Pennsylvania WS has no MOUs with any American Indian tribe. If WS enters into an agreement with a tribe for MDM, this EA would be reviewed and supplemented if appropriate to insure compliance with NEPA. MOUs, agreements and NEPA compliance would be conducted as appropriate before conducting MDM on tribal lands.

1.7. 5 Summary of Public Involvement

Issues related to the proposed action were initially developed by WS. Issues were defined and preliminary alternatives were identified. As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS-NEPA implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings of NOA to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

1.8 AUTHORITY AND COMPLIANCE

1.8.1 Authority of Federal and State Agencies in Mammal Damage Management in Pennsylvania[3]

1.8.1.1 WS Legislative Authorities

The primary statutory authority for the Wildlife Services program is 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), which provides that:

> *"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001"*

[3]See Chapter 1 of USDA (1994) for a complete discussion of Federal laws pertaining to WS.

Since 1931, with the changes in societal values, WS policies and programs place greater emphasis on the part of the Act discussing "*bringing (damage) under control*," rather than "*eradication*" and "*suppression*" of wildlife populations. In 1988, Congress strengthened the legislative mandate of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

> *"That hereafter, the Secretary of Agriculture is authorized., except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammal and bird species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."*

1.8.1.2 Pennsylvania Game Commission (PGC)

The Pennsylvania Game Commission is charged by law 322(a) Title 34 “to protect, propagate, manage, and preserve the game or wildlife of this Commonwealth and to enforce, by proper actions and proceedings, the law of this Commonwealth relating thereto.”

1.8.1.3 Pennsylvania Department of Agriculture (PDA)

The Division of Health and Safety of PDA enforces state laws pertaining to the use and application of pesticides. Under the Pennsylvania Pesticide Use and Application Act this section monitors the use of pesticides in a variety of pest management situations. It also licenses private and commercial pesticide applicators and pesticide contractors. Under the Pennsylvania Pesticide Control Act the division licenses restricted use pesticide dealers and registers all pesticides for sale and distribution in Pennsylvania.

The PDA currently has a MOU with WS, which establishes a cooperative relationship between WS and the PDA, outlines responsibilities, and sets forth annual objectives and goals of each agency for resolving wildlife damage management conflicts in Pennsylvania.

1.8.1.4 U.S. Fish and Wildlife Service (USFWS)

The USFWS authority for action is based on the Migratory Bird Treaty Act of 1918 (as amended), which implements treaties with the United States, Great Britain (for Canada), the United Mexican States, Japan, and the Soviet Union. Section 3 of this Act authorized the Secretary of Agriculture:

“From time to time, having due regard to the zones of temperature and distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of

such birds, to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the convention to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President."

The authority of the Secretary of Agriculture with respect to the Migratory Bird Treaty was transferred to the Secretary of the Interior in 1939 pursuant to Reorganization Plan No. II. Section 4(f), 4 Fed. Reg. 2731, 53 Stat. 1433.

CFR 50 Subchapter C - The National Wildlife Refuge System - Part 30 - Feral Animals Subpart B-30.11 - Control of feral animals states: (a) Feral animals, including horses, burros, cattle, swine, sheep, goats, reindeer, dogs, and cats, without ownership that have reverted to the wild from a domestic state may be taken by authorized Federal or state personnel or by private persons operating under permit in accordance with applicable provisions of Federal or State law or regulation.

1.8.1.5 U.S. Army Corps of Engineers (COE)

The COE regulates and permits activities regarding waters of the United States including protection and utilization under Section 404 of the Clean Water Act.

1.8.1.6 U.S. Environmental Protection Agency (EPA)

The EPA is responsible for implementing and enforcing the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) which regulates the registration and use of pesticides. The EPA is also responsible for administering and enforcing the Section 404 program of the Clean Water Act with the Corps; this established a permit program for the review and approval of water quality standards that directly impact wetlands.

1.8.1.7 Natural Resource Conservation Service (NRCS)

NRCS is responsible for certifying wetlands under the Wetland Conservation provisions of the Food Security Act (16 U.S.C. 3821 and 3822). Topographic maps are available through their offices that identify the presence of wetlands.

1.8.2 Compliance with Other Federal Laws

Several other Federal laws authorize, regulate, or otherwise affect WS wildlife damage management. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

1.8.2.1 National Environmental Policy Act (NEPA)

WS prepares analyses of the environmental effects of program activities to meet procedural requirements of this law. This EA meets the NEPA requirement for the proposed action in Pennsylvania. When WS operational assistance is requested by another Federal agency, NEPA compliance is the responsibility of the other Federal agency. However, WS could agree to complete NEPA documentation at the request of the other Federal agency.

1.8.2.2 Endangered Species Act (ESA)

It is Federal policy, under the ESA, that all Federal agencies will seek to conserve T&E species, and will utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). WS conducts Section 7 consultations with the USFWS to use the expertise of the USFWS to ensure that "*any action authorized., funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency will use the best scientific and commercial data available*" (Sec.7 (a) (2)). WS obtained a Biological Opinion (B.O.) from USFWS in 1992 describing potential effects on T&E species, and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F). In addition, WS is in the process of initiating formal consultation at the programmatic level to re-evaluate the 1992 B.O. and to fully evaluate potential effects on T&E species listed or proposed for listing since the 1992 FWS B.O.

1.8.2.3 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The EPA is responsible for implementing and enforcing FIFRA. All chemical methods used or recommended by the WS program in Pennsylvania are registered with and regulated by the EPA and PDA and are used by WS in compliance with labeling procedures and requirements.

1.8.2.4 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 has 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.

1.8.2.5 The Clean Water Act (33 U.S.C. 1344)

The Clean Water Act provides regulatory authority and guidelines for the EPA and the U.S. Army Corps of Engineers related to wetlands. Several Sections of the Clean Water Act pertain to regulating effects on wetlands. Section 101 specifies the objectives of this Act, which are implemented largely through Subchapter III (Standards and Enforcement), Section 301 (Prohibitions). The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Subchapter IV (Permits and Licenses) of this Act. Section 401 (Certification) specifies additional requirements for permit review particularly at the State level. WS consults with appropriate regulatory authorities when wetlands exist in proximity to proposed activities or when such activities might impact wetland areas. Such consultations are designed to determine if any wetlands will be affected by proposed actions.

1.8.2.6 Executive Order 13112 on Invasive Species

Executive Order 13112 - Invasive Species 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, State, or Local government agencies, or with industry or private individuals to reduce damage to the environment or threats to human health and safety.

1.8.2.7 Food Security Act

The Wetland Conservation provision (Swampbuster) of the 1985 (16 U.S.C. 3801-3862), 1990 (as amended by PL 101-624), and 1996 (as amended by PL 104-127) Food Security Act require all agricultural producers to protect wetlands on the farms they own. Wetlands converted to farmland prior to December 23, 1985 are not subject to wetland compliance provisions even if wetland conditions return as a result of lack of maintenance or management. If prior converted cropland is not planted to an agricultural commodity (crops, native and improved pastures, rangeland, tree farms, and livestock production) for more than 5 consecutive years and wetland characteristics return, the cropland is considered abandoned and then becomes a wetland subject to regulations under Swampbuster and Section 404 of the Clean Water Act. NRCS is responsible for certifying wetland determinations according to this Act.

1.8.2.8 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act require 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 had been made to protect the items and the proper authority had been notified.

1.8.2.9 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, NHDA, FDA, 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, 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 and property damage.

1.8.2.10 Protection of Children from Environmental Health and Safety Risks (Executive Order 13045)

Children may suffer disproportionately for many reasons from environmental health and safety risks, including the development of their 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 occur by using only legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action. Additionally, since the proposed mammal damage management program is directed at reducing human health and safety risks at locations where children are sometimes present, it is expected that health and safety risks to children would be reduced.

1.8.2.11 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.

1.8.2.12 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.

1.8.2.13 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 in rabies management programs. 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 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 *undated*). 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.

1.8.2.14 Occupational Safety and Health Act of 1970

The 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.

1.8.3 Compliance with Other State Laws

Several other State laws authorize, regulate, or otherwise affect WS wildlife damage management activities. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

1.8.3.1 Destruction for Agricultural Protection (killing game or wildlife to protect property) (PGC:Chapter 21, subchapter B, Section 2121)

General rule—Subject to any limitations in this subchapter, nothing in this title shall be construed to prohibit any person from killing any game or wildlife:

(1) which the person may witness actually engaged in the material destruction of cultivated crops, fruit trees, vegetables, livestock, poultry or beehives;

(2) anywhere on the property under the person's control, including detached lands being cultivated for the same or similar purposes, immediately following such destruction; or

(3) where the presence of the game or wildlife on any cultivated lands or fruit orchards is just cause for reasonable apprehension of additional imminent destruction. Lands divided by a public highway shall not be construed as detached lands. Any person who wounds any game or wildlife shall immediately make a reasonable effort to find and kill the game or wildlife. Every person shall comply with all other regulations in this subchapter pertaining to the method and manner of killing, reporting the killing and the disposition of game or wildlife and their skins and carcasses.

2.0 CHAPTER 2: ISSUES

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental effects analysis in Chapter 4 (Environmental Consequences), issues that have driven the development of standard operating procedures, and issues that will not be considered in detail, with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop standard operating procedures. Additional affected environments are incorporated into the discussion of the environmental impacts in Chapter 4 and the description of the proposed program in Chapter 3.

Issues are concerns of the public and/or of professional communities about potential environmental problems that might occur from a proposed federal action. Such issues must be considered in the NEPA decision process. Issues relating to the management of wildlife damage were raised during the scoping process in preparing the programmatic ADC FEIS (USDA 1997) and were considered in the preparation of this EA. These issues are fully evaluated within the FEIS, which analyzed data specific to the Pennsylvania WS Program.

2.1 AFFECTED ENVIRONMENT

Upon request for assistance, mammal damage management could be conducted on private, federal, state, county, and municipal lands in Pennsylvania to protect agricultural and natural resources, property, and public health and safety. Areas of the proposed action could include, but are not limited to, state, county, municipal and federal natural resource areas, park lands, and historic sites; state 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; private and public 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 are a threat to human safety through the spread of disease. The area of the proposed action would also include airports and military airbases where mammals are a threat to human safety and to property; areas where mammals negatively impacts wildlife, including T&E species; and public property where mammals are negatively impacting historic structures, cultural landscapes and natural resources.

2.1.1 The “Environmental Status Quo” for managing damage and conflicts associated with State managed or unprotected wildlife species

As defined by 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 will occur in the absence of the federal action. This concept is applicable to situations involving federal assistance in managing damage associated with State-resident wildlife species or unprotected wildlife species.

Unprotected wildlife species, such as most non-native invasive species, are not protected under state or federal law. Most State-resident wildlife species are managed under State authority or law without any federal oversight or protection. In some states, with the possible exception of restrictions on methods (e.g., firearms restrictions, pesticide regulations), unprotected wildlife species and certain resident wildlife species are managed with little or no restrictions allowing them to be killed or taken by anyone at any time. For mammal damage management in Pennsylvania, the PGC has the authority to manage and authorize the taking of mammals for damage management purposes (see section 1.8).

When a non-federal entity (i.e. State wildlife agencies, State agriculture agencies, State health agencies, municipalities, counties, private companies, individuals, etc.) takes a management action on a State-resident wildlife species or unprotected wildlife species, the action is not subject to NEPA compliance 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 species *as they are managed or impacted by non-federal entities in the absence of the federal action being proposed*. Therefore, in those situations in which a non-federal entity has decided that a management action directed towards a state protected or unprotected wildlife species will occur and even the particular methods that will be used, WS's involvement in the action will not affect the *environmental status quo*. WS's decision-making ability is restricted to one of two alternatives - either taking the action using the specific methods as decided upon by the non-federal entity, or taking no action at all at which point the non-federal entity will take the same action anyway.

The inability to change the *environmental status quo* in the types of situations described above presents a clear question of whether there is enough federal control over the action to be taken to make direct assistance by WS a federal action requiring compliance with the National Environmental Policy Act. This lack of federal control over the decision to be made is even clearer when the non-federal entity has committed to taking the same actions in the absence of any federal assistance from WS. Clearly, under these circumstances, by any analysis we can envision, WS would have virtually no ability to affect the *environmental status quo* by selecting any possible alternative, even the alternative of no federal action by WS.

Therefore, based on the discussion above, it is clear that in those situations where a non-federal cooperator has obtained the appropriate PGC 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 will not affect the *environmental status quo*. In some situations, however, certain aspects of the human environment may actually benefit more from WS's 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 target and non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS involvement may actually have a *beneficial*

effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

2.2 SUMMARY OF ISSUES

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 Wildlife
- Effects on Human Health and Safety
- Effects on Socio-cultural Elements and Economics of The Human Environment
- Humaneness of Methods Used by Wildlife Services

2.3 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES

2.3.1 Effects on Wildlife

2.3.1.1 Effects on Target Mammal Species Populations

A common concern among members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA are the primary species which may be affected by WS's MDM activities in Pennsylvania. Mammal species addressed in this EA include: red fox, raccoons, striped skunks, woodchucks, feral cats, little brown bat, Northern long-eared bat, Indiana bat, small-footed bat, silver-haired bat, Eastern pipistrelle, big brown bat, red bat, and hoary bat.

2.3.1.2 Effects on Nontarget Species Populations, Including T&E Species

A common concern among members of the public and wildlife professionals, including WS personnel, is the impact of damage management methods and activities on nontarget species, particularly T&E species. Wildlife Services' standard operating procedures include measures intended to mitigate or reduce the effects on nontarget species populations and are presented in Chapter 3. To reduce the risks of adverse affects to non-target species, WS would select damage management methods that are target-selective or apply such methods in ways to reduce the likelihood of capturing or killing non-target species.

Threatened and Endangered species lists for the USFWS and the Commonwealth of Pennsylvania were reviewed to identify potential effects on federal and state listed T&E species. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the Endangered Species Act concerning potential effects of MDM methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997). As stated is Section 1.3.5 WS activities

often help to enhance or maintain populations of T&E species that are adversely affected by mammalian predators.

2.3.2 Effects on Human Health and Safety

2.3.2.1 Safety and Efficacy of Chemical Control Methods Used in MDM.

The public is sometimes concerned about chemicals used in mammal damage management programs because of potential adverse effects on people from being exposed either to the chemicals directly or to mammals that have died as a result of the chemical use. Under the alternatives proposed in this EA, chemical use is regulated by the EPA through FIFRA, by Pennsylvania State Pesticide Control Laws, by DEA, by FDA 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, Appendix P).

Other individuals may have concerns that there is a potential for drugs used in animal capture, handling, and euthanasia to cause adverse health effects in humans that hunt and eat the species involved. Among the species to be captured and handled under the proposed action, this issue is expected to only be of concern for wildlife which are hunted and sometimes consumed by people as food.

2.3.2.2 Effects on Human Health and Safety from Non-Chemical MDM Methods

Some people may be concerned that WS's use of firearms, traps, snares, and pyrotechnic scaring devices could cause injuries to people. A formal risk assessment of WS operational management methods found that risks to human safety were low (USDA 1997, Appendix P).

WS personnel occasionally use traps, snares and firearms to remove mammals that are associated with damage. There is some potential fire hazard to agricultural sites and private property from pyrotechnic use.

Firearm use in wildlife damage management can be a public sensitivity issue. Safety issues related to the misuse of firearms and the potential human hazards associated with firearms use are concerns both to the public and WS. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearm safety and use training program, and repeat safety training biannually (WS Directive 2.615). WS employees who carry and use firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment*, which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. Additionally, USDA conducts a thorough background check on all new employees entering the agency.

The use of restraining devices such as foothold, body-grip traps, or snares is a sensitive issue because of the lack of understanding and experience by the public in using these devices. Some people believe they could be captured and restrained by these traps. Some believe these traps indiscriminately and automatically capture people who may unknowingly approach locations where these traps or snares are placed. When conducting activities that require using such devices, WS personnel provide information about the techniques used to the appropriate landowners or land management personnel. WS is also assisting with the development of Best Management Practices (BMP's) for improving traps and trapping programs in the United States. These BMP's evaluate the animal welfare and efficiency of various traps for species which can be legally harvested in North America.

2.3.2.3 Effects on Human Health and Safety from not Conducting MDM to Reduce Disease Threats or Outbreaks and Mammal Strike Hazards at Airports

The concern stated here is that the absence of adequate MDM would result in adverse effects on human health and safety associated with the transmission of mammal-borne diseases, and mammal strikes on aircraft would not be reduced to acceptable levels. The potential impacts of not conducting such work could lead to increased incidence of injuries, illness, or loss of human lives. A discussion of these potential human health and safety risks are discussed in Sections 1.3.2 and 1.3.3.

WS frequently assists airports in Pennsylvania that seek to resolve wildlife hazards to aviation. Airport managers and air safety officials are concerned that the absence of a WS MDM could lead to failure to adequately address the complex wildlife hazard problems faced by these facilities. Hence, potential effects of not conducting such work could lead to an increased incidence of injuries or loss of human lives from mammal strikes to aircraft.

2.3.3 Effects on the Socio-cultural Elements and Economics of the Human Environment

2.3.3.1 Effects on Human Affectionate-Bonds with Individual Mammals and on Aesthetic Values of Wild Mammal Species

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. 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. 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.

Some individual members or groups of wild and feral domestic mammal species habituate and learn to live in close proximity to humans. Some people in these situations

feed such mammals and/or otherwise develop emotional attitudes toward such animals that result in aesthetic enjoyment. In addition, some people consider individual wild mammals as "pets," or exhibit affection toward these animals. Examples would be people who visit state or national parks to feed deer, or visit a city park to feed squirrels or raccoons, or homeowners who have wildlife feeders or bat houses. Many people do not develop emotional bonds with individual wild animals, but experience aesthetic enjoyment from observing them. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife. 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). 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).

Public reaction to damage management actions is variable because individual members of the public can have widely different attitudes toward wildlife. Some individuals who are negatively affected by wildlife support removal or relocation of damaging wildlife, while other individuals affected by the same wildlife may oppose removal or relocation. Individuals unaffected by wildlife damage may be supportive, neutral, or opposed to wildlife removal depending on their individual personal views and attitudes.

Some people do not believe that animals should even be harassed to stop or reduce damage problems. Some of them are concerned that their ability to view an animal is lessened by WS nonlethal harassment efforts. Those 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. Some people would strongly oppose removal of any mammal species 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.

Some individuals are offended by the presence of overabundant mammal species, such as raccoons, woodchucks, or feral species, such as house cats. To such people these species represent pests which are nuisances and which upset the natural order in ecosystems, and that are sowers of diseases transmissible to humans or other wildlife. Their overall enjoyment of other animals is diminished by what they view as a destructive presence of such species. They are offended because they feel that these mammal species proliferate in such numbers and appear to remain unchecked.

2.3.3.2 Effects on Aesthetics and Value of Property Damaged by Mammals

Property owners that have mammals damaging and/or killing expensive ornamentals and shrubs are generally concerned about the negative aesthetic appearance of such sites, and loss of valuable property. Business owners are particularly concerned because negative aesthetics can result in lost business. Recovery of aesthetic appearance of business property might include labor and costs of replacement plants and trees, costs of methods to mitigate flooding or reduce erosion, and costs associated with implementation of wildlife damage management methods. They are also concerned about direct loss of the use of property and of income which might have been gained from the sale of commercially valuable resources; loss of aesthetic value of flowers, plants, and gardens consumed by mammals; and lost time contacting local health departments and wildlife management agencies on health and safety issues.

2.3.4 Humaneness of Methods Used by WS

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but 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."*

According to the AVMA (1987), 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 . . ."* 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.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would *" . . . probably be causes for pain in other animals . . ."* (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to considerable pain (CDFG 1991).

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since *" . . . neither medical nor veterinary*

curricula explicitly address suffering or its relief" (CDFG 1991). Research suggests that some methods, such as restraint in foot-hold traps or changes in the blood chemistry of trapped animals, indicate "*stress*" (USDA 1997). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

The American Veterinary Medical Association (AVMA) states "*... euthanasia is the act of inducing humane death in an animal*" and "*... the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness.*" (Beaver et al. 2001). Some people would prefer AVMA accepted methods of euthanasia to be used when killing all animals, including wild and feral animals. The AVMA states that "*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.*" (Beaver et al. 2001).

The decision-making process involves tradeoffs between the above aspects of pain and humaneness. Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

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 nonlethal damage management methods are not practical or effective.

Pennsylvania WS personnel are experienced and professional in their use of wildlife damage management methods, so that they are as humane as possible under the constraints of current technology, workforce and funding. SOPs used to maximize humaneness are listed in Chapter 3.

2.4 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

2.4.1 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area

The question could be raised pertaining to whether preparing an EA for an area as large as Pennsylvania would meet the NEPA requirements for site specificity. Wildlife damage management falls within the category of Federal or other 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. The WS program is analogous to other agencies or entities with damage management missions such as fire and police departments, emergency clean-up organizations, insurance companies, etc. 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 mammal damage problem has become intolerable to the point that they request assistance from WS. Nor would WS be able to prevent such damage in all areas where it might occur without resorting to destruction of wild animal populations over broad areas at a much more intensive level than would be desired by most people, including WS and State agencies. Such broad scale population control would also be impractical, or impossible, to achieve.

If a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative effects, one EA analyzing impacts for the entire Commonwealth will provide a more comprehensive and less redundant analysis than multiple EA's covering smaller zones.

2.4.2 Effects on Public Use of Mammals

Many mammal species offer enjoyment to wildlife watchers and hunters and provide a significant economic contribution in Pennsylvania. In 2001, over 850,000 Pennsylvanians hunted within Pennsylvania with hunting expenditures totaling over $941 million (USDI, FWS, CDC 2001). The number of residents and nonresidents who participated in some type of wildlife-watching activity within Pennsylvania totaled 3.8 million and wildlife-watching expenditures totaled over $961 million (USDI, FWS, CDC 2001). During 2001, 4.6 million people participated in wildlife-associated recreation in Pennsylvania. In pursuit of wildlife-associated recreation participants contributed more than $3 billion to the economy of Pennsylvania for expenses related to travel, equipment, feed, licenses, wildlife club memberships and other associated costs (USDI, FWS, CDC 2001). Because mammals are such a substantial economic and recreational resource, there may be concerns that WS MDM actions related to managing damage by mammals might negatively affect these factors.

Wildlife Services' biologists conduct no programs in Pennsylvania to eradicate native wildlife populations. The number of target and non-target animals taken during MDM operations has not and will not adversely impact statewide populations of these animals and therefore will remain common and abundant for consumptive and non-consumptive use throughout Pennsylvania. See Section 4.1 for specific information on target and non-target species population impacts.

2.4.3 WS's Effect on Biodiversity

The WS program does not attempt to eradicate any species of native wildlife in Pennsylvania. WS operates in accordance with international, Federal and State laws, and regulations enacted to ensure species viability. Effects on target and nontarget species populations are minor as shown in Section 4.1. The effects of the current WS MDM program on biodiversity are not significant nationwide or statewide (USDA 1997).

2.4.4 Wildlife Damage is a Cost of Doing Business -- a "Threshold of Loss" Should Be Established Before Allowing Any Lethal Mammal Damage Management.

WS is aware that some people feel Federal wildlife damage management should not be allowed until economic losses reach some arbitrary predetermined threshold level. Such policy, however, would be difficult or inappropriate to apply to human health and safety situations. Although some damage can be tolerated by most resource owners, situations differ widely and a set wildlife damage threshold levels would be difficult to determine or justify. WS has the legal discretion to respond to requests for assistance, and it is program policy to aid each requester to minimize losses. WS uses the Decision Model thought process discussed in Chapter 3 to determine appropriate strategies.

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 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 percentage of loss of a particular resource to justify the need for wildlife damage management actions.

2.4.5 Wildlife Damage Management Should not Occur at Taxpayer Expense, but Should be Fee- Based

It is the opinion of some that wildlife damage management should not be provided at the expense of the taxpayer or that it should be fee-based. 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. Funding for WS comes from a variety of sources in addition to Federal appropriations. Such non-Federal sources include State general appropriations, Local government funds (county or city), and private funds which are all applied toward program operations. Additionally, wildlife damage management is appropriate for government programs, since wildlife management is a government responsibility. A commonly voiced argument for publicly funded wildlife damage management is that the public should bear responsibility for damage to private property caused by public wildlife.

A Federal appropriation is allotted for the maintenance of a WS program in Pennsylvania. This allocation does not cover the costs of the entire program. The remainder of the WS program is entirely fee-based. Technical assistance is provided to requesters as part of the Federally-funded activities, but all direct assistance in which WS employees perform damage management activities is funded through cooperative agreements between the requester and WS. Thus, MDM by WS in Pennsylvania is fee-based to a high degree.

2.4.6 Cost Effectiveness of MDM

Perhaps a better way to state this issue is by the question “Does the value of damage avoided equal or exceed the cost of providing MDM?” The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.23) does not require a formal, monetized cost-benefit

analysis to comply with NEPA. Consideration of this issue is not essential to making a reasoned choice among the alternatives being considered. The ADC EIS, Appendix L, p. 32 (USDA 1997) stated*:*

"Cost effectiveness is not, nor should it be, the primary goal of the APHIS ADC program. Additional constraints, such as environmental protection, land management goals, and others, are considered whenever a request for assistance is received. These constraints increase the cost of the program while not necessarily increasing its effectiveness, yet they are a vital part of the APHIS ADC program".

2.4.7 Effectiveness of Mammal Damage Management Methods

A concern among members of the public is whether the methods of reducing mammal damage will be effective in reducing or alleviating damage and conflicts. The effectiveness of each method or methods can be defined in terms of decreased potential for health risks, decreased human safety hazards, reduced property damage, reduced agricultural damage, and reduced natural resource damage. In terms of the effectiveness of a specific method or group of methods, this would not only be based on the specific method used, but more importantly upon the skills and abilities of the person implementing the control methods and the ability of that person to determine the appropriate course of action to take. It would be expected that the more experience a person has in addressing mammal damage conflicts and implementing control methods the more likely they would be successful reducing damage to acceptable levels. WS technical assistance program provides information to assist persons in implementing their own MDM program, but at times the person receiving WS technical assistance may not have the skill or ability to implement the MDM methods recommended by WS. Therefore, it is more likely that a specific MDM method or group of methods would be effective in reducing damage to acceptable levels when WS professional wildlife damage assistance is provided than that would occur when the inexperienced person attempts to conduct MDM activities.

3.0 CHAPTER 3: ALTERNATIVES INCLUDING THE PROPOSED ACTION

Chapter 3 contains a discussion of the project alternatives, including those that will receive detailed environmental impacts analysis in Chapter 4 (Environmental Consequences), alternatives considered but not analyzed in detail, with rationale, and SOP's for wildlife damage management techniques. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop mitigation measures. Evaluation of the affected environments will be addressed in more detail in Chapter 4.

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992) as described in Chapter 2 (pages 20-35), Appendix J (Methods of Control), Appendix N (Examples of WS Decision Model), and Appendix P (Risk Assessment of Wildlife Damage Control Methods Used by USDA, Wildlife Services Program) of the ADC FEIS (USDA 1997).

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), and is a viable and reasonable alternative that could be selected. This alternative serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the Council on Environmental Quality's definition (CEQ 1981).

Alternatives analyzed in detail are:

1) **Alternative 1 - Continue the Current Federal MDM Program.** This is the Proposed Action and is the "No Action" alternative as defined by the Council on Environmental Quality for analysis of ongoing programs or activities.

2) **Alternative 2 - Nonlethal Required Before Lethal Control.** This alternative would not allow lethal control by WS until all nonlethal methods had been tried and found to be inadequate in each damage situation.

3) **Alternative 3 - Technical Assistance Only.** Under this alternative, WS would not conduct any direct operational MDM activities in Pennsylvania. If requested, affected requesters would be provided with technical assistance information only.

4) **Alternative 4 - No Federal WS MDM.** This alternative consists of no Federal MDM program by WS. Affected resource owners would be left to their own devices to address mammal damage in Pennsylvania.

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1 - Continue the Current Federal MDM Program (No Action/Proposed Action)

The proposed action is to continue the current portion of the WS program in Pennsylvania that responds to requests for MDM to protect agriculture, human health and safety, natural resources, and property in Pennsylvania. One component of MDM in the Pennsylvania WS program has the goal of minimizing human health and safety threats at and property damage

at airports and other urban and rural environments. Another component is aimed at reducing losses or the risk of loss to agricultural crops and any other agriculture-related resource. Damage caused by mammal species to natural resources, including threatened and endangered species, wildlife, natural flora, parklands, recreation areas, peculiar habitats, etc. may be addressed through programs conducted by WS. Elimination or alleviation of damage to property such as residential and non-residential buildings, landscape plantings, golf courses, grasses and turf, pets, zoo animals, or any other properties would be an objective of WS MDM programs contemplated under this EA.

To meet these goals, WS' objective would be to attempt to respond to all requests for assistance with, at a minimum, technical assistance or self-help advice, or, where appropriate and when cooperative or congressional funding is available, direct damage management assistance in which professional WS Wildlife Biologists or Specialists conduct damage management actions. An Integrated Wildlife Damage Management approach would be implemented which would allow use of any legal technique or method, used singly or in combination, to meet requester needs for resolving conflicts with mammals. Lethal methods include shooting, trapping, snaring, and FDA and EPA approved chemicals. Nonlethal methods include fencing, netting, deterrents/repellents, exclusion, harassment, habitat alteration, or live-capture and translocation. However, non-lethal methods would not always be applied as a first response to each damage problem. The most appropriate response would often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. In many situations, the implementation of nonlethal methods such as exclusion-type barriers would be the responsibility of the requester which means that, in those situations, WS's only function would be to implement lethal methods if determined to be necessary. MDM by WS would be allowed in the Commonwealth, when requested on private property or public facilities where a need has been documented upon the completion of an *Agreement for Control*. All management actions would comply with appropriate Federal, State, and Local laws. Appendix B provides a more detailed description of the methods that could be used under the proposed action.

3.1.2 Alternative 2 - Nonlethal Required Before Lethal Control

This alternative is similar to the Proposed Action alternative except that WS personnel would be required to always recommend or use nonlethal methods prior to recommending or using lethal methods to reduce mammal damage. This alternative would not allow the use of lethal methods by WS until all nonlethal MDM methods had been attempted, and these methods were found to be ineffective or inadequate. Although WS personnel experienced in MDM generally know when and where nonlethal control techniques would work, this alternative could result in the use of methods that are known to be ineffective in particular situations. This would likely increase the costs of MDM efforts and would also allow unacceptable levels of damage to continue until requirements of this strategy could be met. Appendix B provides a more detailed description of the methods that could be used under this alternative.

3.1.3 Alternative 3 - Technical Assistance Only

This alternative would not allow for WS operational MDM in Pennsylvania. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, or others could conduct MDM using traps**,** shooting, vertebrate pesticides or any nonlethal or lethal method that is legally available to them. Property owners and land managers could implement their own mammal damage management program, use contractual services of private businesses, use volunteer services, or take no action. This alternative would place the immediate burden of operational damage management work on the property owners and other federal, state, or county agencies. Appendix B describes a number of methods that could be employed by private individuals or other agencies after receiving technical assistance advice under this alternative.

3.1.4 Alternative 4 - No Federal WS MDM

This alternative would eliminate WS' Federal involvement in MDM in Pennsylvania. WS would not provide direct operational or technical assistance and requesters of WS services would have to conduct their own MDM without WS input. Information on MDM methods would still be available to producers and property owners through such sources as the PGC, universities, or pest control organizations or companies. Property owners and land managers could implement their own mammal damage management program, use contractual services of private businesses, use volunteer services, or take no action. This alternative would place the immediate burden of operational damage management work on the property owners and other federal, state, or county agencies.

3.2 MDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN PENNSYLVANIA

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 WS technical assistance and operational MDM by WS. Appendix B is a more thorough description of the methods that could be used or recommended by WS.

3.2.1 Integrated Wildlife Damage Management (IWDM)

For more than 70 years, WS has considered, developed, and used numerous methods of managing wildlife damage problems (USDA 1997, P. 2-15). The efforts have involved research and development of new methods and the implementation of effective strategies to resolve wildlife damage.

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. Integrated Wildlife Damage Management is the implementation and application of safe and practical methods for the prevention and control of damage caused by wildlife based on local problem analyses, and the informed judgment of trained personnel. The WS Program applies IWDM, commonly known as Integrated Pest

Management (IPM) (WS Directive 2.105), to reduce damage through the WS Decision Model (Slate et. al. 1992) described in the FEIS (USDA 1997).

The philosophy behind IWDM is to implement functional damage management techniques in the most cost-effective[4] manner, while minimizing the potentially harmful effects on humans, target and nontarget species, and the environment. IWDM draws from the largest possible array of options to create a combination of techniques appropriate for the specific circumstances. IWDM may incorporate cultural practices (i.e. animal husbandry), habitat modification (i.e. barriers, exclusionary methods), animal behavior modification (i.e. scaring), removal of individual offending animals, local population management (i.e. local population reduction, redistribution of animal populations through live-capture and translocation), or any combination of these, depending on the characteristics of the specific damage problems and other criteria, such as management objectives of state wildlife agencies. In selecting management techniques for specific damage situations consideration is given to the:

- Species responsible,
- Magnitude and geographic extent of damage,
- Duration and frequency of the damage,
- Prevention of future damage (lethal and nonlethal techniques), and
- Environmental concerns such as T&E species in the same area.

WS employs different strategies to resolve wildlife damage problems. In certain situations, WS may provide cooperators with the information necessary to resolve the problem themselves (technical assistance). In others, WS may directly resolve the problem (direct assistance). However, the most common strategy to resolve wildlife damage is to use a combination of these approaches. WS considers the biology and behavior of the damaging species and other factors using the WS Decision Model (Slate et al 1992). The recommended strategy(ies) may include any combination of preventive and corrective actions that could be implemented by the requester, WS, or other agency personnel, as appropriate. Two strategies available are:

1. Preventive Damage Management is applying wildlife damage management strategies before damage occurs, based on historical problems and data. All non-lethal methodologies, whether applied by WS or resource owners, are employed to prevent damage from occurring and therefore fall under this heading. When requested, WS personnel provide information and conduct demonstrations, or take action to prevent additional losses from recurring. An example would be a cooperator installing and maintaining a woven wire fence with an underground skirt to reduce potential access of raccoons and foxes to domestic waterfowl and poultry rearing facilities.

2. Corrective Damage Management is applying wildlife damage management to stop or reduce current losses. As requested and appropriate, WS personnel provide information and conduct demonstrations, or take action to prevent additional losses from

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

recurring. An example would be in areas where woodchucks are damaging crops or vegetation, WS may provide information about fencing, or conduct operational damage management to stop the losses.

3.2.2 The IWDM Strategies Employed by WS

3.2.2.1 Technical Assistance Recommendations

"Technical assistance" as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods. 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 non-WS entities to use. 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.

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.

3.2.2.2 Operational Damage Management Assistance

Operational assistance is the conduct or supervision of damage management activities by WS personnel. Operational damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone, and when *Agreements for Control* or other comparable instruments provide for direct damage management by WS. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. 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.

3.2.2.3 Education/Outreach Programs

Education/outreach is an important element of WS' program activities, because wildlife damage management is about finding "balance" or co-existence between the needs of people and 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 and demonstrations are provided to farmers, homeowners, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS' personnel, other wildlife professionals, and the public are updated on recent developments in damage management technology, laws and regulations, and agency

policies. WS provides informational leaflets about mammal damage management, biology, and ecology. Pennsylvania WS program annually provides hundreds of mammal leaflets and handouts to the public about MDM. This information is disseminated by means of school programs, exhibits, and calls from requesters.

3.2.2.4 Research and Development

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

3.2.2.5 Examples of WS Operational Assistance with MDM in Pennsylvania.

The following examples serve as illustrations of WS Operational MDM projects. They are intended to present realistic examples of on-going MDM projects only and are not a conclusive or all encompassing list of all MDM projects conducted by WS in Pennsylvania.

Management of Wildlife Hazards to Aircraft and Air Passengers in Pennsylvania

WS provides information and/or services regarding mammal damage management with several airports in Pennsylvania. Upon request for assistance, WS evaluates wildlife hazards at the airport, prepares a Wildlife Hazard Assessments which outlines the wildlife hazards found, and assists the airport in developing a Wildlife Hazard Management Plan to address these wildlife hazards and threats.

WS's current program in Pennsylvania utilizes an IWDM approach, including technical and operational damage management assistance. Direct operational activities consist of various harassment techniques, and live capture and lethal removal techniques aimed at removing potentially injurious wildlife. WS personnel also provide ongoing technical advice to airport managers regarding methodologies to reduce the presence of wildlife in airport environments, including providing technical advice on various habitat management projects implemented by airport personnel. In addition, WS promotes improved mammal strike record keeping, maintains a program of mammal identification, and monitors mammal numbers at participating airports to assist in developing an effective damage management program.

WS may receive requests for assistance from any airport in Pennsylvania in resolving wildlife hazards to aviation. As appropriate, WS may provide technical assistance and/or direct operational assistance using any combination of approved methods discussed in this EA based upon the WS Decision Model (Slate et al. 1992).

Management of Wildlife Rabies

The Pennsylvania Wildlife Services program cooperates with WS programs in other states, and various State Agencies to implement a cooperative oral rabies vaccination (ORV) program in Pennsylvania. Wildlife Services personnel utilize aircraft and hand baiting to distribute ORV baits to a delineated area in Pennsylvania which has been determined to be part of the ORV barrier to stop the westward expansion of raccoon rabies (USDA 2001). WS personnel are also involved in rabies monitoring and surveillance activities which include the capture and release or lethal collection of raccoons to take biological samples for testing to determine the effectiveness of the ORV program.

Management of Human Health and Safety Threats and Predation on Native Birds caused by Feral Cats

The Pennsylvania WS program provides operational assistance at county parks where local populations of feral cats are extremely high. Operational methods used consist of trapping and euthanasia or shooting. These parks have a high visitor use rate including small children. WS operational activities are directed towards reducing the risk for injury/illness due to bite potential and general disease transmission through direct contact and contact with fecal remains. High populations of feral cats may also predate on native bird populations resulting in a detrimental impact to the local passerine songbirds population residing within these parks.

Management of Damage to Property caused by Woodchucks

The Pennsylvania WS program provides operational assistance to military installations to reduce woodchuck damage to electronic firearm targets. Operational methods used consist of trapping (body-gripping traps). The burrowing of the woodchucks can cause the wiring in the targets to malfunction. The malfunctioning targets are hindering required training to military troops.

WS also provides operational assistance at industrial sites to reduce woodchuck burrowing activity around buildings and gnawing behavior around light fixtures and underground wiring. Operational methods used consist of trapping (body-gripping traps).

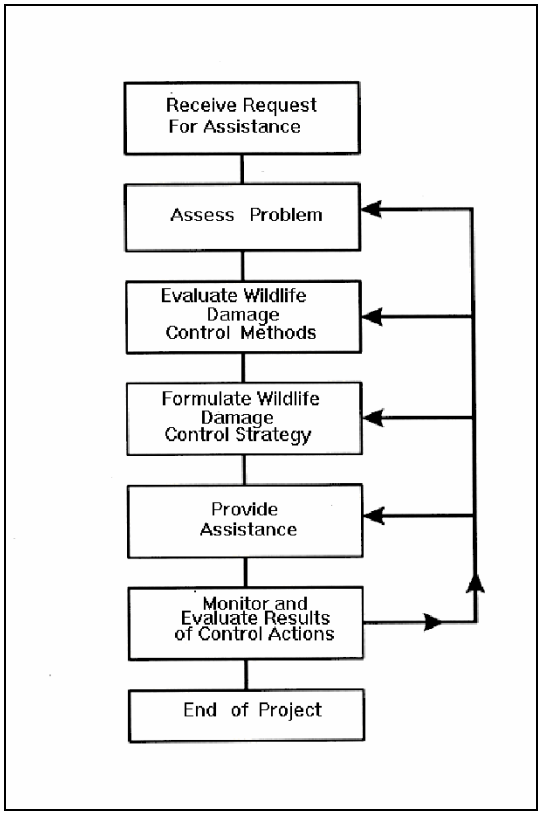
Management of Damage to Property caused by Red Fox

The Pennsylvania WS program provides operational assistance at a nuclear power plant to remove red fox that are burrowing under security fences, thereby, tripping the alarm system. Valuable Homeland Security funds are being utilized to respond to alarm notifications. Operational methods used consist of trapping and euthanasia.

3.2.3 WS Decision Making

WS personnel use a thought process for evaluating and responding to damage complaints that are depicted by the WS Decision Model described by Slate et al., in 1992 (Figure 3.1). WS personnel are frequently contacted after requesters have tried or considered nonlethal methods and found them to be impractical, too costly, or inadequate for acceptably reducing damage. WS personnel assess the problem; 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 professions.

Figure 3.1. APHIS - WS Decision Model



3.2.4 Mammal Damage Management Methods Available for Use.

3.2.4.1 Nonchemical Methods

Agricultural producer and property owner practices consist primarily of nonlethal preventive methods such as **cultural methods[1] and habitat modification.**

Animal behavior modification refers to tactics that alter the behavior of mammals to reduce damages. Some but not all of these tactics include the following:

- Propane exploders
- Pyrotechnics
- Visual repellents and scaring tactics
- Electronic guards

[1]Generally involves modifications to the management of protected resources to reduce their vulnerability to wildlife damage.

Habitat modification is used whenever practical to attract or repel certain wildlife species.

Live capture and relocation can be conducted to reduce damage caused by certain mammals. Various capture devices such as box or cage traps, and nets can be used to live capture mammals for relocation. In some instances permits are required by the State wildlife agency to capture and remove certain mammals.

Lure crops/alternate foods are crops planted or other food resources provided to mitigate the potential loss of higher value crops.

Sport hunting/trapping can be part of a MDM strategy to enhance the effectiveness of harassment techniques or used to reduce local populations of mammals.

Shooting is selective for the target species and may involve the use of spotlights and rifles or shotguns. Calls and decoys may also be utilized with shooting. WS personnel using firearms receive firearms safety training as specified by appropriate WS directives.

Foothold Traps can be effectively used to capture a variety of mammals. Placement of traps is contingent upon habits of the respective target species, habitat conditions, and presence of nontarget animals.

Snares are capture devices comprised of a cable formed in a loop with a locking device. Snares are usually placed in travel ways. Snares may be used as either a lethal or nonlethal method. Snares are generally easier to keep operational than foothold traps during inclement weather.

Cage traps are live capture traps used to trap a variety of small to medium sized mammals. Cage traps are available in a variety of sizes. A cage traps is typically made of galvanized wire mesh, and consists of a treadle in the middle of the cage that triggers the door to close behind the animal being trapped.

Body grip (Conibear type) traps are designed to cause the quick death of the animal that activates the trap. Body grip traps usually range in size from #110 to #330. Safety hazards and risks to humans are usually related to setting, placing, checking, or removing traps.

3.2.4.2 Chemical Methods

Repellants. Several products are available that are designed to act as repellants for certain mammals. Most of these are taste repellants used on trees, shrubs, garbage, fences and other objects. Some of the trade names for repellants include:

- Hinder®
- Ropel® Animal, Rodent, and Bird Repellent
- Ropel® Garbage Protector

As with most repellents, frequent reapplication is often necessary to obtain continued results.

Carbon dioxide (CO_2) gas is an AVMA approved euthanasia method which is sometimes used to euthanize mammals which are live captured and when relocation is not a feasible option (Beaver et al. 2001). Live animals are placed in a container or chamber into which CO_2 gas is released. The animal quickly expires after inhaling the gas.

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.

Ketamine (Ketamine HCl) is a dissociative anesthetic that is used to capture wildlife, primarily mammals, birds, and reptiles. It is used to eliminate pain, calms fear, and allays anxiety.

Xylazine is a sedative that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with ketamine to produce a relaxed anesthesia.

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 WS personnel are authorized to use sodium pentobarbital and dilutions for euthanasia in accordance with DEA and state regulations.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

Several alternatives were considered, but not analyzed in detail. These were:

3.3.1 Lethal MDM Only by WS

Under this alternative, WS would not conduct any nonlethal control of mammals for MDM purposes in the Commonwealth, but would only conduct lethal MDM. This alternative was eliminated from further analysis because some mammal damage problems can be resolved effectively through nonlethal means. For example, a number of damage problems involving the encroachment of smaller mammals such as woodchucks under buildings can be resolved by installing barriers or repairing of structural damage to the buildings, thus excluding the animal. Further, such damage situations as immediately shooting an animal on a runway might not be possible, where as scaring them away through noise harassment might resolve the air passengers' threat at once.

3.3.2 Compensation for Mammal Damage Losses

The compensation alternative would require the establishment of a system to reimburse persons impacted by mammal damage. This alternative was eliminated from further analysis because no Federal or State laws currently exist to authorize such action. Under such an alternative, WS would not provide any direct management or technical assistance. Aside from lack of legal authority, analysis of this alternative in the FEIS indicated that the concept has many drawbacks (USDA 1997):

- It would require larger expenditures of money and labor to investigate and validate all damage claims, and to determine and administer appropriate compensation. A compensation program would likely be significantly more costly than the current program.
- Compensation would most likely be below full market value.
- It would be difficult, if not impossible, to assess and confirm losses in a timely manner for all requests, and, therefore, many losses could not be verified and would remain uncompensated.
- 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.

3.3.3 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 on private, State, Local and Federal government lands wherever a cooperative program was initiated in the Commonwealth. In Pennsylvania, eradication of native mammal species is not a desired population management goal of State agencies or WS. Eradication as a general strategy for managing mammal damage will not be considered in detail because:

- All State and Federal agencies with interest in, or jurisdiction over, wildlife oppose eradication of any native wildlife species.
- Eradication is not acceptable to most people.

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 the Commonwealth would be conducted on a very small portion of the sites or areas inhabited or frequented by problem species.

3.3.4 Bounties

Payment of funds (bounties) for killing some mammals suspected of causing economic losses have not been supported by Pennsylvania State agencies such as PGC and PDA as well as most wildlife professionals for many years (Latham 1960, Hoagland 1993). WS concurs with these agencies and wildlife professionals because of several inherent drawbacks and inadequacies in the payment of bounties, including:

- Bounties are generally ineffective at controlling damage, especially over a wide area such as Pennsylvania,
- Circumstances surrounding the take of animals are typically arbitrary and completely unregulated,
- It is difficult or impossible to assure animals claimed for bounty were not taken from outside the damage management area, and
- WS does not have the authority to establish a bounty program.

3.3.5 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.), socioeconomic 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, multiple treatments, and population dynamics of free-ranging populations place considerable logistic and economic constraints on the adoption of reproduction control technologies as a wildlife management tool for some species. 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, initial treatment usually followed by a booster and annual follow-up treatments).

Sterilization could be accomplished through:

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

Contraception could be accomplished through:

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

Research into the use of these techniques would consist 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.

The use of reproductive control is subject to Federal and State regulation. Additionally:

- No chemical or biological agent to accomplish reproductive control for free-ranging mammals has been approved by Federal and Pennsylvania authorities,
- If an effective tool was legally available, and if the project area was fenced., it would take many years for some mammal populations to stabilize at a lower level, and ongoing damage would continue to occur at unacceptably high levels, and
- There are considerable logistic, economic and socio-cultural limitations to trapping, capturing and chemical treatment of the hundreds or thousands of mammals that would be necessary to affect an eventual decline in the population. Because there is no tool currently available for field application, 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.

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

The Trap-Neuter-Release (TNR) program for feral and free ranging cats has undergone considerable debate in animal welfare and scientific communities for a number of years. Two main questions or viewpoints dominate this debate: 1) Does trap-neuter-release work in controlling cat populations over the long run or even the short run? and 2) Does TNR programs address or alleviate problems (i.e., diseases) created by cat colonies?

Trap, neuter, and release programs have been going on for decades in Britain and Europe. Today, feral and free-ranging cats are causing the same problems they were causing ten years ago. Cat colonies have not died out or reduced in size, many continue to increase. Common consensus is that some cat colonies stabilize, but never come close to extinction. Many of these colonies would not survive if it were not for the supplemental feeding by humans in some areas (Smith and Shane 1986). So the problem with wildlife and human health issues have not been resolved by the TNR philosophy (USDA 2003).

The National Association of State Public Health Veterinarians and the American Veterinarians Medical Association oppose TNR programs based on health concerns and threats (JAVMA 1996). First, diseases and parasites transmitted by cats to humans including ringworm, bartonellosis, larval migrans, cat scratch fever, toxoplasmosis, and vector-borne zoonotic diseases are not controlled in colony situations. Second, rabies is a major concern because cats are the number one domesticated species testing positive for

rabies in the United States and other species commonly infected by the disease are also attracted to feeding stations in cat colonies (USDA 2003).

The Wildlife Society (TWS), founded in 1937, is the wildlife manager's professional equivalent of the American Veterinary Medical Association (AVMA). Their special expertise is the health of the environment and maintenance of our nation's wildlife resources. TWS has spent more than 2 years developing its policy No. 25 on feral and free-ranging cats, and this policy clearly identifies the problems associated with these non-native predators. The society's policy includes support for "passage and enforcement of local and state ordinances prohibiting the public feeding of feral cats, especially on public lands, and release of unwanted pet or feral cats into the wild." It also indicates opposition to "passage of any local or state ordinances that legalize the maintenance of the 'managed' (i.e., TNR) free-ranging cat colonies." (JAVMA 2004).

Many other organizations have developed similar policies, including the following: the International Association of Fish and Wildlife Agencies, the Association of Avian Veterinarians, the American Association of Wildlife Veterinarians, the Council of State and Territorial Epidemiologists/National Association of State Public Health Veterinarians, the American Bird Conservancy, The Humane Society of the United States, the American Ornithologists' Union, People for the Ethical Treatment of Animals (PETA), the National Audubon Society, and various state wildlife federations and commissions. The Perspective of PETA is, "because of the huge number of feral cats and the severe shortage of good homes, the difficulty of socialization, and the dangers lurking where most feral cats live, it may be necessary and the most compassionate choice to euthanize feral cats. A painless injection is far kinder than the fate that feral cats will meet if left to survive on their own." (JAVMA 2004).

As a result of the prevalent and perpetual threat to human health and safety created by TNR programs (cat colonies) and the continued threat to threatened and endangered wildlife and native wildlife in general, WS will not consider this issue further or be a participant of TNR programs in Pennsylvania.

3.3.7 Nonlethal MDM Only by WS

Under this alternative, WS would not conduct any lethal control of mammals for MDM purposes in the Commonwealth, but would only conduct nonlethal MDM. This alternative was eliminated from further analysis because some mammal damage problems can not be resolved effectively through nonlethal means. If nonlethal methods were determined to be ineffective at reducing damage and conflicts, WS would not be able to use or recommend any other method to rectify the problem. Nonlethal methods are an important component of any program using an IWDM approach. A non-lethal only management approach would have similar impacts as the "Non-lethal Required Before Lethal Control" alternative that is analyzed in detail in this EA. The analysis shows that the use of nonlethal methods alone could result in a substantial increase in losses as well as an increase in expenditures. For example, in situations where feral cats are at risk of transmitting disease to humans and/or domestic animals or are negatively impacting native bird populations, the use of only

nonlethal methods would likely not be effective. In these types of situations, it is often necessary to remove/euthanize these feral animals to rectify the problem.

3.4 STANDARD OPERATING PROCEDURES FOR MAMMAL DAMAGE MANAGEMENT TECHNIQUES

The current WS program, nationwide and in Pennsylvania, uses many SOPs and these are discussed in detail in Chapter 5 of the FEIS (USDA 1997).

3.4.1 Standard Operating Procedures (SOPs)

Some key SOPs pertinent to the proposed action and alternatives include:

- The WS Decision Model thought process is used to identify effective wildlife damage management strategies and their effects.
- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid effects to T&E species.
- 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.
- Drugs are used according to the Drug Enforcement Agency, FDA, and WS program policies and directives and procedures are followed that minimizes pain.
- All controlled substances are registered with DEA or FDA.
- WS employees would follow approved procedures outlined WS Field Manual for the Operational Use of Immobilizing and Euthanizing Drugs (Johnson, et al. 2001).
- WS employees that use controlled substances are trained to use each material and are certified to use controlled substances under Agency certification program.
- WS employees who use pesticides and controlled substances participate in State approved continuing education to keep abreast of developments and maintain their certifications.
- Pesticide and controlled substance use, storage, and disposal conform to label instruction and other applicable laws and regulations, and Executive Order 12898.
- Material Safety Data Sheets for pesticides and controlled substances are provided to all WS personnel involved with specific WDM activities.
- All WS Specialists in the Commonwealth who use restricted chemicals are trained and certified by, or else operate under the direct supervision of, program personnel or others who are experts in the safe and effective use of chemical MDM materials.
- Research is being conducted to improve MDM methods and strategies so as to increase selectivity for target species, to develop effective nonlethal control methods, and to evaluate nontarget hazards and environmental effects.
- Management actions would be directed toward localized populations or groups of target species and/or individual offending members of those species. Generalized population suppression across the Commonwealth, or even across major portions of the Commonwealth, would not be conducted.
- WS 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, 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.

3.4.2 Additional Standard Operating Procedures Specific to the Issues

The following is a summary of additional SOPs that are specific to the issues listed in Chapter 2 of this document.

3.4.2.1 Effects on Target Species Populations

- MDM activities are directed to resolving mammal damage problems by taking action against individual problem mammals, or local populations or groups, not by attempting to eradicate populations in the entire area or region.
- WS take is monitored by comparing numbers of mammals killed by species or species group (e.g., carnivore) with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse effects to the viability of native species populations (See Chapter 4).

3.4.2.2 Effects on Nontarget Species Populations, Including T&E Species

- WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding nontargets. For example, WS personnel utilize pan tension devices or alter trap triggers in order to exclude or reduce the capture of non-target species.
- WS has consulted with the USFWS regarding potential effects of control methods on T&E species, and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion see the ADC FEIS, Appendix F (USDA 1997).
- WS uses chemical methods for MDM that have undergone rigorous research to prove their safety and lack of serious effects on nontarget animals and the environment.

3.4.2.3 Effects on Human Health and Safety

- WS personnel are trained and supervised in the use of MDM methods, including firearms, watercraft, traps, immobilization drugs, and vertebrate pesticides to ensure that they are used properly and according to policy. Furthermore, WS personnel using restricted-use vertebrate pesticides will be certified according to EPA and Pennsylvania State laws. WS personnel using firearms will routinely receive firearms safety training according to WS policy.

3.4.2.4 Effects on Socio-cultural Elements and Economics of the Human Environment

- Whenever practicable, WS personnel perform components of mammal removal activities, such as shooting and euthanizing, away from public view.
- In addition, animals which are transported after being killed are concealed from public view when they must be transported in areas of human habitation, in an effort to reduce adverse effects on the aesthetic quality of the environment.

3.4.2.5 Humaneness of Methods Used by Wildlife Services

- WS personnel kill captured target animals that are slated for lethal removal as quickly and humanely as possible. In most field situations, a shot to the brain with a small caliber firearm is performed which causes rapid unconsciousness followed by cessation of heart function and respiration. This is in concert with the American Veterinary Medical Association's definition of euthanasia (AVMA 2000).
- Research continues with the goal of improving the selectivity and humaneness of management devices.
- WS personnel recommend the use of various nonlethal methods such as exclusion, habitat and animal behavior modification, where these are applicable.
- WS personnel use trap lures and set traps in locations that are conducive to capturing the target animal, but minimize potential effect on nontarget species. Further, all damage management methods would be used in a manner that minimizes pain and suffering of individual animals, to the extent that the method is effective and its use is practical.

4.0 CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter Four provides information needed for making informed decisions in selecting the 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. This section analyzes the environmental consequences of each alternative in comparison with the No Action Alternative to determine if the real or potential effects would be greater, lesser, or the same. Therefore, the proposed action or current program alternative serves as the baseline for the analysis and the comparison of expected effects among the alternatives. The background and baseline information presented in the analysis of the current program alternative thus also applies to the analysis of each of the other alternatives.

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

Cumulative Effects: 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 nontarget 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 1.8.2.4).

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

As described in section 2.1.1, in those situations where a non-federal cooperator has obtained the appropriate PGC 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 will not affect the *environmental status quo*. In some situations, however, certain aspects of the human environment may actually benefit more from WS's 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 target and non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.1 Alternative 1 - Continue the Current Federal Mammal Damage Management Program (The Proposed Action/No Action)

4.1.1.1 Effects on Wildlife

4.1.1.1.1 Effects on Target Species Mammal Populations

In those situations where a non-federal cooperator has obtained the appropriate PGC 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 will not affect the *environmental status quo*.

The authority for management of resident wildlife species has traditionally been a responsibility left to the states. The PGC is the state agency with management responsibility over animals classified by state law as protected. The PGC provided information where available regarding population estimates for certain species, but was unable to provide any definitive estimates of population sizes for some species.

The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997). Magnitude is described in USDA (1997) 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 shows the numbers of mammals killed by species and method as a result of WS MDM activities in Pennsylvania from FY 2001 through FY 2005.

NEPA requires federal agencies to determine whether their actions have a "significant impact on the quality of the human environment." A declining population of a resident wildlife species does not necessarily equate to a "significant impact" as defined by NEPA if the decline is collectively condoned or desired by the people that live in the affected human population. It is reasonable and proper to rely on the representative form of government within a state as the established mechanism for determining the "collective" desires or endorsements of the people of a state. WS abides by this philosophy and defers to the collective desires of the people of the Commonwealth of Pennsylvania by complying with State laws and regulations that govern the take or removal of resident wildlife. Although the analysis herein indicates mammal populations are not being affected to the point of causing a decline, if at some point in the future they are, then such a decline would not constitute a "significant" impact as defined by NEPA so long as the actions that cause the decline are in accordance with state law, and concomitantly, with the collective desires of the people of the Commonwealth.

Table 4.1. Number of Mammals Killed by WS in Pennsylvania during FY 2001 – 2005.

SPECIES	YEAR					TOTAL
	2001	2002	2003	2004	2005	
Feral Cats	10	29	8	6	27	80
Red Fox	6	26	13	15	26	86
Woodchucks	66	101	92	258	351	868
Raccoon	1	241	16	135	177	570
Striped Skunk	2	11	1	7	16	37

Table 4.2. Pennsylvania Furbearer Harvest for the 1996 to 2004 Seasons (PGC 2004).

***** Harvest figures are estimates based on furtaker and gametake surveys.

SPECIES	**Harvest***							
	1996-1997	**1997-1998**	**1998-1999**	**1999-2000**	**2000-2001**	**2001-2002**	**2002-2003**	**2003-2004**
Red Fox	29,623	36,923	47,202	36,860	33,060	33,003	33,007	31,592
Skunk	11,571	12,344	11,190	6,723	7,534	9,245	7,207	9,319
Raccoon	214,958	194,696	195,110	107,407	108,890	121,810	106,485	104,781
Estimated # Trappers**	8,061	11,859	10,817	7,845	8,994	7,210	6,693	9,298
No. Furtakers (trappers + hunters)	21,376	27,413	25,877	19,574	18,551	19,410	20,676	22,454

** Estimated based on furtaker license sales and furtaker survey information (License structure changed during 1999-2000).

4.1.1.1.1.1 Feral Cat Population Information and Effects Analysis

Feral cats (*Felis catus*) are house cats living in the wild. They are small in stature, weighing from 3 to 8 pounds (1.4 to 3.6 kg), standing 8 to 12 inches (20 to 30.5 cm) high at the shoulder, and 14 to 24 inches (35.5 to 61 cm) long. The tail adds another 20 - 30.5 cm (8 - 12 inches) to their length. Colors range from black to white to orange, and an amazing variety of combinations in between. Other hair characteristics also vary greatly (Fitzwater 1994).

Cats are found in commensal relationships wherever people are found. In some urban and suburban areas, cat populations equal human populations. In many suburban and eastern rural areas, feral house cats are the most abundant predators. They 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).

Feral cats produce 2 - 10 kittens during any month of the year. An adult female may produce 3 litters per year where food and habitat are sufficient. Cats may be active during the day but typically are more active during twilight or night. House cats have been reported to live up to 27 years, but feral cats probably average only 3 - 5 years. They are territorial and move within a home range of

roughly 4 km^2 (1.5 mi^2). After several generations, feral cats can be considered to be totally wild in habits and temperament (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). 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).

WS killed 80 feral cats in all MDM programs in Pennsylvania during FY 2001-2005 (USDA-WS MIS Database 2005). This number is insignificant to the total population of this species in the commonwealth. The lowest estimate of the U.S. feral cat population is 20 million, which gives Pennsylvania some 400,000 feral cats (Alley Cat Allies 2003). In future programs, WS may be requested to address damage being caused by feral cats anywhere in Pennsylvania to protect any resource being damaged or threatened. It is possible that WS could kill as many as 100 feral cats each year in MDM programs in the Commonwealth. Many of these would be removed in projects aimed at protecting human health and safety, valuable wildlife, or captive birds and other animals. Feral cats are not viewed as furbearers in Pennsylvania.

Based upon the above information, WS limited lethal removal of feral cats would have minimal effects on local or statewide populations of this species in Pennsylvania. 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 local site. In those cases where feral cats are causing damage or are a nuisance and complete removal of the local population could be achieved, this would be considered a beneficial impact on the human environment since these species are not considered part of the native ecosystem.

4.1.1.1.1.2 Red Fox Population Information and Effects Analysis

The red fox (*Vulpes vulpes*) is a typically proportioned member of the dog family. The bushy and unusually long tail, pointed ears, slender muzzle, and slanted eyes coupled with its small dog size and typical reddish coloration, make the red fox instantly recognizable to most people. This species is also the most common and well-know species in the genus Vulpes, which includes about 10 other species worldwide (Honacki et al. 1982). Typically, black-tipped ears, black cheek patches, white throat parts, a lighter underside, and black “leg stockings” are found on most red foxes. The white tip of the tail (which is much more prominent in North American foxes than elsewhere) can be used to distinguish brownish fox pups from similarly colored coyote pups, which lack a white tail tip (Voigt 1987).

In North America the red fox weighs about 3.5 - 7 kg.(7.7 - 15.4 lbs.), with males averaging about 1 kg. (2.2 lbs) heavier than females. Generally, adult foxes measure 100 - 110 cm (39 - 43 inches) from the tip of the nose to the tip of the tail. Juveniles in their first autumn are as large as adults (Voigt 1987). They occur over most of North America, north and east from southern California, Arizona, and central Texas. They are found throughout most of the U. S. with the exception of a few isolated areas. Prehistoric fossil records suggest that the red fox may not have inhabited much of the U. S., but were plentiful in many parts of Canada. However, it has been suggested that climatic factors, interbreeding with the introduced European red fox, extirpation of the gray and red wolf, and clearing of land for agriculture has possibly contributed to the present-day expansion and range of this species in North America (Voigt 1987).

Red foxes are adaptable to most habitats within their range, but usually prefer open country with moderate cover. Some of the highest fox densities reported are in the north-central U.S., where woodlands are interspersed with farmlands. The range of the species has expanded in recent years to fill habitats formerly occupied by coyotes. The reduction of coyotes in many sagebrush / grassland areas of Montana and Wyoming has resulted in increased fox numbers. Red foxes have also demonstrated their adaptability by establishing breeding populations in many urban areas of the U. S., Canada, and Europe (Phillips and Schmidt 1994). In many areas, competition with other canids and the availability of suitable year-round food resources limit fox survival. Habitat determines the availability of year-round food resources and the presence or absence of other canids. Because these 2 factors strongly influence red fox survival, habitat limits fox numbers but seldom limits distribution (Voigt 1987).

Red foxes mate from January - March and produce litters of 1-10 kits after a gestation period of 51-53 days. They rear young in a maternity den, commonly an enlarged woodchuck or badger den, usually in sparse ground cover on a slight rise, with a good view of all approaches (National Audubon Society 2000). Juvenile foxes are able to breed before their first birthday, but in areas of high red fox densities, most yearlings do not produce pups (Harris 1979, Voigt and MacDonald 1984, Voigt 1987). Gier (1968) reported average litter sizes of 4.8-5.1 in years with low rodent numbers, but litters of 5.8-6.2 during years with high rodent numbers. Litter sizes of 1-19 pups have been reported (National Audubon Society 2000). These offspring disperse from the denning area during the fall and establish breeding areas in vacant territories, sometimes dispersing considerable distances. Red foxes are generally solitary animals as adults, except when mating (Phillips and Schmidt 1994). Rabies and distemper are associated with this species.

The red fox is a skilled nonspecific predator, foraging on a variety of prey. It is also an efficient scavenger, and in parts of the world garbage and carrion are extremely important to its diet (Voigt 1987). They are opportunists, feeding

mostly on rabbits, mice, bird eggs, insects, and native fruit. They usually kill animals smaller than a rabbit, although fawns, pigs, kids, lambs, and poultry are sometimes taken (Phillips and Schmidt 1994). They also feed on squirrels, woodchucks, crayfish, and even grasses (National Audubon Society 2000).

The density of red fox populations is difficult to determine because of the animals secretive and elusive nature. Estimates are prone to error even in open areas with good visibility. Methods used to estimate numbers have included aerial surveys, questionnaires to rural residents and mail carriers, scent post surveys, intensive ground searches, and indices derived from hunting and trapping harvest (Voigt 1987). In Great Britain, where food is superabundant in many urban areas, densities as high as 30 foxes / km^2 (78 / mi^2) have been reported (Harris 1977, MacDonald and Newdick 1982, Harris and Rayner 1986), while in southern Ontario, densities of about 1 fox km2 (2.6 / mi^2) occur during spring. This includes both pups and adults. In small areas of the best habitat, 3 times as many foxes have been observed (Voigt 1987). However, these densities rarely occur extensively because of the dispersion of unsuitable habitat, high mortality, or the presence of competition such as coyotes (Voigt and Earle 1983). Cyclical changes in fox numbers occur routinely and complicate density estimates as well as management. These cycles can occur because of changes in prey availability, or disease outbreaks, especially rabies, among red foxes. For fox populations to remain relatively stable, mortality and reproduction must balance approximately.

Home ranges for red foxes in the eastern U. S. are usually from 500 - 2,000 ha. (1,235 - 4,940 acres) in rural settings such as farmland (Voigt and Tinline 1980), but such sizes may not apply among fox populations in urban settings.

Red fox populations in Pennsylvania are considered stable by the PGC (PGC 2004). This species is a regulated furbearer, and seasons for take are set by the PGC. Fox hunting and trapping is open from October 16 to February 19 for the 2005 season and take is unlimited (PGC 2005). During the 2003-2004 furbearer season it was estimated that 31,592 red fox were harvested in Pennsylvania (Table 4.2) (PGC 2004). The harvest of red fox has been steady over the last ten years with a harvest estimate of over 30,000 a year. The PGC believes this sustained level of harvest represents less than 25% of the total statewide red fox population (Matt Lovallo, Furbearer Biologist, PGC, personal communication 9/1/2005). Based upon this information a statewide red fox population could be estimated at over 120,000 foxes.

Wildlife Services killed 86 red foxes in all MDM programs in Pennsylvania during FY 2001-2005 (Table 4.1) (USDA-WS MIS Database 2005). In future programs, WS may be requested to address damage being caused by red foxes anywhere in Pennsylvania to protect any resource being damaged or threatened. It is possible that WS could kill no more than 100 red foxes each year in MDM programs in the Commonwealth. Many of these would be removed in projects aimed at protecting human health and safety. Almost all of these animals would

be killed in urban or industrial habitats. Few red foxes are trapped for fur or hunted in these locales. Red fox damage management activities would target single animals 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. Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a local site.

Based upon the above information, WS limited lethal take of red foxes would have minimal effects on local or statewide red fox populations in Pennsylvania.

4.1.1.1.1.3 Woodchuck Population Information and Effects Analysis

The woodchuck (*Marmota monax*), also known as the "groundhog," is a large rodent, often seen in pastures, meadows, and fields in Pennsylvania. The woodchuck is one wildlife species native to Pennsylvania that has benefited from civilization. By cutting forests, raising crops and clearing pasture land, settlers provided suitable habitat and the woodchuck population expanded. Today the woodchuck is one of most common mammal species found in Pennsylvania (PGC 2004b). Woodchucks range in the United States extends throughout the East, northern Idaho, northeastern North Dakota, southeastern Nebraska, eastern Kansas, and northeastern Oklahoma, as well as south to Virginia and Alabama. They dig large burrows, generally 8-12 inches at the opening, sometimes 5 feet deep and 30 feet long with more than 1 entrance to a spacious grass filled chamber. Green vegetation such as grasses, clover, alfalfa forms its diet; at times it will feed heavily on corn and can cause extensive damage in a garden to other crops (National Audubon Society 2000). They may also jeopardize the integrity of earthen dams, present hazards to livestock and farm equipment as a result of burrowing; gnaw electrical cables, and damage hoses and other accessories on automobiles by gnawing (Bollengier 1994, USDA-WS MIS Database 2002).

The breeding season for woodchucks is usually from March through April (Bollengier, 1994). Female woodchucks usually produce from 4 to 6 young (Chapman and Feldhamer, 1982) with off-spring breeding at age 1 and typically living 4 -5 years. Mammal species with high mortality rates, such as rodents and lagomorphs, typically possess high reproductive rates and produce large and frequent litters of young (Smith 1996). For example, if a pair of woodchucks and their offspring all survived to breed as soon as possible, with an average litter size of 4 with a 1:1 sex ratio; they could produce over 645 woodchucks through their life time.

Woodchuck numbers vary from area to area, depending on food availability, soil type, hunting pressure and predation. Sometimes populations are extremely dense, with up to six or seven individuals per acre; this high density is seldom reached (PGC 2004b). A population of four per acre is considered abundant, and the average is probably closer to one per acre of farmland (PGC 2004b). In some regions, woodchucks are under heavy hunting pressure but still produce high

populations year after year. This illustrates how a game species can absorb heavy local losses if it has enough good habitat (PGC 2004b).

No population estimates were available for woodchucks in Pennsylvania. Therefore the best available information was used to estimate statewide populations. There are over 23 million acres of rural land in Pennsylvania, with approximately 5 million acres considered cropland (U.S. Census Bureau 2005). Using the assumption that 50% of the croplands throughout the Commonwealth have sufficient habitat to support woodchucks, and that woodchuck densities average 1 woodchuck per cropland acre, a conservative statewide woodchuck population could be estimated at over 2.5 million woodchucks.

Woodchucks are considered game animals in most states. There is usually no bag limit or closed season (Bollengier 1994). In Pennsylvania the season for woodchucks is year round with no limit on the number that can be taken.

A total of 868 woodchucks were killed in all MDM activities conducted by WS in Pennsylvania during FY 2001-2005 (Table 4.1) (USDA-WS MIS Database 2005). It is possible that WS could be requested to provide MDM to address woodchuck damage at any location in the Commonwealth. Based upon current and an anticipated increase in woodchuck damage management activities in the future, it is possible that WS would kill no more than 750 woodchucks per year in all MDM programs in Pennsylvania. Woodchuck damage management activities would target single animals 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.

Based upon the above information, WS limited lethal take of woodchucks would have minimal effects on local or statewide woodchuck populations in Pennsylvania.

4.1.1.1.1.4 Raccoon Population Information and Effects Analysis

The raccoon (Procyon lotor) is a stocky mammal about 61-91 cm (2-3 feet) long, weighing 4.5 - 13.5 kg (10 - 30 lbs). It is distinctly marked, with a prominent black mask over the eyes and a heavily furred, ringed tail. The animal is a grizzled salt-and-pepper gray and black above, although some individuals are strongly washed with yellow (Boggess 1994b).

The raccoon is one of the most omnivorous of animals. It will eat carrion, garbage, birds, mammals, insects, crayfish, mussels, other invertebrates, and a wide variety of grains, various fruits, other plant materials and most or all foods prepared for human or animal consumption (Sanderson 1987). They occasionally kill poultry (Boggess 1994b), and come into conflict with man frequently in urban and suburban environments by raiding garbage cans and pet food sources (Scott R. Stopak, WS, pers. comm., 2003).

The raccoon is found throughout most of the United States, with the exception of the higher elevations of mountainous regions and some areas of the arid southwest (Boggess 1994b, National Audubon Society 2000). Raccoons are more common in the wooded eastern portions of the United States than in the more arid western plains (Boggess 1994b), and are frequently found in cities or suburbs as well as rural areas (National Audubon Society 2000). Movements and home ranges of raccoons vary according to sex, age, habitat, food sources, season, and other factors. In general males have larger home ranges than females. Home range diameters of raccoons have been reported as being 1-3 km (0.6 - 2.9 mi.) maximum, with some home range diameters of dense suburban populations to be 0.3-0.7 km (0.2 - 0.4 mi.).

Absolute raccoon population densities are difficult or impossible to determine because of the difficulty in knowing what percentage of the population has been counted or estimated and the additional difficulty of knowing how large an area the raccoons are using (Sanderson 1987). Due to their adaptability raccoon densities reach higher levels in urban areas than that of rural areas. Relative raccoon population densities have been variously inferred by take of animals per unit area. For instance, Twichell and Dill (1949) reported removing 100 raccoons from tree dens in a 41 ha (101 acres) waterfowl refuge area, while Yeager and Rennels (1943) studied raccoons on 881 ha (2,177 acres) in Illinois and reported trapping 35-40 raccoons in 1939-39, 170 in 1939-40, and 60 in 1940-41. Slate (1980) estimated one raccoon/7.8 ha (19.3 acres) in New Jersey in predominantly agricultural land on the inner coastal plain. Raccoon densities of 100 per sq. mile (1 raccoon per 6.4 acres) can be attained around abundant food sources (Kern 2002).

No population estimates were available for raccoons in Pennsylvania. Therefore the best available information was used to estimate statewide populations. There are over 23 million acres of rural land in Pennsylvania, with approximately 5 million acres considered cropland (U.S. Census Bureau 2005). Using the assumption that 75% of the rural lands throughout the commonwealth have sufficient habitat to support raccoons, raccoons are only found in rural habitat, raccoon densities average 1 raccoon per 19/acre, a conservative statewide raccoon population could be estimated at over 900,000 raccoons. Considering raccoons inhabit urban areas as well as rural lands an estimate of 900,000 raccoons is likely low.

In Pennsylvania, raccoons cause damage to gardens, residential and non-residential buildings, fish, domestic fowl, and pets, as well as general property damage. Results of their feeding may be the total loss of ripened sweet corn in a garden. Damage to buildings generally occurs when they seek to gain entry or begin denning in those structures. Raccoons may den in uncapped chimneys, or may tear off shingles or fascia boards to gain access to attics or wall spaces. They

may also damage or destroy sod by rolling it up in search of earthworms and other invertebrates (Boggess 1994b).

The public are also concerned about health and safety issues associated with raccoons. These diseases include, but are not limited to, canine distemper and rabies, and the roundworm Baylisascaris procyonis, the eggs of which survive for extremely long periods in raccoon feces and soil contaminated by them. Ingestion of these eggs can result in serious or fatal infections in other animals as well as humans (Davidson and Nettles 1997 and Table 1.1).

Raccoon populations in Pennsylvania are considered stable by the PGC (PGC 2004c). Raccoons are regulated furbearers in Pennsylvania. They are harvested for fur value and for food. For the 2005 season, hunting and trapping seasons run from October 16 – February 19 with unlimited take (PGC 2005). During the 2003-2004 furbearer season it was estimated that 104,781 raccoons were harvested in Pennsylvania (Table 4.2) (PGC 2004).

Wildlife Services provides assistance in combating the spread of raccoon rabies in Pennsylvania. These activities are part of the national rabies barrier program covered under separate environmental analyses (USDA 2001). Other rabies monitoring or control activities may occur as part of this program. Raccoons killed under the ORV program are covered by the EA and FONSI – Oral Vaccination to Control Specific Rabies Virus Variants in Raccoons, Gray Foxes, and Coyotes in the United States (USDA 2001) but are included in this EA for cumulative impact analysis.

Wildlife Services killed 570 raccoons in all MDM programs in Pennsylvania during FY 2001-2005 (Table 4.1) (USDA-WS MIS Database 2005). In future programs, WS may be requested to address damage being caused by raccoons anywhere in Pennsylvania to protect any resource being damaged or threatened. Based upon current and an anticipated increase in raccoon damage management activities in the future, it is possible that WS would kill no more than 500 raccoons per year in all MDM programs in Pennsylvania. Raccoon damage management activities would target single animals or local populations of the species at sites where their presence was causing unacceptable damage and/or conflicts.

Based upon the above information, WS limited lethal take of raccoon would have minimal effects on local or statewide raccoon populations in Pennsylvania.

4.1.1.1.1.5 Striped Skunk Population Information and Effects Analysis

Although easily recognized by their black and white fur, the striped skunk (Mephitis mephitis) may be most readily recognized by the odiferous smell of its' musk. They are common throughout the United States and Canada (Rosette 1987). Striped skunks are primarily nocturnal and do not have a true hibernation

period, although during extremely cold weather it may become temporarily dormant. The striped skunk is an omnivore, feeding heavily on insects such as grasshoppers and crickets, beetles and bees and wasps (Chapman and Feldhamer 1982). The striped skunk's diet also includes small mammals, the eggs of ground-nesting birds and amphibians. Striped Skunks are typically non-aggressive, and will attempt to flee when approached by humans (Rosatte 1987). However, when provoked, skunks will give a warning and assume a defensive posture prior to discharging their foul-smelling musk. This musk is sulfur-alcohol compounds know as butylmercaptan (Chapman and Feldhamer 1982).

Skunks den in ground burrows, beneath buildings, stumps, wood and rock piles and overhanging creek banks (PGC 2004d). Often a skunk will use an abandoned woodchuck burrow, although if none is available it will dig its own. The burrow has a central chamber (12-15 inches in diameter) about three feet underground, connected to the surface by one or more tunnels 5-15 feet long. The central chamber is lined with dry grass and leaves. Skunks seem to prefer slopes for den sites, probably because these areas drain well. In spring, summer and early fall, a skunk may den in several different burrows; in winter, it tends to use just one.

Adult skunks begin breeding in late February. Yearling females (born in the preceding year) mate in late March. Gestation usually lasts about 7-10 weeks, and there is usually only 1 litter annually. Litters commonly consist of 4-6 young. The home range of striped skunks is usually not consistent. It appears to be in relation to life history requirements such as winter denning, feeding activities, dispersal and parturition (Rosatte 1987). Other literature reported the home ranges of striped skunks to average between 2.2 and 4.9 km^2 (0.85 -1.9 $miles^2$) in rural areas of Minnesota and Illinois (Rosette, in Novak, et al. 1987). During the breeding season, males may travel larger areas in search of females. Skunk densities vary widely according to season, food sources and geographic area. Densities have been reported to range from 1 skunk per 77/acres to 1 per 10/acres (Rosatte 1987). Striped skunks live throughout Pennsylvania. Highest numbers are found in farming areas; lowest populations occur in densely forested mountain regions (PGC 2004d).

No population estimates were available for striped skunks in Pennsylvania. Therefore the best available information was used to estimate statewide populations. There are over 23 million acres of rural land in Pennsylvania, with approximately 5 million acres considered cropland (U.S. Census Bureau 2005). Using the assumption that 50% of the rural lands throughout the commonwealth have sufficient habitat to support stripped skunks, skunks are only found in rural habitat, and skunk densities average 1 skunk per 77/acre, a conservative statewide stripped skunk population could be estimated at approximately 150,000 skunks. Considering skunks inhabit urban areas as well as rural lands an estimate of 150,000 skunks is likely very low.

In Pennsylvania, the 2005 hunting and trapping season for striped skunks is from October 16 to February 19 and take is unlimited (PGC 2005). During the 2003-2004 furbearer season it was estimated that 9,319 skunks were harvested in Pennsylvania (Table 4.2) (PGC 2004).

Wildlife Services killed 37 striped skunks in all MDM programs in Pennsylvania during FY 2001-2005 (Table 4.1) (USDA-WS MIS Database 2005). In future programs, WS may be requested to address damage being caused by striped skunks anywhere in Pennsylvania to protect any resource being damaged or threatened. Based upon current and an anticipated increase in striped skunk damage management activities in the future, it is possible that WS would kill no more than 100 striped skunks per year in all MDM programs in Pennsylvania. Skunk damage management activities would target single animals or local populations of the species at sites where their presence was causing unacceptable damage and/or conflicts.

Based upon the above information, WS limited lethal take of striped skunks would have minimal effects on local or statewide skunk populations in Pennsylvania.

4.1.1.1.1.6 Bat Populations Information and Effects Analysis

Bats are the only mammals that fly. Their wings are thin membranes of skin stretched from fore to hind legs, and from hind legs to tail. Their long slender finger bones act as wing struts, stretching the skin taut for flying; closed, they fold the wings alongside the body (PGC 2004e).

Pennsylvania bats range in size from the hoary bat (length, 5.1-5.9 inches; wingspread, 14.6-16.4 inches; weight, 0.88-1.58 ounces) to the Eastern pipistrelle (length, 2.9-3.5 inches; wingspread, 8.1-10.1 inches; weight, 0.14-0.25 ounces). Nine species of bats occur in Pennsylvania; two are rare visitors from the South (PGC 2004e) (Table 4.3).

All Pennsylvania bats belong to the family *Vespertilionidae*, and are also known as evening bats or common bats. They are insect eaters, taking prey on the wing. Often they feed over water, and some species occasionally land and seize prey on the ground. A bat consumes up to 25% of its weight at a single feeding (PGC 2004e).

The eyes of bats are relatively small, but their ears are large and well developed. Bats can see quite well, but unique adaptations help them fly and catch prey in total darkness. While in flight, a bat utters a series of high-pitched squeaks, which echo off nearby objects and bounce back to the bat's ear. These sound pulses may only be 2.5 milliseconds in duration. Split-second reflexes help the bats change flight direction to dodge obstructions or intercept prey (PGC 2004e).

Most bats mate in late summer or early fall, although some breed in winter. The male's sperm is stored in the female's reproductive system until spring, when fertilization occurs. The young, born in summer, are naked, blind, and helpless. They are nursed by their mothers and by six weeks of age, most are self-sufficient and nearly adult size (PGC 2004e).

In fall, winter and early spring, insects are not readily available to bats in Pennsylvania. At this time, three species migrate south; six others hibernate (PGC 2004e). Bats are true hibernators. Throughout winter, they eat nothing, surviving by slowly burning fat accumulated during summer. A hibernating bat's body temperature drops close to the air temperature; respiration and heartbeat slow; and certain changes occur in the blood (PGC 2004e).

Several bat species in Pennsylvania are known to roost, raise young, or hibernate in various human structures. Such behavior sometimes causes human/bat conflicts due to droppings, odor, noise, and perceived or actual threats of rabies.

Table 4.3 Bats Found in Pennsylvania (PGC 2004e)

Common Name	Scientific Name	Occurrence	Roosting / Rearing / Hibernating Habitat	Status in PA*
Big Brown Bat	***Eptesicus fuscus***	year-round, statewide	buildings during the spring, summer, and winter; caves, mines, and storm sewers in the winter	PN
Eastern pipistrelle	***Pipistrellus subflavus***	year-round, statewide, except southeastern corner	Hollow trees, buildings, caves in summer; deep in caves in winter	PN
Hoary bat	***Lasiurus cinereus***	Spring and Summer, migrate south in winter; most of state	trees, under clusters of leaves except in winter when may roost in hollow trees, abandoned buildings	PN
Indiana Bat	***Myotis sodalis***	Fringe of species range	Limestone caves and abandoned mines in winter; trees in summer. Not common in buildings.	PN, FE, SE
Little Brown Bat	***Myotis lucifugus***	most common, year round, statewide	caves, mines, tunnels in winter; barns, buildings (especially attics) in summer	PN

Common Name	Scientific Name	Occurrence	Roosting / Rearing / Hibernating Habitat	Status in PA*
Red Bat	***Lasiurus borealis***	Migrate south in winter; statewide	Forests, beneath clusters of leaves, hollow trees. Rarely buildings or caves.	PN
Northern Long-eared Bat	***Myotis septentrionalis***	year round; statewide	Caves, behind window shutters, under loose bark, in cliff crevices, attics, and barns.	PN
Silver-haired Bat	***Lasionycteris noctivagans***	migrate south in winter; northern part of state	hollow trees, tree cavities, crevices beneath peeling bark.	PN
Small-footed Bat	***Myotis leibii***	year round (mostly in winter), majority of the state, except upper third of middle portion of state	caves, rock shelters, cliff fissures, old mines, quarries, abandoned buildings, bridges	PN, ST

* Codes: F = Federal listing, S = State listing, E = Endangered, T = Threatened, PN = Protected non-game

The Seminole bat (*Lasiurus seminolus*) and Evening bat (*Nycticeius humeralis*) have been found a few times in Pennsylvania, but are not considered regular residents.

Currently, almost all complaints are handled through providing technical assistance advice. Most of the complaints are concerning bats which wandered into living or working spaces or buildings or roosting in various manmade structures. Most situations were resolved through providing an escape route for the intruding bat, by capturing and releasing it, or by exclusion of roosting animals. WS routinely makes recommendations that bats be excluded from buildings by various proven techniques as follows: to exclude bats correctly may take two years. The first summer the bats should be observed when they leave at dusk to find where the bats are exiting the structure. If possible, a bat box should be erected before August (it should be large enough to accommodate all the bats that will be evicted) (PGC 2004e). When the bats leave in the fall, seal all the entrances. The following spring, when the bats return, they are likely to move into the bat box. Do not seal entrances during June or July because they may be flightless young still in the structure (PGC 2004e).

In future program activities bat damage will continue to be handled primarily by WS through various technical assistance projects. Program activities would continue to feature such non-lethal control methods as exclusion, live capture/release and habitat manipulation. To reduce the possibility of adversely affecting a bat maternity colony, WS would implement and recommended to persons receiving technical assistance that all exclusion and habitat manipulation be conducted from September 1 to early November, when practicable. Many bat species, would have migrated at that time and the rearing of young would have been completed. MDM activities conducted after this date would therefore be highly unlikely to disturb maternity colonies of any species during critical young-rearing periods. Conducting exclusionary and other projects at this time would also give species which overwinter in Pennsylvania, an opportunity to find alternate roost sites before extremely cold weather.

Most requests for WS assistance would likely occur in relation to bats inhabiting human-occupied buildings. Federally or state listed T&E bat species in Pennsylvania are not generally found associated with man-made structures and so it is unlikely that any federally or state listed T&E bats would be found occupying such habitats. For that reason, it is highly unlikely that programs to address bat damage in such sites would affect any federally listed T&E bat species. If the need arises, WS will consult with a qualified biologist and/or the USFWS to positively identify bats prior to removing them in order to eliminate any chance of harming a rare or listed species. If it is determined that a federally listed bat species may be impacted by WS MDM activities, WS will initiate ESA consultation process with the USFWS at that time.

Based upon the above information, WS would have no adverse impacts on bat populations within the Commonwealth.

4.1.1.2 Effects on Non-target Species Populations, Including T&E Species

Adverse Effects on Non-target (non-T&E) Species. Direct impacts on nontarget species 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. WS take of non-target species during WDM activities is expected to be extremely low to non-existent. While every precaution is taken to safeguard against taking non-target species, at times changes in local animal movement patterns and other unanticipated events could result in the incidental take of unintended species. These occurrences are rare and should not affect the overall populations of any species under the current program. Mitigation measures designed and implemented to avoid adverse effects on non-target species are described in Chapter 3.

WS personnel are experienced and trained in wildlife identification, and to select the most appropriate methods for taking targeted animals and excluding non-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. Shooting is virtually 100% selective for the target species; therefore no adverse impacts are anticipated from use of this method. WS 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 unharmed in a live trap would be subsequently released on site.

Any operational uses of MDM chemicals would be in accordance with labeling requirements under FIFRA and Pennsylvania pesticide laws and regulations that are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on non-target species populations. No adverse impacts from the use of chemical methods are anticipated. Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997).

Non-target species taken in Pennsylvania are recorded as Target - Unintentional (i.e., they were listed on the agreement as target species but were taken unintentionally during efforts to take other target species) or Non-target (i.e., they were not listed as target species on the agreement and were taken unintentionally during efforts to take target species). With this type of data recording, some species were targets in some situations and non-targets in others. Non-target mammals killed by WS during MDM activities in Pennsylvania during FY 2001-2004 included raccoons (9) and striped skunks (4) (USDA-WS MIS Database 2005). Analysis of impacts on striped skunks and raccoons are provided in Section 4.1.1.1. The level of non-target take for each of these species is insignificant and had no adverse affect on their populations in the Commonwealth. WS does not anticipate the level of non-target take to increase substantially above current levels of take. Any other non-target species that may incidentally be taken by WS is expected to be minimal and should have no adverse effect on statewide populations

Beneficial Effects on Non-target Species. This alternative has the greatest possibility of successfully reducing mammal damage and conflicts to wildlife species since all MDM methods could possibly be implemented or recommended by WS.

4.1.1.2.1 Threatened and Endangered Species

Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. The USFWS's and Department of Conservation of Natural Resources's (DCNR) list of Federal and State T&E species for Pennsylvania were reviewed by WS to determine whether any T&E species might be affected by the proposed action. Mitigation measures designed and implemented to avoid adverse effects on T&E species were described in Chapter 3 (Subsection 3.4).

Federally listed species

WS has consulted with the USFWS under Section 7 of the ESA concerning potential impacts of MDM methods on T&E species and has obtained a Biological Opinion. For the full context of the Biological Opinion, see Appendix F of the ADC Final EIS (USDA 1997, Appendix F). For the preparation of this EA, WS obtained and reviewed the list of federally listed T&E species for the Commonwealth of Pennsylvania (Appendix C) and determined that the proposed WS MDM program would not likely adversely affect any T&E species or critical habitat. Additionally, WS sent a section 7 consultation letter on March 7, 2007 and the USFWS concurred with WS not likely to adversely affect determination.

Effects on Bald Eagle

As stated in the 1992 BO, the USFWS has determined that the only MDM methods that might adversely affect the bald eagle were the use of leghold traps and snares used near animal carcasses or large pieces of meat; and the above ground use of strychnine treated bait. It is WS program policy to set leghold traps and snares no closer than 30 feet from exposed bait to prevent the capture of non-target animals. Strychnine is no longer registered for above ground use and would not be used by WS for MDM in the State. Therefore, WS use of MDM in Pennsylvania is not likely to adversely affect bald eagles.

State listed species

WS has obtained and reviewed the list of Pennsylvania State listed T&E species (Appendix C) and has determined that the proposed WS MDM program is not likely to adversely affect any state listed endangered or threatened species.

In those situations where a non-federal cooperator 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 will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS management activities may have less of an impact non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.1.3 Effects on Human Health and Safety

When used improperly or by untrained individuals, various methods used in mammal damage management projects could pose risks to humans. Methods analyzed that could pose risks to human health and safety include the use of chemicals, firearms, snares, foothold traps, conibear traps, and harassment with pyrotechnics. No accidents resulting in harm to any persons have occurred under the current WS MDM program in Pennsylvania. A formal risk assessment of WS operational management methods found that risks to human safety were low (USDA 1997). Wildlife Services SOP's include

measures intended to mitigate or reduce the effects on human health and safety and are presented in Chapter 3. Risk to members of the public from WS' use of pyrotechnics to harass offending animals, or from use of chemicals, firearms, snares, foothold traps or body-gripping traps to take mammals would remain low due to adherence to WS policies, required safety precautions, and training.

Safety and Efficacy of Chemical Control Methods Used in MDM

Under the proposed alternative WS may use EPA registered gas cartridges as a fumigant. Gas Cartridges are placed in woodchuck burrows/dens and are burned to create carbon monoxide gas to euthanize animals. Applicators must exercise caution to avoid burns to the skin or surrounding vegetation. All chemicals are regulated by EPA under FIFRA, and PDA. Their use by WS personnel is carefully defined in WS Directives. Based on a thorough Risk Assessment, APHIS concluded that, when WS Program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997). Therefore, MDM programs in Pennsylvania where such chemicals are used are not expected to adversely affect public safety.

Non-lethal MDM chemicals that might be used or recommended by WS include repellents. Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before EPA or FDA would register them. Any operational uses of chemical repellents would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations that are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on human health and safety.

Drugs used in capturing, handling, and euthanizing wildlife for wildlife hazard management purposes include ketamine, a mixture of ketamine/xylazine, sodium pentobarbital, potassium chloride, and Beuthanasia-D. Meeting the requirements of the AMDUCA should prevent any significant adverse impacts on human health with regard to this issue. Mitigation measures that would be part of the standard operating procedures include:

- All drug use 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 APHIS-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. Ear tagging or other marking of animals

drugged and released to alert hunters and trappers that they should contact state officials before consuming the animal.

- Most animals administered drugs would be released well before Pennsylvania 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.

By following these procedures in accordance with AMDUCA, wildlife management programs would avoid any significant impacts on human health with regard to this issue.

In those situations where a non-federal cooperator 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 will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Effects on Human Health and Safety from Non-Chemical MDM Methods

Non-chemical MDM methods that might raise safety concerns include shooting with firearms; use of traps and snares; and harassment with pyrotechnics. No adverse affects on human safety from WS's use of these methods is expected.

Firearms, traps, snares and pyrotechnics are only used by WS personnel who are experienced in handling and using them. Wildlife Services personnel use firearms to shoot mammals and euthanize animals caught in traps. Wildlife Services personnel are trained and given refresher courses to maintain awareness of firearm and pyrotechnic safety and handling as prescribed by WS policy. Snares and traps are strategically placed to minimize nontarget take and minimize exposure to the public. Signs are used to post properties where traps are set to alert the public of their presence.

In those situations where a non-federal cooperator 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 will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Effects on Human Health and Safety from not Conducting MDM to Reduce Disease Threats or Outbreaks and Mammal Strike Hazards at Airports

People are concerned with potential disease threats; and injury and loss of human life as a result of mammal/aircraft collisions. An IWDM strategy, a combination of lethal and

non-lethal means, has the greatest potential of successfully reducing this risk. All WDM methods could possibly be implemented and recommended by WS.

In those situations where a non-federal cooperator 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 will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.1.4 Effects on Socio-cultural Elements and Economics of the Human Environment

4.1.1.4.1 Effects on Human Affectionate-Bonds with Individual Mammals and on Aesthetic Values of Wild Mammal Species

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 animals that would be killed by WS's lethal control activities. Lethal control actions 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. Lethal removal of mammals from airports should not affect the public's enjoyment of the aesthetics of the environment since airport properties are closed to public access. The ability to view and interact with animals at these sites is usually either restricted to viewing from a location outside boundary fences or is forbidden.

As discussed in Subsection 2.3.3.1, some people form human affectionate-bonds with individual wild or feral mammals. For some, removal of these individual animals is considered objectionable because these animals may be considered pets, or the relationship which exists may be similar to that experienced with domestic pets. A number of professionals in the field of psychology have studied human behavior in response to attachment to pet animals (Gerwolls, 1994, Marks and Koepke 1994, Zasloff 1996, Archer 1997, Ross and Baron-Sorensen 1998, Meyers, 2000). Similar observations are probably applicable to close bonds which could exist between people and wild animals. For some, humans experience affection for pet animals is similar in scope and meaning to human-human affections (Stephens and Hill 1996, Boyce 1998). Loss of this relationship may cause a sense of loss, the experiences of grief, and the need for healing and acceptance of the loss and rebuilding, which can include establishing new bonds with other animals or engaging in other activities (Lefrancois 1999).

If humans establish affectionate relationships with wild animals, removal of these individual animals from certain sites by WS MDM actions may result in severing of those established bonds. However, as affected individuals follow the usual human pattern related to the experience of loss, they will experience recovery and may establish new bonds with other animals. Wildlife Services MDM actions rarely remove all mammals or even all mammals of one species from a locale where actions occur. Individuals wishing to establish bonds with wild animals will still be able to interact with them. Therefore, Wildlife Services MDM programs are not expected to markedly affect this element of the human environment.

Some individuals obtain aesthetic benefit from viewing animals in the wild and may feel that removal of such animals from a locale by Wildlife Services MDM programs could affect their aesthetic enjoyment. In addition, some people do not believe that mammals should even be harassed to stop or reduce damage problems. They are concerned that their ability to view mammals is lessened by WS nonlethal harassment efforts. The public's ability to view wild mammals in a particular area would be more limited if the mammals are removed or relocated. However, immigration of mammals from other areas could possibly replace the animals removed or relocated during a damage management action. The opportunity to view or feed other wildlife would also be available if an individual makes the effort to visit other areas with adequate habitat and local populations of the species of interest. The live capture and translocation or killing of some mammals may result in complete, but usually temporary, removal of all of these mammals from one property. However, adjacent properties in nearby neighborhoods would likely contain mammals of the same species.

Some individuals are offended by the presence of overabundant mammal species, and feel that their overall enjoyment of wildlife is diminished by the presence of such species. In cases where WS MDM actions reduce the numbers of overabundant mammal species, the removal or relocation of these animals may actually enhance the aesthetic value of wildlife for these affected individuals.

In those situations where a non-federal cooperator 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 will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.1.4.2 Effects on Aesthetics and Value of Property Damaged by Mammals

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.

In those situations where a non-federal cooperator 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 will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.1.5 Humaneness of Methods Used by WS

MDM methods viewed by some persons as inhumane would be employed by WS under this alternative. Despite SOP's designed to maximize humaneness, the perceived stress and trauma associated with being held in foothold traps or snares 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 uses EPA registered and approved pesticides, such as burrow and den fumigants to manage damage caused by mammals in Pennsylvania. Some individuals consider the use of such chemicals to be inhumane.

WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Under this Alternative, mammals would be trapped as humanely as possible or shot by experienced WS personnel using the best and most appropriate method(s) available. Some animal rights activists may perceive these methods as inhumane because they oppose all lethal methods of damage management.

Wildlife Services 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 nonlethal damage management methods are not practical or effective.

In those situations where a non-federal cooperator 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 will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.2 Alternative 2 - Nonlethal Required Before Lethal Control

4.1.2.1 Effects on Wildlife

4.1.2.1.1 Effects on Target Mammal Species Populations

Under this alternative, no preventive lethal control actions would be taken by WS. For many individual damage situations, this alternative would be similar to the current program because many producers have tried one or more nonlethal methods such as habitat modifications, exclusion, or behavior modification of the offending species, without success, or have considered them and found them to be impractical in their particular situations prior to requesting WS's assistance. WS impacts to target mammal populations would be similar to the proposed action alternative. However, because non-lethal control must be applied before lethal control, damage may not be reduced in a timely and effective manner. In those situations, resource owners may be unwilling to accept further losses as all available non-lethal methods are applied. This could result in resource owners rejecting WS non-lethal methods and implement their own lethal control program resulting in impacts similar to Alternative 4.

4.1.2.1.2 Effects on Non-target Wildlife Species Populations, Including T&E Species

Adverse Effects on Nontarget Species. Wildlife Services impacts to non-target wildlife populations are expected to be similar to the proposed action.

Beneficial Effects on Nontarget Species. Because non-lethal control must be applied before lethal control, damage may not be reduced in a timely and effective manner. In those situations, resource owners may be unwilling to accept further losses as all available non-lethal methods are applied. This could result in resource owners rejecting WS non-lethal methods and implement their own lethal control program resulting in impacts similar to Alternative 4.

4.1.2.2 Effects on Human Health and Safety

4.1.2.2.1 Safety and Efficacy of Chemical Control Methods Used in MDM

Impacts of WS chemical MDM methods on human health and safety would be similar to the proposed action alternative.

4.1.2.2.2 Effects on Human Health and Safety from Non-Chemical MDM Methods

Impacts of WS non-chemical MDM methods on human health and safety would be similar to the proposed action alternative.

4.1.2.2.3 Effects on Human Health and Safety from not Conducting MDM to Reduce Disease Threats or Outbreaks and Mammal Strike Hazards at Airports

Because non-lethal control must be applied before lethal control, damage may not be reduced in a timely and effective manner. Without the option of WS conducting lethal damage management activities prior to implementation of nonlethal methods, damage

could rise considerably before nonlethal means failed or could take effect. Therefore, adverse impacts of this alternative on human health and safety could be greater than the proposed action alternative if nonlethal methods were ineffective at reducing disease and aircraft strike threats**.**

4.1.2.3 Effects on the Socio-cultural Elements and Economics of the Human Environment

4.1.2.3.1 Effects on Human Affectionate-Bonds with Individual Mammals and on Aesthetic Values of Wild Mammal Species

Wildlife Services impacts on this issue would be similar to the proposed action. However, because non-lethal control must be applied before lethal control, damage may not be reduced in a timely and effective manner. In those situations, resource owners may be unwilling to accept further losses as all available non-lethal methods are applied. This could result in resource owners rejecting WS non-lethal methods and implementing their own lethal control program resulting in impacts similar to Alternative 4.

4.1.2.3.2 Effects on Aesthetics and Value of Property Damaged by Mammals

Because non-lethal control must be applied before lethal control, damage may not be reduced in a timely and effective manner. Without the option of WS conducting lethal damage management activities prior to implementation of nonlethal methods, damage could rise considerably before nonlethal means failed or could take effect. Therefore, impacts of this alternative on those persons adversely affected by mammal damage could be greater than the proposed action alternative if nonlethal methods were ineffective at reducing damage to acceptable levels**.**

4.1.2.4 Humaneness of Methods Used by WS

Wildlife Services impacts on humaneness would be similar to the proposed action alternative.

4.1.3 Alternative 3 - Technical Assistance Only

4.1.3.1 Effects on Wildlife

Effects on Target Mammal Species Populations

Under this alternative, WS would have no impact on target mammal populations in Pennsylvania because the program would not provide any operational MDM activities. The program would be limited to providing advice only. Some resource owners experiencing damage may trap or shoot mammals, or hire private trappers. Some mammal populations would continue to increase where trapping and shooting pressure was low and may decline or stabilize where trapping and shooting pressure was adequate.

Since affected resource owners would likely lethally remove the damaging mammal that would no longer be removed by WS, private efforts to reduce or prevent mammal damage and perceived disease transmission risks could increase, which could result in similar or even greater effects on those populations than the Proposed Action. However, for the same reasons shown in the population effects analysis in section 4.1.1, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003).

Effects on Non-target Wildlife Species Populations, Including T&E Species

Adverse Effects on Nontarget Species. This Alternative would not allow any WS direct operational MDM in Pennsylvania. Non-target or T&E species would not be impacted by WS activities from this alternative. Technical assistance or self-help information would be provided at the request of producers and others. 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, leading to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that, similar to Alternative 4, 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 some T&E species (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). 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.

Beneficial Effects on Nontarget Species. The ability to reduce negative impacts caused by mammals to wildlife species, including T&E species, would be variable based upon the skills and abilities of the person implementing control actions. It would be expected that this alternative would have a greater chance of reducing damage than Alternative 4 since WS would be available to provide information and advice.

4.1.3.2 Effects on Human Health and Safety

Safety and Efficacy of Chemical Control Methods Used in MDM

Concerns about human health and safety risks from WS's use of chemical MDM methods would be alleviated because no such use would occur. WS would provide technical advice to those persons requesting assistance. Resource owners could use information provided by WS or implement their own damage reduction program without WS' technical assistance. Negative impacts to human health and safety resulting from the improper use of chemical control methods should be less than Alternative 4 when WS' technical advice is followed.

Effects on Human Health and Safety from Non-Chemical MDM Methods

Concerns about human health and safety risks from WS's use of non-chemical MDM methods would be alleviated because no such use would occur. WS would provide technical advice to those persons requesting assistance. Resource owners could use information provided by WS or implement their own damage reduction program without WS' technical assistance. Negative impacts to human health and safety resulting from the improper use of non-chemical control methods should be less than Alternative 4 when WS' technical advice is followed.

Effects on Human Health and Safety from not Conducting MDM to Reduce Disease Threats or Outbreaks and Mammal Strike Hazards at Airports

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, disease and mammal aircraft strike threats to human health and safety should be less than Alternative 4. However, resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts to human health and safety could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

4.1.3.3 Effects on the Socio-cultural Elements and Economics of the Human Environment

4.1.3.3.1 Effects on Human Affectionate-Bonds with Individual Mammals and on Aesthetic Values of Wild Mammal Species

Under this alternative, WS would not conduct any direct operational MDM, but would still provide technical assistance or self-help advice to persons requesting assistance with mammal damage. Those who oppose direct operational assistance in 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 the individual 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 resulting in impacts similar to the Proposed Action alternative.

4.1.3.3.2 Effects on Aesthetics and Value of Property Damaged by Mammals

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,

resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, mammal damage could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

4.1.3.4 Humaneness of Methods Used by WS

The issue of humaneness as it relates to WS under this alternative is not applicable because resource owners or others would be responsible to implement the damage management methods. Wildlife Services would provide technical advice to those persons requesting assistance. 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.

4.1.4 Alternative 4 - No Federal WS MDM

4.1.4.1 Effects on Wildlife

Effects on Target Mammal Species Populations

WS would conduct no mammal damage management activities under this alternative. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Under this alternative, WS would have no impact on target mammal populations in the State. Private efforts to reduce or prevent depredations could increase which could result in effects on target species populations to an unknown degree. Effects on target species under this alternative could be the same, less, or more than those of the proposed action depending on the level of effort expended by private persons. Some resource owners experiencing damage may trap or shoot mammals, or hire private trappers. Some mammal populations would continue to increase where trapping and shooting pressure was low and may decline or stabilize where trapping and shooting pressure was adequate.

Since affected resource owners would likely lethally remove the mammal that would no longer be removed by WS, private efforts to reduce or prevent mammal damage and perceived disease transmission risks could increase, which could result in similar or even greater effects on those populations than the Proposed Action. However, for the same reasons shown in the population effects analysis in section 4.1.1, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003).

Effects on Non-target Wildlife Species Populations, Including T&E Species

There would be no impact on other wildlife species, including T&E species by WS from this alternative. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Adverse Effects on Nontarget Species. Alternative 4 would not allow any WS MDM in the State. There would be no impact on non-target or T&E species by WS MDM activities from this alternative. Private efforts to reduce or prevent depredations could result in less experienced persons implementing control methods, leading 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 lead to unknown effects on local non-target species populations, including some T&E species (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). 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.

Beneficial Effects on Nontarget Species. The ability to reduce negative impacts caused by mammals to wildlife species and their habitats, including T&E species, would be variable based upon the skills and abilities of the person implementing control actions.

4.1.4.2 Effects on Human Health and Safety

Safety and Efficacy of Chemical Control Methods Used in MDM

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Concerns about human health and safety risks from WS's use of chemical MDM methods would be alleviated because no such use would occur. Resource owners could use any legal MDM chemical available to them, including EPA registered chemicals. Without professional assistance or proper training in the use of chemical MDM methods, there is the potential for increased risks to public safety. Resource owners inexperienced in the safe and proper use of chemical MDM methods may attempt to resolve mammal damage problems.

The potential for illegal use of chemical toxicants under this alternative might pose threats to human health and safety if such chemicals were used indiscriminately in areas used by humans, or where such chemicals might be transported into the human food chain.

Effects on Human Health and Safety from Non-Chemical MDM Methods

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Concerns about human health and safety risks from WS's use of non-chemical MDM methods would be alleviated because no such use would occur. Resource owners could use any legal MDM non-chemical available to them, including pyrotechnics, traps, snares, and firearms. Without professional assistance or proper training in the use of non-chemical MDM methods, there is the potential for increased risks to public safety. Resource owners inexperienced in the safe and proper use of non-chemical MDM methods may attempt to resolve mammal damage problems. These increased risks are associated with the improper or inexperienced use of damage management methods such as trapping and shooting.

Effects on Human Health and Safety from not Conducting MDM to Reduce Disease Threats or Outbreaks and Mammal Strike Hazards at Airports

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

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 owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts to human health and safety could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

4.1.4.3 Effects on the Socio-cultural Elements and Economics of the Human Environment

4.1.4.3.1 Effects on Human Affectionate-Bonds with Individual Mammals and on Aesthetic Values of Wild Mammal Species

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Under this alternative, WS would not conduct any MDM in Pennsylvania. 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, resulting in impacts similar to the proposed action alternative.

4.1.4.3.2 Effects on Aesthetics and Value of Property Damaged by Mammals

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo.*

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 owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

4.1.4.4 Humaneness of Methods Used by WS

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

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 SUMMARY OF POTENTIAL IMPACTS

Table 4.4 summarizes the expected impact of each of the alternatives on each of the issues.

Table 4.4 Alternative Effects on Issues Compared

Issues/Alternatives	Alternative 1. Continue Current Federal MDM Program	Alternative 2. Nonlethal Required Before Lethal Control	Alternative 3. Technical Assistance Only	Alternative 4. No Federal WS MDM
Effects on Wildlife	*Low effect.* Reductions in local target mammal numbers by WS; would have minimal effects on local and state populations. *Low effect.* No adverse affect on	*Low effect.* WS impacts to target mammal populations similar to Alternative 1. *Low effect.* No adverse affect on nontarget species by WS. Methods used by WS would	No effect by WS on target mammal populations and nontarget species. *Low to moderate effect* If resource owners conduct their own MDM, impacts on target	No effect by WS on target mammal populations and nontarget species. *Low to moderate effect.* If resource owners conduct their own MDM, impacts on target mammal populations could be similar or

Issues/Alternatives	Alternative 1. Continue Current Federal MDM Program	Alternative 2. Nonlethal Required Before Lethal Control	Alternative 3. Technical Assistance Only	Alternative 4. No Federal WS MDM
	nontarget species by WS. Methods used by WS would be highly selective with very little risk to nontarget species. Some species could be affected positively by WS MDM actions.	be similar to Alternative 1. Beneficial impacts would be variable. *Low to moderate effect.* Resource owners may reject WS program and implement their own lethal control program resulting in impacts to target and nontarget species similar to Alternative 4.	mammal populations could be similar or greater than Alternative 1; increased possibility that non-targets species maybe taken, less likely than Alternative 4. Beneficial impacts would be variable.	greater than Alternative 1; increased possibility that non-targets species maybe taken. Beneficial impacts would be variable.
Effects on Human Health and Safety	***(Methods)*** *- Low effect.* Methods used by WS would be safe with no probable risk to human health and safety. ***(Mammal Threats)*** *- Moderate to high effect.* The proposed action has the greatest potential of successfully	***(Methods)*** *- Low effect* WS impacts similar to Alternative 1. Resource owners may reject WS program and implement their own lethal control program resulting in impacts similar to Alternative 4.	***(Methods)*** *– Low to moderate effect.* No effect by WS. Resource owner's impacts would be variable dependent upon experience and knowledge of person implementing methods. Negative impacts	***(Methods)*** *– Low to moderate effect.* No effect by WS. Resource owner's impacts would be variable dependent upon experience and knowledge of person implementing methods. ***(Mammal Threats)*** *- Low to high effect.*

Issues/Alternatives	Alternative 1. Continue Current Federal MDM Program	Alternative 2. Nonlethal Required Before Lethal Control	Alternative 3. Technical Assistance Only	Alternative 4. No Federal WS MDM
	reducing this risk.	***(Mammal Threats)*** *- Low to high effect.* This alternative less likely than Alt. 1 to reduce damage in an effective and timely manner.	resulting from the improper use of control methods should be less than Alternative 4. ***(Mammal Threats)*** *- Low to high effect.* Impacts would be variable dependent upon experience and knowledge of person implementing methods.	Impacts would be variable dependent upon experience and knowledge of person implementing methods.
Effects on Socio-Cultural Elements And Economics Of the Human Environment	*Variable effects.* Some would oppose this alternative, others would support it. Those people adversely affected by wildlife damage would likely favor this alternative.	*Variable effects.* Some would oppose this alternative, others would support it; Damage may not be reduced in a timely and effective manner for some projects.	*Variable effects.* Some would oppose this alternative, others would support it. No effect by WS. Resource owners would likely conduct MDM activities no longer conducted by WS resulting in impacts similar to Alternative 1; Damage may not be reduced in a timely and	*Variable effects.* Some would oppose this alternative, others would support it. No effect by WS. Resource owners would likely conduct MDM activities no longer conducted by WS resulting in impacts similar to the proposed program. Damage may not be reduced in a timely and effective manner for some projects.

Issues/Alternatives	Alternative 1. Continue Current Federal MDM Program	Alternative 2. Nonlethal Required Before Lethal Control	Alternative 3. Technical Assistance Only	Alternative 4. No Federal WS MDM
			effective manner for some projects.	
Humaneness Of Methods Used by Wildlife Services	*Variable effect.* Methods viewed by some people as inhumane would be used by WS.	*Variable effect.* Methods viewed by some people as inhumane would be used by WS.	*Variable effect.* No effect by WS. Resource owner's impacts would be variable dependent upon experience and knowledge of person implementing methods.	*Variable effect.* No effect by WS. Resource owner's impacts would be variable dependent upon experience and knowledge of person implementing methods.

4.3 CUMULATIVE IMPACTS OF THE PROPOSED ALTERNATIVE BY ISSUE

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 address damage associated with mammals in a number of situations throughout the Commonwealth. The WS MDM program would be the primary federal program with MDM responsibilities; however, some state and local government agencies may conduct MDM activities in Pennsylvania 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.

4.3.1 Cumulative Impacts on Wildlife

Evaluation of MDM program activities relative to target, non-target and T&E species indicated that program activities will likely have no cumulative adverse effects on wildlife populations in Pennsylvania. MDM program actions would be occurring simultaneously, over time, with other natural processes and human generated changes that are currently taking place. These activities include, but are not limited to:

- Natural mortality of target, non-target, and T&E species
- Human-induced mortality of target and non-target species through hunting, MDM, and other activities
- Human and naturally induced alterations of wildlife habitat
- Annual and perennial cycles in wildlife population densities

All these factors play a role in the dynamics of wildlife populations. In many circumstances, MDM is necessary to reduce damage when some or all of these elements have contrived to elevate target species populations or place target species at a juncture to cause damage to resources. WS actions taken to minimize or eliminate damage are constrained as to scope, duration and intensity, for the purpose of minimizing or avoiding impacts to the environment. WS evaluates damage occurring, including other affected elements and the dynamics of the damaging species; determines appropriate strategies to minimize effects on environmental elements; applies damage management actions; and subsequently monitors and adjusts/ceases damage management actions (Slate et al. 1992). This process allows WS to take into consideration other influences in the environment, such as those listed above, in order to avoid cumulative adverse impacts on target, non-target, and T&E species.

No cumulative adverse impacts on target and non-target wildlife are expected from WS MDM actions based on the following considerations:

1. Historical outcomes of WS MDM programs on wildlife

No cumulative adverse affects have been identified for target, non-target, and T&E species identified in this EA as a result of MDM program activities implemented over time.

2. SOP's and mitigation strategies built into WS MDM program

SOPs and mitigation measures are designed to reduce the potential negative effects of WS MDM actions on wildlife, and are tailored to respond to changes in wildlife populations which could result from unforeseen environmental changes. This would include those changes occurring from sources other than WS. Alterations in MDM programs are defined through SOP's and mitigation measures, and implementation is insured through monitoring, in accordance with the ADC Decision Model (Slate et al. 1992).

3. Current status of potentially affected wildlife species

Natural and human-induced mortality patterns for target, non-target, and T&E species are expected to remain essentially unchanged in Pennsylvania. These elements are truly outside of the WS MDM conducted programs. As a result, no cumulative adverse affects are expected from repetitive MDM programs over time in the fairly static set of conditions currently affecting wildlife in Pennsylvania.

4.3.2 Cumulative Impacts on Human Health and Safety

Non-Chemical Methods

All non-chemical MDM methods, such as trapping, snaring, shooting, harassment methods, etc. are used within a limited time frame, are not residual, and do not possess properties capable of inducing cumulative adverse impacts on human health and safety.

Chemical Methods

Lethal chemical MDM methods may include the use of gas cartridges. In Pennsylvania, gas cartridges are typically used to manage damage being caused by woodchucks, but may also be used to manage damage and conflicts associated with other ground denning/burrowing mammals. Gas cartridges are available for public use in Pennsylvania and therefore may be used by non-WS entities. Any non-WS programs that might employ gas cartridges for purposes specified on product labels would not collectively produce cumulative effects for the same reasons outlined for WS MDM programs.

Sodium nitrate is the principle active chemical in gas cartridges, is a naturally occurring substance. Although stable under dry conditions, it is readily soluble in water and likely to be highly mobile in soils. In addition, dissolved nitrate is very mobile, moving quickly through the vadose zone to the underlying water table (Bouwer 1989). Burning sodium nitrate however, as in the use of a gas cartridge as a fumigant in a ground den or burrow, is believed to produce mostly simple organic and inorganic gases, using all of the available sodium nitrate. In addition, the human health drinking water tolerance level for this chemical is 10 mg / L, a relatively large amount, according to EPA Quality Criteria for Water (1986c). The gas along with other components of the cartridge, are likely to form oxides of nitrogen, carbon, phosphorus, and sulfur. These products are environmentally non-persistent because they are likely to be metabolized by soil microorganisms or enter their respective elemental cycles. In gas cartridges, sodium nitrate is combined with seven additional ingredients; sulfur, charcoal, red phosphorus, mineral oil, sawdust, and two inert ingredients. None of the additional ingredients in these two formulations are likely to accumulate in soil, based on their degradation into simpler elements by burning the gas cartridge. Sodium nitrate is not expected to accumulate in soils between applications, nor does it accumulate in the tissues of target animals (USEPA 1991g). No gas residues remain at the treatment site for any period of time (USDA 1997), and so, no cumulative adverse affects from the presence of gases can be expected. Based on properties and fate of sodium nitrate and its components as used in gas cartridges, no cumulative adverse affects to human health and safety are expected from its use.

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

4.3.3 Cumulative Impacts on Socio-cultural Elements and Economics of the Human Environment

Five aspects of this issue have been identified in the EA:

- possible disruption of human affectionate-bonds which some people develop with individual wild or feral mammals,
- possible decrease in aesthetic enjoyment which some people gain by feeding, and viewing wild or feral mammals,
- decrease in aesthetic enjoyment of feral or wild mammals experienced by some people as a result of overabundant species present, and
- degradation or loss of value of properties by some people as a result of the presence of too many individuals of a species.

This Subsection evaluates possible cumulative effects of each of these elements.

4.3.3.1 Cumulative Impacts on Human Affectionate-bonds

In the wild, few animals in the United States have life spans approaching that of humans. Mortality is high among wildlife populations and specific individuals among a species may experience death early in life. This is a natural occurrence and humans who form affectionate bonds with animals experience loss of those animals over time in most instances. A number of professionals in the field of psychology have studied human behavior in response to attachment to pet animals (Gerwolls, 1994, Marks and Koepke 1994, Zasloff 1996, Archer 1999, Ross and Baron-Sorensen 1998, Meyers, 2000). Similar observations are probably applicable to close bonds which could exist between people and wild animals. As observed by researchers in human behavior, normal human responses to loss of loved ones proceed through phases of shock or emotional numbness, sense of loss, grief, acceptance of the loss or what cannot be changed, healing, and acceptance and rebuilding which leads to resumption of normal lives (Lefrancois 1999). Those who lose companion animals, or animals for which they may have developed a bond and affection, are observed to proceed through the same phases as with the loss of human companions (Gerwolls 1994, Boyce 1998, Meyers 2000). However, they usually establish a bond with other individual animals after such losses. Although they may lose the sense of enjoyment and meaning from the association with those animals which die or are no longer accessible, they usually find a similar meaningfulness by establishing an association with new individual animals or through other relational activities (Weisman 1991). Through this process of coping with the loss and establishing new affectionate bonds, people may avoid compounding emotional effects resulting from such losses (Parkes 1979, Lefrancois 1999).

Some mammals with which humans have established affectionate bonds may be removed from some project sites by WS. However, other individuals of the same species would likely continue to be present in the affected area and people would tend to establish new bonds with those remaining animals. In addition, human behavior processes usually result in individuals ultimately returning to normalcy after experiencing the loss of association with a wild animal which might be removed from a specific location. Other activities that may impact human affection bonds on wildlife include those activities identified in section 4.3.1

WS activities are not expected to have any cumulative adverse affects on this element of the human environment.

4.3.3.2 Cumulative Impacts on Aesthetic Enjoyment of Wildlife

Those who enjoy viewing wildlife may experience a temporary reduction in being able to view wildlife at some sites where WS program activities are implemented. However, other individuals of the same species would likely continue to be present in the affected area, and would also likely be available for viewing and enjoyment at adjacent locations. Other activities that may impact the aesthetic enjoyment of wildlife include those activities identified in section 4.3.1

Some people experience a decrease in aesthetic enjoyment of wildlife because they feel that overabundant species are objectionable and interfere with their enjoyment of wildlife

in general. Continued increases in numbers of individuals or the continued presence of an overabundant species may lead to further degradation of some people's enjoyment of any wildlife. WS MDM actions could positively affect the aesthetic enjoyment of wildlife for those people that are being adversely affected by the target species identified in this EA.

WS activities are not expected to have any cumulative adverse affects on this element of the human environment.

4.3.3.3 Cumulative Impacts on Economic Loss Resulting From Overabundant Wildlife

Landowners, business owners, and managers of land in public trust are concerned with economic losses that may occur as a result of excessive populations of a species. Over time, large populations of target mammal species have the ability to greatly affect the quality of protected resources and also increase anxiety and frustration among affected individuals. Cumulative damage can occur over time, if no remedy is found. The implementation of a MDM program could positively affect economic elements at affected sites and reduce the likelihood of recurrent damage.

WS activities are not expected to have any cumulative adverse affects on this element of the human environment.

4.3.4 Cumulative Impacts on Concerns About Humaneness of MDM Methods

WS continues to seek new methods and ways to improve current technology to improve humaneness of methods used to manage damage caused by mammals. Cooperation with individuals and organizations involved in animal welfare continues to be an agency priority for the purpose of evaluating strategies and defining research aimed at developing MDM methods. Because WS continues to develop and implement more humane methods as technology advances, and also makes this information available to non-WS enities, no cumulative adverse affects from WS activities are expected in relation to this element of the human environment.

4.4 SUMMARY OF CUMULATIVE IMPACTS

No significant cumulative environmental impacts are expected from any of the 4 alternatives including the Proposed Action. WS management activities will not adversely impact protected flora and fauna in Pennsylvania, including T&E species. Under the Proposed Action and Alternative 2, the lethal removal of target mammal species by WS would not have a significant impact on overall mammal populations in Pennsylvania, but some local reductions may occur.

No risk to human health and safety is expected when WS' services are provided and accepted by requesting individuals in Alternatives 1, 2, and 3, since only trained and experienced wildlife biologists and wildlife specialists would conduct and recommend MDM methods. There is a slight increased risk to human safety when persons who reject WS assistance and

recommendations in Alternatives 1, 2 and 3 and conduct their own MDM activities, and when no WS assistance is provided in Alternative 4. In all 4 Alternatives, however, it would not be to the point that the impacts would be significant.

Under Alternative 4, management actions taken by non-federal entities would be considered the *environmental status quo*. In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance in Alternatives 1, 2 and 3, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Although some persons will likely be opposed to WS participation in management activities to reduce mammal damage, the analysis in this EA indicates that WS MDM program will not result in significant cumulative adverse impacts on the quality of the human environment.

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APPENDIX B

MAMMAL DAMAGE MANAGEMENT (MDM) METHODS AVAILABLE FOR USE OR RECOMMENDED BY THE PENNSYLVANIA WILDLIFE SERVICES PROGRAM

Mammal Damage Management Methods

Resource owners and government agencies have used a variety of techniques to reduce mammal damage. However, all lethal and non-lethal methods developed to date have limitations based on costs, logistics, or effectiveness. Below is a discussion of mammal damage management methods currently available to the Pennsylvania WS program. If other methods are proven effective and legal to use in Pennsylvania, they could be incorporated into the PA WS program, based upon NEPA compliance.

Nonchemical Wildlife Damage Management Methods

Nonchemical management methods consist primarily of tools or devices used to repel, capture or kill a particular animal or local population of wildlife to alleviate damage and conflicts. Methods may be nonlethal (e.g., fencing, frightening devices, etc.) or lethal (e.g., firearms, body gripping traps, snares, etc.). If WS personnel apply these methods on private lands, an *Agreement for Control on Private Property* must be signed by the landowner or administrator authorizing the use of each damage management method. Nonchemical methods used or recommended by WS include:

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. Fencing, especially if it is installed with an underground skirt, can prevent access to areas for many mammal species which dig, including foxes, feral cats, and striped 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. Exclusion and one-way devices such as netting or nylon window screening can be used to exclude bats from a building or an enclosed structure (Greenhall and Frantz 1994). Electric fences of various constructions have been used effectively to reduce damage to various crops by deer, raccoons, and other species (Craven and Hygnstrom 1994, Boggess 1994b).

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 through barriers or fences to deter animals from entering a protected area, or planting lure crops on fringes of protected crops. Removal of trees from around buildings can sometimes reduce damage associated with raccoons.

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. If raccoons are a problem, making trash and garbage

unavailable and removing all pet food from outside during nighttime hours can reduce their presence.

Lure crops/alternate foods are crops planted or other food resources provided to mitigate the potential loss of higher value crops

Animal behavior modification 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. Unfortunately, many of these techniques are only effective for a short time before wildlife habituate to them (Conover 1982). Devices used to modify behavior in mammals include:

- electronic guards (siren strobe-light devices)
- propane exploders
- pyrotechnics
- laser lights
- human effigies
- harassment / shooting into groups

Live Capture and Relocation can be accomplished through the use of cage traps, snares, and foothold traps to capture some species of mammals for the purpose of translocating them for release to wild sites. WS does not usually use this method to conduct MDM programs in Pennsylvania because the PGC opposes relocation of rabies vector species in Pennsylvania. Live capture and handling of wild mammals poses an additional level of human health and safety threat if target animals are aggressive, large, or extremely sensitive to the close proximity of humans. For that reason, WS may limit this method to specific situations and certain species. Excessive populations may make this a poor wildlife management strategy for some species. In addition, moving damage-causing individuals to other locations can typically result in damage at the new location, or the translocated individuals can move from the relocation site to areas where they are unwanted. The American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists all oppose the relocation of mammals because of the risk of disease transmission, particularly for small mammals such as raccoons or skunks (Center for Disease Control 1990). Although relocation is not necessarily precluded in all cases, it would in many cases be logistically impractical and biologically unwise in Pennsylvania, and is evaluated by WS on a case-by-case basis.

Trapping can utilize a number of devices, including footholds, cage-type traps, and body gripping (Conibear) traps, foot snares, and neck/body snares. For a description of these methods the reader is referred to the FEIS, Appendix J (USDA 1997). These techniques are implemented by WS personnel because of the technical training required to use such devices.

> **Foothold Traps** can be effectively used to capture a variety of mammals. Foothold traps are either placed beside, or in some situations, in travel ways being actively used by the target species. Placement of traps is contingent upon the habits of the respective target

species, habitat conditions, and presence of non-target animals. Effective trap placement and adjustment and the use and placement of appropriate baits and lures by trained WS personnel also contribute to the foothold trap's selectivity. An additional advantage is that foothold traps can allow for the on-site release of non-target animals. The use of foothold traps requires more skill than some methods, but they are indispensable in resolving many damage problems.

Snares are capture devices comprised of a cable formed in a loop with a locking device and placed in travel ways. Most snares are also equipped with a swivel to minimize cable twisting and breakage. Snares are also easier than foothold traps to keep operational during periods of inclement weather. Snares set to catch an animal around the body or legs are usually a live-capture method.

Cage traps are live capture traps used to trap a variety of small to medium sized mammals. Cage traps come in a variety of sizes and are made of galvanized wire mesh, and consist of a treadle in the middle of the cage that triggers the door to close behind the animal being trapped.

Body-grip (e.g., Conibear-type) Traps are designed to cause the quick death of the animal that activates the trap. Placement is at burrow entrances created or used by the target species. The animal captured as it travels through the trap and activates the triggering mechanism. Safety hazards and risks to humans are usually related to setting, placing, checking, or removing the traps.

Shooting is selective for target species and may involve the use of spotlights and either a handgun, shotgun or rifle. Shooting is an effective method to remove a small number of mammals in damage situations, especially where trapping is not feasible. Removal of specific animals in the problem area can sometimes 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 quickly and selectively than some other methods, but it is not always effective. Shooting may sometimes be one of the only damage management options available if other factors preclude setting of damage management equipment. WS personnel receive firearms safety training to use firearms that are necessary for performing their duties.

Hunting/Trapping: WS sometimes recommends that resource owners consider legal hunting and trapping as an option for reducing mammal damage. Although legal hunting/trapping is impractical and/or prohibited in many urban-suburban areas, it can be used to reduce some populations of mammals.

Chemical Wildlife Damage Management Methods

All pesticides used by WS are registered under the FIFRA and administered by the EPA and PDA. All WS personnel in Pennsylvania who apply restricted - use pesticides are certified pesticide applicators by PDA and have specific training by WS for wildlife damage management pesticide application. The EPA and PDA require pesticide applicators to adhere to all

certification requirements set forth in the FIFRA. Pharmaceutical drugs, including those used in wildlife capture and handling, are administrated by FDA and/or DEA.

No chemicals are used by WS on public or private lands without authorization from the land management agency or property owner or manager. The following chemical methods have been proven to be selective and effective in reducing damage by mammals.

Ketamine (Ketamine HCl) is a dissociative anesthetic that is used to capture wildlife, primarily mammals, birds, and reptiles. It is used to eliminate pain, calms 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.

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 should be 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.

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 WS personnel are authorized to use sodium pentobarbital and dilutions for euthanasia in accordance with DEA and state regulations.

Potassium Chloride used in conjunction with prior general anesthesia is used as a euthanasia agent for animals, and is considered acceptable and humane by the AVMA (AVMA 2001). Animals that have been euthanized with this chemical experience cardiac arrest followed by death, and are not toxic to predators or scavengers.

Beuthanasia-D combines pentobarbital with another substance to hasten cardiac arrest. Intravenous (IV) and intracardiac (IC) are the only acceptable routes of injection. As with pure sodium pentobarbital, IC injections with Beuthanasia-D are only acceptable for animals who are unconscious or deeply anesthetized. With other injection routes, there are concerns that the cardiotoxic properties may cause cardiac arrest before the animal is fully unconscious. It is a Schedule III drug, which means it can be obtained directly from the manufacturer by anyone with a DEA registration. However, Schedule III drugs are subject to the same security and record-keeping requirements as Schedule II drugs.

The Gas Cartridge is registered as a fumigant by the EPA (Reg. No. 56228-2) and is used in conjunction with denning operations. When ignited., the cartridge burns in the den of an animal and produces large amounts of carbon monoxide, a colorless, odorless, and tasteless, poisonous gas. The combination of oxygen depletion and carbon monoxide exposure kills the animals in the den. Carbon monoxide euthanasia is recognized by the AVMA as an approved and humane method to kill animals (AVMA 1987).

CO_2 is sometimes used to euthanize mammals which are captured in live traps and when relocation is not a feasible option. Live mammals are placed in a sealed chamber. CO_2 gas is released into the chamber and the animal quickly dies after inhaling the gas. This method is approved as a euthanizing agent by the American Veterinary Medical Association. CO_2 gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is used to carbonate beverages for human consumption and is also the gas released by dry ice. The use of CO_2 by WS for euthanasia purposes is exceedingly minor and inconsequential to the amounts used for other purposes by society.

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. Only a few repellents are commercially available for mammals, and are registered for only a few species. 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 resource to be protected, time and length of application, and sensitivity of the species causing damage. Again, acceptable levels of damage control are usually not realized unless repellents are used in conjunction with other techniques.

APPENDIX C

FEDERAL AND STATE THREATENED AND ENDANGERED SPECIES

State Listed Threatened and Endangered Species in Pennsylvania
(http://www.dcnr.state.pa.us)

Status	Common Name	Scientific Name	Category
E	Northern rifflesheell	*Epioblasma torulosa rangiana*	Invertebrate
E	regal fritillary	*Speyeria idalia*	Invertebrate
T	American bittern	*Botaurus lentiginosus*	Bird
E	bald eagle	*Haliaeetus leucocephalus*	Bird
E	black tern	*Childonias niger*	Bird
T	great egret	*Casmerodius albus*	Bird
T	king rail	*Rallus elegans*	Bird
T	least bittern	*Ixobrychus exilis*	Bird
E	Loggerhead shrike	*Lanius ludovicianus*	Bird
E	osprey	*Pandion haliaetus*	Bird
E	peregrine falcon	*Falco peregrinus*	Bird
T	sedge wren	*Cistothorus platensis*	Bird
E	short-eared owl	*Asio flammeus*	Bird
T	upland sandpiper	*Bartramia longicauda*	Bird
T	yellow-bellied flycatcher	*Empidonax flaviventris*	Bird
T	yellow-crowned night heron	*Nycticorax violaceus*	Bird
E	Delmarva fox squirrel	*Sciurus niger cincerus*	Mammal
T	Eastern woodrat	*Neotoma magister*	Mammal
E	Indiana bat	*Myotis sodalist*	Mammal
E	least shrew	*Cryptotis parva*	Mammal
T	small-footed myotis	*Myotis leibii*	Mammal
T	West Virginia water shrew	*Sorex palustris punctulatus*	Mammal
T	Atlantic sturgeon	*Acipenser oxyrhychus*	Fish
T	bluebreast darter	*Etheostoma camurum*	Fish
T	burbot	*Lota lota*	Fish
T	channel darter	*Percina copelandi*	Fish
T	Eastern sand darter	*Ammocrypta pellucida*	Fish
T	gilt darter	*Percina evides*	Fish
E	gravel chub	*Erimystax x-punctatus*	Fish
E	lake sturgeon	*Acipenser fulvescens*	Fish
E	longhead darter	*Percina macrocephala*	Fish
E	longnose sucker	*Catostomus catostomus*	Fish
T	mountain brook lamprey	*Ichthyomyzon Greeley*	Fish
T	mountain madtom	*Noturus eleutherus*	Fish
E	Northern brook lamprey	*Ichthyomyzon fossor*	Fish
T	Northern madtom	*Noturus stigmosus*	Fish
T	Ohio lamprey	*Ichthyomyzon bdellium*	Fish
E	shortnose sturgeon	*Acipenser brevirostrum*	Fish
E	spotted darter	*Etheustoma maculatum*	Fish
E	Tippecanoe darter	*Etheostoma Tippecanoe*	Fish
E	bog turtle	*Clemmys muhlenbergii*	Reptile

Status	Common Name	Scientific Name	Category
E	Eastern massasauga	*Sistrurus catenatus cetenatus*	Reptile
E	Kirtland's snake	*Clonophis kitlandii*	Reptile
T	red-bellied turtle	*Pseudemys rubriventris*	Reptile
T	rough green snake	*Opheodrys aestivus*	Reptile
E	Coastal plain leopard frog	*Rana utricularia*	Amphibian
E	Eastern mud salamander	*Pseudotriton montanus montanus*	Amphibian
T	green salamander	*Aneides aeneus*	Amphibian
E	New Jersey chorus frog	*Pseudacris feriarum kalmi*	Amphibian
T	box huckleberry	*Gaylussacia brachycera*	Plant
E	Canby's mountain-lover	*Paxistima canbyi*	Plant
E	eared false-foxglove	*Tomanthera auriculata*	Plant
E	glade spurge	*Euphorbia purpurea*	Plant
E	hispid gromwell	*Lithospermum caroliniense*	Plant
E	Jacob's ladder	*Polemonium van-bruntiae*	Plant
T	jeweled shooting-star	*Dodecatheon amethystinum*	Plant
E	large-flowered marshallia	*Marshallia grandiflora*	Plant
E	Northeastern bulrush	*Scirpus ancistrochaetus*	Plant
T	serpentine aster	*Aster depauperatus*	Plant
T	shale-barren evening primrose	*Oenothera argillicola*	Plant
T	showy lady's slipper	*Cypripedium reginae*	Plant
E	small whorled pogonia	*Isotria medeoloides*	Plant
E	spreading globeflower	*Trollius laxus*	Plant
E	swamp pink	*Arethusa bulbosa*	Plant
E	tall larkspur	*Delphinium exaltatum*	Plant
E	variable sedge	*Carex polymorpha*	Plant
E	white monkshood	*Aconitum reclinatum*	Plant

Federally Listed Threatened and Endangered Species in Pennsylvania
(http://www.ecos.fws.gov)

Status	Common Name	Scientific Name	Category
E	Indiana bat	*Myotis sodalist*	Mammal
E	eastern puma	*Puma concolor*	Mammal
T	gray wolf	*Canis lupus*	Mammal
E	del. Peninsula fox squirrel	*Sciurus niger cinereus*	Mammal
E	American burying beetle	*Nicrophorus americanus*	Invertebrate
E	karner blue butterfly	*Lycaeides Melissa samuelis*	Invertebrate
T	tiger beetle	*Cicindela dorsalis dorsalis*	Invertebrate
E	fanshell	*Cyprogenia stegaria*	Invertebrate
E	clubshell	*Pleurobema clava*	Invertebrate
E	pink mucket (pearlymussel)	*Lampsilis abrupta*	Invertebrate
E	rough pigtoe	*Pleurobema plenum*	Invertebrate
E	orangefoot pimpleback	*Plethobasus cooperianus*	Invertebrate
E	Northern riffleshell	*Epioblasma torulosa rangiana*	Invertebrate
E	ring pink	*Obovaria retusa*	Invertebrate
E	dwarf wedgemussel	*Alasmidonta heterodon*	Invertebrate
T	bog turtle	*Clemmys muhlenbergii*	Reptile
T	bald eagle	*Haliaeetus leucocephalus*	Bird
E	Eskimo curlew	*Numenius borealis*	Bird
E	piping plover	*Charadrius melodus*	Bird
E	smooth coneflower	*Echinacea laevigata*	Plant
T	sensitive joint-vetch	*Aeschynomene virginica*	Plant
T	east. prairie fringed orchid	*Platanthera leucophaea*	Plant
T	small whorled pogonia	*Isotria medeoloides*	Plant
E	Northeastern bulrush	*Scripus ancistrochaetus*	Plant
T	Virginia spiraea	*Spiraea virginiana*	Plant