FINAL
ENVIRONMENTAL ASSESSMENT

MAMMAL DAMAGE MANAGEMENT
IN ILLINOIS

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SUMMARY

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

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

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

ACRONYMS

ADC[1]	Animal Damage Control
AMDUCA	Animal Medicinal Drug Use Clarification Act
APHIS	Animal and Plant Health Inspection Service
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
AVMA	American Veterinary Medical Association
B.O.	Biological Opinion
CDC	Center for Disease Control
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEA	Drug Enforcement Administration
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FMD	Foot and Mouth Disease
FY	Fiscal Year
HPS	Hantavirus Pulmonary Syndrome
IDNR	Illinois Department of Natural Resources
IDOA	Illinois Department of Agriculture
IDPH	Illinois Department of Public Health
IWDM	Integrated Wildlife Damage Management
MDM	Mammal Damage Management
MIS	Management Information System
MOU	Memorandum of Understanding
MPC	Marathon Petroleum Company
NEPA	National Environmental Policy Act
NHPA	Natural Historic Preservation Act
NOA	Notices of Availability
NRCS	Natural Resources Conservation Service
NWP	Nationwide Permit
NWRC	National Wildlife Research Center
ORD	O'Hare International Airport
SOP	Standard Operating Procedure
TB	Tuberculosis
T&E	Threatened and Endangered
USACE	United States Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	United States Department of the Interior, Fish and Wildlife Service
WDM	Wildlife Damage Management
WS[1]	Wildlife Services
WNV	West Nile Virus
WWHC	Western Wildlife Health Committee
ZP	Zinc Phosphide

[1] On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The phrases Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this Environmental Assessment.

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CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with the needs of wildlife which increases the potential for conflicting human/wildlife interactions. Human/wildlife conflict issues are complicated by the wide range of public responses to wildlife and wildlife damage. What may be unacceptable damage to one person may be a normal cost of living with nature to someone else. The *Animal Damage Control Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (United States Department of Agriculture (USDA) 1997 Revised):

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

Wildlife damage management (WDM) is the science of reducing damage or other problems associated with wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1992). The USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program uses an Integrated Wildlife Damage Management (IWDM) approach (WS Directive 2.105[2]), in which a combination of methods may be used or recommended to reduce wildlife damage (USDA 1997 Revised, Chapter 1:1-7). These methods may include non-lethal techniques like alteration of cultural practices, habitat management, repellents, frightening devices, and physical exclusion to prevent or reduce damage. The reduction of wildlife damage may also require removal of individual animals or reduction in local animal populations through lethal means.

This environmental assessment (EA) evaluates the potential environmental effects of alternatives for WS involvement in mammal damage management (MDM) in Illinois. WS is the federal agency directed by law and authorized to protect American resources from damage associated with wildlife (the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c)). To fulfill this Congressional direction, WS activities are conducted to prevent or reduce wildlife damage to agricultural, industrial and natural resources; property; livestock; and threats to public health and safety on private and public lands in cooperation with federal, state and local agencies, private organizations, and individuals. WS' wildlife damage management program activities are not based on punishing offending animals but are conducted to reduce damage and risks to human and livestock health and safety, and are used as part of the WS Decision Model (Slate et al. 1992, USDA 1997 Revised, WS

[2] The WS Policy Manual (http://www.aphis.usda.gov/wildlife_damage/ws_directives.shtml) provides guidance for WS personnel to conduct wildlife damage management activities through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Appendix.

Directive 2.101).(Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to resources or the public.

WS is a cooperatively funded, service-oriented program that receives requests for assistance with wildlife damage management from private and public entities, including other governmental agencies. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently in accordance with applicable federal, state and local laws and Memorandums of Understanding (MOUs) between WS and other agencies. WS' mission, developed through its strategic planning process, is to provide federal leadership in managing problems caused by wildlife. WS recognizes that wildlife is an important public resource greatly valued by the American people. By its very nature, however, wildlife is a highly dynamic and mobile resource that can damage agricultural and industrial resources, pose risks to human health and safety, and affect other natural resources. The WS program carries out the federal responsibility for helping to solve problems that occur when human activity and wildlife are in conflict with one another

WS's Policy Manual reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training wildlife damage management professionals;
- Developing and improving strategies to reduce losses and threats to humans from wildlife;
- Collecting, evaluating, and disseminating management information;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989).

Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded {7 Code of Federal Regulation (CFR) 372.5(c), 60 Fed. Reg. 6,000 -6,003, (1995)}. WS has decided in this case to prepare this EA to facilitate planning, interagency coordination and the streamlining of program management, and to clearly communicate with the public the analysis of individual and cumulative impacts. In addition, this EA has been prepared to evaluate and determine if there are any potentially significant or cumulative impacts from the proposed and planned damage management program. This analysis relies on data contained in published documents (Appendix A), including the *Animal Damage Control Program*[3] *Final Environmental Impact Statement* (USDA 1997 Revised).

1.1 PURPOSE OF THIS EA

The purpose of this EA is to address and evaluate the potential impacts on the human environment from alternatives for WS involvement in the protection of agricultural resources, natural resources, property, livestock, and public health and safety from damage and risks associated with mammals in Illinois. Damage problems can occur throughout the State. Under the Proposed Action, MDM could be conducted on private, federal, state, tribal, county, and municipal lands in Illinois upon request. Several mammal species have potential to be the subject of WS MDM activities in Illinois including: coyotes (*Canis latrans*), raccoons (*Procyon lotor*), Virginia opossums (*Didelphis virginianus*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), mountain lion (*Puma concolor*), feral cats (*Felix* sp.), striped skunk (*Mephitis mephitis*), badger (*Taxidea taxus),* mink (*Mustela vison*), bobcat (*Lynx rufus*), weasel (*Mustela*

3 On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services.

frenata and *M. rixosa*), beaver (*Castor canadensis*), nutria (*Myocastor coypus)*, muskrat (*Ondatra zibethica*), river otter (*Lutra canadensis*), woodchuck (*Marmota monax*), eastern cottontail rabbit (*Sylvilagus floridanus*), feral swine (*Sus scrofa*), domestic/feral dog (*Canis familiaris*), nine-banded armadillo (*Dasypus novemcinctus*), brown (Norway) rat (*Rattus norvegicus*), black (roof) rat (*Rattus rattus*), house mouse (*Mus musculus*), deer mouse (*Peromyscus maniculatus*), white-footed mouse (*Peromyscus leucopus*), meadow vole (*Microtus pennsylvanicus*), eastern mole (*Scalopus aquaticus*), short-tailed shrew (*Blarina brevicauda*), gray squirrel (*Sciurus carlolinensis*), fox squirrel (*Sciurus niger*), red squirrel (*Tamiasciurus hudsonicus*), Eastern chipmunk (*Tamias striatus*), and thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*).

1.2 NEED FOR ACTION

Conflicts between humans and wildlife are common in Illinois. WS and the Illinois Department of Natural Resources receive requests for assistance with wildlife damage from the public and state, federal and local government agencies. Comprehensive surveys of mammal damage in Illinois have not been conducted, but WS does maintain a Management Information System (MIS) database to document assistance that the program provides in addressing wildlife damage conflicts. Table 1-1 provides a summary of technical assistance projects (advice/ recommendations) completed by the Illinois WS program for Fiscal Years 2003-2006. A full description of the WS Direct Damage Management and Technical Assistance programs is contained in Chapter 3 of this EA. This table does not include data from hands-on operational projects conducted by WS. MIS data are limited to information that is collected from people who have requested services or information from WS. It does not include requests received or responded to by local, State or other Federal agencies or private companies. Consequently, the number of requests for assistance to WS does not necessarily reflect the full extent of need for action, but this data does provide an indication that needs exists.

In Illinois, the Illinois Department of Natural Resources (IDNR) has management responsibility for resident mammals, and conducts mammal management programs for furbearers, game species, and non-game mammals. WS' potential involvement in the area of mammal damage management in Illinois would be to provide basic recommendations, refer callers to the IDNR as needed, and to provide direct management assistance with the implementation of mammal damage management programs upon request and as permitted or otherwise authorized by the IDNR. To date, direct mammal damage management programs conducted by WS in Illinois have included beaver damage management on private, state, and federal property for flood control, mammal trapping to prevent dike failure at oil refineries, management of raccoons, feral cats, and groundhogs at Department of Energy sites, as well as mammal hazard management at Illinois airports. Additionally, WS cooperates with state and federal agencies to assess disease risks involving wild and feral mammals.

Table 1-1. Annual number of requests for technical assistance involving mammals for Illinois Wildlife Services during 2003-2006.

Fiscal Year	Agriculture	Human Health and Safety	Property	Natural Resources	Total
2003	5	0	0	6	11
2004	0	2	0	0	2
2005	1	10	16	3	30
2006	3	9	23	2	36

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

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

Zoonotic Diseases. Zoonotic diseases are diseases of animals which are communicable to humans. Some of the mammals in Illinois may carry disease organisms or parasites including viral, bacterial, mycotic (fungal), protozoan and rickettsial diseases which pose a risk to humans.

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 associated with mammals. Usually, MDM is requested because of a perceived risk to human health or safety associated with wild animals living near humans, from animals acting out of character in human-inhabited areas during the day, or showing no fear when humans are present. In the majority of cases in which human health concerns are a major reason for requesting MDM, there may have been no actual cases of transmission of disease to humans by mammals to prompt the request. Thus, it is the risk of disease transmission that is the primary reason for requesting and conducting MDM. In most cases, the risk to humans from the diseases discussed below is low and there may not have been a confirmed case of the disease in the state. However, it is the goal of agricultural and human health programs to prevent disease/illness from occurring. Wildlife Services works with cooperators on a case-by-case basis to assess the nature and magnitude of the wildlife conflict including providing information on the limitations about what we know regarding health risks associated with wild mammals. It is the choice of the individual cooperator to tolerate the potential health risks or to seek to reduce those risks.

WS' primary involvement in the management of these types of diseases would be to aid other Federal, State, and local government and research entities in monitoring for the presence or absence of diseases in wildlife. This data can be used to predict potential risks to human health and safety and aid agencies in directing management efforts. In the unlikely event of a disease outbreak, WS could also be asked to conduct localized population reduction to prevent spread of disease to other areas.

Situations in Illinois where the threat of disease associated with wild or feral mammal populations might occur include, but are not limited to:

- Risk of exposure to raccoon roundworm (*Baylisascaris procyonis*) in fecal deposits accumulated droppings from denning or foraging raccoons in a suburban community or at an industrial site where humans work or reside.
- Threat of rabies exposure from wildlife denning and foraging in a residential community.
- Threat of infections with parasites like *Giardia* spp. from high beaver populations in a park or recreation area where swimming is allowed or in ponds or reservoirs used as a source of drinking water.

Beaver damming activity creates conditions favorable to certain types of mosquitoes and can hinder mosquito control efforts or result in population increases of these insects (Wade and Ramsey 1986). While the presence of these insects is largely a nuisance, mosquitoes can transmit diseases, such as Eastern equine encephalitis (Mallis 1982) and West Nile Virus (WNV) (Center for Disease Control (CDC) 2000). In Illinois, West Nile virus was first identified in September 2001 when laboratory tests confirmed its presence in two dead crows found in the Chicago area. The following year, the state's first human cases and deaths from West Nile disease were recorded. By the end of 2002, Illinois had counted more human cases (884) and deaths (67) than any other state in the United States. In 2003, Colorado reported the highest number of cases (2,947). The number of West Nile human cases in Illinois fell in 2003 and 2004

(2003 - 54 cases and one death; 2004 – 60 cases and four deaths). In 2005, Illinois recorded 252 cases and 12 deaths, both totals the second highest in the nation to California's 880 cases and 19 deaths, and in 2006, there were 215 cases and 10 deaths reported, the sixth highest number of cases in the U.S. (Illinois Department of Health 2007 http://www.idph.state.il.us/envhealth/wnv.htm).

Beaver are carriers of the intestinal parasite *Giardia lamblia,* which can contaminate human water supplies and cause outbreaks of the disease Giardiasis in humans (Woodward 1983, Beach and McCulloch 1985, Wade and Ramsey 1986, Miller and Yarrow 1994). The CDC has recorded at least 41 outbreaks of waterborne Giardiasis, affecting more than 15,000 people. Beaver are also known carriers of tularemia, a bacterial disease that is transmittable to humans through bites by arthropod vectors or infected animals or by handling animals or carcasses which are infected (Wade and Ramsey 1986). Skinner et al. (1984) found that in cattle-ranching sections of Wyoming the fecal bacterial count was much higher in beaver ponds than in other ponds, something that can be a concern to ranchers and recreationists. On rare occasions, beaver may contract the rabies virus and attack humans. In February 1999, a beaver attacked and wounded a dog and chased some children that were playing near a stream in Vienna, Virginia. Approximately a week later, a beaver was found dead at the site and tested positive for rabies (T. Menke, Virginia WS, pers. comm., 2003).

Feral cats (*Felis catus*) serve as major reservoirs for the bacterium *Bartonella* spp. Feral 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 rather by scratches or bites from pet cats infected by flea bites. Human infections that may result from exposure of this bacterium via stray cats include: cat scratch disease and hepatic peliosis in immunocompromized patients, bacillary angiomatosis, 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 domestic animal contracting rabies and presenting a subsequent risk of transmission to humans (Eng and Fishbein 1990; Krebs et al. 1996; Vaughn 1976).

Norway rats, roof rats and house mice live in close association to human habitations and provide a potential source of disease transmission. The Norway rat and house mouse are the domestic rodents of greatest public health concern in Illinois. Roof rats are not established in Illinois. Only two roof rats have been found in Illinois, one in Chicago in 1948, and the other was captured in Champaign in 1972, (Hoffmeister 1989). Many of the diseases associated with these species are transmitted to humans and animals through primary hosts such as fleas, lice, and mites which live on rats (Schmidt and Roberts 1989). Among the diseases rats may transmit to humans or livestock are murine typhus, leptospirosis, trichinosis, and salmonellosis (food poisoning) (Table 1-1, Timm 1994). Plague and murine typhus are not currently endemic in Illinois. Plague is a disease that can be carried by a variety of rodents, but it is more commonly associated with roof rats than with Norway rats (Timm 1994).

<u>Hantavirus Pulmonary Syndrome</u> (HPS) is caused by infection with hantaviruses. HPS was first recognized in North America when a cluster of cases was diagnosed in the southwestern US. Infection in humans causes acute, severe respiratory disease with a mortality rate of 38%. Rodents are the primary reservoir hosts of hantaviruses and are asymptomatic carriers, with the white-footed mouse *and* the deer mouse being the primary reservoir hosts in Illinois. Human infection occurs when virus particles aerosolized from rodent urine, feces, or saliva are inhaled or by handling rodents (Davidson and Nettles 1997). As of May 9, 2006 the CDC reports two cases of confirmed Hantavirus known to be contracted in Illinois. Hantavirus has also been confirmed for two cases contracted in Indiana (CDC 2006a)

Table 1-1. Wildlife Diseases That Pose Potential Human Health Risks in the United States (modified from 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, fox, 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 & captive bison(evidence from Texas that organism has infected coyotes that scavenged aborted fetuses and placentas of infected cattle)
Toxoplasmosis	protozoan parasite (*Toxoplasma ondii*)	Cats, such as bobcats, are definitive hosts, mammals and birds are intermediate hosts
Spirometra infection	tapeworm, (*Spirometra mansonoides*)	bobcats, raccoons, foxes, dogs, cats
Murine typhus	bacteria (*Rickettsia mooseri* = R. *typhi*)	rats, mice, as hosts for primary flea, louse or mite host
Giardiasis	protozoan parasite (*Giardia lamblia, G. Duodenalis*, and other *Giardia* sp.-taxonomy controversial)	beavers, coyotes, dogs, cats
Hantavirus Pulmonary Syndrome	Hantaviruses	Rodents
Histoplasmosis	*Histoplasma capsulatum*	Fungus occurs in bat guano
Lyme Disease	*Borelia burgdorferi* (spirocheate)	Rodents
Plague	*Yersinia pestis*	Rodents
Rocky Mountain Spotted Fever	*Rickettsii rickettsii*	Dogs and Rodents

Tularemia, also know as "rabbit fever" is a disease caused by a bacterium. Tularemia typically infects animals such as rodents, rabbits, and hares. Usually, people become infected through the bite of infected ticks or tabanid flies, by handling infected sick or dead animals, by eating or drinking contaminated food or water, or by inhaling airborne bacteria. About 200 human cases of tularemia are reported each year in the U.S. Most cases occur in the south-central and western states; however cases have been reported in every state except Hawaii. Cases have also resulted from laboratory accidents. Without treatment with appropriate antibiotics, tularemia can be fatal (CDC 2003a). The causative agent of tularemia is one of the most infectious pathogenic bacteria known, requiring as few as 10 organisms to cause disease. The Working Group on Civilian Biodefense considers tularemia to be a dangerous potential biological weapon because of its extreme infectivity, ease of dissemination, and substantial capacity to cause illness and death (Dennis et al. 2001).

Rabies**.** Rabies is an acute, fatal viral disease of mammals most often transmitted through the bite of a rabid animal. Rabies is preventable, but it is fatal without prior vaccination or post-exposure treatment. In Illinois, from 1996 through 2005, a total of 275 animals have tested positive for rabies. In 2007, a total of 113 bats have tested positive for rabies (Austin 2007). In rare cases in other parts of the country, rabies has even been detected in beaver which have behaved aggressively toward humans (http://www.co.ba.md.us/News/releases/0816rabidbeaver.html). WS involvement in rabies management in Illinois has consisted of partnering with other State agencies (i.e. IDPH & Illinois Department of Agriculture (IDOA)) for rabies surveillance in the northern Illinois striped skunk population.

Telephone calls received by WS related to bats are forwarded on to the IDNR in accordance with a Memorandum of Understanding between WS, IDNR, IDA, IDPH, and University of Illinois Extension. WS is involved with the removal of rabies positive bat colonies only when assistance is requested by the Illinois Department of Public Health.

Foreign Animal Diseases: International trade and travel and the popularity of exotic pets have resulted in an ongoing risk of foreign animal disease introduction. In some cases, these diseases may be transmissible to humans. For example, in 2003, 16 individuals in Illinois and 65 individuals in five other Midwestern states were diagnosed as having contracted monkeypox from pet prairie dogs and/or other exotic rodents (APHIS 2003). Symptoms of monkeypox in humans included fever, cough, rash and swollen lymph nodes. The prairie dogs were believed to have contracted the disease from African rodents imported for sale as pets. As part of the investigation of the incident, Wisconsin WS was requested to conduct surveillance in wild rodent populations around the residences of individuals with infected prairie dogs to see if native rodents had been exposed to the virus. In the event of a foreign animal disease outbreak in Illinois, WS could be requested to provide similar assistance and/or aid VS or State Animal and Human Health authorities in the management of animals involved in the outbreak.

Mammal Hazards to Public Safety at Airports. At many airports there is the risk of a mammal/aircraft strike which could result in human injury or death (Cleary and Dolbeer 2005). Although a greater number of wildlife strikes with aircraft involve birds, the most hazardous wildlife species in terms of damage to aircraft, cost of collisions, and effects on flight, is white-tailed deer (Dolbeer et al. 2003). Animals such as deer, coyotes, skunks and raccoons often venture onto airfields and become a direct threat to planes both landing and taking off. Other mammals which pose hazards to aircraft and public safety include but are not limited to feral dogs, fox, woodchucks, opossums, beaver, muskrat, gophers (damage to underground cables), and small rodents (mice and voles). The primary difficulty with mice and voles at airfields is not that they are a direct threat to aircraft, but that they attract predators (e.g., raptors, coyotes) that are a direct threat to aircraft.

WS receives requests for assistance regarding mammal damage management at civil airports and military airfields in Illinois. WS assists airports in Illinois with the management of wildlife problems including the removal of mammals from the airfields, under buildings, and from common areas where people work or congregate. Examples include the removal of skunks from hangers and around buildings, badgers burrowing under runways, as well as coyotes that have crossed runways and taxiways while foraging for rodents. Airports throughout the state of Illinois have experienced a total of 69 mammal strikes from 1990-2006, involving 11 different species of mammals (FAA Wildlife Strike Database). Out of those 69 mammal strikes 27 of those were coyotes (FAA Wildlife Strike Database). It is estimated that only 20 to 25% of all bird strikes are reported (Conover et al. 1995, Dolbeer et al. 1995, Linnell et al. 1996, Linnell et al. 1999), and it's likely that mammal strikes are also underreported. Consequently, the number of mammal strikes in Illinois is most likely much higher than FAA records indicate.

Other Mammal Hazards to Public Health and Safety. Beaver activity in certain situations can become a threat to public health and safety (e.g., burrowing into or flooding of roadways and railroad beds can result in serious accidents) (Miller 1983, Woodward 1983). Increased water levels in urban areas resulting from beaver activity can lead to unsanitary conditions and potential health problems by flooding septic systems and sewage treatment facilities (DeAlmeida 1987, Loeb 1994). WS may also be requested to provide assistance with reduction of risk of bites and injuries from animals that appear to have lost their fear of humans and/or are behaving aggressively toward people.

1.2.2 Need for Mammal Damage Management to Protect Agricultural Resources

Livestock and dairy production in Illinois contribute substantially to the State's economy. Milk production in Illinois totaled 1.9 billion pounds in 2004, valued at an estimated $309 million. There were an estimated 104,000 milk cows, 460,000 beef cows, 4,000,000 pigs, 63,000 sheep, and 4.9 million chickens in Illinois during 2005 (Illinois Agricultural Statistics 2005).

The IDNR and WS receives requests for assistance from Illinois citizens experiencing agricultural damage problems from mammals, including, but not limited to the following: 1) predation on livestock, including poultry, by coyotes and foxes; 2) threat and occurrence of damage to crops and stored feed due to mammals such as woodchucks and other rodents; and 3) risk of disease transmission, and 4) other problems. WS would conduct and assist in management efforts involving dogs, cats, deer, and other mammals, coordinated by or with the IDNR, IDPH, USDA/APHIS/Veterinary Services (VS) and/or other Federal and State agencies, to study, monitor and/or control the occurrence and spread of animal diseases to protect livestock and other agricultural resources throughout the state.

Risk of Disease Transmission

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

<u>Toxoplasmosis</u> The domestic cat has been found to transmit the protozoan parasite, *Toxoplasma gondii* to both domestic and wild animal species. Cats have been found to be important reservoirs

and the only species known to allow for the completion of the life cycle for *T. gondii* (Dubey 1973; Teutsch et al. 1979). Both feral and 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. Dubey et al. (1986) found cats to be a major reservoir of seroprevalence of *Toxoplasma gondii* on swine farms in Illinois. The main sources for infecting cats are thought to be birds and mice.

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

While FDM is primarily an economically devastating disease of livestock, experimental studies have clearly demonstrated that it also threatens wildlife. North American wildlife that are susceptible to FMD include white-tailed deer, feral pigs, bison, moose, antelope, musk ox, caribou, sheep, and elk. Most free-living North American wildlife have not had previous viral exposure to FMD, and there is little information available about their vulnerability (USGS NWHC 2001). Feral swine are known to be vulnerable to FMD and could be an important carrier/reservoir of the disease in the event of an outbreak in the U.S. Each state in the U.S. is or has developed its own FMD emergency response plan. The Illinois Emergency Animal Disease/Animals in Disaster document details the response protocol should FMD either be suspected or confirmed in Illinois. In the event of FMD outbreak in Illinois state officials will contact the USDA WS in Illinois office to notify of a possible request for assistance from a field location if assessments warrant such a request.

Disease Risks from Feral Swine. Feral swine are potential reservoirs for 30 viral and bacterial diseases as well as 37 parasites that threaten the health of livestock and humans (Hutton et al 2006). Of greatest concern is infection of swine production facilities with diseases like swine brucellosis, pseudorabies, and brucellosis. A study (Corn et al, 1986) conducted in Texas found that feral swine do represent a reservoir of diseases transmissible to livestock. Swine harvested in this study tested positive for pseudorabies, brucellosis, and leptospirosis. Other diseases carried by feral swine include hog cholera, tuberculosis, bubonic plague, and anthrax (Beach 1993). A recent study in Oklahoma (Saliki et al. 1998) found samples also positive for antibodies against porcine parvovirus, swine influenza and the recently emerged porcine reproductive and respiratory syndrome virus. Porcupine reproductive and respiratory syndrome is a highly infectious virus, requiring only a few viral particles to initiate infection (Henry 2003).

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

Feral swine act as reassortment vessels for such viruses as the highly pathogenic H5N1 influenza virus found throughout Europe, Asia, Africa and the Middle East (Hutton et al 2006). The reassortment of viruses could lead to new strains of influenza viruses that would become easily transferrable from mammals to humans (Brown 2004). Hutton (2006) states that feral swine can be the location for the reassortment of the H5N1 virus, into a virus that is easily transmitted from human to human.

WS could be requested to assist with the collection of blood and tissue samples from feral swine to determine the diseases present in feral swine in Illinois and subsequent risks, if any, to the state livestock industry.

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

Damage to Crops

Wild and feral mammals can cause damage to a variety of crops and stored feed. For example, in addition to causing flooding and water management problems by building dams, and burrowing into water containment structures, aquatic rodents (beaver, muskrats, nutria) may feed on crops including but not limited to corn, soybeans, sorghum, sugar and table beets, alfalfa, wheat, barely, oats, peanuts, various melons, and a variety of vegetables from home gardens and truck farms. Aquatic rodents may also girdle or cut (beaver) fruit and nut trees and trees raised for wood/fiber production (Hill 1982, Perry 1982, Woodward 1983, Wade and Ramsey 1986, Miller and Yarrow 1994).

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

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

Rats (*Rattus spp*.) and mice cause damage to stored grain through feeding and contamination with droppings. They may damage crops in fields and containers and packaging materials in stored food. They cause structural damage to commodity storage structures and foundations, etc. by burrowing and gnawing.

Predation and Livestock

Red foxes, gray foxes, coyotes, and feral dogs can cause predation losses or injury to livestock (e.g. sheep, goats, cattle, pigs, horses) and poultry (e.g. chickens, turkeys, geese ducks). Sheep and lamb losses from predators in the U.S. totaled 224,200 head and $18.3 million during 2004 (NASS 2005). Coyotes and dogs accounted for 60.5% and 13.3% of these predator losses,

respectively. In 2005, cattle and calf losses from predators in the U.S. totaled 190,000 head and $92.7 million (NASS 2006). Coyotes and dogs accounted for 51.1% and 11.5% of these predator losses, respectively. Cattle and calves are most vulnerable to predation at calving time and less vulnerable as they get older and larger (Horstman and Gunson 1982).

Feral swine can also be efficient predators. Calves, kids, lambs, and poultry have been known to become prey of feral swine (Stevens 1996, Beach 1993).

1.2.3 Need for Mammal Damage Management to Protect Property

In Illinois during Fiscal Year (FY) 2003-2005, WS received reports of mammal damage to property by the following species: bats (rabies threat), bobcats (predation threat), pocket gophers (burrowing), gray squirrel (damage to vegetable gardens, residential buildings, and vehicles), raccoons (damage to residential buildings, and other property), coyotes (predation on pets), beaver (property), muskrats (burrowing/digging), nutrias (browsing/grazing and burrowing/digging), skunks (landscaping, property), moles (burrowing/digging), woodchucks (burrowing/digging), feral hogs (damage to agricultural crops). The IDNR also receives requests from the public in situations where beaver, coyote and other mammals are causing property damage.

Most of the damage caused by beaver is a result of dam building, bank burrowing, tree cutting, obstructing overflow structures and spillways, or flooding. Some cases of beaver damage include roads being flooded, reservoir dams being destroyed by bank den burrows, and train derailments being caused by continued flooding and burrowing (Miller and Yarrow 1994). Housing developments have been threatened by beaver dam flooding. Some small bridges also have been destroyed because of beaver dam-building activity. Miller (1983) estimated that the annual damage by beavers in the United States was $75-$100 million. The estimated value of beaver damage is perhaps greater than that of any other single wildlife species in the U.S. with economic damage estimated to have exceeded $4 billion in the southeastern U.S. over a 40-year period (Arner and Dubose 1980). In some southeastern states, losses from beaver damage have been estimated at $3 million to $5 million dollars annually (Miller and Yarrow 1994), with timber losses as the most common type of damage (Hill 1976). Tracts of bottomland hardwood timber up to several thousand acres in size may be lost to beaver activity (Miller and Yarrow 1994). Beaver often inhabit sites in or adjacent to urban/suburban areas and cut or girdle trees and shrubs in yards, undermine yards and walkways by burrowing, flood homes and other structures, destroy pond and reservoir dams by burrowing into levees, gnaw on boat houses and docks, and cause other damage to private and public property (Wade and Ramsey 1986). Additionally, roads and railroads may be damaged by saturation of the roadbed from beaver flooding or by beaver burrowing into the banks that comprise roadbeds and railroad beds.

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

aquaculture ponds. Aquaculture reservoirs often lack aquatic vegetation which makes muskrat runs and burrows, remains of mussels, crawfish, and fish from muskrat feeding, and other muskrat sign easier to observe. Nutria often burrow into styrofoam used for floatation under boat docks, wharves, and houseboats. These burrows can cause structures to become unstable due to unequal buoyancy and possibly sink. Nutria have also been known to burrow under buildings and structures which can lead to uneven settling and foundation failure.

In addition to the risks to human health and safety discussed in Section 1.2.1, mammals can also cause considerable damage to property at airports. Coyotes, skunks and raccoons venture onto airfields and become a direct threat to planes both landing and taking off. Over the period of 1990-2003 there have been 1,272 strikes that involved aircraft and mammals resulting in more than $5 million in damage (Cleary and Dolbeer 2005). Airports throughout the state of Illinois have experienced a total of 69 mammal strikes from 1990-2006, involving 11 different species of mammals; 27 coyotes, 11 striped skunks, eight Virginia opossums, seven woodchucks, four bats, four Eastern cottontail rabbits, four raccoons, two foxes, one muskrat and one domestic dog (FAA Wildlife Strike Database).

1.2.4 Need for Mammal Damage Management to Protect Natural Resources

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

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

While beaver ponds can be beneficial to some species of wildlife, beaver activities can also destroy critical habitat types (e.g. free-flowing water, riparian areas, and bird roosting and nesting areas) which are important to other wildlife species including certain species of fish and mussels which may be dependent upon clear, cool and/or fast moving water. Beaver dams may increase sedimentation in streams thereby negatively affecting species that depend on clear water and gravel stream bottoms. For example, the Louisiana WS program has conducted beaver damage management activities to protect the Louisiana pearlshell (*Margaritifera hembeli*), which requires clear, free-flowing water to survive (D. LeBlanc, USDA/APHIS/WS, personal communication). Beaver impacts on trout habitat have been a major concern of the Wisconsin Department of Natural Resources and the general public since as early as 1950. Patterson (1951) found beaver impoundments in the Peshtigo River Watershed caused significant negative impacts to trout habitat by raising water temperatures, destroying immediate bank cover, changing water and soil conditions, and causing silt accumulations in spawning areas. Studies from other areas also document negative impacts of beaver impoundments on trout habitat (Sayler 1935, Cook 1940, Sprules 1940, Bailey and Stevens 1951). The Wisconsin Department of Natural Resources guidelines for management of trout stream habitat stated that beaver dams are a major source of

damage to trout streams (White and Brynildson 1967, Churchill 1980). More recent studies have documented improvements to trout habitat upon removal of beaver dams. Avery (1992) found wild brook trout populations in tributaries to the north branch of the Pemebonwon River in northeastern Wisconsin improved significantly following the removal of beaver dams. Species abundance, species distribution, and total biomass of non-salmonids also increased following the removal of beaver dams (Avery 1992). Increased soil moisture both within and surrounding beaver flooded areas can result in reduced timber growth and mast production and increased bank destabilization. While beneficial in some areas, these habitat modifications can conflict with human land or resource management objectives and can be problems for some plants and animals, including T&E species.

Aquatic rodents and other burrowing rodents can also damage natural resources by burrowing into earthen dams and dikes used to manage/retain ponds and riparian areas used by other wildlife species, by excessive foraging on riparian and wetland vegetation and cutting/girdling timber, seedlings, and other vegetation in natural areas, and parks, especially in riparian restoration sites..

Feral swine can compete with and prey upon native wildlife and severely damage wildlife habitats. Feral swine are omnivorous and feed on a wide variety of items, many of which are staples for native fauna. One of the more important seasonal food resources used by feral swine is wild fruit and nut crops, especially oak mast (Wood and Roark 1980). Oak mast is also an important food source for deer and wild turkey. When feral swine actively compete for mast, resident deer and wild turkey may enter the winter with inadequate fat reserves, thus threatening the viability of these native wildlife species (Beach 1993). Feral swine also predate native wildlife, especially young animals and ground nesting birds, their nestlings and eggs (Beach 1993). The rooting and foraging behavior of feral swine can completely destroy the understory in forests and make trees less stable during windstorms. Their wallowing and foraging can significantly damage wetlands, which may be important for threatened and endangered (T&E), and sensitive species such as fish.

When muskrats become over-populated, generally an “eat-out” occurs and the feeding area is ruined for a number of years (O’Neil 1949). An “eat-out” occurs when vegetation and soil binding roots are consumed which results in loss of vegetation, food, and cover for muskrats and other wildlife. Marsh damage from muskrats is inevitable when areas heavily populated by muskrats are under-trapped (Lynch et al. 1947). “Eat-outs” are beneficial to some fish eating bird species because they reduce cover for prey creating easier access to food sources. “Eat-outs” are also beneficial by increasing the amount of loafing areas for shorebirds and some species of ducks; however, “eat-outs” also result in stagnate water which predisposes the same birds to diseases(Lynch et al. 1947) like West Nile Virus, St. Louis encephalitis, LaCrosse encephalitis, and Western Equine encephalitis.

Need to Protect T&E Species

Some of the species listed as threatened or endangered under the Endangered Species Act of 1973 and Illinois Endangered Species Conservation Act are preyed upon or otherwise adversely affected by certain mammal species. Piping plovers (*Charadrius melodus*, Federally threatened, State endangered), Interior least terns (*Sterna antillarum*, State endangered) can be negatively affected by raccoons, opossums, striped skunks, and other mammals that prey on birds, eat eggs, and cause disturbances on nesting sites. Massey (1971) and Massey and Atwood (1979) found that predators can prevent least terns from nesting or cause them to abandon previously occupied sites. In another study, mammal predators were found to have significantly impacted the nesting success of least terns on sandbars and sandpits (Kirsch 1996). Skunks (Massey and Atwood 1979), red foxes (Minsky 1980), coyotes (Grover and Knopf 1982), and raccoons (Gore and Kinnison 1991) are common predators of least terns. During one two-year study, coyotes

destroyed 25.0-38.5% of all interior least tern nests (Grover 1979). In Massachusetts, predators destroyed 52-81% of all active piping plover nests from 1985-1987 (MacIvor et al. 1990). Red foxes accounted for 71-100% of the nests destroyed by predators at the site. A WS predation management program to protect rare species can be one component of integrated programs that also include nest exclosures, management of public access and impacts, and other methods.

1.3 DECISION TO BE MADE

WS is the lead agency in the preparation of this EA. This proposal would require the participation of other agencies that have management authority and expertise related to this project (cooperating and consulting agencies). The USDA, Forest Service, Shawnee National Forest (USFS) has responsibility to manage the resources of federal lands for multiple uses including timber production, recreation and wildlife habitat, while recognizing the state's authority to manage wildlife populations. This includes managing beaver activity to prevent dams from raising water levels to the point where the natural balance of wetland species in the forest is threatened, and to prevent flooding damage to property on lands adjacent to the forest (Sections 1.5 and 3.2.2.). The USFW was a cooperating agency in the preparation of this EA. The IDNR provides for the control, management, restoration, conservation and regulation of birds, fish, game, forestry and all wildlife resources of the state. The IDNR was a consulting agency in the preparation of this EA.

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

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

1.4 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

1.4.1 Actions Analyzed

This EA evaluates mammal damage management by WS to protect: 1) property; 2) agricultural resources; 3) natural resources; and 4) public health and safety in Illinois 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.

1.4.2 Native American Lands and Tribes

WS would not conduct MDM activities on tribal lands without the consent of the affected tribe(s). Currently, Illinois WS does not have any MOUs with any Native American tribes. 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 documentation would be prepared as appropriate before conducting MDM on tribal lands.

1.4.3 Period for which this EA is Valid

If it is determined that an EIS is not needed, this EA would remain valid until the WS program in Illinois and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA is sufficient.

1.4.4 Site Specificity

This EA analyzes the potential impacts of MDM and addresses WS' activities on all lands in Illinois under MOUs, Cooperative Service Agreements and in cooperation with the appropriate public land management agencies, and federal lands to include all of the LaRue Ecological Area. 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 federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, insurance companies, etc. Although some of the sites where 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 Illinois (see Chapter 3 for a description of the Decision Model and its application). The analyses in this EA are intended to apply to any action that may occur *in any locale* and at *any time* within the State of Illinois. In this way, 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.

1.4.5 Public Involvement

Issues related to the proposed action were initially identified and developed by WS. As part of WS' Environmental Analysis process, and as required by the Council on Environmental Quality (CEQ 1981) and APHIS-NEPA implementing regulations, this document and its Decision will be made available to the public through "Notices of Availability" (NOA) published in local media, through direct mailings of NOA to parties that have specifically requested to be notified and through the WS website (http://www.aphis.usda.gov/wildlife_damage/nepa.shtml). New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA should be revisited and, if appropriate, revised prior to issuance of a final Decision.

1.5 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

ADC Programmatic Environmental Impact Statement. WS, previously called Animal Damage Control (ADC), has issued a Final EIS on the national APHIS/WS program (USDA 1997 Revised). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

Environmental Assessment: An integrated management approach for the management of white-tailed deer damage in the state of Illinois. WS completed an EA that covered white-tailed deer damage management in the state of Illinois in 2002. Management of damage by and conflicts with white-tailed deer will not be addressed in this EA.

Environmental Assessment: Reducing beaver damage through and integrated wildlife damage management program in the state of Illinois. WS completed an EA that covered beaver damage management in the state of Illinois in 2002. Once completed, this EA on mammal damage management in Illinois will replace the analysis in the beaver damage management EA..

Environmental Assessment LaRue Swamp Beaver Dam Control. The USFS completed an EA that addressed the proposal to allow target removal of problem beaver dams on National Forest in LaRue Swamp Natural Area by mechanical means where possible and/or by the use of approved explosives. This EA also covered the removal of nuisance beaver from the LaRue Swamp Natural Area.

1.6 AUTHORITY AND COMPLIANCE

1.6.1 Wildlife Services Legislative Authority

WS is the Federal program authorized by law to reduce damage caused by wildlife (the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c)). The mission of the USDA/APHIS/WS program is to provide federal leadership in managing conflicts with wildlife. Wildlife Services' mission, developed through its strategic planning process (USDA 1999), is: 1) *"to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and 2) to safeguard public health and safety."* WS recognizes that wildlife is an important public resource greatly valued by the American people. By its very nature, however, wildlife is a highly dynamic and mobile resource that can cause damage to agriculture and property, pose risks to human health and safety, and affect industrial and natural resources. WS conducts programs of research, technical assistance and applied management to resolve problems that occur when human activity and wildlife conflict.

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

1.6.2 USDA, Forest Service, Shawnee National Forest.

The Forest Service has the responsibility to manage the resources of federal lands for multiple uses including timber production, recreation and wildlife habitat, while recognizing the state's authority to manage wildlife populations. The Forest Service recognizes the importance of

reducing wildlife damage on lands and resources under their jurisdiction, as integrated with their multiple use responsibilities. Occasionally, wildlife damage management actions may be taken on National Forest Service lands to protect resources on adjacent propertiesFor these reasons, the Forest Service has entered into a national MOU with WS to facilitate a cooperative relationship. Copies of the MOU are available by contacting the WS State Director's Office at 2869 Via Verde Drive, Springfield, IL 62703. At the Shawnee National Forest, wildlife damage management issues are particularly relevant for the management of the LaRue Swamp Natural Area and are addressed in the USFS EA on LaRue Swamp Beaver Dam Control.

1.6.3 Illinois Department of Natural Resources Legislative Authority

The Illinois Department of Natural Resources authority in wildlife management is given under Illinois Compiled Statutes (ILCS) Chapter 520 of the Wildlife Code for managing most wildlife species in the State. Article II, 5/1.3-1.12 states in part; *The regulation and licensing of the taking of wildlife in Illinois are exclusive powers and functions of the State…* The Department shall take all measures necessary for the conservation, distribution, introduction and restoration of birds and mammals…The Department shall use the most modern conservation methods to manage wildlife on State controlled lands or waters for propagation or breeding wildlife. The Department may cooperate with any person desirous of managing wildlife on private lands or waters by (a) furnishing trees, shrubs, seeds or other materials where deemed necessary or desirable and (b) providing labor, equipment and technical supervision to plan and assist the landowner in wildlife habitat development."

1.6.4 Illinois Department of Agriculture's Bureau of Animal Health

Illinois Department of Agriculture's Bureau of Animal Health and Welfare is responsible for detection and eradication of certain animal diseases. State veterinarians perform epidemiological investigations, develop plans to eradicate disease in infected herds, and monitor and test animals. Animal health investigators assist state field veterinarians with livestock testing, collect milk samples from dairy herds, test poultry for disease and ensure livestock owners comply with testing requirements. These officials also inspect livestock markets for proper sanitation, monitor livestock identification and ensure animals are transported properly. The IDA licenses individuals and businesses, such as auction markets, livestock dealers, feeder swine dealers and slaughter buyers, who purchase and sell livestock for a fee or assume ownership of livestock to resell at a profit. Licensing allows the department to ensure compliance with animal health laws and strengthens the livestock industry by taking action when businesses operate illegally.

1.6.5 Compliance with Federal Laws

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

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

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

Endangered Species Act (ESA). It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act (Sec. 2(c)). WS conducts Section 7 consultations with the United States Fish and Wildlife Service (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 shall use the best scientific and commercial data available" (Sec. 7(a)(2)). WS obtained a Biological Opinion (B.O.) from the U.S. Fish and Wildlife Service describing potential effects of the National WS program on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997 Revised, Appendix F). WS is consulting with the Federal Endangered species office on the risks to federally-listed threatened and endangered species from the proposed MDM program and will incorportate all USFWS provisions for the protection of threatened and endangered species from that consultation in program activities.

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

This law established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans. Funds were authorized for cost-sharing grants to states to develop their programs. Subsequent to Federal approval of their plans, grants would be awarded for implementation purposes. In order to be eligible for Federal approval, each state's plan was required to define boundaries of the coastal zone, to identify uses of the area to be regulated by the state, the mechanism (criteria, standards or regulations) for controlling such uses, and broad guidelines for priorities of uses within the coastal zone. In addition, this law established a system of criteria and standards for requiring that Federal actions be conducted in a manner consistent with the federally approved plan. The standard for determining consistency varied depending on whether the Federal action involved a permit, license, financial assistance, or a Federally authorized activity. Illinois has not completed its state Coastal Zone Management Plan. WS will initiate consultation on a concurrency determination in accordance with the provisions of the Act when the state plan is completed

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

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

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 (USACE) 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.

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 five 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. Natural Resources Conservation Service (NRCS) is responsible for certifying wetland determinations according to this Act.

The Native American Graves and Repatriation Act of 1990. The Native American Graves Protection and Repatriation Act requires federal agencies to notify the Secretary of the Department that manages the federal lands upon the discovery of Native American cultural items on federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

National Historic Preservation Act (NHPA) of 1966 as amended. The NHPA of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that have the potential to cause effects on historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the Advisory Council on Historic Preservation (i.e. State Historic Preservation Office, Tribal Historic Preservation Officers), as appropriate. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties.

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

EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

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

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 pesticides used by WS are regulated by the EPA through FIFRA, the Illinois Department of Environmental Protection, by MOUs with land managing agencies, and by WS Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997 Revised, Appendix P). The WS operational program properly disposes of any excess solid or hazardous waste. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations. In contrast, the proposed action may benefit minority or low-income populations by reducing mammal damage such as threats to public health and safety.

Protection of Children from Environmental Health and Safety Risks (Executive Order 13045). Children may suffer disproportionately from environmental health and safety risks for many reasons, including their developmental, physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, WS has considered the impacts that this proposal might have on children. The proposed mammal damage management program would only occur by using legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action.

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

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

Animal Medicinal Drug Use Clarification Act of 1994 (AMDUCA). The AMDUCA and its implementing regulations (21 CFR Part 530) establish several requirements for the use of animal drugs, including those used to capture and handle wildlife 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 (WWHC) of the Western Association of Fish and Wildlife Agencies has recommended that suitable identification markers include durable ear tags, neck collars, or other external markers that provide unique identification (WWHC *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.

1.6.6 Illinois Wildlife Laws, Regulations and Policies Regarding Mammal Damage Management

Illinois Wildlife Laws Several state laws and regulations pertain to WS' wildlife damage management actions (Appendices F, G). WS complies with these laws and regulations, and consults and cooperates with other agencies as appropriate.

Illinois Pesticide Laws The use of pesticides in Illinois is conducted pursuant to the Illinois Pesticide Act (Illinois Administrative Code Title 8, part 250, section 250.3). Use of products such as those intended to kill rodents and larger mammals is regulated by the IDA.

1.7 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four (4) chapters and seven (7) appendices. Chapter 2 discusses the issues relevant to the analysis. Chapter 3 contains a description of each alternative, alternatives not considered in detail, and standard operating procedures (SOP) that may be used by WS. Chapter 4 analyzes environmental consequences and the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers and those consulted during the EA process. Appendix A is a list of the literature cited during the preparation of the EA and Appendix B is a detailed description of the methods used for MDM in Illinois. Appendix C is a list of Federal and State protected Threatened and Endangered Species. Appendix D contains the criteria for beaver dam breaching and removal. Appendix E contains the Illinois Administrative Code concerning the incidental taking of endangered or threatened species. Appendix F contains the Illinois Compiled Statutes regarding laws and regulations for fish and game in the state of Illinois.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that received detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues used to develop SOPs, and issues not considered in detail, with the rationale. Pertinent portions of the affected environment are included in this chapter and in the discussion of the environmental impacts in Chapter 4.

2.1 AFFECTED ENVIRONMENT

The proposed action could include areas in and around commercial, industrial, public, and private buildings, facilities and properties and at other sites where mammals burrow, feed, or otherwise occur. Examples of areas where mammal damage management activities could be conducted are, but are not necessarily limited to: agricultural fields, orchards, farmyards, dairies, ranches, livestock operations, waste handling facilities, industrial sites, natural areas, government properties and facilities, private homes and properties, corporate properties, schools, hospitals, parks and recreation areas, swimming lakes, communally-owned homeowner/property owner association properties, wildlife refuges, wildlife management areas, lake beaches, ponds, rivers, and inlets, airports and surrounding areas.

2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4

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

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

2.2.1 Effects on Target Mammal Species

WS, program recipients, and members of the public are concerned about the impact of MDM on the size and viability of target species populations. The target species selected for analysis in this EA include: coyotes, raccoons, opossums, red fox, gray fox, mountain lions, feral cats, striped skunk, mink, bobcat, badger, beaver, nutria, muskrat, river otter, weasel, woodchuck, eastern cottontail rabbit, feral swine, domestic/feral dog, nine-banded armadillo, brown (Norway) rat, black (roof) rat, house mouse, deer mouse, white-footed mouse, meadow vole, gray squirrel, fox squirrel, Red squirrel, southern flying squirrel, thirteen-lined ground squirrel and the Eastern chipmunk.

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

WS and the rest of the wildlife management profession, as well as the public, are concerned about whether the proposed action or any of the alternatives might result in adverse impacts on nontarget wildlife species, especially state and federally listed T&E species. WS' SOPs are designed to reduce potential impacts on non-target 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 MDM methods in ways to reduce the likelihood of capturing or killing non-target species.

Threatened and Endangered species lists for the United States Fish and Wildlife Service (USFWS) and State of Illinois 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 SOPs. WS has consulted with the USFWS under Section 7 of the ESA concerning potential effects of the national WS program on T&E species and has obtained a B.O. For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997 Revised). WS has also consulted with the USFWS regarding the proposed Illinois MDM program.

Some members of the public are concerned that the use of registered toxicants to reduce mammal damage would have adverse impacts on other wildlife species, including T&E species. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997 Revised, Appendix P). WS only uses pesticides that have been approved by the EPA and the IDA and applies these in accordance with the label directions. Under the alternatives proposed in this EA, the primary toxicants proposed for use and recommendation by WS are gas cartridges and zinc phosphide (ZP). Appendix B contains detailed descriptions of these chemical products.

2.2.3 Effects on Human Health and Safety

Safety and efficacy of chemical MDM methods

Some individuals may have concerns that chemicals used for wildlife damage management should not be used because of potential adverse effects on people from direct exposure to chemicals or exposure to animals that have died as a result of chemical use. Under the alternatives proposed in this EA, pesticide products proposed for use by WS are gas cartridges (for rodent control) and zinc phosphide and anticoagulant rodenticides. WS may also provide technical assistance on the use of repellents. Use of these products is regulated by the EPA through FIFRA, the IDOA, and by WS Directives. The use of registered chemical toxicants and repellants for mammal damage management poses no risk to public health and safety when applied according to label instructions. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997 Revised, Appendix P). Chemical pesticides that have come into use since the Risk Assessment was completed have undergone considerable environmental review through EPA and State registration processes, which means they have been found to present no unreasonable risk to the environment or human health and safety when used according to label directions." (this verbage is consistent with what FIFRA says EPA has to assure when they register a pesticide). WS personnel who apply pesticides are certified pesticide applicators and apply pesticides according to label instructions. A detailed description of these chemicals is contained in Appendix B.

WS also uses Food and Drug Administration (FDA) registered chemicals for animal immobilization and euthanasia. Some individuals are concerned that the drugs used in animal capture, handling,

and euthanasia may cause adverse health effects in humans that hunt and eat the species involved.

Impacts on human safety of non-chemical MDM methods

Some people may be concerned that WS' use of firearms, traps, snares and pyrotechnic scaring devices could cause injuries to people. 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 is a very sensitive issue and a concern because of public fears regarding the risks associated with unsafe firearms use and the threat of misuse of firearms. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within three months of their appointment and a refresher course every two years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are 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.

Impacts on human health and safety from mammals

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

2.2.4 Impacts to Stakeholders, Including Aesthetics

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

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

The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The American public is no exception, and today a large percentage of households have pets. Some people may consider individual wild animals and

birds as “pets” or exhibit affection toward these animals. Others may experience anxiety or fear when wild animals come into close proximity to their homes and families. It is not surprising that , the public reaction to wildlife damage management techniques is mixed because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife.

Many people, directly affected by problems and threats to public health or safety associated with mammals may insist upon removal of the animal(s) from the property or public location when they cause damage. Some members of the public have an idealistic view and believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety. Others, directly affected by the specific wildlife “problem”, may not agree that there is a problem. They may perceive that the issue at hand is normal animal behavior and a consequence of living in proximity to nature and should be tolerated. Similarly, individuals not directly affected by the harm or damage caused by wildlife may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Individuals totally opposed to mammal damage management want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed. Some people would strongly oppose removal of mammals regardless of the amount and type of damage. Some members of the public who oppose removal of wildlife do so because of human-affectionate bonds with individual animals. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment. Advocates of the Animal Rights philosophy believe that animals are entitled to the same rights and protections as humans and that if an action is unacceptable treatment for a human it is unacceptable treatment for an animal.

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

2.2.5 Humaneness and Animal Welfare Concerns of Methods Used

Humaneness, in part, is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important and very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if *" . . . the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process."* Suffering is described as a *" . . . highly unpleasant emotional response usually associated with pain and distress."* However, suffering *" . . . can occur without pain . . . ,"* and *" . . . pain can occur without suffering . . . "* (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for *" . . . little or no suffering where death comes immediately . . . "* (CDFG 1991), such as shooting.

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).

The 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.*" (AVMA 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.*" (AVMA 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. One challenge with coping with this issue is how to achieve the least amount of animal suffering within the constraints of current technology and resources. WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some MDM methods are used in situations where non-lethal damage management methods are not practical or effective.

Illinois WS personnel are experienced and professional in their use of management methods so that they are humane within the constraints of current technology and resources. Standard operating procedures used to maximize humaneness are described in Chapters 3 and 4.

Analysis of this issue must consider not only the welfare of the animals captured, but also the welfare of humans, livestock and some T&E species if damage management methods are not used. For example, some individuals may perceive techniques used to remove a predator that is killing or injuring pets or livestock as inhumane, while others may believe it is equally or more inhumane to permit pets and livestock that depend upon humans for protection to be injured or killed by predators. The challenge in coping with this issue is how to achieve the least amount of animal suffering with the constraints imposed by current technology. WS personnel are concerned about animal welfare. WS is aware that techniques like snares and traps are controversial, but also believes that these activities are being conducted as humanely and responsibly as practical. WS and the National Wildlife Research Center are striving to bring additional non-lethal damage management alternatives into practical use and to improve the selectivity and humaneness of management devices. Until new findings and products are found practical, a certain amount of animal suffering could occur when some methods are used in situations when non-lethal damage management methods are not practical or effective. WS supports the most humane, selective, and effective damage management techniques, and would continue to incorporate advances into program activities.

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

Some people are concerned about the humaneness of drowning beaver, nutria, and muskrats while restrained by leg-hold traps. Considerable debate and disagreement among animal activists, veterinarians, wildlife professionals, fur trappers, and nuisance wildlife specialists is apparent. Debate centers around an uncertainty as to whether drowning animals are rendered unconscious by high levels of carbon dioxide (CO_2) and thus insensitive to distress and pain (Ludders et al. 1999). The AVMA identifies drowning as an unacceptable method of euthanasia (Beaver et al. 2001), but provides no details on the reasons for this decision. Ludders et al.

(1999) concluded drowning is not euthanasia based on the animals not dying from CO_2 narcosis, because CO_2 narcosis does not occur until 95 millimeters of mercury in arterial blood is exceeded. Ludders et al. (1999) showed death during drowning is from hypoxia and anoxia, and thus

animals experience hypoxemia. Ludders et al. (1999) also concluded that animals that drown are distressed because of stress related hormones, therefore, drowning is not euthanasia.

CO_2 causes death in animals by hypoxemia (inadequate oxygenation of the blood) and some animals (i.e. cats, rabbits, and swine) are distressed before death (Beaver et al. 2001). Even though these animals are distressed, the AVMA states that CO_2, when used properly, is an acceptable form of euthanasia (Beaver et al. 2001). Thus, the AVMA does not preclude distress or pain in euthanasia. In fact, the AVMA supports inducing hypoxemia related distress when necessary to reduce total distress, because reducing total distress is a more humane death.

Death by drowning in the classical sense is caused by inhalation of fluid into the lungs and is referred to as wet drowning (Gilbert and Gofton 1982, Noonan 1998). Gilbert and Gofton (1982) reported that all submerged beaver do not die from wet drowning, but die of oxygen deprivation after a period of CO_2 induced stupor (narcosis). According to Gilbert and Gofton (1982) and Noonan (1998), the AVMA accepts CO_2 as a suitable form of euthanasia. However the 2000 AVMA report on Euthanasia only considers use of CO_2 acceptable or provisionally acceptable if administered under tightly controlled conditions including requiring that the only acceptable source of CO_2 is bottled gas because of the amount of CO_2 administered can be carefully controlled (Beaver et al. 2001). Gilbert and Gofton (1982) also reported that after beaver were trapped and entered the water struggling occurred for two to five minutes followed by a period of reflexive responses. Andrews et al. (1993) reports that with some techniques that induce hypoxia, some animals have reflex motor activity followed by unconsciousness that is not perceived by the animal. Gilbert and Gofton (1982) stated it is unknown how much conscious control actually existed at this stage and oxygen deprivation may have removed much of the sensory perception by 5-7 minutes post submersion. However, Gilbert and Gofton (1982) have been criticized because levels of CO_2 in the blood were not reported (Ludders et al. 1999) and there was insufficient evidence that the beaver in their study were under a state of CO_2 narcosis when they died. Adding to the controversy, Clausen and Ersland (1970) did measure CO_2 in the blood for submersed restrained beaver, yet none of the beaver in the study died. Therefore, Clausen and Ersland (1970) could not determine the exact cause of death. However, Clausen and Ersland (1970) were able to demonstrate that CO_2 increased in arterial blood while beaver were submersed and that CO_2 was retained in tissues. While Clausen and Ersland (1970) did measure the amounts of CO_2 in the blood of submersed beaver they did not attempt to measure the desensitizing effect of CO_2 buildup in beaver.

When beaver are captured using leg-hold traps with intent to drown, beaver are exhibiting a flight response. Gracely and Sternberg (1999) reported that there is stress-induced reductions in sensitivity to pain during fight and flight responses. Environmental stressors that animals experience during flight or fight activate the similar stress-induced reductions in sensitivity to pain as capture in traps (Gracely and Sternberg 1999).

Use of drowning trap sets has been a traditional wildlife management technique in trapping aquatic mammals such as beaver, nutria, and muskrats. Trapper education manuals and other wildlife damage management manuals written by wildlife biologists recommend drowning sets for foothold traps set for beaver (Howard et al. 1980, Randolph 1988, Bromley et al. 1994, Dolbeer et al. 1994, Miller and Yarrow 1994). Drowning trap sets are considered by some to be the most appropriate and effective method available to capture beaver, nutria, and muskrats in some situations. These people generally perceive the relatively short time to death from drowning (minutes) to be preferable to the potential stress and distress an animal might experience while in a live capture device (hours) until eventually euthanized. Animals in live capture devices are vulnerable to being harassed, killed or injured by humans, dogs, or other wildlife (Miller and Yarrow 1994). Drowning sets make the captured animal and trap less visible and prevent injury (i.e., bites and scratches) to people who may otherwise approach a restrained animal. Some sites

may be unsuitable for body-gripping traps or snares because of unstable banks, deep water, or substrate conditions. However, these sites may be suitable for foothold traps.

Given the relatively short time period of a drowning event compared to being held in a live capture device, possible analgesic effect of CO_2 buildup to beaver, acceptance of catching and drowning muskrats approved by International Humane Trapping Standards, the conclusion has been drawn that drowning, though rarely used by WS, will continue to be included as an available method in alternatives that allow for lethal methods of MDM. Some people will disagree and remain un-swayed.

2.2.6 Effects on Wetlands

Some people are concerned about the effects of the alternatives on wetland ecosystems, specifically that the removal of beaver or breaching/removing beaver dams from an area will result in the loss of wetland habitat and the plant and animal species included in those habitats.

Beaver build dams primarily in smaller rivers (intermittent and perennial streams and creeks) with dams consisting of mud, sticks, and other vegetative materials. Dams obstruct the normal flow of water and typically change the preexisting wetland hydrology from flowing or circulating waters to slower, deeper, more expansive waters that accumulate bottom sediment. Depth of the bottom sediment depends on the length of time an area is covered by water and the amount of suspended sediment in the water. If a beaver dam is not breached/removed and water levels remain constant, hydric soils and hydrophytic vegetation eventually form. This process can take anywhere from several months to years depending on preexisting conditions. Hydric soils are those soils that are saturated, flooded, or submerged long enough during the growing season to develop anaerobic conditions. In general, hydric soils form much faster in areas where wetlands have previously existed. Hydrophytic vegetation includes those plants that grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. If these conditions are met, a wetland can develop that would have different wildlife habitat values than an area recently impounded by beaver dam activity.

Some species will benefit from the addition of a beaver dam, while others will diminish. For example, some species of darters listed as federally endangered require fast moving waters over gravel or cobble beds which beaver dams can eliminate, thus reducing the habitat's value for these species. In general, it has been found that terrestrial wildlife habitat values decline around bottomland beaver impoundments in the southern US, because hardwood trees are killed from flooding and mast production declines. On the other hand, beaver dams can potentially be beneficial to species of wildlife such as river otters, Neotropical birds, and waterfowl.

WS beaver damage management activities would primarily be conducted to alleviate damages to agricultural crops, timber resources, and public property such as roads, bridges, and water management facilities. MDM would also be conducted to enhance or reclaim wildlife and stream fishery/mussel habitats. Activities most often take place on small watershed streams, tributary drainages, and ditches and can best be described as small, one-time projects conducted to restore water flow through previously existing channels. Under the preferred alternative, WS would routinely incorporate beaver removal with dam breaching/removing and/or installation of water control devices and beaver exclusion devices. Dams would be breached/removed by hand when possible, or small charges of binary explosives could be used when necessary. No heavy equipment such as backhoes or bulldozers would be used by WS in these damage reduction and wildlife enhancement activities. Only the portion of the dam blocking the stream or ditch channel is altered or breached. Projects involving the use of binary explosives would be conducted by trained WS certified explosive specialists. After a blast, any remaining fill material still obstructing the channel is normally washed downstream by water current. The only noticeable side effects from this activity are diluted mud, water, and small amounts of debris from the dam scattered

around the blasting site. Considerably less than 10 cubic yards of material would be moved in each of these project activities.

The United States Army Corps of Engineers (USACE) has criteria that would be implemented by WS during dam breaching/removal activities to minimize any impacts to the water course basin, adjacent riparian areas, or surrounding vegetation (see Appendix C). The intent of most dam breaching/removal is not to drain established wetlands. With few exceptions, requests from public and private individuals and entities involve dam breaching/removal to return an area back to its preexisting condition. Hydric soils and wetland conditions usually take many years to develop, often greater than five years as recognized by Swampbuster provisions. Most beaver dam removal by WS is either exempt from regulation under Section 404 of the Clean Water Act as stated in 33 CFR part 323 or may be authorized under the USACE Nationwide Permit System in 33 CFR part 330. However, breaching/removal of some beaver dams can involve certain portions of Section 404 to require landowners to obtain permits from the USACE. WS personnel determine the proper course of action upon inspecting a beaver dam impoundment. Appendix C describes the procedures used by WS to assure compliance with the pertinent laws and regulations.

2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

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

Funding for WS comes from a variety of sources in addition to federal appropriations. In Illinois, funds to implement wildlife damage management activities and programs are derived from a number of sources, including, but not limited to Federal, state, county and municipal governments/agencies, private organizations, corporations and individuals, homeowner/property owner associations, and others, under Cooperative Service Agreements and/or other contract documents and processes (Illinois WS state report, http://www.aphis.usda.gov/wildlife_damage/state_report_pdfs/illinois.pdf). Federal, state, and local officials have decided that wildlife damage management should be conducted by appropriating funds. WS was established by Congress as the agency responsible for providing wildlife damage management to the people of the United States. Wildlife damage management is an appropriate sphere of activity for government programs, since aspects of wildlife damage management are a government responsibility and authorized and directed by law.

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

Private nuisance wildlife control agents could be contacted to reduce mammal damage for property owners or property owners could attempt to reduce their own damage problems. Some property owners would prefer to use a private nuisance wildlife control agent because the nuisance wildlife agent is located in closer proximity and thus could provide the service at less expense, or because they prefer to use a private business rather than a government agency. However, some property owners would prefer to contract with a government agency. In particular, large industrial businesses and cities and towns may prefer to use WS because of security and safety issues and reduced administrative burden. The relationship between WS and private industry is addressed in WS directive 3.1.1 (http://www.aphis.usda.gov/wildlife_damage/ directives/3101.pdf).

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

Some individuals might question whether preparing an EA for an area the size of the State of Illinois would meet the NEPA requirements for site specificity. If in fact 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 impacts, one EA analyzing impacts for the entire State may provide a better analysis than multiple EAs covering smaller zones. In addition, the WS program in Illinois only conducts MDM on a relatively small area of the State where damage is occurring or likely to occur.

2.3.4 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 in successfully reducing damage to acceptable levels. The 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.

2.3.5 WS Impact on Biodiversity

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

CHAPTER 3: ALTERNATIVES

3.0 INTRODUCTION

This chapter consists of seven parts: 1) introduction, 2) description of alternatives considered and analyzed in detail including the Proposed Action (Alternative 2), 3) mammal damage management approaches used by WS, 4) specific mammal damage management methods that could be authorized for use or recommended by WS, 5) methodologies recommended but deemed impractical, ineffective, or unsafe at the present time, 6) a description of alternatives considered, but eliminated from detailed analysis, and 7) standard operating procedures. Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992), Methods of Control (USDA 1997 Revised), and "*Risk Assessment of Wildlife Damage Control Methods Used by the USDA Animal Damage Control Program*" (USDA 1997 Revised).

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

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

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1: Technical Assistance Only

This alternative would not allow for WS operational MDM in Illinois. WS would only provide technical assistance (advice) and make recommendations when requested. Currently, IDNR only provides direct MDM assistance in limited situations, but does provide technical assistance and issues permits for MDM activities as appropriate. Producers, property owners, agency personnel, or others could conduct MDM using any legal lethal or non-lethal method. Individuals might choose to implement WS recommendations, implement other methods not recommended by WS, use contractual services of private businesses, or take no action. 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.

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

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

WS proposed to continue the current damage management program that responds to mammal damage in the State of Illinois. WS involvement in mammal damage management in Illinois is

closely coordinated with the IDNR, and WS take of mammals is authorized through permits and/or other authorities granted by IDNR. An IWDM approach would be implemented to reduce mammal damage to property, agricultural resources, and natural resources, and to reduce mammal impacts on human/public health and safety. Damage management would be conducted on public and private property in Illinois when the resource owner (property owner) or manager requests assistance. The IWDM strategy would encompass the use and recommendation of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate non-lethal techniques like physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using shooting, trapping, registered pesticides and other products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy.

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

This alternative would require WS to only use and recommend non-lethal methods to resolve mammal damage problems. Information on lethal MDM methods would still be available to producers and property owners through other sources such as IDNR, USDA Agricultural Extension Service offices, universities, or pest control organizations. Requests for information regarding lethal management approaches would be referred to these entities. Currently, IDNR only provides direct MDM assistance in limited situations, but does provide technical assistance and issues permits for MDM activities as appropriate. Individuals might choose to implement WS non-lethal recommendations, implement lethal methods or other methods not recommended by WS, obtain WS direct assistance with non-lethal MDM, use contractual services of private businesses, or take no action. Persons receiving WS's non-lethal technical and direct damage management assistance could still resort to lethal methods that were available to them.

3.1.4 Alternative 4: No Federal WS Mammal Damage Management

This alternative would eliminate WS involvement in MDM in Illinois. WS would not provide direct technical or control assistance and requesters of WS's assistance would have to conduct their own MDM without WS input. Information on MDM methods would still be available to producers and property owners through other sources such as IDNR, USDA Agricultural Extension Service offices, universities, or pest control organizations. Currently, IDNR only provides direct MDM assistance in limited situations, but does provide technical assistance and issues permits for MDM activities as appropriate. Requests for information would be referred to these entities. Individuals might choose to conduct MDM themselves, use contractual services of private businesses, or take no action.

3.2 MAMMAL DAMAGE MANAGEMENT STRATEGIES USED BY WS

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2 and 3 described above. Alternative 4 would terminate both technical assistance and operational MDM by WS. Appendix 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)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in the most cost-effective[4] manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM may incorporate cultural practices (e.g., animal husbandry), habitat modification (e.g., exclusion), animal behavior modification (e.g., scaring), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific damage problem.

3.2.2 The IWDM Strategies Employed by WS

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

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

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

Educational Efforts
Education is an important element of WS program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures, courses, and demonstrations are provided to producers, homeowners, state and county agents, colleges and universities, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts.

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

Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

Research and Development

The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. 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.

Examples of WS Technical Assistance and Direct MDM in Illinois

- The City of Chicago and the O'Hare International Airport (ORD) entered into Cooperative Service Agreements with Illinois WS for the purpose of assessing, managing, and monitoring wildlife-related public safety and aviation hazards at ORD. Mammal-aircraft strikes and hazards involving white-tailed deer, red fox, coyotes, and other mammals have created safety hazards at the airport. WS has implemented an IWDM approach consisting of technical assistance and direct damage management components including: WS review of airport development and landscaping plans, habitat management recommendations, providing training to ORD personnel, hazardous mammal species population management, and exclusion. WS involvement at ORD has considerably reduced or prevented strikes with hazardous mammal species at the airport.

- A private company entered in to a Cooperative Service Agreement with Illinois WS for the purpose of mitigating their wildlife damage issues. A variety of mammals move freely around the company's fenced property creating potentially unsafe working conditions for employees and contractors. Burrowing mammals such as woodchucks, raccoons and red foxes potentially risk the integrity of the earthen dikes, and other mammals such as skunks, opossums, muskrats, cottontail rabbits, and feral cats have the potential to cause a variety of problems, such as skunks spraying around the facility, damaging buildings, going through garbage cans, and defecating on machinery. In 1997 WS implemented an IWDM approach consisting of technical assistance and direct damage management. direct damage management components include cage traps, foot hold traps, conibear traps, exclusion, and shooting. WS involvement at MPC has considerably reduced and prevented hazardous conditions caused by mammals at the site.

- Wildlife Services has, since 2000, provided annual IWDM assistance to the U.S. Forest Service to minimize beaver damage to a small, economically depressed town, as well as the entire LaRue ecological area, in southern Illinois. Beaver activities at this site had caused water depths to be raised well above the historic level in the ecological area. This elevation in water level was threatening the natural balance of wetland species in the area as well as causing frequent flooding of septic systems and basements in the town. The project has involved the installation and continued maintenance of seven modified Clemson Beaver Pond Levelers as well as yearly removal of limited number of beavers in order to prevent additional damages.

3.2.3 WS Decision Making

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

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

3.3.1 Non-lethal Methods

Non-lethal methods are often used by the cooperators before and/or after requesting assistance from WS. It is not unusual for cooperators to have already tried non-lethal methods prior to requesting assistance from WS. For example, in a 2005 NASS Nationwide survey of cattle producers, Illinois cattle producers reported using frequent checking (26.1%), livestock guarding animals (40.1%), night penning (11.9%), exclusion fencing (55.2%), livestock carcass removal (17.0%), culling of sick or injured animals (26.7%), and herding (5.0%) to prevent predation losses (NASS 2006). In a similar 2004 survey, sheep producers, reported using fencing (52.6%), shed lambing (52.6%), culling of sick/injured animals (23.6%), night penning (53.9%), frequent checks (22.4%), changing bedding (7.9%), carcass removal (23.5%), guard dogs (25.8%), guard llamas (7.2%), guard donkeys (7.8%), herding (8.3%), and frightening devices (5.5%), other (7.3) to prevent predation losses (NASS 2005).

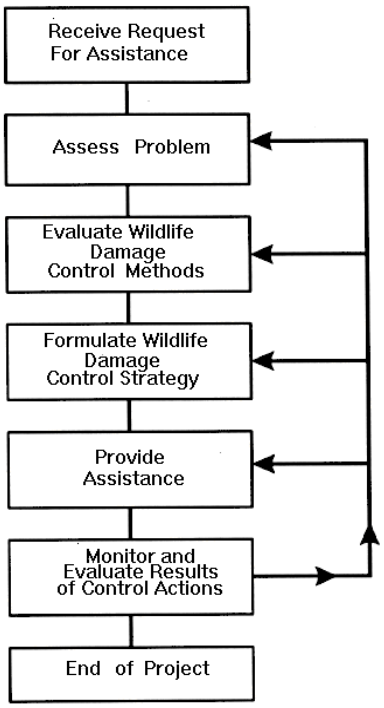

Figure 3.1 WS Decision Model as presented by Slate et al. (1992) for developing a strategy to respond to a request for assistance with human-wildlife conflicts.

Exclusion - (tree wraps, fencing, electrical barriers, paint with sand, beaver exclusion devices, etc) involves physical exclusion of wildlife from protected resources and/or prevention of girdling and gnawing.

Cultural methods and habitat modifications are typically implemented by agricultural producers or property owners. They consist primarily of non-lethal preventive methods which minimize exposure and/or reduce the amount or attractiveness of the protected resource to wildlife that would cause damage or pose a threat. A few examples of these

types of techniques are: removal of beaver dams, installation of water control devices, planting lure crops, providing alternate foods changing animal husbandry practices, switching to short variety crops, picking less palatable varieties of landscape plants, picking up and containing rubbish in mammal resistant containers, providing raptor perching poles, and keeping the vegetation around the protected resource short.

Water Control Devices – Devices, usually pipe systems, developed to allow water to pass through a beaver dam and enable landowner/manager to retain beaver and benefits associated with beaver and beaver ponds while minimizing negative impacts from impounded water.

Beaver Dam Breaching/Removal - Beaver dam breaching/removal involves the removal of debris deposited by beaver that impedes water flow. Debris would be removed from beaver dams with binary explosives, mechanical equipment, or hand tools.

Animal behavior modification refers to tactics that alter the behavior of animals to reduce damage.

Some of these tactics include:

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

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

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

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

Relocation is accomplished through use of traps, nets or tranquilizer chemicals designed to capture mammals alive. Captured target mammals can then be relocated to other field locations or to animal shelters, pursuant to State laws and regulations. WS is authorized to relocated any species of mammal excepts striped skunks (euthanasia is mandatory) and raccoons (euthanasia or release within 100 yards of capture and on same person's property or surrender to a licensed veterinarian who is also a licensed rehabilitator) under our IDNR permit by 520 ILCS part 525. When relocation is to be used, WS would work with IDNR to identify suitable relocation sites.

3.3.2 Lethal Methods

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

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

Shooting is helpful in some situations to supplement and reinforce other dispersal techniques and to kill mammals that are legally trapped. It is selective for target species and may be used in conjunction with the use of spotlights, calling, and other legal tools such as elevated positions, stands, etc.). Shooting with firearms is sometimes used to manage mammal damage problems when lethal methods are determined to be appropriate. The animals are killed as quickly and humanely as possible.

Colony traps Colony traps are multiple catch traps used mainly to capture muskrats. Colony traps are usually set at the entrance of a muskrat den and can be used for kill-trapping or live-trapping muskrats. All muskrats live-captured would be euthanized by shooting.

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

Zinc Phosphide (ZP) is a metallic pesticide used to reduce damage by rodents as well as nutria in Illinois WS program. This chemical would be registered with IDOA prior to use. Zinc phosphide is used to reduce nutria damage by applying the chemical to bait. The maximum application rate is 10 lbs of bait (0.6% active ingredient) per raft placed no closer than 50 feet apart, (EPA Reg. No. 56228-6). It has a strong, pungent, garlic-like odor that actually is attractive to rodents such as rats, but may be unattractive to some nontarget species. Zinc phosphide comes in prepared baits on wheat and oats, or it can be prepared on apples, carrots, or other baits attractive to the target animal. Bait stations and other barriers (e.g., placing bait under a shingle or board) would be used as needed to restrict/prevent access by nontarget species. ZP will not be used to take a protected species identified in 520 ILCS 5/2.2.

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

Carbon dioxide (CO_2) gas is an AVMA-approved euthanasia method (AVMA 2001) which is sometimes used to euthanize mammals that have been chemically immobilized or captured in live traps. Live animals are placed in an enclosed space into which CO_2 gas is released. The animals quickly expire after inhaling the CO_2.

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

3.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

3.4.1 Lethal Mammal Damage Management Only By WS

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

3.4.2 Compensation for Mammal Damage Losses

Compensation involves reimbursing individuals for the losses caused by wolves. Reimbursement provides producers monetary compensation for losses, it does not remove the problem nor does it assist with reducing future losses from predation. 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 technical assistance or direct damage management. Aside from lack of legal authority, analysis of this alternative in the ADC Final EIS indicated that the concept has many drawbacks (Wagner et al. 1997, USDA 1997 Revised):

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

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

- In the case of predation on livestock or pets, compensation may not be a satisfactory solution for individuals who feel responsible for the well-being of their livestock or in situations where there is an emotional attachment to the animal.

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

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

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

3.4.3 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, requirements for repeated treatments with some contraceptive products, 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. There are also considerable socio-cultural concerns pertaining to the use of reproductive control techniques. Research into reproductive control technologies, however, has been ongoing, and the approach will probably be considered in an increasing variety of wildlife management situations.

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

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

Contraception could be accomplished through:

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

Research into the use of these techniques consists of laboratory/pen experimentation to determine and develop the sterilization or contraceptive material or procedure, field trials to develop the delivery system, and field experimentation to determine the effectiveness of the technique in achieving population reduction. Prior to implementation, the product must be registered and approved by the appropriate federal and state regulatory agencies. No chemical or biological agent to accomplish reproductive control for the free-ranging mammals targeted in this EA has been approved for operational use by Federal and Illinois authorities.

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. However research into this area of wildlife damage management continues. WS will monitor new developments and, where practical and appropriate, could incorporate reproductive control techniques into its program after necessary NEPA review is completed.

3.4.4. Exhaust All Feasible Non-lethal Methods Before Using Lethal Methods

This comment apparently suggests that WS does not consider non-lethal methods when devising a management strategy. This is far from the truth and all reasonable alternatives were evaluated in the EA. WS' proposed alternative, Integrated Wildlife Damage Management, as outlined in the EA is similar to an "all feasible non-lethal before lethal" alternative because WS encourages and considers the use of non-lethal methods before lethal methods (WS Directive 2.101). Adding an "all feasible non-lethal before lethal" alternative and the associated analysis would not add additional information to the analysis for the public or decision maker. WS recognizes that the most effective approach to resolving wildlife damage is to use an integrated approach which may call for the use of several damage management methods (non-lethal and/or lethal) simultaneously or sequentially. If the requester is already using non-lethal methods or if the birds have habituated to scare tactics, repellents or loud noises, etc., WS would not consider continuing to implement those techniques because they have not proven effective. When evaluating methods for a

damage situation, WS recognizes that some methods may be more or less effective, or applicable.

3.5 STANDARD OPERATING PROCEDURES (SOPs) FOR MAMMAL DAMAGE MANAGEMENT

The current WS program, nationwide and in Illinois has developed SOPs for its activities that reduce the potential impacts of these actions on the environment. Procedures applicable to the national WS program are discussed in detail in Chapter 5 of the ADC Final EIS (USDA 1997 Revised). Some key standard operating procedures pertinent to the proposed action and alternatives of this EA include:

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

Target, Nontarget, and Threatened and Endangered Species

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

- WS consulted with the USFWS regarding potential effects of the national WS program methods on T&E species and abides by reasonable and prudent alternatives and/or reasonable and prudent measures established as a result of that consultation. For the full context of the B.O., see the ADC Final EIS, Appendix F (USDA 1997 Revised).

- WS has consulted with the USFWS and IDNR regarding potential impacts of the proposed alternatives on state and federally-listed T&E species. Reasonable and prudent measures or other provisions identified through consultation with the USFWS and IDNR will be implemented to avoid adverse effects on T&E species.

- WS will consult with the IDNR and USFWS regarding potential impacts on T&E species prior to conducting any beaver dam removal activities in areas where a wetland may have developed as the result of a beaver pond (e.g., areas where the pond has been present more than 3 yrs).

- WS will consult with the IDNR prior to using rodenticides in counties where state-listed rodents may occur.

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

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

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

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

- 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.

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

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

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

Health and Safety

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

- 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 Revised, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazards to the public is even further reduced.

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

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

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

- Live-traps would be placed so that captured animals would not be readily visible from any road or public area.

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

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

Humaneness and Animal Welfare Concerns of Methods Used

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

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

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

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

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

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions 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. The environmental consequences of each alternative are analyzed in comparison with the no action alternative (Alternative 2) to determine if the real or potential effects would be greater, lesser, or the same.

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

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

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

Effects on sites or resources protected under the National Historic Preservation Act: WS MDM actions are not undertakings that could adversely affect historic resources (See Section 1.6.4).

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

4.1.1 Effects on Target Mammal Species Populations

4.1.1.1 Alternative 1: Technical Assistance Only

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

managers use the technical assistance provided by WS. However, for the reasons presented in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative.

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

The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997 Revised). Magnitude is described in USDA (1997 Revised) 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. Wild and feral mammals lethal removed by WS to reduce mammal damage and risks to human health and safety in Illinois during FY 2003-2006.

	Method				
Species	Cage Trap[1]	Conibear	Shooting	Non-chemical Other[2]	Range of Annual Lethal Take
Red Fox	0	4	4	1	0 - 4
Virginia Opossum	51	30	16	8	16 - 34
Raccoon	98	36	17	27	27 - 63
Feral Cats	39	4	6	0	6 - 25
Striped Skunk	23	30	31	6	18 - 26
Coyote	0	0	46	4	11 - 22
Muskrat	0	2	12	2	1 -6
Beaver	0	124	41	17	34 - 58
Woodchuck	6	101	14	12	18 - 47
Cottontail Rabbit	0	25	46	28	15 - 42

[1] When live traps are used as lethal techniques, animals captured are killed by gunshot or with euthanasia chemicals described in Section 3.3. Illinois law prohibits the release/relocation of striped skunks and raccoons (raccoons must be released within 100 yards of capture site and on the same property or delivered to a licensed veterinarian who is also a licensed rehabilitator),
[2] Non-chemical other includes snares, padded foot-hold traps and handgrab/caught.)

Furbearers

In Illinois, thirteen species are classified as furbearing mammals, red fox, gray fox, beaver, muskrat, mink, coyote, bobcat, raccoon, Virginia opossum, river otter, striped skunk, weasel and badger (Illinois Department of Natural Resources website; http://www.dnr.state.il.us/orc/wildlife). Populations of all of these species except river otter and bobcat are large and widespread enough that the IDNR and Illinois legislature allow regulated trapping (Bluett et al. 2006, Gehrt et al. 2006, Van Deelen and Gosselink 2006, Woolf et al. 2003, Hoffmeister 1989). Currently, IDNR limits the time available (harvest seasons) for these species, but there are no bag or possession limits except for badger which is limited to one in the southern zone and two in the northern zone. The IDNR does not currently allow take of river otters or bobcats by licensed hunters and

trappers, (Bluett et al. 2004). The IDNR may issue permits on a case-by-case basis for the take of river otter and bobcats in situations where there is damage or a risk to human safety that cannot be resolved using non-lethal methods. WS will consult with the IDNR on a case-by-case basis in situations involving damage by bobcats and river otters occur.

At this time IDNR does not conduct a formal population census for most of these species, but does monitor long-term trends in relative abundance through the sale of fur/hides (estimated fur harvest), road-kill surveys, spotlight surveys, and archer index (Bob Bluett, IDNR, pers. comm.). Population trends are stable to increasing for all species except red fox and gray fox (Bob Bluett, IDNR, pers. comm.). Estimated fur harvest for target species in this EA are provided in Table 4-2.

Based upon current requests for assistance and anticipated increases in future requests, WS anticipates that no more than 50 red fox, 200 individuals per species of coyote, Virginia opossum, striped skunk, woodchucks or raccoons, and 1,000 individuals per species of beaver and muskrats would be lethally removed annually. WS proposed maximum take of all species except beaver is 5% or less of the total annual take permitted by IDNR including harvest by licensed hunters and trappers (Table 4-2). WS annual take of beaver has been less than 18% of total annual take permitted by IDNR. The WS programmatic EIS establishes that if WS take is less than 33% of permitted take the overall magnitude of impact of WS' actions on the species population, singly or cumulatively, is low. WS' MDM actions would only be conducted in small portions of the state. While these actions could result in a reduction in the number of furbearers in a local area, the impact is likely to only be temporary because immigration and natural reproduction will result in recolonization of the site. Given the low level of WS take relative to all take permitted by the IDNR and that WS' actions are limited to specific damage situations in a small portion of the state, the proposed action will not adversely impact the state populations of red fox, coyotes, Virginia opossum, striped skunks, woodchucks, raccoons, beaver or muskrats. WS does not anticipate taking more than five individuals per species per year of any of the other furbearers in the state (gray fox, mink, bobcat, river otter, weasel, badger). This low level of localize take should not adversely impact the state population of any furbearer specie.

Table 4-2. Annual known take of furbearers in Illinois for FY2003-2006

Species/Year	**Hides Sold[1]**	**WS Take**	**Non-WS Take[3]**	**Maximum Proposed Annual WS Take**
Coyotes (Population –Stable to Increasing[2])				200
2003	5,460	11	588	
2004	8,268	8	487	
2005	5,783	9	593	
2006	5,560	22	542	
Red Fox (Population – Stable to Decreasing[2])				50
2003	1,270	2	131	
2004	1,330	0	204	
2005	1,027	4	116	
2006	842	3	161	
Raccoon (Population – Stable to Increasing[2])				200
2003	129,101	57	19,222	
2004	153,640	30	21,303	
2005	125,284	27	21,359	

Species/Year	Hides Sold[1]	WS Take	Non-WS Take[3]	Maximum Proposed Annual WS Take
2006	91,644	63	22,341	
Striped Skunk (Population – Stable to Increasing[2])				200
2003	547	24	4,548	
2004	636	26	5,882	
2005	1,118	18	6,033	
2006	391	22	6,277	
Virginia Opossum (Population – Stable to Increasing[2])				200
2003	5,849	26	8,675	
2004	7,340	28	8,697	
2005	6,979	16	9,176	
2006	3,492	34	8,366	
Beaver (Population – Stable to Increasing[2])				1,000
2003	4,026	49	1,556	
2004	4,947	41	1,719	
2005	4,797	58	1,591	
2006	8,642	34	1,769	
Muskrat (Population – Stable to Increasing[2])				1,000
2003	34,860	1	1,849	
2004	21,555	6	2,120	
2005	24,185	4	2,128	
2006	28,242	5	2,480	

[1] Numbers may be underestimates of licensed take by trappers because not all hides are sold to fur buyers.
[2] Population status information from B. Bluett, Furbearer Biologist, IDNR, pers. comm.
[3] Animals handled for MDM by entities other than WS.

Nutria

Nutria are usually considered furbearers and are hunted/trapped for their fur. However, they are also an introduced species that can compete with native wildlife and cause damage to natural resources. Therefore, the IDNR officially classifies nutria as an exotic invasive species and does not manage them for sustained harvest and healthy populations in the same manner as they manage native furbearers.

Although WS has not received any requests to provide assistance with nutria, biologists with WS and the IDNR are reporting an increase in reports of nutria sightings and nutria activity, and are concerned that nutria numbers in Illinois may be increasing. Management of conflicts associated with nutria is being addressed in this EA so that WS may immediately assist IDNR in minimizing the impacts of this non-native species on people and ecosystems in Illinois. Most reports of nutria in Illinois are from the southern portion of the state in surface water streams, rivers, reservoirs, wetlands, and marsh habitats. Based upon current and anticipated increases in future work, Illinois WS does not anticipate killing more than 500 nutria annually. Nutria are an introduced species and often have negative impacts on the environment. Therefore, these animals are considered by many wildlife biologists to be an undesirable component of North American wild and native ecosystems. Any reduction in nutria populations could be considered a beneficial impact to the environment.

Rabbits

There are nine species of cottontail rabbits in North America, north of Mexico. Illinois WS receives complaints about the eastern cottontail, the most abundant and widespread of the rabbits in the U.S. Population densities for cottontail rabbits vary with habitat quality, but one rabbit per 0.4 hectares (one acre) is a reasonable average (Craven 1994). Rabbits live only 12-15 months, but they can raise as many as six litters per year of one to nine young (usually four to six; National Audubon Society 2000). No population estimates were available for cotton-tailed rabbits in Illinois. Cottontails are a regulated game species in Illinois and the IDNR has established seasons and limits for this species but does not require hunters to record their harvest. No figures are available regarding the total number of cottontail rabbits killed in Illinois each year.

WS estimates that no more than 1,000 cottontail rabbits may be taken per year for MDM. Almost all of these would be removed from urban, airport, commercial, or industrial habitats where hunting is not likely to occur. Cottontail rabbit damage management activities would target single rabbits or local populations of the species at sites where their presence was causing unacceptable damage to agriculture, human health or safety, natural resources, or property. Given the high productivity of cottontail rabbits and that WS actions will be confined to very small, scattered portions of the state that are usually not subjected to hunting, WS' limited lethal take of cottontail rabbits would have no adverse impacts on overall rabbit populations in the state.

Tree Squirrels

Fox squirrels and eastern gray squirrels are the primary species involved in squirrel damage complaints. For that reason only those two species will be treated in this section. Further reference to "squirrels" as a group in this section will be construed to mean these two species.

Gray and fox squirrels are found throughout most of the eastern U. S., including Illinois. They inhabit mixed hardwood forests, especially those containing nut trees such as oak/hickory mix. Gray and fox squirrels are considered small game by the IDNR which has established seasons and bag limits for squirrel hunting. Illinois hunters removed an estimated 457,664, 772,306, and 457,816 gray squirrels from 2003 through 2005. Illinois hunters also removed an estimated 472,608, 707,600, 396,764 fox squirrels from 2003 through 2005 (2006 numbers were not available at time EA was prepared). Gray squirrels produce young during early spring, while fox squirrels have litters around February to early March, but may actually produce at any time until early September (National Audubon Society 2000). Older adults of both species may produce two litters per year (Burt and Grossenheider 1964, Jackson, 1994*b*). The gestation period is 42-45 days, and about three young comprise a litter. Young begin to explore outside the nest at about 10-12 weeks of age (Jackson 1994*b*). Squirrel populations periodically rise and fall, and during periods of high populations they may go on mass emigrations, during which time many animals die. These species are vulnerable to numerous parasites and diseases such as ticks, mange mites, fleas, and internal parasites. Squirrels are also prey for hawks, owls, snakes, and several mammalian predators. Predation seems to have little effect on squirrel populations. Typically about half the squirrels in a population die each year and wild squirrels over four years old are rare, while captive individuals may live 10 years or more (Jackson 1994*b*).

Based upon an anticipated increase for requests for WS assistance, WS anticipates killing no more than 50 squirrels per species per year for MDM in Illinois. These squirrels would almost always be removed from urban and suburban populations which are not hunted.

Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a local project site. Given the widespread and abundant nature of this species, high productivity, low number of squirrels that could be taken relative to the number likely taken by licensed hunters and the limited amount of area in the state where WS would conduct squirrel damage management activities, WS' lethal take of squirrels would not adversely impact gray or fox squirrel populations in Illinois.

Woodchucks

The IDNR is responsible for the management of the states woodchuck population. At this time the IDNR does not conduct population census for woodchucks. There is a set season for hunting woodchucks but no limit on the number of animals that may be taken. During FYs 2003-2006, WS lethally took 127 woodchucks. Woodchucks have one litter a year that ranges from two to six young. Woodchucks breed at age one and live four to five years. If a pair of woodchucks and their offspring all survived to breed as soon as possible, with an average of four young per litter with a 1:1 sex ratio; they could produce over 645 woodchucks through their life time. WS does not anticipate taking more than 200 woodchucks per year. Given the productivity of the species and the limited and localized nature of WS' actions, WS lethal removal of woodchucks for MDM will not adversely impact woodchuck populations.

Other Rodents and Insectivores

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

Native rodents which may be the target of WS activities at airports and other locations include the meadow vole, deer mouse, white-footed mouse, and the thirteen-lined ground squirrel, and Eastern chipmunk. Insectivores which may be the target of WS activities at airports and other locations include Eastern mole and short-tailed shrews. The following species are very prolific: meadow vole (up to 17 liters annually, typically 4-5 young per liter), white-footed mouse (multiple liters, five young each), deer mice (3-4 liters, 4-6 young each), and short-tailed shrews (two to three liters with 5 to seven young each) (Godin 1977). Eastern moles and Eastern chipmunks and thirteen-lined ground squirrels have one or two liters per year: Eastern mole (two to five young each), thirteen-lined ground squirrels (usually one litter per year, seven to 10 young), Eastern chipmunk (usually two litters per year with two to five young per litter)(Godin 1977, Burt and Grossenheider 1976, National Audubon Society 2000). Large population fluctuations are characteristic of many small rodent populations.

Method of lethal take for these species by WS would include trapping and use of chemical products such as zinc phosphide. Determination of numbers of rodents killed by MDM actions is difficult when lethal chemical methods such as zinc phosphide treatments are employed. This is because most animals killed by these methods die underground. Removal of these species by WS would be done at specific isolated sites (e.g., airports, orchards, etc.). Impacts of these activities to rodent and insectivore populations would be minimal due to the species' relatively high reproductive rates and because rodent/insectivore damage management recommended and conducted by WS would be

at a limited number of specific local sites with the use of legal methods. Based upon the above information, WS limited lethal take of small rodents may cause temporary reductions at the specific local sites where WS works, but would have no adverse impacts on overall populations of the species in Illinois.

Non-native Species: Norway Rats, black (roof) rats, and house mice are not native to North America and were accidentally released into this country. In the wild, the impact of these species is seen by many as entirely detrimental (Burt and Grossenheider1980). These species eat anything-digestible and may prey on eggs or offspring of native species and compete with native species for resources. Executive Order 13112 – Invasive Species directs Federal agencies to use their programs and authorities to prevent the spread of or to control populations of invasive species that cause economic or environmental harm, or harm to human health. Although removal of these species up to and including extirpation could be seen as desirable, because of the productivity and distribution of these species and the limited nature of WS work, WS is unlikely to ever do more than limit populations at the specific local sites where WS works.

Based on the above information and WS limited lethal take of rodents and insectivores in Illinois, WS should have minimal effects on local or statewide rodent populations.

Feral Swine

Feral swine are a non-native species, and are primarily found in the southern portions of the state. IDNR currently considers feral swine as an invasive species and does not track harvest or population densities of feral swine. However, the IDNR did fund a study that concentrated on the distribution, habitat use, and morphotypes of feral hogs in Illinois (McCann, Feldhammer 2002). McCann and Feldhammer (2002) found that feral swine are documented in 10 counties throughout Illinois. Given current land use trends and the adaptability of feral swine, biologists with WS and the IDNR are reporting an increase in reports of feral swine sightings and activity, and are concerned that feral swine numbers in Illinois may be increasing (McCann and Feldhammer 2002). Although WS has not received any requests to provide assistance with feral swine damage management, WS has received requests for samples from feral swine for use in a national feral swine disease surveillance effort. Management of conflicts associated with feral swine are being addressed in this EA so that WS may immediately assist land managers and/or State of Federal agencies in minimizing the impacts of this non-native species on people and ecosystems in the state. WS could be requested to assist with the removal of feral swine either for the reduction of damage cause by feral swine to agricultural and natural resources, for reduction of risks to human health and safety, or for the purposed of disease surveillance and management. Based upon current and anticipated increases in future work, it is anticipated that not more than 200 feral swine would be killed annually by WS in Illinois. Feral swine often have negative impacts on the environment. Therefore, these animals are considered by many wildlife biologists to be an undesirable component of North American wild and native ecosystems. Any reduction in feral swine populations could be considered a beneficial impact to the environment. Executive Order 13112 – Invasive Species directs Federal agencies to use their programs and authorities to prevent the spread of or to control populations of invasive species that cause economic or environmental harm, or harm to human health. Although a reduction in the number of feral swine may be desirable, the proposed level of feral swine control is unlikely to result in more than a temporary reduction of feral swine numbers at specific sites.

Feral Cats

Feral cats are house cats living in the wild. Cats are found in commensal relationships wherever people are found. In some urban and suburban areas, cat populations equal human populations. Feral cats produce two to 10 kittens during any month of the year. An adult female may produce three litters per year where food and habitat are sufficient. Cats are opportunistic predators and scavengers that feed on rodents, rabbits, shrews, moles, birds, insects, reptiles, amphibians, fish, carrion, garbage, vegetation, and leftover pet food (Fitzwater 1994). Where it has been documented, the impact of feral cats on wildlife populations in suburban and rural areas, directly by predation, and indirectly by competition for food, has been enormous (Coleman and Temple 1989). In the United Kingdom, one study determined that house cats may take an annual toll of some 70 million animals and birds (Churcher and Lawton 1987). In addition, feral cats serve as a reservoir for human and wildlife diseases, including cat scratch fever, distemper, histoplasmosis, leptospiro sis, mumps, plague, rabies, ringworm, salmonellosis, toxoplasmosis, tularemia, and various parasites (Fitzwater 1994).

WS has provided technical and operational assistance with feral cat problems in Illinois. WS has assisted with the removal of feral cats from a large industrial site where an overabundance of feral cats was causing concerns about risks to human health. Feral cats have also created problems at airfields in Illinois.

When conducting feral cat management projects, WS will give preference to live capture methods. Live-captured cats will be given to local animal shelters and/or animal control offices when practical. Lethal control will not be used on cats bearing obvious identification (e.g., collars). Although preference will be given to live-capture methods, based on current and anticipated requests for assistance with feral cat management, WS estimates that up to 100 feral cats may be lethally removed by WS per year. WS will only use AVMA approved euthanasia measures for lethal removal of cats. Most nonlethal or lethal removal of cats would be conducted for projects protecting human health and safety, valuable wildlife, or captive birds and other animals. The proposed lethal take of cats is insignificant to the total population of this species in the state. In metropolitan areas of Illinois, animal control officers capture and remove hundreds of feral cats each year. Nationwide, the Humane Society of the United States estimates that between three and four million cats are euthanized in shelters each year. Any MDM involving lethal control actions by WS would be restricted to isolated individual sites. Some local populations may be temporarily reduced as a result of MDM projects aimed at reducing damage at a local site. In those cases this would be considered a beneficial impact on the environment because these species are not considered part of the native ecosystem. However, given the reproductive capacity of feral cats and the limited and localized nature of WS' proposed actions, WS' limited lethal removal of feral cats is unlikely to reduce overall populations of this species in Illinois.

Other Target Species

Target species have been killed in small numbers by WS during the past year and have included no more than 20 individuals of a given species. Other species that could be killed during MDM may include: mountain lion, red squirrel, domestic/feral dog, nine-banded armadillo. None of these species are expected to be taken by WS MDM at any level that would adversely affect populations (<20 per year). The list of species that could be targeted under this EA does not include federally-listed T&E species. WS would not conduct MDM involving state-listed T&E or sensitive species without situation specific consultation with IDNR. Given IDNR oversight, and WS limited lethal take, none of the

above mentioned mammal species are expected to be taken by WS MDM at any level that would adversely affect overall mammal populations on a local or statewide basis.

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

Under this alternative, WS would not take any target mammal species because no lethal methods would be used. Although WS lethal take of mammals would not occur, as with Alternative 1, it is likely that without WS conducting some level of lethal MDM activities for these species, private MDM efforts would increase. Cumulative impacts on target species populations would be variable depending upon actions taken by affected landowners/resource managers and the level of training and experience of the individuals conducting the MDM. Some individuals experiencing damage may take illegal or unsafe action against the problem species either unintentionally due to lack of training, or deliberately out of frustration of continued damage. In these instances, more target species may be taken than with a professional MDM program (Alternatives 2). Ready access to WS assistance with non-lethal MDM may decrease private efforts to use lethal techniques. Therefore, take of target species may be less than anticipated with Alternatives 1 and 4. Overall impacts on target species populations would be similar to or slightly higher than Alternative 2 depending upon the extent to which resource managers use the assistance provide by WS. However, for the reasons presented in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative.

4.1.1.4 Alternative 4: No Federal WS Mammal Damage Management

Under this alternative, WS would have no impact on target mammal populations in the State. Private efforts to reduce or prevent depredations would likely increase. As with Alternatives 1 and 3, cumulative impacts on target species populations would be variable, depending upon actions taken by affected landowners/resource managers, and the level of training and experience of the individuals conducting the MDM. Impacts on target species are likely to be similar to or slightly higher than Alternative 2. Because resource owners/managers would not have access to WS direct MDM assistance or, at least, technical assistance, impacts may be greater than Alternatives 1 and 3. For the same reasons shown in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative.

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

4.1.2.1 Alternative 1: Technical Assistance Only

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

risks to non-target species populations and increased risks of secondary toxicity (e.g., feeding on animals that had eaten toxicants) to scavengers and predators.

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

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

Effects on Non-target (non-T&E) Species: With the exception of impacts on wetlands discussed in Section 4.1.3, the WS activities proposed under this alternative would not the destruction or alteration of wildlife habitat and will not impact critical habitat for any species. In the event that WS recommends habitat modification (e.g., modifying a wetland, removing trees attracting birds to an airport) as a damage management practice for the landowner/manager, WS will advise the landowner/manager that they are responsible for checking with state and federal authorities regarding regulations and endangered species protections that may be applicable to the proposed project.

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

WS personnel are experienced and trained in wildlife identification, and to select the most appropriate methods for taking targeted animals and excluding nontarget species. 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 would be subsequently released on site unless it is determined by the WS Specialist that the animal will not survive.

WS' SOPs would require compliance with pesticide label directions and use restrictions, and establish training requirements for all employees applying pesticides as built-in measures to assure that use of registered chemical products does not result in significant adverse effects on non-target species populations. Risk Assessments conducted on the WS program 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 Revised). Chemical pesticides that have come into use since the Risk Assessment was completed have undergone considerable environmental review through EPA and State registration processes, which means they have been found to present no unreasonable risk to the environment or human health and safety when used according to label

directions. Standard operating procedures designed and implemented to avoid adverse effects on non-target species are described in Chapter 3.

Non-target species such as, otters, raccoons, opossums and turtles may occasionally be captured in traps and snares. Muskrats are normally considered to be non-target species when conducting beaver damage management projects in Illinois unless the resource owner requests removal of muskrats. Healthy, uninjured non-target animals that are captured would be released at the capture site. A small number of non-target animals have been captured and killed by Illinois WS annually (Table 4-4). This level of take is unlikely to adversely impact populations of these species. As stated above in the section on target species take, raccoons, Virginia opossum can be taken by licensed hunters (Table 4-3) and WS' take is negligible relative to take by licensed hunters. Similarly, common snapping turtles may also be taken by individuals with a fishing license. In most instances WS has been able to release turtles caught in traps. WS annual lethal take of common snapping turtles is less than the 2007 individual daily bag limit (8). Under ILCS 520 5/2.30 it is unlawful to take river otter in the State at any time. If a river otter is accidentally taken it must be given to the nearest IDNR Conservation Police Officer or IDNR Biologist, (IDNR 2006). WS complies with this regulation if a river otter is taken during any mammal damage management project. WS does not expect to incidentally take more than 25 river otters per year. The incidental take of river otters by WS is not likely to affect the statewide river otter population, (Bob Bluett IDNR, personal communication 9/07/2007). The bobcat population in Illinois south of Interstate 64 was estimated at 2,224 in 2002 (Woolf 2002). More recent bobcat population trends suggest that the current bobcat population is higher than when the 2002 study took place (Bluett 2007). WS has not taken a bobcat incidentally or for damage control purposes. WS does not expect to take more than one incidental bobcat per year during mammal damage control activities in the state of Illinois. WS does not expect the rate of WS non-target species take to substantially increase above current or past program levels under the proposed action. WS has concluded that the level of non-target animals killed by the Illinois WS program would have no adverse effects on any native wildlife species population in Illinois.

Table 4-4: WS non-target capture and take for FY2003-2006.

	2003		2004		2005		2006	
	Killed	Freed	Killed	Freed	Killed	Freed	Killed	Freed
Otters	1	0	2	0	3	1	4	0
Raccoons	1	0	0	0	1	7	0	0
Opossums	1	0	0	0	0	14	0	3
Snapping Turtles	2	0	0	2	0	13	1	4

Effects on T&E species: With the exception of beaver dam removal projects conducted in areas where wetlands have developed in association with a beaver pond, WS' MDM activities will not have a substantive impact on wildlife habitats. The primary risk to state and federally-listed species from these methods is the risks of injury and death of animals accidentally caught in capture devices intended for other species.

Bats: Occasionally (once or twice a year), WS receives a request to assist with a threat to human heath and safety related to bats (e.g., a bat has bitten or scratched some one and WS is requested to capture the bat so it can be tested for rabies, or a request to remove a bat from a public building). WS must receive an official request from the IDOPH before any bat work is initiated in the state of Illinois, per an interagency MOU signed in 2005. Over the period of (2003-2006) WS captured and released seven bats from sites where it was causing concerns. There are two state and federally listed bat species in Illinois (gray bat, Indiana bat) and two additional state-listed bat species (Rafinesque's big-eared bat, Southeastern myotis). The areas where WS provides this type of assistance are generally not the type of habitat used by most of the state and Federally-listed bats in Illinois, however Rafinesque's big-eared bat is known to use buildings. WS personnel who respond to requests for assistance with bats will be trained in the identification of state and federally-listed bats in Illinois. In the event that the problem appears to be related to a federally listed bat, WS will contact the USFWS Illinois Field Office or IDNR as appropriate. Given the extremely low likelihood that a state or Federally-listed bat will be at the sites where WS provides assistance and the low frequency of WS' direct assistance with bat management and that WS' actions rarely result in the death of the bat, the proposed action may affect but is unlikely to adversely affect the gray bat, Indiana bat or Southeastern myotis or Rafinesque's big-eared bat.

Rodents: Eastern woodrats, golden mice, rice rats, and Franklin's ground squirrels and are listed at threatened or endangered species by the state of Illinois. The proposed methods which may pose risks to state listed rodents include use of the rodenticide, zinc phosphide, snap traps and gas cartridges. These methods would primarily be used at airports to reduce wildlife hazards to aircraft and human safety, but could also be used in and around barns and industrial facilities, at landfills and in orchards.[5] Golden mice are adapted to dense woodland areas including areas with tangles of trees, vines and brush (Smithsonian 2007, Davis and Schmidly 1997). These are not the types of areas where WS would be using rodenticides, gas cartridges or snap traps, so risks to golden mice from this alternative are negligible. Similarly, airports, landfills, and the areas in and around barns and industrial sites are unlikely to provide suitable habitat for the other state-listed rodents and risks to these species from the proposed methods are likely very low. To reduce risks to state-listed rodents from MDM actions conducted in orchards, WS will consult with the IDNR prior to using these methods in counties where these rodents are known to occur (Eastern woodrat – Jackson and Union Counties; rice rats – Alexander, Franklin, Hamilton, Jackson, Johnson, Massac, Perry, Pope, Pulaski, Saline, Union, White and Williamson Counties; Franklin's Ground Squirrel – Champaign, Cook, DuPage, Mclean, Sangamon, Vermilion, and Will Counties). WS will implement any recommendations for the protection of state-listed rodents which are provided by the IDNR. Given that WS' rodent damage management activities are restricted to a limited number of sites and a small area of the state and the protective measures listed above, this alternative will not have an adverse impact on state-listed rodents.

Gray Wolves: Gray wolves were removed from the federal list of T&E species in 2007,

5 Rodents rarely cause direct hazards to aircraft and human safety at airports, but do attract predators which may pose risks/cause damage if struck by aircraft.

but wolves are still listed as a T&E species by the state of Illinois which reports wolves as occurring in Lake and Pike Counties. Methods that could pose risks to gray wolves include foot-hold traps and snares. Use of these methods at airports and other enclosed areas which cannot be accessed by wolves poses no threat to wolves. In Pike and Lake Counties, all traps and snares used for beaver damage management will be water sets. Foothold traps for aquatic rodents will not be exposed and will be in deep enough water to minimize nontarget catches. Snares and conibear traps will be partially or totally submerged in water. Carcasses of animals captured in traps will be buried at least 30 feet from active traps in accordance with the Illinois Dead Animal Disposal Act (225 ILCS 610). Multiple traps will not be used at the same location to avoid accidental capture of predators/scavengers attracted to animals in traps.

WS personnel responding to reports of predation on livestock and/or pets in Northern Illinois will be trained in methods used to differentiate wolf predation from predation by other canids. In the event that a depredation incident appears to be related to wolves, WS will contact the IDNR regarding preferred management strategies to address the problem.

Risks of secondary poisoning from rodents which have eaten ZP bait is negligible because wolves are unlikely to occur in the locations where WS would use rodenticides, ZP is generally more toxic to rodents than carnivores and scavengers; 90% of the zinc phosphide ingested by rodents is detoxified in the digestive tract (Matschke unpubl. as cited in Hegdal et al. 1980); 99% of the zinc phosphide residues occur in the digestive tracts, with none occurring in the muscle, 3) the amount of zinc phosphide required to kill target rodents is not enough to kill most other predatory animals (Johnson and Fagerstone 1994). Additionally, ZP has a strong emetic action, and most predators and scavengers in lab tests have regurgitated contaminated tissue. Additional information on risks to nontarget species from ZP is provided in Appendix B.

Based on the above analysis, WS concludes that the proposed action will not adversely impact the state population of gray wolves.

Birds: The primary risks to T&E birds from the proposed action are the risk of primary toxicity to birds from the consumption of rodenticide-treated grain, and the risks of secondary poisoning of birds which may consume rodents that have ingested rodenticide treated grain. The T&E species which might consume treated grain include Henslow's Sparrows, Greater Prairie Chickens and Yellow-headed Blackbirds. Most ZP applications would involve the use of bait stations which prevent access by nontarget species. Broadcast applications of ZP are likely to have minimal impacts on these species because WS would not use broadcast applications of ZP in areas/at times where these species are known to occur; ZP treated baits have a black coloration that is generally rejected by most granivorous birds, and because of the aversive taste and emetic action of ZP for most species (see Appendix B for details).

Risks to predatory and scavenging birds from ZP are also likely to be low for many of the same or similar reasons as noted for gray wolves although avian predators and scavengers may be more likely to access sites where WS uses ZP baits than wolves. Additional information on risks to nontarget species from ZP are provided in Appendix B.

Based on the above analysis, WS concludes that the proposed action will not adversely impact the state populations of T&E birds.

Reptiles: WS activities with the potential impact T&E reptiles include removal of beaver dams in areas where wetland communities have developed and accidental capture in

body gripping traps (e.g. conibear traps) set to capture aquatic rodents. As noted elsewhere in this section, instances where WS would remove dams from areas where wetland characteristics have been established are relatively rare. WS will consult with the IDNR and USFWS prior to conducting beaver dam removal at sites with established wetlands and will implement any recommendations from these agencies for the protection of state and federally-listed species.

As noted in Table 4-4, WS has captured nontarget turtles during MDM activities. To date, WS has only captured snapping turtles and there has been no incidental take of state-listed turtle species (there aren't any federally-listed turtles in Illinois). WS is able to release most turtles it captures. Of the 22 nontarget turtles WS has captured during the period of 2003-2006, WS was able to release all but three turtles. Given the low rate of occurrence for state listed species and that most turtles can be released from the capture device, this alternative will not have an adverse impact on state T&E turtle populations.

Fish, Amphibians, Aquatic/Wetland Invertebrates and Plants: The only risk to species in this group from the proposed action is potential disturbance and/or loss of habitat associated with beaver dam removal. Almost all of WS' beaver dam removal work in Illinois involves removing recently built dams (usually one year old or less) to restore water movement in irrigation canals, under roadways, and in streams where dams result in undesirable property flooding. Recently flooded sites do not possess wetland characteristics, and wildlife habitat values are not the same as in established wetlands (Appendix D). Dam removal in these situations will be restoring the environmental status quo for the sites and will likely be beneficial to resident plants and animals. In the relatively rare instances when WS removes dams from an area where wetland community has developed in response to the presence of a beaver dam/pond (usually for trout stream restoration projects), WS will consult with the USFWS and IDNR, as appropriate, to determine if T&E species are present at the site and the measures needed to protect T&E species. Many fish and aquatic invertebrates prefer clear gravel/sand bottoms and free-flowing water conditions. Beaver dam removals are likely to be beneficial to these species. WS will implement any recommendations for protective measures from these agencies. Based on this analysis and the proposed protective measures, this alternative will not adversely impact state or federally-listed fish, amphibians, aquatic/wetland organisms or plants.

WS MDM activities in Illinois would not adversely affect any Federal or State listed T&E species, including those listed in Appendix C. This determination is based, in part, on the conclusions made by the FWS during their 1992 programmatic consultation on the National WS program and subsequent B.O. (USDA 1997 Revised). Illinois WS will adhere to all applicable Reasonable and Prudent Measures and Terms and Conditions from the 1992 B.O.. WS will also consult with the State and Federal Endangered Species programs prior to the initiation of damage management activities in new areas that are known to have threatened or endangered species in the area (Appendix D).

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

WS efforts to protect rare, threatened or endangered species would not be as effective as the preferred alternative because WS would be unable to access lethal techniques if non-lethal techniques are ineffective. Lethal efforts to protect these species would have to be conducted by other natural resource management entities. Under this alternative, WS take of non-target animals would be less than that of the proposed action because no lethal control actions would be taken by WS. Non-target species are usually not affected by WS's non-lethal management methods, except for the occasional scaring from

harassment devices. In these cases, affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. Capture and release (e.g., for disease monitoring) and capture and relocate would be allowed under this alternative. There is the extremely remote chance that the capture devices could result in the death of a nontarget animal. However, given that these devices would be applied with provisions to keep the target animal alive, the risks to nontarget species are very low and would not result in adverse impacts on nontarget species populations.

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

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

4.1.2.4 Alternative 4: No Federal WS Mammal Damage Management

Alternative 4 would not allow any WS MDM in the State; therefore WS would not take any non-target species under this alternative. The IDNR or other natural resource management entities may have to allocate staff time and resources for projects to protect threatened, endangered and rare birds because WS could no longer assist with these programs. Private efforts to reduce or prevent depredations could increase which could result in less experienced persons implementing control methods and could lead to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could impact local non-target species populations, including some T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

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

and effective use of MDM techniques or have the opportunity to advise individuals regarding the presence of T&E species.

4.1.3 Effects on Human Health and Safety

4.1.3.1 Impacts on Human Safety from Chemical MDM Methods

Alternative 1: Technical Assistance Only

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

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

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

Toxicants. The toxicants that could be used by WS under this alternative are described in detail in Appendix B and include ZP and gas cartridges. Gas cartridges and ZP are used in WS MDM programs in Illinois by WS personnel who are certified pesticide applicators, in accordance with label restrictions in a manner defined by application guidelines on the label. Based on a thorough Risk Assessment, APHIS concluded that, when WS Program chemical methods, including those referenced above, 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 Revised). Chemical pesticides that have come into use since the Risk Assessment was completed have undergone considerable environmental review through EPA and State registration processes, which means they have been found to present no unreasonable risk to the environment or human health and safety when used according to label directions. Therefore, MDM programs in Illinois where such chemicals are used are not expected to adversely affect public safety. There have been no observed symptoms of chronic poisoning due to ZP exposure in humans.

Other MDM Chemicals. Non-lethal MDM chemicals that might be used or recommended by WS would include repellents such Hinder, Deer Away and others that are registered with the IDA. Such chemicals must undergo rigorous testing and research to prove safety, and low environmental risks before they would be registered by the EPA or FDA. Any operational use of chemical repellents would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations which are established to avoid unreasonable adverse effects on the environment. Following labeling

requirements and use restrictions are a built-in SOP that would assure that use of registered chemical products would avoid significant adverse effects on human health.

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

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

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

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

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

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

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

Excessive cost or ineffectiveness of non-lethal techniques could result in some entities rejecting WS's assistance and resorting to other means of MDM. Risks associated with non-WS use of toxicants will vary depending upon the training and experience of the individuals conducting the MDM. Such means could include illegal pesticide uses.

Hazards to humans could be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used. Some chemicals that could be used illegally could present greater risks of adverse effects on humans than those used under the proposed alternative. Overall risks to human health and safety from this alternative are likely to be equal to or greater than Alternative 2.

Alternative 4: No Federal WS Mammal Damage Management

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

4.1.3.2 Impacts on Human Safety from Non-chemical MDM Methods

Alternative 1: Technical Assistance Only

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

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

Non-chemical MDM methods that might raise safety concerns include shooting with firearms, use of traps and snares, and harassment with pyrotechnics. All WS personnel are trained in the safe and effective use of MDM techniques. The Illinois WS program has had no accidents involving the use of any of its non-chemical MDM techniques including firearms, pyrotechnics, traps, snares, or explosives in which any person was harmed. A formal risk assessment of WS's operational management methods found that when used in accordance with all applicable, laws, regulations, policy and directives, risks to human safety from the proposed methods were low (USDA 1997 Revised, Appendix P). Therefore, no adverse affects on human safety from WS's use of these methods is expected. Standard operating procedures designed and implemented to avoid adverse effects on public and pet health and safety are described in Chapter 3. Therefore, no adverse effects on human safety from WS's use of these methods are expected.

WS may occasionally use binary explosives to breach or remove beaver dams. WS personnel responsible for use of explosives are required to complete in-depth training and must demonstrate competence and safety with use of explosives. Employees adhere to WS policies as well as regulations from the Bureau of Alcohol, Tobacco, Firearms, and Explosives, IDNR Division of Mines and Minerals, the Occupational Safety and Health Administration, and the U.S. Department of Transportation with regards to explosives use, storage, safety, and transportation. WS uses binary explosives which require the mixing of two components before the explosive can be detonated. Use of binary explosives reduces the hazard of accidental detonation during storage and transportation. Storage and transportation of mixed binary explosives is not allowed. When explosives are being used by WS, warning signs are posted to restrict public entry. When beaver dams are near roads or highways, police or other road officials are used to help stop traffic and restrict public entry. Illinois Department of Transportation crews would assist with traffic concerns to ensure public safety when WS removes beaver dams, near roadways, with explosives. Therefore, no adverse effects to public safety are expected from the use of explosives by WS under any alternative.

Shooting and trapping are methods used by WS which pose minimal or no threat to pets and/or public health and safety. All firearm safety precautions are followed by WS when conducting MDM and WS complies with all laws and regulations governing the lawful use of firearms. Shooting is virtually 100% selective for target species and may be used in conjunction with spotlights. WS may use firearms to humanely euthanize animals caught in live traps. WS traps are strategically placed to minimize exposure to the public and pets. Appropriate signs are posted on all properties where traps are set to alert the public of trap presence. Body-grip (e.g., Conibear-type) traps used for beaver are restricted to water sets which further reduce threats to public and pet health and safety.

Firearms and firearm misuse are a cause of concern because of issues relating to public safety and accidental injury or death. To ensure safe use of firearms, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within three months of their appointment and a refresher course every two years afterwards (WS Directive 2.615). WS employees who use firearms as a condition of employment must comply with all applicable Federal State and local regulations including the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

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

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

Some resource owners/managers may not feel that non-lethal techniques are adequate to resolve their wildlife conflict and may use lethal MDM methods without WS assistance.

Risks to human safety from these actions will depend on the method selected and the experience and training of the individual using the technique.

Alternative 4: No Federal WS Mammal Damage Management

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

4.1.3.3 Impacts on Human Health and Safety from Mammals

Alternative 1: Technical Assistance Only

With WS technical assistance but no direct damage management, entities requesting MDM assistance for human health concerns would either take no action, which means the risk of human health problems would likely continue or increase in each situation as mammal numbers are maintained or increased, or implement WS recommendations for non-lethal and lethal control methods. Potential impacts would be variable depending upon the training and experience of the individuals conducting the MDM. Individuals or entities that implement the recommendations may lack the experience necessary to efficiently and effectively conduct an effective MDM program and risks could continue or increase. Therefore, the odds of successfully reducing wildlife risks to human health and safety may be similar to or lower than Alternative 2. The likelihood that individual efforts would reduce mammal conflicts would be higher under this alternative than Alternative 4 if people request and use WS technical assistance recommendations.

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

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

In most cases, it is difficult to conclusively prove that mammals were responsible for transmission of individual human cases or outbreaks of mammal-borne diseases. However, the limited records of disease occurrence in Illinois does not necessarily mean absence of risk but may only mean lack of reliable research in this area. There are limited studies available on the occurrence and transmission of zoonotic diseases in wild mammals. Study of this issue is complicated by the fact that some disease-causing agents associated with wildlife, may also be contracted from other sources. WS works with cooperators on a case-by-case basis to assess the nature and magnitude the wildlife

conflict including providing information on the limitations about what we know regarding health risks associated with wild mammals. In most cases, the risk of contracting a disease from wild mammals is relatively low. It is the choice of the individual cooperator to tolerate the potential health risks or to seek to reduce those risks. Certain requesters of MDM service may consider even a low level of risk to be unacceptable. Many property owners/managers wish to eliminate risks *before* someone actually gets sick because of conditions at their site. In such cases, MDM, either by lethal or non-lethal means, would, if successful, reduce the risk of mammal-borne disease transmission at the site for which MDM is requested.

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

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

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with mammal damage problems. Non-lethal methods may not be effective at or suitable for all situations. The efficacy of some techniques may be limited by habituation (the ability of an animal to become accustomed to and not respond to an otherwise frightening sight or sound). Other techniques like fencing may not be suitable because of zoning, visual impacts on the site, or because they may adversely impact other non-injurious species. In some situations the implementation of non-lethal controls such as netting barriers and harassment could actually increase the risk of human health problems at other sites by causing the mammals to move to other sites not previously affected. However, when WS is providing direct damage management assistance in relocating mammals, coordination with local authorities would be conducted to minimize the risk of problem animals relocating to other undesirable areas.

Alternative 4: No Federal WS Mammal Damage Management

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

4.1.4 Impacts to Stakeholders, including Aesthetics

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

Alternative 1: Technical Assistance Only

Under this alternative, WS would not conduct any direct damage management MDM, but would still provide technical assistance or self-help advice to persons requesting assistance with mammal damage. Those who oppose direct damage management 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 this individual animal would not be killed by WS. However, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the Proposed Action Alternative.

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

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

Some members of the public have expressed opposition to the killing of any mammals during MDM activities. Under this Proposed Action Alternative, some lethal control of mammals would occur and these persons would be opposed. However, many persons who voice opposition have no direct connection or opportunity to view or enjoy the particular mammals that would be killed by WS's lethal control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would, therefore, continue to remain available for viewing by persons with that interest.

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

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

Alternative 4: No Federal WS Mammal Damage Management

Under this alternative, WS would not conduct any lethal removal of mammals nor would the program conduct any harassment of mammals. Those in opposition of any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by WS's activities under this alternative. However, other private entities would

likely conduct MDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the Proposed Action Alternative.

4.1.4.2 Effects on Aesthetic Values of Property Damaged by Mammals

Alternative 1: Technical Assistance Only

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

Relocation of mammals through harassment, barriers, or habitat alteration can sometimes result in the mammals causing the same problems at the new location. If WS has only provided technical assistance to local residents or municipal authorities, coordination with local authorities to monitor the mammal's movements to assure the mammals do not reestablish in other undesirable locations might not be conducted, thereby increasing the potential of adverse effects to nearby property owners.

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

Damage to property would be expected to decrease under this alternative since all available damage management methods and strategies would be available for WS use and consideration.

Relocation or dispersal of mammals by harassment can sometimes result in the mammals causing the same or similar problems at the new location. If WS is providing direct damage management assistance in relocating such mammals, coordination with local authorities would be conducted to assure they do not re-establish in other undesirable locations.

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

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

Assuming property owners would choose to allow and pay for the implementation of non-lethal methods, this alternative could result in mammals relocating to other sites where they could cause or aggravate similar problems for other property owners. Thus, this alternative could result in more property owners experiencing adverse effects on the aesthetic values of their properties than the Proposed Action Alternative.

Relocation or dispersal of mammals by harassment can sometimes result in the mammals causing the same or similar problems at the new location. If WS is providing direct damage management assistance in relocating such mammals, coordination with local authorities would be conducted to assure they do not re-establish in other undesirable locations.

Alternative 4: No Federal WS Mammal Damage Management

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

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

4.1.5 Humaneness and Animal Welfare Concerns of Methods Used

4.1.5.1 Alternative 1: Technical Assistance Only

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

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

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

death because the animals die instantly or within seconds to a few minutes. These methods however, are also considered inhumane by some individuals.

WS uses EPA registered and approved pesticides, such as ZP and gas cartridges to manage damage caused by some mammals in Illinois. Some individuals consider the use of such chemicals to be inhumane. WS personnel are experienced, professional and humane in their use of management methods. Under this alternative, mammals would be killed by experienced WS personnel using the best and most appropriate method(s) available. Some people may perceive these methods as inhumane because they oppose all lethal methods of damage management.

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

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

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

4.1.5.4 Alternative 4: No Federal WS Mammal Damage Management

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

4.1.6 Effects on Wetlands

4.1.6.1 Alternative 1: Technical Assistance Only

Under this alternative, WS would not conduct MDM activities and would have no impact on wetlands. Under this alternative, beaver dam breaching and removal needs would be met by private, state, or local government entities. Some beaver impounded areas that WS would advise against draining might be drained under private or local government management, which could have adverse effects on wetland habitats in limited circumstances.

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

Under this alternative, beaver dams could be breached or removed by hand or with explosives for the purpose of returning streams, channels, dikes, culverts, and irrigation canals to their original drainage pattern. Beaver dams are removed according to Section 404 of the Clean Water Act (CWA) (Appendix D). WS breaches/removes most beaver dams because of flooding in areas such as yards, parks, roads, railroads, timberlands,

croplands, pastures, and other types of property or resources that were not previously flooded. Recently flooded sites do not possess wetland characteristics, and wildlife habitat values are not the same as established wetlands (Appendix D). Dam removal in these situations will be restoring the status quo for these sites and will likely be beneficial to most resident plants and animals. In the relatively rare instances when WS removes dams from an areas where wetland communities have developed, WS uses the procedures described in Appendix D to assure compliance with pertinent laws and regulations. WS would also consult with the USFWS and IDNR regarding potential risks to state and federally-listed T&E species and would implement recommendations from these agencies in order to minimize risks to T&E species. For these reasons WS beaver dam removal/breaching activities should have minimal impact on wetlands.

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

Beaver created impoundments could be breached/removed by hand, with machinery, or with explosives by WS for the purpose of returning streams, channels, ditches, and irrigation canals to the original drainage under this alternative. Overall impacts would be similar to Alternative 2. Unless beaver are removed from the site, the duration of the impact is likely to be less than with Alternative 2 because beaver are likely to rapidly rebuild the dam.

4.1.6.4 Alternative 4: No Federal WS Mammal Damage Management

WS not conduct MDM activities and would have no impact on wetlands. Under this alternative, beaver dam breaching and removal needs would be met by private, state, or local government entities. Some beaver impounded areas that WS would advise against draining might be drained under private or local government management, which could have adverse effects on wetland habitats in limited circumstances.

4.2 CUMULATIVE IMPACTS

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

Under Alternatives 1, 2 and 3, WS would, to varying extents, address damage associated with mammals in a number of situations throughout the State. The WS MDM program would be the primary federal program with MDM responsibilities; however, some state and local government agencies may conduct MDM activities in Illinois 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. IDNR keeps records of all animals taken for MDM and this information is presented in the cumulative impact analysis section for target species. The potential cumulative impacts analyzed below could occur either as a result of WS MDM program activities over time, or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

Cumulative Impacts on Wildlife Populations

As shown in Section 4.1.1, MDM methods used or recommended by the WS program in Illinois will have no cumulative adverse effects on target and non-target wildlife populations. WS limited lethal take of target mammal species is anticipated to have minimal impacts on target mammal populations in Illinois. When control actions are implemented by WS the potential lethal take of non-target wildlife species is expected to be minimal and will not adversely affect populations of these species.

Cumulative Impact Potential from Chemical Components

MDM programs which include the use of pesticides as a lethal population management component may have the greatest potential for cumulative impacts on the environment as such impacts relate to deposit of chemical residues in the physical environment and environmental toxicosis. The toxicants ZP, and gas cartridges are the chemicals most frequently used or recommended by the Illinois WS MDM program. These chemicals have been evaluated for possible residual effects which might occur from buildup of the chemicals in soil, water, or other environmental sites in detailed risk assessments in the WS programmatic EIS (USDA 1997 Revised). Based on use patterns, the chemical and physical characteristics of mammal control toxicants, and factors related to the environmental fate of these pesticides, no cumulative impacts are expected from the lethal chemical components used or recommended by the WS MDM program in Illinois (USDA 1997 Revised).

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

Cumulative Impact Potential from Non-chemical Components

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

SUMMARY

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

Table 4-4. Summary of Potential Impacts.

Issue	Alternative 1 Technical Assistance Only	Alternative 2 Integrated Mammal Damage Management Program (Proposed Action/No Action)	Alternative 3 Non-lethal MDM Only by WS	Alternative 4 No Federal WS MDM Program
1. Target Mammal Species Effects	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel variable but likely would not significantly affect local or state populations.	Low effect - reductions in local target mammal numbers; would not significantly affect local or state populations	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel variable but likely would not significantly affect local or state populations.	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel variable but likely would not significantly affect local or state populations.
2. Effects on Other Wildlife Species, Including T&E Species	No effect by WS. Impacts by non-WS personnel would be variable. WS would not provide operational assistance with T&E species protection	Low effect - methods used by WS would be highly selective with very little risk to non-target species. WS would provide operational assistance with T&E species protection	Low effect - methods used by WS would be highly selective with very little risk to non-target species. WS only able to provide limited operational assistance with T&E species protection.	No effect by WS. Impacts by non-WS personnel would be variable. WS would not provide operational assistance with T&E species protection
3. Human Health and Safety Effects	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater risk of injuries and greater potential of not reducing mammal damage than under the proposed action.	The proposed action has the greatest potential of successfully reducing this risk. Low risk from methods used by WS.	Low risk of injuries from methods used by WS. WS less likely to resolve risks associated with animals than with Alt 2. Efforts by non-WS personnel to use lethal MDM techniques could result in less experienced persons implementing control methods, a greater risk of injuries and greater potential of not reducing mammal damage than under the proposed action.	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater risk of injuries and greater potential of not reducing mammal damage than under the proposed action.

4a. Aesthetic Values of Wild Mammal Species and Human Affectionate Bonds	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state target mammal populations.	Low to moderate effect at local levels; Some local populations may be reduced; WS mammal damage management activities do not adversely affect overall state target mammal populations.	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase when non-lethal methods are ineffective unless non-WS personnel successfully implement lethal methods; no adverse affect on state target mammal populations.	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state target mammal populations.
4b. Aesthetic Values of Property Damaged by Mammals	Mammal damage may not be reduced to acceptable levels; mammal may move to other sites which can create aesthetic damage problems at new sites.	Low effect - mammal damage problems most likely to be resolved without creating or moving problems elsewhere.	Mammal damage may not be reduced to acceptable levels; mammals may move to other sites which can create aesthetic damage problems at new sites.	High effect - mammal problems less likely to be resolved without WS involvement. Mammals may move to other sites which can create aesthetic damage problems at new sites
5. Humaneness and Animal Welfare Concerns of Methods Used	No effect by WS. Impacts by non-WS personnel would be variable.	Impact by WS low to moderate effect - methods viewed by some people as inhumane would be used by WS.	Impact by WS Lower effect than Alt. 2 since only non-lethal methods would be used by WS. Impacts by non-WS personnel would be variable.	No effect by WS. Impacts by non-WS personnel would be variable.

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APPENDIX A

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APPENDIX B

MAMMAL DAMAGE MANAGEMENT METHODS

Resource owners and government agencies use a variety of techniques as part of integrated mammal damage management programs. All lethal and non-lethal methods have limitations based on costs, logistics, practicality, or effectiveness. There are also regulatory constraints on the availability and use of some MDM techniques. Mammal damage management methods currently available to the Illinois WS program are described here. If other methods are proven effective and legal to use in Illinois, they could be incorporated into the Illinois WS program, pursuant to permits, other authorizations, agreements with landowners, NEPA compliance, and other laws, regulations, and policies. Details on State restrictions regarding the use of some WDM methods are provided in Section 1.8.4

NONLETHAL METHODS-NONCHEMICAL

Cultural Methods and Habitat Management includes the application of practices which seek to minimize exposure of the protected resource to damaging animals through processes other than exclusion. They may include animal husbandry practices such as employing guard dogs, herders, shed lambing, carcass removal, or pasture selection. Strategies may also include minimizing cover where damaging mammals might hide, manipulating the surrounding environment to deter animals from entering a protected area, removing trees along stream banks to discourage the presence of beavers, removal of trees from around buildings to reduce access by squirrels and raccoons, or planting lure crops on fringes of protected crops. Continual destruction of beaver dams and removal of dam construction materials on a daily basis will sometimes cause beavers to move to other locations, although this strategy can be far more expensive than removing beavers in conjunction with dam removal. Water control devices such as the 3-log drain (Roblee 1983), the T-culvert guard (Roblee 1987), wire mesh culvert (Roblee 1983), and the Clemson beaver pond leveler (Miller and Yarrow 1994) can sometimes be used to control the water in beaver ponds to desirable levels that do not cause damage. Use of these devices is very limited among private landowners. Such methods have variable results and rarely provide acceptable levels of control unless used in an integrated program with other strategies. 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 and opossums are a problem, making trash and garbage unavailable and removing all pet food from outside during nighttime hours can reduce their presence. If tree squirrels are damaging property or causing a nuisance, care in preventing them from obtaining bird seed left in bird feeders can often greatly reduce their presence. This may mean hanging bird feeders by thin wire from tree limbs, or constructing mounting poles which cannot be climbed by these animals.

Animal Behavior Modification. This refers to tactics that deter or repel damaging mammals and thus, reduce damage to the protected resource. These techniques are usually aimed at causing target animals to respond by fleeing from the site or remaining at a distance. They usually employ extreme noise or visual stimuli (e.g., flashing lights). Unfortunately many of these techniques are only effective for a short time before animals habituate (i.e., learn there is not a real threat; Conover 1982). Combining frightening stimuli and regularly changing the location, source and type of stimuli can extend the protective period of non-lethal methods. Using motion activated systems instead of systems which are activated on regular intervals may also extend the effective period for a frightening devices. Devices used to modify behavior in mammals include:

- Electronic guards (siren/strobe-light devices)
- Propane exploders
- Pyrotechnics

- Laser lights
- Human effigies

Wildlife – Exclusion (Physical Exclusion) pertains to preventing access to resources through fencing or other barriers. Fencing of small critical areas can sometimes prevent animals which cannot climb from entering areas of protected resources. Fencing of culverts, drain pipes, and other water control structures like that used with a Beaver Deceiver can sometimes prevent beavers from building dams which plug these devices. In those applications, however, consideration must be given for water flow so that the fence does not act to catch and hold water-borne debris. Fencing, especially if it is installed with an underground skirt, can prevent access to areas for many mammal species which dig, including coyotes, foxes, woodchucks, beaver, and muskrat. Areas such as airports, yards or hay meadows may be fenced. Hardware cloth or other metal barriers can sometimes be used to prevent girdling and gnawing of valuable trees and to prevent the entry of mammals into buildings through existing holes or gaps. Applying a mixture of sand in paint can also block beaver from gnawing trees. Construction of concrete spillways may reduce or prevent damage to dams by burrowing aquatic rodent species. Riprap can also be used on dams or levies at times, especially to deter muskrat, woodchucks, and other burrowing rodents. Electrical water barriers have proven effective in limited situations for beaver; an electrical field through the water in a ditch or other narrow channel, or hot-wire suspended just above the water level in areas protected from public access, have been effective at keeping beaver out. The effectiveness of an electrical barrier is extended when used in conjunction with an odor or taste cue that is emitted because beaver will avoid the area even if the electrical field is discontinued (Kolz and Johnson 1997). Similarly, electric fences of various constructions have been used effectively to reduce damage to various crops by raccoons, bears and other species (Boggess 1994).

BEAVER EXCLUSION AND USE OF WATER CONTROL DEVICES

This section addresses exclusion and water control devices used to alleviate flooding damage without removing beaver. Although dams could be breached/ removed manually or with binary explosives (see below), these methods are usually ineffective because beaver will quickly repair or replace the dam (McNeely 1995). Damage may be effectively reduced in some situations by installing exclusion and water control devices. Exclusion and water control devices can be designed so that the level of the beaver-created pond can be managed to eliminate or minimize damage while still retaining the ecological and recreational benefits derived from beaver ponds. In Illinois, WS also recommends modifications to site and culvert design (Jensen et al. 1999) as a nonlethal way of reducing problems with beaver dams at culverts.

Beaver Exclusion: Beaver exclusion generally involves the placement of fencing to prevent beaver access to water intake areas such as culverts. A variety of exclusion systems have been used including the Beaver Deceiver™, Beaver Bafflers™ and pre-dams (Lisle 2003, 1999, 1996, Partington 2002, Brown et al. 2001, Brown and Brown 1999). The Beaver Deceiver™ is a fencing system that is installed to prevent beaver blockage of culverts by minimizing environmental cues which stimulate dam construction, and by making culverts less attractive as dam construction sites (Lisle 2003, 1999, 1996). Beaver are deterred from blocking culverts by the installation of a fence on the upstream end of the culvert. Installation of a fence increases the length of the area which must be dammed, and if beaver build along the fence, may also increase the distance between the beaver and the source of the cues which stimulate damming behavior (e.g., water moving through culvert; Callahan 2005, Lisle 2003, 1999, 1996). Beaver prefer to build dams perpendicular to water flow, so fences are oriented at odd angles to water flow and are set so that they do not block the stream channel. Usually, fencing is also used to cover the up and downstream ends of the culverts to prevent beaver from entering the deceiver from the downstream side of the culvert and to prevent any beaver that might make it past the outer fence from plugging the interior of the culvert. Efforts are made to reduce the sound of water flowing through the culvert by raising the water level on the down-stream side of the culvert with dam

boards or beaver-made dams; by constructing flumes to replace waterfalls, or, in extreme cases, by resetting the culvert (Lisle 1996). In situations where extra care is needed to ensure sufficient water flow through the culvert, Beaver Deceivers™ may be used in combination with water control devices (see below).

Cylindrical exclusion devices like the Beaver Bafflers™ are attached to culvert openings and reduce the likelihood that beaver will plug a culvert by spreading the water intake over a larger area (Brown et al. 2001). While effective in some situations (Partington 2002), in a study of beaver exclusion and water control devices, cylindrical shapes attached in-line with the culvert had a higher failure rate (40%) than trapezoidal shapes (e.g., Beaver Deceivers™ - 3% failure) and use of the cylindrical devices was discontinued in favor of trapezoidal fences (Callahan 2005).

Unlike Beaver Deceivers™ and cylindrical fences, pre-dam fences (aka, deep water fences, diversion dams; Brown and Brown 1999) are designed with the specific intention that the beaver build the dam along the fence. Pre-dam fences are short semicircular or circular fences that are built in an arc around a water inlet. The fence serves as a dam construction platform which allows beaver to build a dam and pond at the site but prevents beaver from plugging the water intake. If the size of the upstream pond is not an issue, no further modifications of the pre-dam are needed. However, in most cases, pre-dams are used in combination with water control devices to manage the size of the upstream pond.

Fence mesh size should be selected to minimize risks to beaver and nontarget species. Brown et al. (2001) noted that beaver occasionally became stuck in 6 inch mesh and that the risk of beaver entrapment was lower with 5 inch mesh. Lisle (1999) noted that the size of the mesh on the fence of the Beaver Deceivers™ (6 inch mesh) was such that it allowed most species to pass through the fence except beaver and big turtles. In remote areas where there is little traffic it may be acceptable for animals which cannot pass through the deceiver to travel across the road. However, for culverts under busy roads, it is necessary to design special “doors” which can allow the passage of beaver and large turtles through the device. For example, 30 cm-diameter T-joints have been used to allow access through Beaver Deceiver™ fences. The T shape reduces the likelihood that beaver can haul woody debris for dam construction inside the device (Lisle 2003). Fence caps are not attached to the up and down-stream ends of the culvert when it’s necessary to allow passage of species like large turtles and beavers through the culvert.

<u>Water Control Devices</u>: Water control devices (aka pond levelers) are systems used to allow the passage of water through a beaver dam. The devices are used in situations where the presence of a beaver pond is desired but it is necessary to manage the level of water in the pond. Various types of water control devices have been described (Perry 2007, Clemson University 2006, Spock 2006, Simon 2006, Close 2003, Lisle 2003, 1999, 1996, Brown et al. 2001, Brown and Brown 1999, Organ et al. 1996, Wood et al. 1994, Miller and Yarrow 1994, Laramie and Knowles 1985, Roblee 1984, Arner 1964). The devices generally involve the use of one or more pipes installed through the dam to increase the flow of water through the dam. Height and placement of pipes can be adjusted to achieve the desired water level in the beaver pond. Beavers generally only check the dam for leaks, so, when site conditions permit, the inlet of the pipe is placed away from the dam to make the source of the water flow more difficult to detect and decrease the likelihood that beaver will attempt to plug the device. To minimize the sound/sensation of water movement and associated beaver damming behavior, the end of the pipe may be capped and water allowed to flow into the pipe through series of holes or notches cut through the pipe. Holes and notches may be placed on the underside of the pipe to further reduce signs of water movement. Alternatively, ninety-degree elbow joints are placed facing downward on the upstream end of the pipes to prevent the noise of running water from escaping and attracting beaver. A protective cage is placed around the upstream end of the inlet pipe to prevent beaver from blocking the pipe and reduce problems with debris blocking the pipe. As noted above, water control systems can

be combined with exclusion devices to prevent beaver from blocking culverts while still maintaining a beaver pond at an acceptable level.

Efficacy of Beaver Exclusion and Water Control Systems. Exclusion devices and water control systems have been used for many years with varying degrees of success (USGAO 2001). Landowner management objectives play a role in how the efficacy of a level system is perceived (Nolte et al. 2001). Survey respondents classified pond levelers installed to manage wetlands for waterfowl habitat more successful than levelers installed to provide relief from flooding (Nolte et al. 2001). Success rates as low as 4.5% and 3% have been reported by the Massachusetts Division of Fisheries and Wildlife and New York Department of Natural Resources (Langlois and Decker 1997). Nolte et al. (2001) reported only 50% of installed pond levelers in Mississippi meet landowner objectives and found that pond levelers placed in sites with high beaver activity more frequently failed if installed without implementing population control measures. Higher success rates have been reported for newer exclusion and water control systems ranging from 87% - 93% (Boyles 2007, 2006; Simon 2006; Callahan 2005). Lisle (2003) reported that use of the devices or a combination of a Beaver Deceiver™ and flow management device virtually eliminated the need for maintenance and beaver removal at 20 sites where clogged culverts and flooded roads had previously been a routine issue.

Exclusion and water control systems must be specifically designed to meet the needs of each site. Consequently, devices installed by inexperienced individuals may have a higher failure rate than those installed by a professional (Boyles 2006, Simon 2006, Spock 2006, Callahan 2003, Lisle 1996). Higher success rates reported for newer exclusion and water control devices may be indicative of increased understanding of the kinds of situations where these devices work best. For example, Callahan (2005) noted that exclusion and water control systems installed at culvert sites were more successful than similar systems installed at free-standing dams. Callahan (2005, 2003) also provides a list of sites that are not well suited to the use of exclusion or water control devices. Boyles (2007, 2006) reported some of the highest success rates for the new exclusion and water control systems, but only tested the devices at culvert sites.

Beaver build dams to raise water levels to meet their needs for security and access to forage. While pond levelers allow for the retention of some water, if the water level does not meet the needs of the beaver, they may move a short distance downstream and build a new dam (Clemson University 2006, Callahan 2003). This may merely result in moving the problem to a new landowner or, depending upon site characteristics, the resulting pond may result in new or increased damage problems for the original landowner. McNeely (1995) reported the most common reasons cited for lack of success were blocking caused by debris or silt and beaver construction of additional dams slightly upstream or downstream of the management device. In the study by Callahan (2005), construction of a new dam upstream or downstream of the device was the most common cause of failure for free-standing dams (e.g., dams not associated with a culvert or other similar constriction in water flow, 11 of 156 sites), but insufficient pipe capacity (6 sites) and lack of maintenance (2 sites) were also problems. Nolte et al. (2001) also reported need to address problems with dams upstream or downstream of the device. At culvert sites, lack of maintenance was the primary cause of device failure (4 of 227 sites). There was also a problem with vandalism at one of the culvert sites. At two culvert sites and two free-standing dams, the beaver appeared to be able to thwart the exclusion devices and water control systems and build dams that reduced or completely impeded the operation of the devices (Callahan 2005).

Most pond levelers and water control devices require maintenance. The amount of maintenance required can vary considerably among sites, depending on site conditions and the type of water control device (Boyles 2006, Spock 2006, Callahan 2005, Nolte et al. 2001). Stream flow, leaf fall, floods and beaver activity will continuously bring debris to the intake of the water control device. Ice damage and damage from debris washed downstream during high water events may also trigger need for maintenance. Although most exclusion and water control devices generally require some level of maintenance, there are reports of devices which have remained effective for

a period of years with no maintenance (Nolte et al. 2001). Nolte et al. (2001) reported that post-installation maintenance had been performed on 70% of the 20 successfully operating Clemson pond levels installed by WS. The most common action was to adjust the riser on the pipe to manipulate water levels. Other maintenance included removal of vegetation and secondary dams built after the installation of the devices. In a survey of individuals who had received assistance with exclusion and water control devices from Beaver Remedies program (Simon 2006), half the survey respondents 18 of 36 reported maintaining their devices and device installation program staff monitored an additional 10 devices. Sixty one percent of respondents reported that routine maintenance took 15 minutes or less and 93% reported that maintenance took a half hour or less. Boyles (2006) reported that time spent in device maintenance ranged from 1 to 4.75 hours per year. Illinois WS assists with the maintenance of the 7 levelers used by the Shawnee National Forest to address flooding issues. The pond levelers require maintenance every year to remove roots which can clog the intake pipe. If the levelers were not maintained they would have to be replaced approximately once every 5 years. A fire pump is used to clean out the levelers, and it takes 1-2 days for 3 – 5 people to clean out 2-3 levelers each year.

Costs: Installation and upkeep of water control devices vary from site to site. Callahan (2005) reported that the average cost for an exclusion fence at a culvert was $750 with average annual maintenance cost of approximately $200. Flexible leveler pipe systems cost an average of $1,000 to install and $100 per year in maintenance. Average cost to install a combination fence and leveler was $1,400 with approximately $150 per year in maintenance. Properly maintained, a fence or pipe system may be expected to last approximately 10 years. Annualizing the costs of maintenance and levelers ranged from $200 – $275/year (Callahan 2005). The cost of a Beaver Deceiver™ may range from $150 - $1,500, and an additional cost would be applied if pipes were needed at the site (S. Lisle, Penobscot Nation, letter to J. Cromwell, WS, September 7, 2000). Spock (2006) reported that exclusion and/or water control device installation costs ranged from < $600 to over $3,000 dollars. Slightly more than half the systems (58.2%) cost between $600 and $1,000 to install. In many cases the cost included the first year of maintenance. Maintenance costs, when available, ranged from $50 - $600 per year with 49.9% of maintenance agreements costing from $100 - $200. The more expensive installations tended to be extensive fence and leveler systems or systems with numerous leveler pipes. Boyles (2006) reported that device installation cost an average of $1,349 per device and $3,180 per site. Subsequent annual maintenance cost an average of $19.75 per site per year. However, unlike the study by Callahan (2005) the devices had only been in place for a relatively short time (Boyles (2006) average time in place 15 months, range 6 - 22 months; Callahan (2005) average time in place 36.6 months, range 3 to 75 months). Cost of maintenance may change over time as site conditions change in response to new conditions resulting from the devices and/or beaver activity. Illinois WS assists with the maintenance of the 7 levelers used by the Shawnee National Forest to address flooding issues Average annual maintenance cost of just 2-3 of the 7 levelers is $7,358.

Beaver Dam Breaching/Removal

Dam breaching involves the removal of debris deposited by beaver that impedes the flow of water. Breaching a beaver dam is generally conducted to maintain existing streams and irrigation channels, restore drainage patterns, and reduce flood waters that have negatively impacted silvicultural, agricultural, residential or ranching/farming activities. Beaver dams removed by WS are normally from recent beaver activity, and sites have not had enough time to develop characteristics of a true wetland (i.e., hydric soils, hydrophytic vegetation, and hydrological function). Unwanted beaver dams may be removed by hand or with explosives. Explosives are used only by WS personnel specially trained and certified to conduct such activities.

Because beaver dams involve waters of the United States, removal is regulated under Section 404 of the CWA (Appendix D). Beaver dam breaching does not affect substrate or natural course of streams. Breaching beaver dams often re-establishes preexisting conditions with similar flows and circulations.

Most beaver dam breaching operations, if considered discharge, are covered under 33 CFR 323 or 330 and do not require a permit. A permit would be required if the beaver dam breaching activity is not covered by a 404 permitting exemption or Nationwide Permit (NWP) and the area affected by the beaver dam was considered a true wetland. WS personnel survey the site or impoundment to determine if conditions exist for classifying the site as a true wetland. If the site appears to have conditions over three years old or appears to meet the definition of a true wetland, the landowner or cooperator is required to obtain a permit before proceeding (See Appendix D for information that explains Section 404 permit exemptions and conditions for breaching/removing beaver dams).

Explosives

Explosives are defined as any chemical mixture or device which serves as a blasting agent or detonator. Explosives are generally used to breach beaver dams that are too large to remove by hand digging and after beaver have been removed from the site. Binary explosives consist of ammonium nitrate and nitro-methane and are not classified as explosives until mixed. Therefore, binary explosives are subject to fewer regulations and controls. However, once mixed, binary explosives are considered high explosives and subject to all applicable federal regulations. Detonating cord and detonators are considered explosives and WS must adhere to all applicable State and federal regulations for storage, transportation, and handling. All WS explosive specialists are required to attend 30 hours of extensive explosive safety training and spend time with a certified explosive specialist in the field prior to obtaining certification. All blasting activities are conducted by well-trained, certified blasters and closely supervised by professional wildlife biologists. Explosive handling and use procedures follow the rules and guidelines set forth by the Institute of Makers of Explosives which is the safety arm of the commercial explosive industry in the United States and Canada. WS also adheres to transportation and storage regulations from State and federal agencies such as Occupational Safety and Health Association, Bureau of Alcohol, Tobacco, Firearms, and Explosives, IDNR Division of Mines and Minerals, and the Department of Transportation.

Relocation

Relocation of damaging mammals to other areas following live capture generally would not be effective nor cost-effective. Relocation to other areas following live capture would not generally be effective because problem species are highly mobile and can easily return to damage sites from considerable distances, habitats in other areas are generally already occupied, and relocation would most likely result in similar damage problems at the new location. Relocated animals can have poor survival rates at the new site (Rosatte and MacInnes 1989, Wright 1978, Frampton and Webb 1974) although careful timing of relocation and selection of release site can markedly improve survival rates (Griffith et al. 1989). Relocating animals also runs the risk of spreading parasites and diseases to previously uninfected areas. For example, the spread of raccoon variant of rabies in the eastern U.S. was likely unintentionally accelerated through the translocation of infected raccoons (Krebs et al. 1999). Translocation of wildlife is discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats.

However, there are exceptions for the relocation of damaging mammals that might be a viable solution, such as when the mammals are considered to have high value such as T&E species. Under the right conditions, relocating wildlife can be a viable and effective wildlife management technique (Craven et al. 1998). Illinois WS would only relocate wildlife at the direction of and only after consulting with the USFWS and/or IDNR to coordinate capture, transportation, and selection of suitable relocation sites, as well as compliance with all proper guidelines.

Animal Capture Devices:

WS specialists can use a variety of devices to capture mammals. For reasons discussed above under

Relocation, captured animals are usually killed via gunshot, cervical dislocation, or one of the chemical euthanasia methods listed below. However there are occasions where captured animals are relocated, or, in the case of some disease surveillance projects, may be released on site.

Foothold traps are traps that come in a variety of sizes that allows the traps to be species specific to some degree. These traps can be set on land or in water. They are made of steel with springs that close the jaws of the trap around the foot and leg of the target species. These traps may have steel or padded jaws, which hold the animal.

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 generally 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. Cage traps can range from the extremely small, intended for the capture of rodents and other small mammals to the large corral/panel traps used to live-capture feral hogs.

Hancock traps (suitcase/basket type cage traps) are designed to live-capture beaver. This type of trap is constructed of a metal frame covered in chain-link fence that is hinged with springs. Trap appearance is similar to a large suitcase when closed. When set, the trap is opened to allow an animal to enter, and when tripped the sides close around the animal.

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

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

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

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

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

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

NON-LETHAL METHODS – CHEMICAL

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

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

Xylazine is a sedative (analgesic) that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with ketamine to produce a relaxed anesthesia. It can also be used alone to facilitate physical restraint. Because xylazine is not an anesthetic, sedated animals are usually responsive to stimuli. Therefore, personnel 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.

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

LETHAL METHODS - MECHANICAL

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

Conibear (Body Gripping) Traps are the steel framed traps used to capture and quickly kill mammals, especially aquatic species. These traps come in a variety of sizes and may be used on land or in the water depending on trap size and state and local laws. The traps are made of two steel square frames that are hinged on two sides and have one or two springs. State restrictions on the use of conibear traps are provided in Section 1.8.4.

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. 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 efficiently 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. Firearm use may be a public concern because of issues relating to safety and misuse of firearms. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within three months of their appointment and a refresher course every two years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to meet criteria contained in the Lautenberg Amendment which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. WS activities where shooting is used include, but are not limited to, take of mammals in damage situations

pursuant to IDNR permits.

Sport Hunting/Trapping is sometimes recommended by WS as a viable damage management method when the target species can be legally hunted and/or trapped, and activities can meet site security and safety compliance. A valid hunting or trapping license and other licenses or permits may be required by the IDNR. This method provides sport, income and/or food for hunters/trappers and requires no cost to the landowner. Sport hunting/trapping is occasionally recommended if it can be conducted safely for coyotes, feral hogs, beaver and other damage causing mammals.

Snap traps are used to remove small rodents. The trap treadle is baited with peanut butter or other taste attractants and attached near the damage area. These traps pose no imminent danger to pets or the public.

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

LETHAL METHODS - CHEMICAL

All chemicals used by WS are registered as required by the FIFRA administered by the EPA and IDOA. WS personnel that use restricted-use chemical methods are certified as pesticide applicators by IDOA and are required to adhere to all certification requirements set forth in FIFRA and Illinois pesticide control laws and regulations. Chemicals are only used on private, public, or tribal property sites with authorization from the property owner/manager.

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.

Zinc Phosphide is a toxicant used to kill rodents, lagomorphs and nutria. It is two to 15 times more toxic to rodents than to carnivores (Hill and Carpenter 1982). Secondary risks appear to be minimal to predators and scavengers that scavenge carcasses of animals killed with zinc phosphide (Hill and Carpenter 1983, Tietjen 1976, Hegdal and Gatz 1977, Hegdal et al. 1980, and Johnson and Fagerstone 1994). This is because: 1) 90% of the zinc phosphide ingested by rodents is detoxified in the digestive tract (Matschke unpubl. as cited in Hegdal et al. 1980), 2) 99% of the zinc phosphide residues occur in the digestive tracts, with none occurring in the muscle, 3) the amount of zinc phosphide required to kill target rodents is not enough to kill most other predatory animals that consume prairie dog tissue (Johnson and Fagerstone 1994).

Use of zinc phosphide on various types of fruit, vegetable, or cereal baits (e.g., apples, carrots, sweet potatoes, oats, barley) has proven to be effective at suppressing nutria populations. All chemicals used by WS are registered under FIFRA and administered by EPA and IDOA. Zinc phosphide is federally registered for use by APHIS/WS. Specific bait applications are designed to minimize non-target hazards (Evans 1970). WS personnel that use chemical methods are certified as pesticide applicators by IDPH and are required to adhere to all certification requirements set forth in FIFRA and the Illinois pesticide control laws and regulations. No chemicals are used on federal or private lands without authorization from the land management agency or property owner/manager. A quantitative risk assessment, which evaluated potential impacts of WS use of chemical methods when used according to the label, concluded that no adverse effects are expected from the above (USDA 1997 Revised).

In addition, zinc phosphide has a strong emetic action (i.e., causes vomiting) and most non-target animals in research tests regurgitated bait or tissues contaminated with zinc phosphide without succumbing to the toxicant (Hegdal and Gatz 1977, Hegdal et al. 1980, Johnson and Fagerstone 1994). Furthermore, predators tend to eviscerate zinc phosphide-poisoned rodents before eating them or otherwise avoid the digestive tract and generally do not eat the stomach and intestines (Hegdal et al. 1980, Johnson and Fagerstone 1994). Although zinc phosphide baits have a strong, pungent, phosphorous-like odor (garlic like), this characteristic seems to attract rodents, particularly rats, and apparently makes the bait unattractive to some other animals. Many birds appear capable of distinguishing treated from untreated baits and they prefer untreated grain when given a choice (Siefried 1968, Johnson and Fagerstone 1994). Birds appear particularly susceptible to the emetic effects of zinc phosphide, which would tend to offer an extra degree of protection against bird species dying from zinc phosphide grain bait consumption or, for scavenging bird species, from eating poisoned rodents (USDA 1997 Revised). Use of rolled oats instead of whole grain also appears to reduce bird acceptance of bait. Uresk et al. (1988) reported on the effects of zinc phosphide on six non-target rodent populations. They determined that no differences were observed from pretreatment until after treatment in populations of eastern cottontail rabbits (*Sylvilagus floridanus*) and white-tailed jackrabbits (*Lepus townsendii*). However, primary consumption of bait by non-target wildlife can occur and potentially cause mortality. Uresk et al. (1988) reported a 79% reduction in deer mouse (*Peromyscus maniculatus*) populations in areas treated with zinc phosphide, however the effect was not statistically significant because of high variability in densities and the reduction was not long-term (Deisch et al. 1990).

Ramey et al. (2000) reported that five weeks after treatment, no ring-necked pheasants (*Phasianus colchicus*) had been killed as a result of zinc phosphide baiting. In addition, Hegdal and Gatz (1977) determined that zinc phosphide did not affect non-target populations and more radio-tracked animals were killed by predators than died from zinc phosphide intoxication (Hegdal and Gatz 1977, Ramey et al. 2000). Tietjen (1976) observed horned larks (*Eremophila alpestris*) and mourning doves (*Zenaida macroura*) on zinc phosphide-treated prairie dog colonies, but observations after treatment did not locate any sick or dead birds, a finding similar to Apa et al. (1991). Uresk et al. (1988) reported that ground feeding birds showed no difference in numbers between control and treated sites. Apa et al. (1991) further states that zinc phosphide was not consumed by horned larks because: 1) poison grain remaining for their consumption was low (*i.e.*, bait was accepted by prairie dogs before larks could consume it), 2) birds have an aversion to black-colored foods, and 3) birds have a negative sensory response to zinc phosphide. Reduced impacts on birds have also been reported by Tietjen and Matschke (1982). Deisch et al.(1989) reported on the effect zinc phosphide has on invertebrates. They determined that zinc phosphide bait reduced ant densities, however, spider mites, crickets, wolf spiders, ground beetles, darkling beetles and dung beetles were not affected. Wolf spiders and ground beetles showed increases after one year on zinc phosphide treated areas (Desich 1986). Generally, direct long-term impacts from rodenticide treatments were minimal for the insect populations sampled (Deisch et al. 1989). Long-term effects were not directly related to rodenticides, but more to habitat changes (Deisch 1986) as vegetative cover and prey diversity increased without prairie dogs grazing and clipping the vegetation (Deisch et al. 1989).

Gas Cartridges are incendiary devices composed of carbon and sodium nitrate. When ignited and placed in the target animals burrow, the resultant carbon monoxide and other gases cause asphyxiation. The risks assessment for the use of gas cartridges for rodent management in (USDA 1997 Revised) state that the only risks to non-target species are risks to rodents and other species found in burrows with the target species. WS will not use gas cartridges in areas where State and Federally listed species may be in burrows with the target animal

APPENDIX C

STATE AND FEDERALLY-LISTED THREATENED AND ENDANGERED SPECIES IN ILLINOIS

E – State Endangered, T – State Threatened, * Federal Threatened, **Federal Endangered, *** Federal Candidate

PLANTS

Moschatel - *Adoxa moschatellina* (E)
Speckled Alder - *Alnus incana subsp. rugosa* (E)
Shadbush - *Amelanchier sanguinea* (E)
Marram Grass - *Ammophila breviligulata* (E)
Smooth False Indigo - *Amorpha nitens* (E)
Bearberry - *Arctostaphylos uva-ursi* (E)
Dragon Wormwood - *Artemisia dracunculus* (E)
Wooly Milkweed - *Asclepias lanuginosa* (E)
Mead's Milkweed - *Asclepias meadii* (E)*****
Oval Milkweed - *Asclepias ovalifolia* (E)
Narrow-leaved Green Milkweed - *Asclepias stenophylla* (E)
Bradley's Spleenwort - *Asplenium bradleyi* (E)
Black Spleenwort - *Asplenium resiliens* (E)
Large Ground Plum - *Astragalus crassicarpus var. trichocalyx* (E)
Bent Milk Vetch - *Astragalus distortus* (E)
Tennessee Milk Vetch - *Astragalus tennesseensis* (E)
Yellow Wild Indigo - *Baptisia tinctoria* (E)
Screwstem - *Bartonia paniculata* (E)
American Slough Grass - *Beckmannia syzigachne* (E)
Allegheny Barberry - *Berberis canadensis* (E)
Supple-jack - *Berchemia scandens* (E)
Yellow Birch - *Betula alleghaniensis* (E)
Alkali Bulrush - *Bolboschoenus maritimus* (E)
Prairie Moonwort - *Botrychium campestre* (E)
Daisyleaf Grape Fern - *Botrychium matricariifolium* (E)
Northern Grape Fern - *Botrychium multifidum* (E)
Dwarf Grape Fern - *Botrychium simplex* (E)
Blue Grama - *Bouteloua gracilis* (E)
Wooly Buckthorn - *Bumelia lanuginosa* (E)
Bluejoint Grass - *Calamagrostis insperata* (E)
Water Arum - *Calla palustris* (E)
Oklahoma Grass Pink Orchid - *Calopogon oklahomensis* (E)
Grass Pink Orchid - *Calopogon tuberosus* (E)
Wild Hyacinth - *Camassia angusta* (E)
Cuckoo Flower - *Cardamine pratensis var. palustris* (E)
Winged Sedge - *Carex alata* (E)
Arkansas Sedge - *Carex arkansana* (E)
Brownish Sedge - *Carex brunnescens* (E)
Silvery Sedge - *Carex canescens var. disjuncta* (E)
Cordroot Sedge - *Carex chordorrhiza* (E)
Crawford's Sedge - *Carex crawfordii* (E)
Yellow Sedge - *Carex cryptolepis* (E)
Sedge - *Carex cumulata* (E)
Cypress-knee Sedge - *Carex decomposita* (E)
Sedge - *Carex diandra* (E)
Shortleaf Sedge - *Carex disperma* (E)
Sedge - *Carex echinata* (E)
Sedge - *Carex formosa* (E)
Elk Sedge - *Carex garberi* (E)
Large Sedge - *Carex gigantea* (E)
Plains Sedge - *Carex inops subsp. heliophila* (E)
Sedge - *Carex lucorum* (E)
Black-edged Sedge - *Carex nigromarginata* (E)
Few-seeded Sedge - *Carex oligosperma* (E)
Bellow's Beak Sedge - *Carex physorhyncha* (E)
Reniform Sedge - *Carex reniformis* (E)
Lined Sedge - *Carex striatula* (E)
Three-seeded Sedge - *Carex trisperma* (E)
Tuckerman's Sedge - *Carex tuckermanii* (E)
Pale Hickory – *Carya pallida* (E)
Downy Yellow Painted Cup - *Castilleja sessiliflora* (E)
Redroot - *Ceanothus herbaceus* (E)
Fairy Wand - *Chamaelirium luteum* (E)
Seaside Spurge - *Chamaesyce polygonifolia* (E)
Spotted Wintergreen - *Chimaphila maculata* (E)
Pipsissewa - *Chimaphila umbellata* (E)
American Bugbane - *Cimicifuga americana* (E)
False Bugbane - *Cimicifuga racemosa* (E)
Small Enchanter's Nightshade - *Circaea alpina* (E)
Yellowwood - *Cladrastis lutea* (E)
Blue Jasmine - *Clematis crispa* (E)
Mountain Clematis - *Clematis occidentalis* (E)
Leatherflower - *Clematis viorna* (E)
Violet Collinsia - *Collinsia violacea* (E)
Sweetfern - *Comptonia peregrina* (E)

Hemlock Parsley - *Conioselinum chinense* (E)
Bunchberry - *Cornus canadensis* (E)
Golden Corydalis - *Corydalis aurea* (E)
Hale's Corydalis - *Corydalis halei* (E)
Pink Corydalis - *Corydalis sempervirens* (E)
Beaked Hazelnut - *Corylus cornuta* (E)
Cynosciadium - *Cynosciadium digitatum* (E)
Galingale - *Cyperus lancastriensis* (E)
Moccasin Flower - *Cypripedium acaule* (E)
Small Yellow Lady's Slipper - *Cypripedium parviflorum var. makasin* (E)
Showy Lady's Slipper - *Cypripedium reginae* (E)
Laurentian Fragile Fern - *Cystopteris laurentiana* (E)
Leafy Prairie Clover - *Dalea foliosa* (E)**
Hay-scented Fern - *Dennstaedtia punctilobula* (E)
Hairgrass - *Deschampsia flexuosa* (E)
Northern Panic Grass - *Dichanthelium boreale* (E)
Panic Grass - *Dichanthelium joorii* (E)
Hemlock Panic Grass - *Dichanthelium portoricense* (E)
Ravenel's Panic Grass - *Dichanthelium ravenelii* (E)
Panic Grass - *Dichanthelium yadkinense* (E)
Whitlow Grass - *Draba cuneifolia* (E)
Round-leaved Sundew - *Drosera rotundifolia* (E)
Log Fern - *Dryopteris celsa* (E)
Small Burhead - *Echinodorus tenellus* (E)
Capitate Spikerush - *Eleocharis olivacea* (E)
Few-flowered Spikerush - *Eleocharis pauciflora* (E)
Dwarf Scouring Rush - *Equisetum scirpoides* (E)
Woodland Horsetail - *Equisetum sylvaticum* (E)
Rusty Cotton Grass - *Eriophorum virginicum* (E)
Eryngo - *Eryngium prostratum* (E)
American Strawberry Bush - *Euonymus americanus* (E)
Hyssop-leaved Thoroughwort - *Eupatorium hyssopifolium* (E)
Spurge - *Euphorbia spathulata* (E)
Queen-of-the- Prairie - *Filipendula rubra* (E)
Vahl's Fimbristylis - *Fimbristylis vahlii* (E)
Boykin's Dioclea - *Galactia mohlenbrockii* (E)
Wild Licorice - *Galium lanceolatum* (E)
Dwarf Bedstraw - *Galium virgatum* (E)
Northern Cranesbill - *Geranium bicknellii* (E)
Arkansas Manna Grass - *Glyceria arkansana* (E)
Oak Fern - *Gymnocarpium dryopteris* (E)
Scented Oak Fern - *Gymnocarpium robertianum* (E)
Stickseed - *Hackelia deflexa var. americana* (E)
Silverbell Tree - *Halesia carolina* (E)
Tall Sunflower - *Helianthus giganteus* (E)
Slender Heliotrope - *Heliotropium tenellum* (E)
Mud Plantain - *Heteranthera reniformis* (E)
Crested Coralroot Orchid - *Hexalectris spicata* (E)
False Heather - *Hudsonia tomentosa* (E)
Water-pennywort - *Hydrocotyle ranunculoides* (E)
One-flowered Hydrolea - *Hydrolea uniflora* (E)
Shore St. John's Wort - *Hypericum adpressum* (E)
Kalm's St. John's Wort - *Hypericum kalmianum* (E)
Kankakee Mallow - *Iliamna remota* (E)
Bloodleaf - *Iresine rhizomatosa* (E)
Butler's Quillwort - *Isoetes butleri* (E)
Small Whorled Pogonia - *Isotria medeoloides* (E)*
Whorled Pogonia - *Isotria verticillata* (E)
Richardson's Rush - *Juncus alpinoarticulatus* (E)
Vasey's Rush - *Juncus vaseyi* (E)
Trailing Juniper - *Juniperus horizontalis* (E)
Water Willow - *Justicia ovata* (E)
Beach Pea - *Lathyrus maritimus* (E)
Prairie Bush Clover - *Lespedeza leptostachya* (E)*
Silvery Bladderpod - *Lesquerella ludoviciana* (E)
Red Honeysuckle - *Lonicera dioica var. glaucescens* (E)
Yellow Honeysuckle - *Lonicera flava* (E)
Hairy Woodrush - *Luzula acuminata* (E)
Bog Clubmoss - *Lycopodiella inundata* (E)
Running Pine - *Lycopodium clavatum* (E)
Ground Pine - *Lycopodium dendroideum* (E)
Creeping Loosestrife - *Lysimachia radicans* (E)
Narrow-leaved Crabapple - *Malus angustifolia* (E)
False Mallow - *Malvastrum hispidum* (E)
Climbing Milkweed - *Matelea decipiens* (E)
Indian Cucumber Root - *Medeola virginiana* (E)
Water Marigold - *Megalodonta beckii* (E)
White Melanthera - *Melanthera nivea* (E)
Two-Flowered Melic Grass - *Melica mutica* (E)
Millet Grass - *Milium effusum* (E)
Yellow Monkey Flower - *Mimulus glabratus* (E)
Hairy Umbrella-wort - *Mirabilis hirsuta* (E)
Baby Blue-eyes - *Nemophila triloba* (E)
Prairie Dandelion - *Nothocalais cuspidata* (E)
Fragile Prickly Pear - *Opuntia fragilis* (E)

Clustered Broomrape - *Orobanche fasciculata* (E)
Illinois Wood Sorrel - *Oxalis illinoensis* (E)
Bead Grass - *Paspalum dissectum* (E)
Short-sepaled Beard Tongue - *Penstemon brevisepalus* (E)
Large-flowered Beard Tongue - *Penstemon grandiflorus* (E)
Tube Beards Tongue - *Penstemon tubaeflorus* (E)
Ozark Phacelia - *Phacelia gilioides* (E)
Long Beech Fern - *Phegopteris connectilis* (E)
Sangamon Phlox - *Phlox pilosa subsp. sangamonensis* (E)
Jack Pine - *Pinus banksiana* (E)
Shortleaf Pine - *Pinus echinata* (E)
Red Pine - *Pinus resinosa* (E)
Heart-leaved Plantain - *Plantago cordata* (E)
Orange Fringed Orchid - *Platanthera ciliaris* (E)
Wood Orchid - *Platanthera clavellata* (E)
Tubercled Orchid - *Platanthera flava var. flava* (E)
Eastern Prairie Fringed Orchid - *Platanthera leucophaea* (E)*****
Purple Fringed Orchid - *Platanthera psycodes* (E)
Grove Bluegrass - *Poa alsodes* (E)
Weak Bluegrass - *Poa languida* (E)
Wolf's Bluegrass - *Poa wolfii* (E)
Snake-mouth - *Pogonia ophioglossoides* (E)
James' Clammyweed - *Polanisia jamesii* (E)
Pink Milkwort - *Polygala incarnata* (E)
Downy Solomon's Seal - *Polygonatum pubescens* (E)
Halbred-leaved Tearthumb - *Polygonum arifolium* (E)
Carey's Heartsease - *Polygonum careyi* (E)
Balsam Poplar - *Populus balsamifera* (E)
White-stemmed Pondweed - *Potamogeton praelongus* (E)
Spotted Pondweed - *Potamogeton pulcher* (E)
Fern Pondweed - *Potamogeton robbinsii* (E)
Stiff Pondweed - *Potamogeton strictifolius* (E)
Cinquefoil - *Potentilla millegrana* (E)
Bird's-eye Primrose - *Primula mistassinica* (E)
Mock Bishop's Weed - *Ptilimnium nuttallii* (E)
White Mountain Mint - *Pycnanthemum albescens* (E)
Nuttall's Oak - *Quercus texana* (E)
Seaside Crowfoot - *Ranunculus cymbalaria* (E)
Alder Buckthorn - *Rhamnus alnifolia* (E)
Dull Meadow Beauty - *Rhexia mariana* (E)
Clustered Beak Rush - *Rhynchospora glomerata* (E)
Northern Gooseberry - *Ribes hirtellum* (E)
Bristly Rose - *Rosa acicularis* (E)
Purple-flowering Raspberry - *Rubus odoratus* (E)
Prairie Rose Gentian - *Sabatia campestris* (E)
Arrowhead - *Sagittaria australis* (E)
Autumn Willow - *Salix serissima* (E)
Dune Willow - *Salix syrticola* (E)
Red-berried Elder - *Sambucus racemosa subsp. pubens* (E)
American Burnet - *Sanguisorba canadensis* (E)
Southern Sanicula - *Sanicula smallii* (E)
Pitcher Plant - *Sarracenia purpurea* (E)
Early Saxifrage - *Saxifraga virginiensis* (E)
False Melic Grass - *Schizachne purpurascens* (E)
Weak Bulrush - *Schoenoplectus purshianus* (E)
Smith's Bulrush - *Schoenoplectus smithii* (E)
Bulrush - *Scirpus hattorianus* (E)
Bulrush - *Scirpus microcarpus* (E)
Muhlenberg's Nut Rush - *Scleria muhlenbergii* (E)
Carolina Whipgrass - *Scleria pauciflora* (E)
Buffaloberry - *Shepherdia canadensis* (E)
Ovate Catchfly - *Silene ovata* (E)
Royal Catchfly - *Silene regia* (E)
Mountain Blue-eyed Grass - *Sisyrinchium montanum* (E)
American Mountain Ash - *Sorbus americana* (E)
American Burreed - *Sparganium americanum* (E)
Green-fruited Burreed - *Sparganium emersum* (E)
Yellow-lipped Ladies' Tresses - *Spiranthes lucida* (E)
Spring Ladies' Tresses - *Spiranthes vernalis* (E)
Great Chickweed - *Stellaria pubera* (E)
Grass-leaved Lily - *Stenanthium gramineum* (E)
Patterson's Bindweed - *Stylisma pickeringii* (E)
Bigleaf Snowbell Bush - *Styrax grandifolius* (E)
Snowberry - *Symphoricarpos albus var. albus* (E)
Hairy Synandra - *Synandra hispidula* (E)
Fameflower - *Talinum calycinum* (E)
Lakeside Daisy - *Tetraneuris herbacea****** (E)
New York Fern - *Thelypteris noveboracensis* (E)
White Basswood - *Tilia heterophylla* (E)
Pole Manna-grass - *Torreyochloa pallida* (E)
Marsh St. John's Wort - *Triadenum virginicum* (E)
Filmy Fern - *Trichomanes boschianum* (E)
Tufted Bulrush - *Trichophorum cespitosum* (E)

Star-flower - *Trientalis borealis* (E)
Nodding Trillium - *Trillium cernuum* (E)
Ill-scented Trillium - *Trillium erectum* (E)
Green Trillium - *Trillium viride* (E)
Rock Elm - *Ulmus thomasii* (E)
Horned Bladderwort - *Utricularia cornuta* (E)
Small Bladderwort - *Utricularia minor* (E)
Highbush Blueberry - *Vaccinium corymbosum* (E)
Large Cranberry - *Vaccinium macrocarpon* (E)
Small Cranberry - *Vaccinium oxycoccos* (E)
Deerberry - *Vaccinium stamineum* (E)
Marsh Valerian - *Valeriana uliginosa* (E)
Corn Salad - *Valerianella chenopodifolia* (E)
Corn Salad - *Valerianella umbilicata* (E)
American Brooklime - *Veronica americana* (E)
Hairy White Violet - *Viola blanda* (E)
Canada Violet - *Viola canadensis* (E)
Primrose Violet - *Viola primulifolia* (E)
Rusty Woodsia - *Woodsia ilvensis* (E)
White Camass - *Zigadenus elegans* (E)
Pale False Foxglove - *Agalinis skinneriana* (T)
Shadbush - *Amelanchier interior* (T)
Forked Aster - *Aster furcatus* (T)
Kitten Tails - *Besseya bullii* (T)
Decurrent False Aster - *Boltonia decurrens* (T)*****
Southern Grape Fern - *Botrychium biternatum* (T)
Sea Rocket - *Cakile edentula* (T)
Sedge - *Carex atlantica* (T)
Golden Sedge - *Carex aurea* (T)
Sedge - *Carex bromoides* (T)
Fibrous-rooted Sedge - *Carex communis* (T)
Swollen Sedge - *Carex intumescens* (T)
Sharp-scaled Sedge - *Carex oxylepis* (T)
Drooping Sedge - *Carex prasina* (T)
Little Green Sedge - *Carex viridula* (T)
Willdenow's Sedge - *Carex willdenowii* (T)
Pretty Sedge - *Carex woodii* (T)
Water Hickory - *Carya aquatica* (T)
Leatherleaf - *Chamaedaphne calyculata* (T)
Black Cohosh - *Cimicifuga rubifolia* (T)
Pitcher's (Dune) Thistle - *Cirsium pitcheri******
Spotted Coral-root Orchid - *Corallorhiza maculata* (T)
Umbrella Sedge - *Cyperus grayioides* (T)
White Lady's Slipper - *Cypripedium candidum* (T)
French's Shootingstar - *Dodecatheon frenchii* (T)
Narrow-leaved Sundew - *Drosera intermedia* (T)
Beaked Spike Rush - *Eleocharis rostellata* (T)
Bearded Wheat Grass - *Elymus trachycaulus* (T)
Downy Willow Herb - *Epilobium strictum* (T)
Meadow Horsetail - *Equisetum pratense* (T)
Narrow-leaved Sunflower - *Helianthus angustifolius* (T)
Cliff Clubmoss - *Huperzia porophila* (T)
Old Plainsman - *Hymenopappus scabiosaeus* (T)
Ground Juniper - *Juniperus communis* (T)
Tamarack - *Larix laricina* (T)
Pale Vetchling - *Lathyrus ochroleucus* (T)
Pinweed - *Lechea intermedia* (T)
Blazing Star - *Liatris scariosa* var. *nieuwlandii* (T)
Climbing Milkweed - *Matelea obliqua* (T)
Bunchflower - *Melanthium virginicum* (T)
Squirting Cucumber - *Melothria pendula* (T)
Buckbean - *Menyanthes trifoliata* (T)
Slender Sandwort - *Minuartia patula* (T)
Small Sundrops - *Oenothera perennis* (T)
Broomrape - *Orobanche ludoviciana* (T)
Water Elm - *Planera aquatica* (T)
Tubercled Orchid - *Platanthera flava* var. *herbiola* (T)
Grass-leaved Pondweed - *Potamogeton gramineus* (T)
Rock Chestnut Oak - *Quercus montana* (T)
Willow Oak - *Quercus phellos* (T)
Prairie Buttercup - *Ranunculus rhomboideus* (T)
Beaked Rush - *Rhynchospora alba* (T)
Dwarf Raspberry - *Rubus pubescens* (T)
Bristly Blackberry - *Rubus schneideri* (T)
Missouri Orange Coneflower - *Rudbeckia missouriensis* (T)
Blue Sage - *Salvia azurea* subsp. *pitcheri* (T)
Hall's Bulrush - *Schoenoplectus hallii* (T)
Bulrush - *Scirpus polyphyllus* (T)
American Orpine - *Sedum telephioides* (T)
Eastern Blue-eyed Grass - *Sisyrinchium atlanticum* (T)
Cliff Goldenrod - *Solidago sciaphila* (T)
Storax - *Styrax americana* (T)
Sullivantia - *Sullivantia sullivantii* (T)
Small Flower-of-an-hour - *Talinum parviflorum* (T)
False Asphodel - *Tofieldia glutinosa* (T)
Ear-leafed Foxglove - *Tomanthera auriculata* (T)
Prairie Spiderwort - *Tradescantia bracteata* (T)
Buffalo Clover - *Trifolium reflexum* (T)
Common Bog Arrowgrass - *Triglochin maritima* (T)
Slender Bog Arrowgrass - *Triglochin palustris* (T)
Flat-leaved Bladderwort - *Urtica chamaedryoides* (T)

Nettle - *Utricularia intermedia* (T)
Marsh Speedwell - *Veronica scutellata* (T)
Arrowwood - *Viburnum molle* (T)
Dog Violet - *Viola conspersa* (T)

FISH
Lake Sturgeon - *Acipenser fulvescens* (E)
Western Sand Darter - *Ammocrypta clarum* (E)
Bluebreast Darter - *Etheostoma camurum* (E)
Harlequin Darter - *Etheostoma histrio* (E)
Cypress Minnow - *Hybognathus hayi* (E)
Bigeye Chub - *Hybopsis amblops* (E)
Pallid Shiner - *Hybopsis amnis* (E)
Northern Brook Lamprey - *Ichthyomyzon fossor* (E)
Sturgeon Chub - *Macrhybopsis gelida* (E)
Greater Redhorse - *Moxostoma valenciennesi* (E)
River Chub - *Nocomis micropogon* (E)
Pugnose Shiner - *Notropis anogenus* (E)
Bigeye Shiner - *Notropis boops* (E)
Blacknose Shiner - *Notropis heterolepis* (E)
Taillight Shiner - *Notropis maculatus* (E)
Weed Shiner - *Notropis texanus* (E)
Northern Madtom - *Noturus stigmosus* (E)
Pallid Sturgeon - *Scaphirhynchus albus* (E)**
Eastern Sand Darter - *Ammocrypta pellucidum* (T)
Longnose Sucker *Catostomus catostomus* (T)
Cisco - *Coregonus artedi* (T)
Gravel Chub - *Erimystax x-punctatus* (T)
Iowa Darter - *Etheostoma exile* (T)
Banded Killifish - *Fundulus diaphanus*
Starhead Topminnow - *Fundulus dispar* (T)
Least Brook Lamprey - *Lampetra aepyptera* (T)
Redspotted Sunfish - *Lepomis miniatus* (T)
Bantam Sunfish - *Lepomis symmetricus* (T)
River Redhorse - *Moxostoma carinatum* (T)
Ironcolor Shiner - *Notropis chalybaeus* (T)
Blackchin Shiner - *Notropis heterodon* (T)

AMPHIBIANS
Silvery Salamander - *Ambystoma platineum* (E)
Hellbender - *Cryptobranchus alleganiensis* (E)
Spotted Dusky Salamander - *Desmognathus conanti* (E)
Jefferson Salamander - *Ambystoma jeffersonianum* (T)
Eastern Narrowmouth Toad - *Gastrophryne carolinesnsis* (T)
Four-toed Salamander - *Hemidactylium scutatum* (T)
Bird-voiced Treefrog - *Hyla avivoca* (T)
Illinois Chorus Frog - *Pseudacris streckeri* (T)

REPTILES
Spotted Turtle - *Clemmys guttata* (E)
Great Plains Ratsnake - *Elaphe emoryi* (E)
Illinois Mud Turtle - *Kinosternon flavescens* (E)
Alligator Snapping Turtle - *Macrochelys temminckii* (E)
Coachwhip - *Masticophis flagellum* (E)
Broad-banded Watersnake - *Nerodia fasciata* (E)
River Cooter - *Pseudemys concinna* (E)
Eastern Massasauga - *Sistrurus catenatus* (E)***
Kirtland's Snake - *Clonophis kirtlandi* (T)
Timber Rattlesnake - *Crotalus horridus* (T)
Blanding's Turtle - *Emydoidea blandingii* (T)
Western Hognose Snake - *Heterodon nasicus* (T)
Mississippi Green Watersnake - *Nerodia cyclopion* (T)
Flathead Snake - *Tantilla gracilis* (T)
Eastern Ribbon Snake - *Thamnophis sauritus* (T)
Lined Snake - *Tropidoclonion lineatum* (T)

BIRDS
Short-eared Owl - *Asio flammeus* (E)
Upland Sandpiper - *Bartramia longicauda* (E)
American Bittern - *Botaurus lentiginosus* (E)
Swainson's Hawk - *Buteo swainsoni* (E)
Piping Plover - *Charadrius melodus* (E)**
Black Tern - *Chlidonias niger* (E)
Northern Harrier - *Circus cyaneus* (E)
Little Blue Heron - *Egretta caerulea* (E)
Snowy Egret - *Egretta thula* (E)
Mississippi Kite - *Ictinia mississippiensis* (E)
Black Rail - *Laterallus jamaicensis* (E)
Swainson's Warbler - *Limnothlypis swainsonii* (E)
Yellow-crowned Night-heron - *Nyctanassa violacea*
Black-crowned Night-heron - *Nycticorax nycticorax*
Osprey - *Pandion haliaetus* (E)
Wilson's Phalarope - *Phalaropus tricolor* (E)
King Rail - *Rallus elegans* (E)
Least Tern - *Sterna antillarum* (E)**
Forster's Tern - *Sterna forsteri* (E)
Common Tern - *Sterna hirundo* (E)
Bewick's Wren - *Thryomanes bewickii* (E)
Greater Prairie Chicken - *Tympanuchus cupido* (E)
Barn Owl - *Tyto alba* (E)

Yellow-headed Blackbird - *Xanthocephalus xanthocephalus* (E)
Henslow's Sparrow - *Ammodramus henslowii* (T)
Cerulean Warbler - *Dendroica cerulea* (T)
Peregrine Falcon - *Falco peregrinus* (T)
Common Moorhen - *Gallinula chloropus* (T)
Sandhill Crane - *Grus canadensis* (T)
Bald Eagle - *Haliaeetus leucocephalus* (T)
Least Bittern - *Ixobrychus exilis* (T)
Loggerhead Shrike - *Lanius ludovicianus* (T)
Whooping Crane – Grus Americana (Federal non-essential, experimental population)**

MAMMALS

Rafinesque's Big-eared Bat - *Corynorhinus rafinesquii* (E)
Southeastern Myotis - *Myotis austroriparius* (E)
Gray Bat - *Myotis grisescens* (E)**
Indiana Bat - *Myotis sodalis* (E)**
Eastern Woodrat - *Neotoma floridana* (E)
Gray/Timber Wolf - *Canis lupus* (T)
Golden Mouse - *Ochrotomys nuttalli* (T)
Rice Rat - *Oryzomys palustris* (T)
Franklin's Ground Squirrel - *Spermophilus franklinii* (T)

INVERTEBRATES

Redveined Prairie Leafhopper - *Aflexia rubranura* (T)
Slippershell - *Alasmidonta viridis* (T)
Arogos Skipper - *Atrytone arogos* (E)
Isopod - *Caecidotea lesliei* (E)
Isopod - *Caecidotea spatulata* (E)
Swamp Metalmark - *Calephelis muticum* (E)
Anomalous Spring Amphipod - *Crangonyx anomalus* (E)
Packard's Cave Amphipod - *Crangonyx packardi* (E)
Spectaclecase - *Cumberlandia monodonta* (E)***
Purple Wartyback - *Cyclonaias tuberculata* (T)
Fanshell - *Cyprogenia stegaria* (E)**
Iowa Pleistocene Snail - *Discus macclintocki* (E)**
Butterfly - *Ellipsaria lineolata* (T)
Elephant-ear - *Elliptio crassidens* (T)
Spike - *Elliptio dilatata* (T)
Snuffbox - *Epioblasma triquetra* (E)
Hydrobiid Cave Snail - *Fontigens antroecetes* (E)
Ebonyshell - *Fusconaia ebena* (T)
Illinois Cave Amphipod - *Gammarus acherondytes* (E)**
Cobweb Skipper - *Hesperia metea* (T)
Ottoe Skipper - *Hesperia ottoe* (T)

INVERTEBRATES – cont.

Hoary Elfin - *Incisalia polios* (E)
Pink Mucket - *Lampsilis abrupta* (E)**
Wavy-rayed Lampmussel - *Lampsilis fasciola* (E)
Higgins Eye - *Lampsilis higginsii* (E)**
Black Sandshell - *Ligumia recta* (T)
Karner Blue Butterfly - *Lycaeides melissa samuelis* (E)**
Elfin Skimmer - *Nannothemis bella*
Indiana Crayfish - *Orconectes indianensis* (E)
Kentucky Crayfish - *Orconectes kentuckiensis* (E)
Shrimp Crayfish - *Orconectes lancifer* (E)
Bigclaw Crayfish - *Orconectes placidus* (E)
Eryngium Stem Borer - *Papaipema eryngii* (E)
Leafhopper - *Paraphlepsius lupalus* (E)
Orangefoot Pimpleback - *Plethobasus cooperianus* (E)**
Sheepnose - *Plethobasus cyphyus* (E)***
Clubshell - *Pleurobema clava* (E)**
Ohio Pigtoe - *Pleurobema cordatum* (E)
Fat Pocketbook - *Potamilus capax* (E)**
Kidneyshell - *Ptychobranchus fasciolaris* (E)
Rabbitsfoot - *Quadrula cylindrica* (E)
Salamander Mussel - *Simpsonaias ambigua* (E)
Hine's Emerald Dragonfly - *Somatochlora hineana* (E)**
Regal Fritillary - *Speyeria idalia* (T)
Iowa Amphipod - *Stygobromus iowae* (E)
Purple Lilliput - *Toxolasma lividus* (E)
Rainbow - *Villosa iris* (E)
Little Spectaclecase - *Villosa lienosa*

Source: Illinois. Endandered Species Protection Board, One Natural Resources Way, Springfield, IL 62702

APPENDIX D

CRITERIA FOR BEAVER DAM BREACHING/REMOVAL

Beaver dam breaching/removal is generally conducted to maintain existing stream channels and drainage patterns and/or to reduce flood waters. Beaver dams are usually made from natural debris such as logs, sticks, and mud. However, beaver are opportunistic when it come to materials for dam construction and dams may contain man-made materials such as tires, plastic pipe, or plywood. When beaver dams are breached, the material is removed from the approximate center of the dam or the area closest to the existing channel. The dams that WS removes are normally the result of recent beaver activity and the resulting ponds have not been in place long enough to generate characteristics of a true wetland (i.e., hydric soils, hydrophytic vegetation, and hydrology). Beaver dam breaching/removal by hand or with binary explosives does not affect the substrate or the natural course of the stream and returns the area back to its preexisting condition with similar flows and circulations. Because beaver dams involve waters of the United States, dam breaching/removal is regulated under Section 404 of the CWA.

Wetlands are recognized by three characteristics: hydric soils, hydrophytic vegetation, and general hydrology. Hydric soils are either composed of, or have a thick surface layer of, decomposed plant materials (muck); sandy soils have dark stains or streaks from organic material in the upper layer where plant material has attached to soil particles. Hydric soils may be bluish gray or gray below the surface or brownish black to black and commonly smell of rotten eggs. Wetlands also have hydrophytic vegetation present such as cattails, bulrushes, willows (*Salix* sp.), sedges (*Carex* sp.), and water plantains (*Alismataceae*). A final indicator is general hydrology which includes standing and flowing water or waterlogged soils during the growing season; high water marks often are present on trees and drift lines of small piles of debris are usually present. Beaver dams usually will develop a layer of organic material at the surface. Silt deposits can occur rapidly, but aquatic vegetation and high water marks (a new high water mark is created by the beaver dam) are usually not present. However, cattails and willows can show up rapidly if they are in the vicinity, but most hydrophytic vegetation takes time to establish.

In most beaver dam breaching/removal operations, the material that is displaced is exempt from permitting or included in a NWP in accordance with Section 404 of the CWA (33 CFR Part 323). A permit would be required if the impoundment caused by a beaver dam was not covered under a NWP or permitting exemption and was a true wetland. WS biologists and specialists survey the beaver dam site and impoundment to determine if conditions exist for classifying the site as a true wetland. If wetland conditions exist, the landowner or cooperator is asked the approximate age of the dam or how long he/she has known of its presence. This information is useful in determining if Swampbuster, Section 404 permit exemptions, or nationwide permits will allow breaching/removal of the beaver dam. If it is determined that a dam cannot be removed or breached under provisions provided by Swampbusters, 404 permit exemption or NWP, the landowner or cooperator is responsible for obtaining a Section 404 permit before the dam could be breached/removed by WS.
The following explains Section 404 exemptions and conditions that pertain to the breaching/removal of beaver dams.

33 CFR 323 - Permits For Discharges of Dredged or Fill Material into Waters of the United States. This regulation provides guidance to determine whether certain activities require permits under Section 404.

> **Part 323.4 Discharges not requiring permits.** This section establishes exemptions for discharging certain types of fill into waters of the United States without a permit. Certain minor drainage activities connected with normal farming, ranching, and silvicultural practices do not require a permit as long as these drainages do not include the immediate or gradual conversion of a wetland (i.e., beaver ponds greater than three years old) to a non-wetland. Specifically, part (a)(1)(iii)(C)(i) states, "...*fill material incidental to connecting upland drainage facilities* (e.g.,

drainage ditches) *to waters of the United States, adequate to effect the removal of excess soil moisture from upland croplands*...". This indicates that beaver dams that block ditches, canals, or other structures designed to drain water from upland crop fields can be breached without a permit.

Moreover, (a)(1)(iii)(C)(iv) states the following types of activities do not require a permit. "*The discharges of dredged or fill materials incidental to the emergency removal of sandbars, gravel bars, or other similar blockages which are formed during flood flows or other events, where such blockages close or constrict previously existing drainage ways and, if not promptly removed, would result in damage to or loss of existing crops or would impair or prevent the plowing, seeding, harvesting or cultivating of crops on land in established use for crop production. Such removal does not include enlarging or extending the dimensions of, or changing the bottom elevations of, the affected drainage way as it existed prior to the formation of the blockage. Removal must be accomplished within one year of discovery of such blockages in order to be eligible for exemption.*" This allows the breaching of beaver dams in natural streams to restore drainage of agricultural lands within one year of discovery.

Part 323.4 (a)(2) allows "*Maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, bridge abutments or approaches, and transportation structures. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period of time after damage occurs in order to qualify for this exemption.*" This allows beaver dams to be breached without a permit where they have resulted in damage to roads, culverts, bridges, or levees if it is done in a reasonable amount of time.

33 CFR 330 – Nationwide Permit Program

The USACE, Chief of Engineers is authorized to grant certain dredge and fill activities on a nationwide basis if they have minimal impact on the environment. Nationwide Permit Program are listed in Appendix A of 33 CFR 330 and those permitted must satisfy all terms and conditions established to qualify for their use. Individual beaver dam breaching by WS may be covered by any of the following NWP if not already exempted from permit requirements by the regulations discussed above. WS complies with all conditions and restrictions placed on NWP for any instance of beaver dam breaching/removal done under a specific NWP.

Nationwide permits can be used **except** in any component of the National Wild and Scenic River System such as waterways listed as an "*Outstanding Water Resource*", or any water body which is part of an area designated for *"Recreational or Ecological Significance"*.

NWP 3 authorizes the rehabilitation of those structures, such as culverts, homes, and bridges, destroyed by floods and "discrete events," such as beaver dams, provided that the activity is commenced within two years of the date when the beaver dam was established.

NWP 18 allows minor discharges of dredged and fill material, including the breaching of beaver dams, into all waters of the United States provided that the quantity of discharge and the volume of excavated area does not exceed 10 cubic yards below the plane of the ordinary high water mark (this is normally well below the level of the beaver dam) or is in a "special aquatic site" (wetlands, mudflats, vegetated shallows, riffle and pool complexes, sanctuaries, and refuges). The District Engineer must be "notified" (general conditions for notification apply), if the discharge is between 10-25 cubic yards for a single project or the project is in a special aquatic site and less than $^{1}/_{10}$ of an acre is expected to be lost. If the values are greater than those given, a permit is required. Beaver dams rarely would exceed two or three cubic yards of backfill into the waters and probably no more than five cubic yards would ever be exceeded. Therefore, this stipulation is

not restrictive. Beaver dams periodically may be breached in a special aquatic area, but normally the aquatic site will be returned to normal. However, if a true wetland exists, and beaver dam breaching/removal is not allowed under another permit, then a permit must be obtained from the District Engineer.

NWP 27 provides for the discharge of dredge and fill for activities associated with the restoration of wetland and riparian areas with certain restrictions. On non-federal public and private lands, the owner must have: a binding agreement with USFWS or NRCS to conduct restoration; a voluntary wetland restoration project documented by NRCS; or notify the District Engineer according to "notification" procedures. On federal lands, including USACE and USFWS, wetland restoration can take place without any contract or notification. This NWP "*...applies to restoration projects that serve the purpose of restoring "natural" wetland hydrology, vegetation, and function to altered and degraded non-tidal wetlands and "natural" functions of riparian areas. This NWP does not authorize the conversion of natural wetlands to another aquatic use*..." If operating under this permit, the breaching/removal of a beaver dam would be allowed as long as it was not a true wetland. Non-federal public and private lands require the appropriate agreement, project documentation, or notification to be in place.

APPENDIX E

17 ILLINOIS ADMINISTRATIVE CODE CHAPTER 1 SECTION 1080: INCIDENTAL TAKING OF ENDANGERED OR THREATENED SPECIES

Incidental taking of endangered and threatened species shall be authorized by the IDNR only if the applicant submits to the Department a conservation plan that satisfies all criteria established in this Part.

A) A conservation plan submitted to the IDNR as the application for authorization for incidental taking of an endangered or threatened species shall, at a minimum, include:

1) A description of the impact likely to result from the proposed taking of the species that would be covered by the authorization, including but not limited to:

a) legal description, if available, or detailed description including street address and map of the area to be affected by the proposed action and indicia of ownership or control of affected property;
b) biological data on the affected species; on Request of the applicant, the Department shall provide biological data in the Department's possession on the affected species;
c) description of the activities that will result in taking of an endangered or threatened species; and
d) explanation of the anticipated adverse effects on listed species.

2) Measures the applicant will take to minimize and mitigate that impact and the funding that will be available to undertake those measures, including, but not limited to:

a) plans to minimize the area affected by the proposed action, the estimated number of individuals of an endangered or threatened species that will be taken and the amount of habitat affected
b) plans for management of the area affected by the proposed action that will enable continued use of the area by endangered or threatened species;
c) description of all measures to be implemented to minimize or mitigate the effects of the proposed action on endangered or threatened species;
d) plans for monitoring the effects of measures implemented to minimize or mitigate the effects of the proposed action on endangered or threatened species;
e) adaptive management practices that will be used to deal with changed or unforeseen circumstances that affect the effectiveness of measures instituted to minimize or mitigate the effects of the proposed action on endangered or threatened species; and
f) verification that adequate funding exists to support and implement all mitigation activities described in the conservation plan. This may be in the form of bonds, certificates of insurance, escrow accounts \ or other financial instruments adequate to carry out all aspects of the conservation plan.

3) A description of alternative actions the applicant considered that would not result in take, and the reasons that each of those alternatives was not selected. A "no-action" alternative shall be included in this description of alternatives.

4) Data and information to indicate that the proposed taking will not reduce the likelihood of the survival of the endangered or threatened species in the wild within the State of Illinois, the biotic community of which the species is a part or the habitat essential to the species existence in Illinois.

5) An implementing agreement, which shall include, but not be limited to:

a) the names and signatures of all participants in the execution of the conservation plan;
b) the obligations and responsibilities of each of the identified participants with schedules and deadlines for completion of activities included in the conservation plan and a schedule for preparation of progress reports to be provided to the Department;
c) certification that each participant in the execution of the conservation plan has the legal authority to carry out their respective obligations and responsibilities under the conservation plan;
d) assurance of compliance with all other federal, State and local regulations pertinent to the proposed action and to execution of the conservation plan; and
e) copies of any final federal authorizations for a taking already issued to the applicant, if any.

B) The Department, after review and public comment, may require additional measures as necessary or appropriate to the success of the conservation plan. Requirements for additional measures shall be based on the life history needs of the species involved.

C) A Habitat Conservation Plan approved by the U.S. Fish and Wildlife Service pursuant to Section 10 of the Endangered Species Act of 1973 [26 USC 1539], and amendments thereto, may be submitted in lieu of the conservation plan described in this Section.

D) Authorization to take an endangered or threatened species under the terms of a B.O. issued by the U.S. Fish and Wildlife Service pursuant to Section 7 of the Endangered Species Act of 1973 [26 USC 1536], and amendments thereto, or regulations implementing Section 7 [50 CFR 402] may be submitted in lieu of the conservation plan described in this Section.

A quick response without delays resulting from permitting requirements can be critical to the success of minimizing or preventing aquatic rodent damage. Damage often escalates the longer an area remains flooded. Exemptions contained in the above regulations or NWP provide for the breaching/removal of the majority of beaver dams that Illinois WS encounters. The primary determination that must be made by WS personnel is whether a beaver impounded area meets the criteria to be classified as a true wetland or is the area a more recently flooded site lacking true wetland characteristics. Flexibility allowed by these exemptions and NWP is important for the efficient and effective resolution of many beaver damage problems.

APPENDIX F

TITLE 17: CONSERVATION CHAPTER 1: DEPARTMENT OF NATURAL RESOURCES SUBCHAPTER B: FISH AND WILDLIFE PART 525: NUISANCE WILDLIFE CONTROL PERMITS

Section 525.10 Purpose

This Part has been established to govern the taking, possession, transport, and disposition of Protected Species as defined by Section 2.2 of the Wildlife Code [520 ILCS 5/2.2] which are causing damage to property or a risk to human health or safety and the issuance of Nuisance Wildlife Control Permits. Drainage Districts controlling beavers under authority of the Wildlife Code [520 ILCS 5/2.37] and recipients of Nuisance Animal Removal Permits, Deer Removal Pemits and Deer Population Control Permits are exempt from the provisions of this Part.

Section 525.20 Requirements and Application

a) Any individual desiring to control Protected Species which are causing damage to property or a risk to human health or safety on the land of another, for a fee, must first obtain a valid Class A Nuisance Wildlife Control Permit from the Department. Taking any protected species in violation of this subsection is a Class B misdemeanor (see 520 ILCS 5/2.33, 2.33(a)). Control of white-tailed deer and threatened or endangered species is prohibited except as provided for in Section 525.30(h). Unlawful taking of white-tailed deer is a Class B misdemeanor (see 520 ILCS 5/2.24), as is unlawful taking of migratory birds (see 520 ILCS 5/2.18). Unlawful taking of an endangered species is a Class A misdemeanor (see 520 ILCS 10/9).

b) Any person desiring to control Protected Species which are causing damage to property or a risk to human health or safety on the land of another, at no charge, must first obtain a valid Class B Nuisance Wildlife Control Permit from the Department. Not-for-profit (501(c)(3)) zoos and botanical gardens desiring to control protected species that are causing damage to property or are a risk to human health or safety on lands owned by that entity must first obtain a valid Class B Nuisance Wildlife Control Permit from the Department. Control of white-tailed deer and migratory, threatened, or endangered species is prohibited except as provided for in Section 525.30(h). Unlawful taking of white-tailed deer is a Class B misdemeanor (see 520 ILCS 5/2.24), as is unlawful taking of an endangered species (see 520 ILCS 5/2.18). Unlawful taking of migratory birds is a Class B misdemeanor (see 520 ILCS 10/9).

c) Any governmental body desiring to control Protected Species which are causing damage to property or a risk to human health or safety on lands governed, owned or managed by that governmental body must first obtain a valid Class C Nuisance Wildlife Control Permit from the Department. Control of white-tailed deer and migratory, threatened, or endangered species is prohibited except as provided for in Section 525.30(h). Unlawful taking of white-tailed deer is a Class B misdemeanor (see 520 ILCS 5/2.24), as is unlawful taking of an endangered species (see 520 ILCS 5/2.18). Unlawful taking of migratory birds is a Class B misdemeanor (see 520 ILCS 10/9).

d) Permit Procedures

1) To be eligible for a Class A or Class B Nuisance Wildlife Control Permit the applicant must be at least 18 years of age.
2) Application for a Nuisance Wildlife Control Permit shall be made on forms provided by the Department's Division of Wildlife Program Development and Coordination and shall be obtained by submitting a request to the Division.
3) The Department shall issue a Class A Nuisance Wildlife Control Permit to an individual provided the applicant has:

A) met eligibility requirements as per this Section;
B) passed a written examination administered by the Department which tests the applicant's knowledge and understanding of:

i) this Part;
ii) the Wildlife Code [520 ILCS 5/2.37];
iii) Illinois List of Endangered and Threatened Fauna (17 Ill. Adm. Code 1010);
iv) the Illinois Dead Animal Disposal Act [225 ILCS 610];
v) "Specifications for the Humane Handling, Care, Treatment, and Transportation of Warmblooded Animals Other Than Dogs, Cats, Rabbits, Hamsters, Guinea Pigs, Nonhuman Primates, and Marine Mammals" (Subpart F, Subchapter A, ch. 1, Title 9 CFR, 2004) (no later editions or amendments are included);
vi) Disease Free Certification and Quarantine Provisions for Propagation, Release, Importation, Exportation, and Transportation of Game Mammals, Game Birds, Migratory Birds, or Exotic Wildlife (17 Ill. Adm. Code 630); and
vii) Diseases, life cycles, habits, and habitats of common Illinois wildlife as well as methods of preventing or controlling damage and risks to human health or safety.

C) completed a Hunter Safety Course administered by the Department or provided proof of equivalent training if guns are to be used to take or euthanize animals.

4) Each new applicant or person whose permit has been revoked or has expired shall be required to answer correctly at least 80% of the questions on the closed-book examination. Applicants failing the required examination may repeat the exam after 45 days. Should a second failure occur, a six-month waiting period from the date of the second exam is required. The examination sequence can be repeated no more than twice during any two-year period.

5) The Department shall issue a Class B Nuisance Wildlife Control Permit to an individual provided the applicant has:

A) met eligibility requirements as per this Section;

B) successfully completed an interview during which a representative of the Division of Wildlife Resources has determined the applicant's knowledge of wildlife and wildlife capture techniques sufficient to render services as provided for in this Section; and

C) completed a Hunter Safety Course administered by the Department or provided proof of equivalent training if guns are to be used to take or euthanize animals.

6) The Department shall issue a Class B Nuisance Wildlife Control Permit to a not-for-profit (501(c)(3)) zoo provided that entity is accredited by the American Zoological Association and a staff member in charge of nuisance wildlife control activities complies with provisions set forth in Section 525.20(d)(5). The Department shall issue a Class B Nuisance Wildlife Control Permit to a not-for-profit (501(c)(3)) botanical garden provided that entity is a member of the American Arboreta and Botanic Garden Association and a staff member in charge of nuisance wildlife control activities complies with provisions set forth in Section 525.20(d)(5). Authorization granted to not-for-profit zoos and botanical gardens is limited to properties owned by those entities and subject to refusal, r revocation and/or suspension pursuant to Sections 525.20(e), 525.30(q), and 525.40.

7) The Department shall issue a Class C Nuisance Wildlife Control Permit to a governmental body upon application.

e) Violation of the Illinois Endangered Species Protection Act [520 ILCS 10], the Fish Code of 1971 [520 ILCS 5] or the Wildlife Code [520 ILCS 5] during the three years prior to application for a Class A or Class B Nuisance Wildlife Control Permit shall be grounds for refusal to issue said permit.

f) Final judgment of applications shall be made by the Chief, Division of Wildlife Program Development and Coordination, or his designee, based on criteria contained in subsection (d).

g) Providing deceptive or false information on an application is a Class A misdemeanor (see 520 ILCS 5/2.38).

Section 525.30 General Provisions

a) Nuisance Wildlife Control Permits shall be issued on an annual basis and expire January 31 of each year. Nuisance Wildlife Control Permits are not transferable. Permitted Nuisance Wildlife Control is governed solely by Sections 2.37 and 2.38 of the Wildlife Code [520 ILCS 5/2.37 and 2.38] and this Part. All other provisions of The Game Protective Regulations of the Wildlife Code [520 ILCS 5] do not apply.

b) Under no circumstances shall a Nuisance Wildlife Control Permit be used in lieu of a scientific collector's permit or sport or commercial licenses.

c) Permittee's method of taking fauna must be approved by the Department. Approved methods include, but are not limited to trapping and shooting. In addition,

1) Only the following devices shall be used for land sets:

A) box traps, cage traps or traps of similar design;

B) EGG traps®, D-P® (Dog-Proof) traps or traps of similar design with a single access opening no larger than three square inches;

C) cushion-hold traps with no modifications from the manufacturer's specifications other than the addition of auxiliary springs and/or swivels. "Cushion-hold trap" means an approved, commercially manufactured trap of the spring-loaded type with offset jaws designed to capture an animal by closing upon one of its limbs and that is so constructed that the edges

designed to touch the animal are composed of a non-metallic substance that eliminates or mitigates injury to the trapped animal; and

D) body-gripping traps powered by two springs and having an inside jaw spread no larger than 25 square inches may be used if set inside a residence at least four inches from any outside surface of the structure or set outdoors at least eight feet from the ground and enclosed in a tube, cylinder or open-ended box constructed of solid wood, metal or plastic such that the trigger of the trap is located at least twelve inches from any entrance to the enclosure in which it is set.

E) Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(a)).

2) Body-gripping traps, cushion-hold traps, leghold traps, EGG® traps and D-P® (Dog-Proof) traps or traps of similar design, Bailey beaver traps or traps of similar design, Snead colony traps or traps of similar design, and cage traps, box traps or traps of similar design may be used for water sets. Snares that are not powered by springs or other mechanical devices shall be used for water sets only if at least one-half of the snare noose loop is located under water at all times; the noose loop diameter is not greater than 15 inches (38.1 CM); the snare is equipped with a mechanical lock, anchor swivel, and stop device to prevent the mechanical lock from closing the noose loop to a diameter of less than 2½ inches (6.4 CM); the cable diameter is not less than 5/64 inch (2.0 MM) but not greater than ⅛ inch (3.2 MM); and the snare is not constructed of stainless steel metal cable or wire. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(a)).

3) It is unlawful to fail to visit and remove all animals from traps staked out, set, used, tended, placed or maintained at least once each calendar day. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(a)).

4) It is unlawful for any person to place, set, use, or maintain any trap or snare that is not tagged, inscribed, or otherwise identified with the permittee's name and address. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(a)).

5) It is unlawful for any person to place, set, use, or maintain a cushion-hold trap or leghold trap, in water, that has an inside jaw spread larger than 7½ inches (19.1 CM), or a body-gripping trap having an inside jaw spread larger than 144 square inches. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(a)).

6) It is unlawful for any person to place, set, use, or maintain a cushion-hold trap, on land, that has an inside jaw spread larger than 6½ inches (16.6 CM). Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(a)).

7) It is unlawful to use any trap with saw-toothed, serrated, spiked, or toothed jaws. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(a)).

8) It is unlawful to place, set, or maintain any leghold trap or cushion-hold trap within 30 feet (9.14 m) of bait placed in such a manner or position that it is not completely covered and concealed from sight, except that this shall not apply to underwater sets. Bait shall mean and include any bait composed of mammal, bird, or fish flesh, fur, hide, entrails, or feathers. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(a)).

9) It is unlawful to use any deadfall, pit trap, spear, gig, hook, crossbow, poison, chemical, explosive or any like device to take any Protected Species, except that commercially available gas cartridges that emit carbon monoxide or carbon dioxide as

primary lethal agents may be used according to the manufacturer's specifications. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(a)).

10) It is unlawful for any person, except persons permitted by law, to have or carry any gun in or on any vehicle, conveyance or aircraft, unless such gun is unloaded and enclosed in a case. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(n)).

11) It is unlawful to fire a rifle, pistol, revolver, or airgun on, over or into any waters of this State, including frozen waters. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(q)).

12) It is unlawful to discharge any gun along, upon, across, or from any public right-of-way or highway in this State. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(r)).

13) It is unlawful to use a silencer or other device to muffle or mute the sound of the explosion or report resulting from the firing of any gun. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(s)).

14) It is unlawful for any person to remove animals from or to move or disturb in any manner, the traps owned by another person without written authorization of the owner to do so. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(v)).

15) It is unlawful for any person to wantonly or carelessly injure or destroy, in any manner whatsoever, any real or personal property on the land of another while engaged in activities permitted by this Section. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(x)).

16) It is unlawful for any person to take any Protected Species during the gun deer hunting season in those counties open to gun deer hunting, unless he wears, when in the field, a cap and outer garment of a solid blaze orange color, with such articles of clothing displaying a minimum of 400 square inches of blaze orange material. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(ff)).

17) The use of guns shall be subject to all State restrictions.

18) The use of guns shall be subject to municipal restrictions unless otherwise authorized in writing by an official of the municipality.

d) Taking of fauna on private properties by Class A and Class B permittees requires the landowner's or tenant's written permission. Class B not-for-profit permittees are restricted to taking nuisance fauna only on the lands owned by the not-for-profit entity. Nothing in this Part allows the taking of wildlife on the property of another without permission from the landowner or tenant. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33(t)).

e) Taking of fauna on State-owned or -managed lands requires written authorization from the Site Superintendent or District Wildlife Habitat Biologist. Violation is a Class B misdemeanor (see 520 ILCS 835/6).

f) Permittees shall describe to the persons seeking services the estimated cost and type of control methods to be used to relieve the nuisance problem and/or to alleviate damage to livestock, crops, or property.

g) The Nuisance Wildlife Control Permit must be carried on the person at all times when taking or transporting fauna and be presented, upon request, to any

authorized employee of the Department or any peace officer. Violation is a petty offense (see 520 ILCS 5/2.37).

h) The taking of white-tailed deer, endangered species, threatened species or other species protected by Federal regulations is prohibited except for the salvage and disposal of dead white- tailed deer in accordance with subsection (k) of this Section.

i) All fur-bearing mammals [520 ILCS 5/1.2g] and game mammals [520 ILCS 5/1.2h] that are not endangered or threatened (17 Ill. Adm. Code 1010) and are taken under authority of this Part must be released alive or euthanized except that:

1) striped skunks must be euthanized; and

2) raccoons must be euthanized or released on the same property and within 100 yards of where they were captured, or surrendered to a licensed veterinarian who is a licensed wildlife rehabilitator for euthanasia or treatment and release. Release may only be after an observation period of at least 45 days. During observation, raccoons may be housed at any properly licensed rehabilitator. Violation is a petty offense (see 520 ILCS 5/2.37).

All other Protected Species must be released alive or surrendered to a licensed rehabilitator. Violation is a Class B misdemeanor (see 520 ILCS 5/2.33).

j) Methods of euthanizing animals must be approved by the Department and include such methods as:

1) captive bolt, gunshot, drowning, and stunning (mechanical only);

2) inhalants, including halothane, isoflurane, carbon monoxide, and carbon dioxide; and

3) non-inhalants including Secobarbital/dibucaine.

k) All dead animals must be transferred to a licensed renderer or disposed of in accordance with the Illinois Dead Animal Disposal Act [225 ILCS 610]. Violation is a Class C misdemeanor (see 225 ILCS 610/19).

l) Animals, animal parts and animal by-products taken under authority of this Part may not be sold, offered for sale, bartered or shipped for the purpose of sale or barter. Violation is a Class A misdemeanor (see 520 ILCS 5/2.36).

m) All animals released alive must be re-located into suitable habitat in the State of Illinois within 24 hours after capture. Except as provided for in subsection (i) of this Section, the release site must be located at least 10 but not more than 40 miles from the capture site unless the Department grants specific authority to release animals greater than 40 miles from the capture site and the animals are certified disease-free as provided for in 17 Ill. Adm. Code 630. Animals captured by duly appointed representatives of municipalities shall be re-located into suitable habitat less than 10 miles from the capture site if this subsection would require the release of animals on lands outside their jurisdiction. Violation is a petty offense (see 520 ILCS 5/2.37).

n) Temporary holding facilities must meet U.S. Department of Agriculture standards for animal welfare as specified in "Specifications for the Humane Handling, Care, Treatment, and Transportation of Warmblooded Animals Other Than Dogs, Cats,

Rabbits, Hamsters, Guinea Pigs, Nonhuman Primates, and Marine Mammals" (subpart F, subchapter A, ch. 1, Title 9 CFR, 2004) (no later editions or amendments are included). Violation is a petty offense (see 520 ILCS 5/2.37).

o) Release of fauna onto public or private land requires written authorization from the site superintendent, tenant, or landowner. In the event that threatened or endangered species are involved, the release shall be directed by the Endangered and Threatened Species Conservation Program Coordinator, Division of Resource Stewardship and Protection, Department of Natural Resources, One Natural Resources Way, Springfield, Illinois 62702-1271. Violation is a petty offense (see 520 ILCS 5/2.37).

p) Permittees who rent, lend or otherwise transfer traps to clients, citizens, or other parties who are not under their direct supervision and have not obtained a Nuisance Wildlife Control Permit or a Nuisance Animal Removal Permit are responsible for any damages or violations of this Section that are perpetrated by the other party. Any animals taken by a second party must be reported by the permittee in accordance with subsection (q). Failure to comply with this Part shall result in permit suspension or revocation in accordance with Section 525.40.

q) All permittees shall maintain records and submit an annual report to the Department showing the following information: total number of complaints received, number of complaints serviced, county of residence, name, address, and phone number of the permittee, number and kinds of animals relocated, name, address, and phone number of any site supervisor, tenant or landowner on whose property animals were released, locations where animals were released, and number and kinds of all animals euthanized. This report shall be made on or before January 20 and shall include all operations for the period from January 1 through December 31 of the previous year. All such reports and records required by this Section shall be available for inspection by any officer or authorized employee of the Department, any sheriff, deputy sheriff, or any other peace officer at any reasonable time when request is made for same. Failure to comply with the provisions of this Section shall bar the permittee from obtaining a Nuisance Wildlife Control Permit for the following year.

r) It shall be unlawful for any person to represent himself or herself falsely to be an authorized employee of the Department, or to assume to act as such without having been duly appointed and employed as such. Violation is a petty offense (see 520 ILCS 5/1.23).

s) A Class A Nuisance Wildlife Control Permittee is an industrial user as listed in the Hypodermic Syringes and Needles Act [720 ILCS 635].

Section 525.40 Revocation and Suspension of Permits – Hearings and Appeals

In accordance with Section 3.36 of the Wildlife Code [520 ILCS 5/3.36], failure to comply with the provisions of the Nuisance Wildlife Control Permit, portions of the Wildlife Code of Illinois pertaining to Nuisance Wildlife Control Permits, and this Part or providing false information to obtain a Nuisance Wildlife Control permit shall result in suspension and revocation of the Nuisance Wildlife Control Permit. Suspension of the Nuisance Wildlife Control Permit shall be for a period of not less than one year. Upon receiving three or more complaints about services rendered by a permittee, the Department shall review allegations and shall immediately suspend the permit of said person for a period not to exceed 90 days pending an investigation. The procedure by which suspensions and revocations are made, the rights of

permittees to notice and hearing; and the procedures governing such hearings are set forth in 17 Ill. Adm. Code 2530.

Illinois Compiled Statutes Chapter 520: Wildlife Section 5: Wildlife Code

520 ILCS 5/2.37. Permit to Take, Kill, or Capture Wild Animal Damaging Property.

Authority to kill wildlife responsible for damage. Subject to federal regulations and Section 3 of the Illinois Endangered Species Act, the Department may authorize owners and tenants of lands or their agents to remove or destroy any wild bird or wild mammal when the wild bird or wild mammal is known to be destroying property or causing a risk to human health or safety upon his or her land. Upon receipt by the Department of information from the owner, tenant, or sharecropper that any one or more species of wildlife is damaging dams, levees, ditches, or other property on the land on which he resides or controls, together with a statement regarding location of the property damages, the nature and extent of the damage, and the particular If, after investigation, the Department finds that damage does exist and can be abated only by removing or destroying that wildlife, a permit shall be issued by the Department to remove or destroy the species responsible causing the damage. A permit to control the damage shall be for a period of up to 90 days, shall specify the means and methods by which and the person or persons by whom the wildlife may be removed or destroyed, and shall set forth the disposition procedure to be made of all wildlife taken and other restrictions the Director considers necessary and appropriate in the circumstances of the particular case. Whenever possible, the specimens destroyed shall be given to a bona-fide public or State scientific, educational, or zoological institution. The permittee shall advise the Department in writing, within 10 days after the expiration date of the permit, of the number of individual species of wildlife taken, disposition made of them, and any other information which the Department may consider necessary. Subject to federal regulations and Section 3 of the Illinois Endangered Species Act, the Department may grant to an individual, corporation, association or a governmental body the authority to control species protected by this Code. The Department shall set forth applicable regulations in an Administrative Order and may require periodic reports listing species taken, numbers of each species taken, dates when taken, and other pertinent information. Drainage Districts shall have the authority to control beaver provided that they must notify the Department in writing that a problem exists and of their intention to trap the animals at least seven days before the trapping begins. The District must identify traps used in beaver control outside the dates of the furbearer trapping season with metal tags with the district's name legibly inscribed upon them. During the furtrapping season, traps must be identified as prescribed by law. Conibear traps at least size 330 shall be used except during the statewide furbearer trapping season. During that time trappers may use any device that is legal according to the Wildlife Code. Except during the statewide furbearer trapping season, beaver traps must be set in water at least 10 inches deep. Except during the statewide furbearer trapping season, traps must be set within 10 feet of an inhabited bank burrow or house and within 10 feet of a dam maintained by a beaver. No beaver or other furbearer taken outside of the dates for the furbearer trapping season may be sold. All animals must be given to the nearest conservation officer or other Department of Natural Resources representative within 48 hours after they are caught. Furbearers taken during the fur trapping season may be sold provided that they are taken by persons who have valid trapping licenses in their possession and are lawfully taken. The District must submit an annual report showing the species and numbers of animals caught. The report must indicate all species which were taken.

520 ILCS 5/2.38

No person at any time shall:

1) Falsify, alter or change in any manner, or provide deceptive or false information required for, any license, permit or tag issued under the provisions hereof;

2) Falsify any record required by this act;

3) Counterfeit any for of license, permit or tag provided for this act;

4) Loan or transfer to another person any license, permit or tag issued under this act; or

5) Use in the field any license, permit or tag issued to another person.

It is unlawful to possess any license, permit or tag issued under the provisions knew, or should have known, was falsified, altered, changed in any manner or fraudulently obtained. The department shall suspend privileges, under this Act, of any person found guilty of violating this section for a period of not less than one year.