

ENVIRONMENTAL ASSESSMENT

**An Integrated Wildlife Damage Management Approach
for the Management of White-tailed Deer Damage
In the State of Illinois**

Prepared By:
**UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES**

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ACRONYMS

ADC	Animal Damage Control
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
ESA	Endangered Species Act
FY	Fiscal Year
IWDM	Integrated Wildlife Damage Management
IDA	Illinois Department of Agriculture
IDNR	Illinois Department of Natural Resources
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
SOP	Standard Operating Procedures
T&E	Threatened and Endangered
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
WS	Wildlife Services

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

NOTE: Upon examining this document, you will note that some information has been removed. This is in compliance with an injunction granted to the American Farm Bureau and Texas Farm Bureau (February 9, 2000), which states that Wildlife Services (WS) is restrained and prohibited from releasing to third parties any private information. The injunction identifies private information as “any information that allows the recipient of it to obtain or deduce the specific identity or personal identifying information of the entities who have requested, executed cooperative agreements with or otherwise allowed WS to enter their property for any purpose.” Third parties are “individuals, groups, agencies, including but not limited to animal rights groups.” Therefore, cooperators’ private information has been removed from the Environmental Assessment.

1.0 CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

Within Illinois and 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 wildlife thereby increasing the potential for conflicting human/wildlife interactions. In addition, segments of the public desire protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. 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):

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

Wildlife damage management is the science of reducing damage or other problems caused by wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1992). Wildlife Services (WS) uses an Integrated Wildlife Damage Management (IWDM) approach, known as Integrated Pest Management (WS Directive 2.105¹), in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1:1-7 of USDA (1997). These methods may include alteration of cultural practices and habitat and behavioral modification to prevent or reduce damage. The reduction of wildlife damage may require that the local populations of offending animal(s) be reduced through lethal means.

This environmental assessment (EA) documents the analysis of the potential environmental effects of a proposed Illinois WS integrated white-tailed deer (*Odocoileus virginians*) damage management program to alleviate damage to agriculture, property, natural resources, and human health and safety. This analysis relies mainly on existing data contained in published documents (Appendix A), including the *Animal Damage Control Program Final Environmental Impact Statement* (USDA 1997) to which this EA is tiered. USDA (1997) may be obtained by contacting the USDA, Animal and Plant Health Inspection Service (APHIS), WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737.

WS is the federal agency directed by law and authorized to protect American resources from damage associated with wildlife (Animal Damage Control Act of March 2, 1931, as amended 46 Stat. 1486; 7 USC. 426-426c and the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988, Public law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 USC 426C)). To fulfill this Congressional direction, WS activities are conducted to prevent or reduce wildlife damage caused to agricultural,

¹ WS Policy Manual - Provides guidance for WS personnel to conduct wildlife damage management activities through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Appendix.

industrial and natural resources, property, and threats to public health and safety on private and public lands in cooperation with federal, State, and local agencies, private organizations, and individuals. Therefore, wildlife damage management is not based on punishing offending animals but on reducing damage and is used as part of the WS Decision Model (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's vision is to improve the coexistence of people and wildlife, and its mission is to provide federal leadership in managing problems caused by wildlife.

Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded (7 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. All wildlife damage management that would take place in Illinois would be undertaken according to relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA). Notice of the availability of this document will be made available consistent with the agency's NEPA procedures.

WS is a cooperatively funded, service-oriented program from which other governmental agencies and entities may request assistance. Before any wildlife damage management is conducted, Cooperative Agreements, Agreements for Control, or other comparable documents are in place. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently according to applicable federal, State, and local laws and Memorandums of Understanding (MOUs) between WS and other agencies. WS's mission, developed through its strategic planning process, 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's Policy Manual reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats to humans from wildlife;
- Collection, evaluation, and dissemination of 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 1999a).

1.1 PROPOSED ACTION

Wildlife Services proposes to continue the current program that administers an Integrated Wildlife Damage Management (IWDM) approach to alleviate white-tailed deer damage to agriculture, property, natural resources, and human health and safety in Illinois. An IWDM approach would be implemented on all private and public lands of Illinois where a need exists, a request is received, and funding is available. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, other species, and the environment. Under this action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, habitat modifications, harassment, repellants, and

physical exclusion could be recommended and utilized to reduce deer damage. In other situations, deer would be removed as humanely as possible by sharpshooting or as otherwise authorized on permits issued by the Illinois Department of Natural Resources (IDNR). 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 there could be instances where application of lethal methods alone would be the most appropriate strategy. Appendix B describes the methods available for recommendation and use by WS under this alternative. Deer damage management would be conducted in the State, when requested, on private or public property after an *Agreement for Control* or other comparable document has been completed. All deer damage management would be consistent with other uses of the area and would comply with appropriate federal, State, and local laws.

1.2 PURPOSE

The purpose of white-tailed deer damage management in Illinois is primarily directed towards the alleviation of deer damage to agricultural resources, damage to urban/suburban landscaping, damage to property and human safety from deer-vehicle and deer-aircraft collisions, and concerns about the spread of disease. Under the Proposed Action, deer damage management could be conducted on private, federal, State, tribal, county, and municipal lands in the state of Illinois upon request for WS assistance.

1.2.1 Background and Need for Action

1.2.1.1 Deer Damage to Agriculture

Conover (1997) estimates that deer cause \$100 million in damage to agricultural productivity annually. Deer are most often cited as being the source of the wildlife damage (Conover and Decker 1991); 67% of all farmers reported problems with deer (Conover 1994). The IDNR tracks deer-agricultural crop damage annually. In 2000, the Department received 240 deer complaints and issued 139 deer removal permits (DRP's). Over 53% of the DRP's were issued to protect agricultural crops. The primary crops damaged by deer in Illinois are corn and soybeans, but also include oats, alfalfa, vineyards/grapes and nursery stock (IDNR 2002).

1.2.1.2 Deer-Vehicle Collisions

Deer-vehicle collisions are a serious concern nationwide because of losses to property and the potential for human injury and death (Conover 1997, Conover et al. 1995, Romin and Bissonette 1996). Conover et al. (1995) estimated that 1.5 million deer-vehicle collisions occur annually in the United States. In addition, Conover et al. (1995) estimated that the average cost to repair the vehicle after a collision with a deer was \$1,500. The total damage to vehicles in the United States each year from deer-vehicle collisions is estimated to be greater than \$1 billion (Conover et al. 1995). Additionally, deer-vehicle collisions in the United States result in 40,000 injuries and 300 human fatalities annually (Terry

Messmer, pers. commu.). In Illinois, there were 22,933 deer-vehicle collisions reported to State police in 2001; more than a 30 percent increase from the 17,076 deer-vehicle collisions reported in 1997 (Illinois Department of Transportation 1997, 1998, 1999, 2000, 2001).

1.2.1.3 Damage to Urban Areas, Landscaping and Natural Resources

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

Deer overabundance can affect native vegetation and natural ecosystems in addition to ornamental landscape plantings. White-tailed deer selectively forage on vegetation (Strole and Anderson 1992), and thus can have substantial impacts on certain herbaceous and woody species and on overall plant community structure (Waller and Alverson 1997). These changes can lead to adverse impacts on other wildlife species, which depend on these plants for food and/or shelter. Numerous studies have shown that overbrowsing by deer can decrease tree reproduction, understory vegetation cover, plant density, and plant diversity (Warren 1991). In the ██████████, near Chicago, Illinois, overabundant deer were causing increasing damage to native flora. After a series of annual deer removals, mean percent ground cover, mean plant height, and number of plant indicator species had a considerable positive response by year (Etter et al. 2000). This response was the result of cumulative deer harvests and a subsequent decline in deer populations (Etter et al. 2000).

Overbrowsing by deer can have a dramatic impact upon other wildlife communities (e.g., neotropical migrant songbirds and small mammals) that depend upon understory vegetative habitats. These habitats can be altered and destroyed by deer browsing (Virginia Department of Game and Inland Fisheries 1999). Similarly, in Pennsylvania, De Calesta



Figure 1-1. A deer-vehicle accident causing significant damage to the vehicle and minor injury to the driver. Photographer unknown.

(1994a) reported that deer browsing affected vegetation that songbirds need for foraging surfaces, escape cover, and nesting. Species richness and abundance of intermediate canopy nesting songbirds was reduced in areas with higher deer densities (De Calesta 1994b). Intermediate canopy-nesting birds declined 37% in abundance and 27% in species diversity at higher deer densities. Five species of birds were found to disappear at densities of 38.1 deer per square mile and another two disappeared at 63.7 deer per square mile. Waller and Alverson (1997) hypothesize that by competing with squirrels and other fruit eating animals for oak mast, deer may further affect many other species of animals and insects.

1.2.1.4 Threats to Livestock Health and Safety from Disease Transmission

Chronic Wasting Disease Transmission Threat to Livestock. Chronic Wasting Disease (CWD) is a nervous system disease of deer and elk (WDNR 2002a). It belongs to the family of diseases known as transmissible spongiform encephalopathies (TSE's) or prion diseases. Though it shares certain features with other TSE's like bovine spongiform encephalopathy ("Mad Cow Disease") or scrapie in sheep, it is a distinct disease apparently affecting only deer and other species of the family cervidae such as elk. CWD occurs in wild deer and elk primarily in northeastern Colorado, and adjacent parts of Wyoming, Nebraska, and South Dakota. However, CWD has recently been diagnosed to infect wild deer in south central Wisconsin in neighboring counties with Illinois. CWD has also been found to infect herds of captive elk in Colorado, Kansas, Montana, Nebraska, Oklahoma, South Dakota, and Saskatchewan.

CWD attacks the brains of infected deer and elk, causing the animal to become emaciated, display abnormal behavior, lose bodily functions and die. Signs identified in captive deer include excessive salivation, loss of appetite, progressive weight loss, excessive thirst and urination, listlessness, teeth grinding, holding the head in a lowered position, and drooping ears. CWD is a slowly progressive disease; signs are usually not seen until the animal is 18 months of age or older.

Chronic Wasting Disease in Wisconsin. The State of Wisconsin has tested over 1,000 free-ranging white-tailed deer for CWD since 1999 (WDNR 2002a). During the 2001 gun deer season 450 deer were sampled with three deer testing positive for CWD. All three deer were harvested from ██████ County, ██████ ██████████ and were bucks 2 1/2- 3 years of age. During the 1999-2000 deer season, all of the 650 deer from across the State that were tested for CWD tested negative for the disease. In May 2002, the ██████ extended the surveillance plan in a 287 square mile area in ██████ counties to determine the distribution of the disease (WDNR 2002b). The plan involved the issuance of special scientific collector's permits to allow landowners/hunters to collect 500 deer in the affected area. The ██████ also requested WS assistance in the surveillance effort. WS staff from the WI State Office, the Waupun District, and the Rhinelander District participated in all aspects of the program after receiving \$60,000 in emergency funding from the USDA-APHIS Administrator. After a week's time of allowing landowners/hunters to collect the needed samples, ██████ and WS sharpshooters began efforts to collect deer in locations where

landowners/hunters were unsuccessful. WS and [REDACTED] sharpshooting teams collected deer on private and public property only after receiving permission from the respective landowner(s) and after a safety plan for each site was completed. The surveillance project was completed in early April 2002 after 516 deer were collected for CWD testing. Of the 516 deer collected, 11 deer were diagnosed as having CWD.

In response to these findings, the [REDACTED] established a 361 square mile white-tailed deer depopulation zone in an area of [REDACTED] Counties where the disease had been identified (Journal Register 2002). It is estimated that 25,000 deer will need to be culled in the depopulation zone. Attempts to accomplish this ambitious plan will begin in the summer of 2002 with landowners being issued special permits to shoot deer. In addition, the [REDACTED] is proposing to establish an extremely liberal deer hunting season in the area from late October 2002 through January 31, 2003. Deer population reduction efforts may also include the use of government sharpshooters and shooting from helicopters. The [REDACTED] intends to reduce the deer herd in 13 deer management units surrounding the depopulation zone to 50% lower than the current population goals.

There is no evidence that CWD can be transmitted under natural conditions to humans or cattle (USDAa 2001). CWD has been a problem in captive elk in several western states, but has not been documented to date on elk or deer farms in Illinois. In April 2002, the Illinois Department of Agriculture (IDA) passed an emergency rule aimed at preventing CWD in Illinois' deer and elk farms by closing the borders to interstate transport of cervids without certified testing of animals to be transported.

The mode of transmission between deer is not completely understood. It is thought that the disease can be passed between animals in a herd and also from close contact between mother and offspring (USDA 2001b). It is not easily killed by environmental factors, heat or disinfection, so transmission from a contaminated environment may also be possible (WDNR 2002c).

WS currently serves, at the request of the [REDACTED], as a member of an interagency working group with State and federal programs to develop management plans to address CWD issues in Illinois. The existence of CWD in free-ranging deer in Wisconsin poses a risk for the disease to enter Illinois, thereby threatening the health of captive deer and elk, which are regulated as livestock in the State.

Bovine Tuberculosis. Tuberculosis is a contagious disease of both animals and humans and can be caused by three specific types of the Mycobacterium bacteria (USDA 1995). Bovine TB, caused by *Mycobacterium bovis*, primarily affects cattle and other bovine-like animals (e.g., bison, deer, and goats) but can be transmitted to humans and other animals (USDA 1995). Transmission between deer and cattle can occur via either direct or indirect means. Direct transmission could occur through nose-to-nose contact. Due to the social nature of deer, transmission between deer could be amplified. Transmission between deer is known to occur when an infected deer coughs near another (e.g., nose to nose) and droplets, in aerosol form, containing the bacteria is transmitted to a nearby deer

(McGinness 1998). Transmission among other age classes of deer occurs primarily through nose-to-nose contact. Older bucks show higher prevalence rates possibly due to breeding activity. Indirect transmission could occur at contaminated hay bales, feed troughs, and bait/feed piles.

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

Bovine Tuberculosis (TB) in Michigan. In 1994, bovine TB was found in a deer taken by a hunter in the northeastern portion of lower Michigan (MDNR 2002a). Since that time, a total of 63,179 free-ranging deer have been tested and 338 have been found to be positive for *M. bovis*. In addition to testing deer, the Michigan Department of Agriculture and the USDA Veterinary Services have been testing cattle for tuberculosis. As of June 25, 2001 whole herd tests were conducted on 601,965 head of cattle. In the High Risk Area, only 14 beef and 2 dairy herds have been found with bovine TB (Michigan Department of Agriculture pers. commu. 2001).

The USDA Cooperative State-Federal Tuberculosis Eradication Program, which began in 1917, is chiefly responsible for the near-eradication of the disease from the Nation's livestock population. Under the previous USDA rules governing state bovine TB status, at the end of fiscal year 1998-99, 45 states were in "Accredited Free" status and four states were in "Modified Accredited" status (USDA 1995). Under the new USDA rules governing state bovine TB status, Illinois' status maintained its "Accredited Free" status (USDA Veterinary Services pers. commu. 2002). This means the State has 0% TB prevalence in cattle, bison, and goat herds and no TB in the past three years from the time the last infected herd was depopulated or from the time of surveillance indicating no risk of TB spreading.

The *M. bovis* bacteria strain isolated from infected deer and cattle in Michigan has so far been susceptible to common antibiotics. Although *M. bovis* has been diagnosed in humans (MDNR 2002b), at this time, there are no known active human cases of *M. bovis* infection due to exposure to free-ranging white-tailed deer in Michigan. The period of time that tuberculosis has existed in the deer populations in northeastern Michigan is unknown but the disease has been present in cattle since the late 1950's (MDNR 2002a). Since human occupational and recreational activities involving deer have been occurring this long, it appears that the risk of tuberculosis in humans from this situation is low.

1.2.1.5 Deer Damage at Airports and Airbases

Airports provide ideal conditions for deer and other wildlife due to the large grassy areas adjacent to brushy, forested habitat. Airport habitats provide deer excellent feeding and bedding sites and are usually protected from hunting and other human disturbance.

White-tailed deer are a commonly encountered problem at airfields in Illinois, causing considerable hazards

to the safe operation of aircraft at those facilities. Illinois has a total of 138 airports (IL Dept. of Trans. 2001). Collisions between deer and aircraft have caused millions of dollars of damage over the past decade (FAA 2001) and can threaten public safety. Serious consequences are also possible if pilots lose control of the aircraft while attempting to avert a collision with deer. In January 2001, an aircraft owned by a professional team organizer struck a deer while landing at the Troy, Alabama airport (Figure 1-1). The pilot and passengers were injured and the aircraft was destroyed (Blackley 2001).



Figure 1-2. Aircraft destroyed after striking two deer.
Photo by Brian Blackley.

Wildlife collisions with aircraft are a serious economic and safety problem (Dolbeer et al. 2000). Cleary et al. (1999) estimated that between 1990 and 1998 wildlife strikes cost the U.S. civil aviation industry a minimum of 92,233 hours/year of aircraft down time, \$50.60 million/year in direct monetary losses, and \$26.59 million/year in associated costs. In a recent study which ranked the hazard to aviation for wildlife species commonly involved in aircraft strikes, deer were ranked as the most hazardous species group (Dolbeer et al. 2000). This study found that 87% of reported deer-aircraft collisions resulted in damage. This was the highest percent of reported damage occurrence of any species studied. Also, 53% of deer-aircraft strike reports noted an effect on the flight (aborted take-off, engine shutdown, precautionary landing, etc.) (Dolbeer et al. 2000).

Analysis of wildlife strike reports from three major airports in the United States showed that less than 20% of all strikes occurring at these airports were reported to the Federal Aviation Administration (FAA). Additionally, many reports received by the FAA were filed before aircraft damage had been fully assessed. For these reasons, the information on the number of strikes and their associated costs compiled from the voluntary reporting program is believed to underestimate the magnitude of the problem (Cleary et al. 1997).

Deer/aircraft strikes can result in loss of human life, injury to passengers or people on the ground, damage or malfunction of aircraft, aircraft navigational aids, or airport facilities. Mammals colliding with aircraft during the most vulnerable phases of flight, takeoff or landing, can cause the aircraft to crash or sustain physical damage (FAA 1997). In Illinois, there have been many deer/airplane strikes and numerous near misses. Illinois

airports have reported 19 deer/airplane collisions since 1990 (WS unpublished report 2001). Mammals, especially deer, are characteristically unpredictable in their initial response to approaching aircraft. Deer may wander onto runway surfaces and be startled into the path of oncoming aircraft, and at night, freeze when caught in beams of light causing a strike. The majority of deer strikes occur at night and in the fall during the breeding season (Dolbeer et al. 1995).

1.3 ACTIVITIES BY WS TO ALLEVIATE DEER DAMAGE IN ILLINOIS

Wildlife Services in Illinois has been involved in a number of activities to help reduce the negative impacts of overabundant deer herds. The following are some examples of deer damage management projects that WS has been involved with in Illinois.

- In 1993, WS entered into an agreement with the [REDACTED] to reduce the wildlife hazards to aircraft at [REDACTED]. As a part of this agreement, WS recommended the airport upgrade the existing fencing to a height of 12' to prohibit immigration of white-tailed deer. Once the fencing was in place, WS used sharpshooting methods to depopulate the airfield of the 59 deer that had been living on the airfield for years.
- In 1994, WS entered into an agreement with the [REDACTED] to assist with wildlife management operations at [REDACTED] in southwestern [REDACTED] County. White-tailed and European fallow deer had become a human health & safety threat due to the high number of deer/vehicle collisions that were occurring at [REDACTED]. The deer were also damaging several varieties of ornamental plants because there was little natural vegetation available for them to consume. The main project in this agreement was to reduce the number of white-tailed and European fallow deer to population levels of established cultural carrying capacities (from >100/km² to <8/km²). WS used sharpshooting methods to remove 525 white-tailed deer and 26 European fallow deer during the winter of 1995/96 which effectively reduced both populations to “maintenance” levels. WS continues to remove white-tailed deer and European fallow deer at [REDACTED] as necessary.
- In 1997, WS entered into an agreement with the [REDACTED] to reduce the population of white-tailed deer at [REDACTED] in western [REDACTED] County. White-tails had become a human health & safety threat due to the high number of deer/vehicle collisions that were occurring at [REDACTED]. The deer were also hampering prairie restoration efforts by consuming prairie plants. WS began removal operations with sharpshooters during the winter of 1998. In two years, WS removed 568 white-tailed deer that effectively reduced the population to a “maintenance” level. WS continues to remove white-tailed deer at [REDACTED] as necessary.
- In 1997, WS entered into an agreement with the [REDACTED] County [REDACTED] to supplement their already established white-tailed deer removal program. White-tailed deer populations at several forest preserves (i.e., parks) were sufficient to cause severe over-browsing of the native vegetation. The deer also placed at risk threatened or endangered species of plants in the forest preserves and caused damage to neighboring yards by consuming ornamental plants. Over the past five years, WS has expanded its role with [REDACTED] program by performing more of the sharpshooting activities. The [REDACTED] continues to set management goals of the

program. To date, WS has removed 843 white-tailed deer for [REDACTED].

- In 2001, WS entered into an agreement with the [REDACTED] to remove a small number of white-tailed deer from one of their forest preserves. White-tailed deer populations at several forest preserves (i.e., parks) were sufficient to cause severe over-browsing of the native vegetation. The deer also placed at risk threatened or endangered species of plants in the forest preserves and caused damage to neighboring yards by consuming ornamental plants. In March of 2002, WS sharpshooters removed 10 white-tailed deer.

1.4 NEED FOR DEER DAMAGE MANAGEMENT IN ILLINOIS

The biological carrying capacity (BCC) of a wildlife population is defined as the maximum number of animals that an area can support without degradation to the animals' health and the environment over an extended period of time (Kroll et al. 1986). When this number is exceeded, the health of the population begins to suffer, reproduction declines, parasitism and disease increase, and habitat quality and diversity decrease due to overbrowsing of plant species preferred as food by deer (Kroll et al. 1986). Overbrowsing negatively impacts the habitat and landscape resulting in the decline of overall animal health due to less nutritious food items being available.

The cultural carrying capacity (CCC), more recently referred to as the wildlife acceptance capacity (WAC), is defined as the maximum density of a given species that can coexist compatibly with the local human population (Decker and Purdey 1988). This term is useful because it defines when conflicts with deer have exceeded an acceptable level, and provides managers with a target for establishing management objectives. Certain factors may influence the WAC, such as landscape or vegetation impacts, threats to public safety, the potential for illegal killing of deer, and personal attitudes and values. The threshold of wildlife damage acceptance is a primary limiting factor in determining the WAC. For any given damage situation, there will be varying acceptance thresholds by those directly, as well as indirectly, affected by the damage. While the WAC and BCC are not the same, both are important factors in managing conflicts between humans and deer.

With the expansion of human populations into rural environments, the potential for human-deer encounters will inevitably increase. Unfortunately, these encounters are often in the form of deer-vehicle collisions, deer-aircraft encounters, and damage to landscaping, natural resources, horticulture, and agricultural commodities. While hunting is still an effective tool to manage deer populations in rural environments, other options need to be investigated to handle overabundant deer herds in non-traditional settings (i.e., airports, city parks, suburban areas, etc.). Both lethal and non-lethal options need to be addressed to minimize the potential negative impact that overabundant deer may have on the environment.

1.5 WILDLIFE SERVICES' OBJECTIVE

The objective of Wildlife Services in Illinois is to respond to 100% of the requests for assistance with the appropriate action (technical assistance or direct control) as determined by the WS Decision Model (Slate et al. 1992). In obtaining this objective, WS will hold the lethal take of nontarget animals by WS personnel during damage management to less than 1% of the total white-tailed deer taken in Illinois.

Other project specific objectives may be established on a case by case basis based upon the management goals of the person or agency requesting WS assistance. An example would be if WS was requested by

State agencies to assist in the suppression of diseases in free-ranging deer populations of the State. In this situation, the management goals of these activities would be established by the State.

1.6 RELATIONSHIP OF THIS EA TO OTHER ENVIRONMENTAL DOCUMENTS

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

1.7 DECISION TO BE MADE

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

- Should WS continue the current white-tailed deer damage management program in Illinois to alleviate damage to agriculture, property, natural resources, and human health and safety?
- What mitigation measures, if any, should be implemented?
- Would the proposed action have significant impacts on the quality of the human environment requiring preparation of an EIS?

1.8 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

Actions Analyzed. This EA evaluates WS involvement in white-tailed deer damage management to protect property, agricultural resources, natural resources, and human health and safety in the State of Illinois.

Period for which this EA is Valid. This EA would remain valid until Illinois WS 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.

Site Specificity. This EA analyzes and addresses the potential impacts of WS white-tailed deer damage management activities on all private and public lands in Illinois under MOU, Cooperative Agreement, and in cooperation with the appropriate public land management agencies. It also addresses the impacts of WS deer damage management on areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional wildlife damage management efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program. This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever deer 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 Description of Alternatives for a description of the Decision Model and its application).

Public Involvement/Notification. As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS-NEPA implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings of NOA to parties that have specifically requested to be notified. New issues

or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

1.9 AUTHORITY AND COMPLIANCE

1.9.1 Authority of Federal Agencies in Wildlife Damage Management in Illinois

1.9.1.1 Wildlife Services Legislative Authority

The primary statutory authority for the Wildlife Services program is the Act of 1931, as amended in the Fiscal Year 2001 Agriculture Appropriations Bill, which provides that:

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

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

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

1.9.1.2 U.S. Department of Interior, Fish and Wildlife Service Legislative Authority

The U. S. Fish and Wildlife Service’s (USFWS) authority for action is based on the Migratory Bird Treaty Act of 1918 (as amended), which implements treaties with the United States, Great Britain (for Canada), the United Mexican States, Japan, and the Soviet Union. The authority of the Secretary of Agriculture with respect to the Migratory Bird Treaty was transferred to the Secretary of the Interior in 1939 pursuant to Reorganization Plan No. II. Section 4(f), 4 Fed. Reg. 2731, 53 Stat. 1433.

1.9.1.3 Authority of State Agencies in Wildlife Management in Illinois

The Illinois Department of Natural Resources authority in wildlife management is given

under Illinois Conservation Law (ILCS) Chapter 520 of the Wildlife Code for managing most wildlife species in the State. Article II, 5/2.1 states in part; *The regulation and licensing of the taking of wildlife in Illinois are exclusive powers and functions of the State.*

1.9.1.4 Compliance with Other Federal and State Statutes

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

National Environmental Policy Act (NEPA). The National Environmental Policy Act (NEPA) of 1969 (42 USC Section 4231 et seq.) is implemented by Federal Agencies pursuant to Council on Environmental Quality (CEQ) Regulations (40 CFR Section 1500-1508) and agency implementing regulations. WS prepares analyses of the potential environmental impacts of program activities to meet procedural requirements of NEPA and to facilitate planning, decision-making, and public and interagency involvement. NEPA and its supporting regulations require that an EA be a concise public document that provides sufficient evidence and analysis to determine if an EIS should be prepared, aids in WS's compliance with NEPA, describes the purpose and need for action, alternatives, and environmental impacts, and includes a list of agencies/persons consulted.

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

Endangered Species Act (ESA). It is federal policy, under the ESA, that all federal agencies seek to conserve threatened and endangered (T&E) species and utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). Where appropriate, WS conducts Section 7 consultations with the U.S. Fish & Wildlife Service (USFWS) to ensure that "*any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency shall use the best scientific and commercial data available*" (Sec.7(a)(2)). WS obtained a Biological Opinion (BO) from USFWS in 1992 describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F). WS is in the process of initiating formal consultation at the programmatic level to reevaluate the 1992 B.O. and to fully evaluate potential effects on T&E species listed or proposed for listing since the 1992 FWS BO. In addition to these programmatic efforts to comply with the ESA, individual WS programs may confer with FWS Ecological Services in the State of the proposed action to determine the presence of T&E species in project areas, and to identify potential impacts of proposed actions and alternatives on these species.

National Historic Preservation Act (NHPA) of 1966, as amended. The National Historic Preservation Act (NHPA) of 1966, and its implementing regulations (36 CFR

800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that can result in changes in the character or use of historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological, and historic resources, and 3) consult with appropriate American Indian Tribes to determine whether they have concerns for traditional cultural properties in areas of these federal undertakings. 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. WS activities as described under the proposed action do not cause ground disturbances nor do they otherwise have the potential to significantly affect visual, audible, or atmospheric elements of historic properties and are thus not undertakings as defined by the NHPA. WS has determined deer damage management actions are not undertakings as defined by the NHPA because such actions do not have the potential to result in changes in the character or use of historic properties.

Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations."

Executive Order 12898, entitled, "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations" promotes the fair treatment of people of all races, income levels, and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Environmental justice is a priority 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. 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.

Executive Order 13045 - Protection of Children from Environmental Health and Safety Risks.

Children may suffer disproportionately from environmental health and safety risks for many reasons, including their 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 deer damage management would occur by using only legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action.

2.0 CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.1 AFFECTED ENVIRONMENT

In 1925 the Illinois Legislature created the State Department of Conservation, later renamed the Department of Natural Resources, to oversee the management of wildlife in the state of Illinois. The Department is responsible for the management of wildlife on all lands throughout the State of Illinois. The affected environment includes not only the local wildlife populations within the area under consideration, but also native flora and human populations and their respective environments.

The areas of the proposed action include farms and areas where deer are causing damage to agriculture through feeding and antler rubbing; public and private properties in urban/suburban areas where deer cause damage to landscaping and natural resources; urban/suburban and rural areas where deer cause damage to property during deer-vehicle collisions and are a threat to human safety through deer-vehicle collisions; and areas where deer have the potential to spread diseases to humans and/or livestock. The area of the proposed action would also include airports and military airbases where deer are a threat to human safety and to property.

2.2 ISSUES ANALYZED IN DETAIL

Following are issues that have been identified as areas of concern requiring consideration in this Environmental Assessment:

- Effects on white-tailed deer populations;
- Effects on plants and other wildlife species, including threatened and endangered species;
- Effects on human health and safety;
- Humaneness of methods to be used;
- Effects on aesthetic values; and
- Effects on regulated white-tailed deer hunting.

2.2.1 Effects on White-tailed Deer Populations.

There are concerns that the proposed action or any of the alternatives would result in the loss of local white-tailed deer populations or could have a cumulative adverse impact on regional or statewide populations. In Illinois, where deer pose damage problems in various habitats and where populations of damaging species have exceeded acceptable levels, IDNR believes a deer population management strategy to be that of reduction rather than extirpation. In other instances (e.g., at airports), the presence of individual animals in a given locale can present unacceptable damage or risk to local habitats or humans. In these instances, IDNR considers reduction or elimination of damage or risk to be an integral part of limited wildlife management programs. The extent to which each of the alternatives contributes towards this strategy is considered a positive impact.

2.2.2 Effects on Plants and other Wildlife Species, including Threatened and Endangered Species.

There are concerns among members of the public and wildlife professionals, including WS, that there is the potential for control methods used in the proposed action or any of the alternatives to

inadvertently capture or remove nontarget animals or potentially cause adverse impacts to nontarget species populations, particularly T&E species. Special efforts are made to avoid jeopardizing threatened and endangered species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the Endangered Species Act (ESA) concerning potential impacts of deer damage management control methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997, Appendix F). WS's standard operating procedures include measures intended to mitigate or reduce the effects on nontarget species populations and are described in other sections of this EA. IDNR's Endangered Species Protection Board has provided a list of both State and federally listed T&E species that occur in Illinois (Appendix C).

To reduce the risks of adverse affects to nontarget species, WS would select damage management methods that are as target-selective as possible or apply such methods in ways to reduce the likelihood of negatively affecting nontarget species.

Many property owners experience substantial damage to landscaping and vegetation from deer. These people are concerned whether the proposed action would reduce such damage to more acceptable levels. Some people are also concerned that high deer populations cause excessive damage to the native vegetation and subsequently adversely impact the natural ecosystem and other species of wildlife, including State and federally listed Threatened and Endangered animal species, whose habitat is destroyed by deer over-browsing. "Deer also have some impact on State and federally listed Threatened and Endangered plant species, some of which seem to be preferred deer browse. Repeatedly-browsed plants will attempt to regrow but the loss of energy reserves tends to preclude blooming, setting of seeds, and causes reduced plant height and vigor." (Jones, 2002) These people are concerned as to whether the proposed action or any of the alternatives would reduce such damage to acceptable levels.

2.2.3 Effects on Human Health and Safety.

A common concern is whether the proposed action or any of the alternatives pose an increased threat to public and pet health and safety. In particular, there is concern that the methods of deer removal (i.e., trapping and sharpshooting) may be hazardous to people and pets. Another concern is that high deer populations pose a threat to human health and safety through the potential for deer-vehicle collisions, deer-aircraft collisions, and the spread of disease.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and firearms misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program prior to the use of firearms in the conduct of official duties and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees are also tested, annually, through the IDNR Sharpshooter Testing Procedures before they are allowed to remove deer under Deer Population Control Permits. WS employees who use firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

2.2.4 Humaneness of Methods to be Used.

The issue of humaneness, as it relates to the killing or capturing of wildlife is an important but complex concept. Kellert and Berry (1980) surveyed American attitudes toward animals and found that 58% of their respondents "*. . . care more about the suffering of individual animals . . . than they do about species population levels.*" Schmidt (1989) indicated that vertebrate pest control for societal benefits could be compatible with animal welfare concerns, if "*. . . the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*"

The American Veterinary Medical Association (1987) describes suffering as a "*. . . highly unpleasant emotional response usually associated with pain and distress*". The American Veterinary Medical Association (AVMA) (1987) further states that suffering "*. . . can occur without pain . . .*" and "*. . . pain can occur without suffering . . .*" Since the concept of suffering carries with it the implication of a time frame, a case could be made that there is "*. . . little or no suffering where death comes immediately . . .*" (CDFG 1991), as in situations where taking involves shooting.

Defining pain as a component in humaneness of proposed wildlife damage management methods is a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain. 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 significant pain (CDFG 1991).

Pain and suffering, as it relates to wildlife damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public need to recognize the complexity of defining suffering, since "*. . . neither medical or veterinary curricula explicitly address suffering or its relief*" (AVMA 1987, CDFG 1991).

Research suggests that with some methods, such as restraint in traps, changes in the blood chemistry of trapped animals indicate "*stress*" (USDA 1997: 3-81). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

Thus, the decision-making process involves tradeoffs between the above aspects of pain and humaneness. An objective analysis of this issue must consider not only the welfare of wild animals but also the welfare of humans if damage management methods were not used. Therefore, humaneness appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of suffering with the constraints imposed by current technology and funding.

WS has improved the selectivity and humaneness of management devices through research and is striving 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 methods are used in those situations when 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 as humane as possible under the constraints of current technology and funding. Mitigation and standard operating procedures (SOP) used to maximize humaneness are listed in this EA. As appropriate, WS euthanizes live animals by methods recommended by the AVMA (Beaver et al. 2001) or the recommendations of a veterinarian, even though the AVMA euthanasia methods were developed principally for companion animals and slaughter of food animals, and not for free-ranging wildlife.

2.2.5 Effects on Aesthetic Values

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. However, some people may consider individual wild animals and birds as “pets” or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to manage conflicts/problems between humans and wildlife.

There is some concern that the proposed action or the alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. 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. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics are truly subjective in nature, dependent on what an observer regards as beautiful.

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 stability of 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 up 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 benefitting 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).

Illinois WS recognizes that all wildlife has aesthetic value and benefit. WS only conducts deer damage management at the request of the affected home/property owner or resource manager. If WS received requests from an individual or official for deer damage management, WS would address the issues/concerns and consideration would be made to explain the reasons why the individual damage management actions would be necessary. Management actions would be carried out in a humane, and professional manner.

2.2.6 Effects on Regulated White-tailed Deer Hunting

Some people may be concerned that WS conducted deer removal activities would affect regulated deer hunting by significantly reducing local deer populations.

2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

2.3.1 WS's Impact on Biodiversity

No Illinois WS deer damage management is conducted to eradicate a native wildlife population. WS operates according to international, federal, and State laws, and regulations enacted to ensure species viability. In addition, any reduction of a local population or group is frequently temporary because immigration from adjacent areas or reproduction replaces the animals removed. The impacts of the current WS program on biodiversity are minor and not significant nationwide, statewide, or region wide (USDA 1997). WS operates on a relatively small percentage of the land area of the State, and the WS take of any wildlife species analyzed in this EA is a small portion of the total population and insignificant to the viability and health of the population.

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

Some individuals might question whether preparing an EA for an area as large as the State of 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 EA's covering smaller zones. In addition, Illinois WS only conducts deer damage management in a very small area of the State where damage is occurring or likely to occur.

3.0 CHAPTER 3: ALTERNATIVES

3.1 INTRODUCTION

This chapter consists of 6 parts: 1) an introduction, 2) description of alternatives considered and analyzed in detail including the Proposed Action (Alternative 1), 3) a description of Integrated Wildlife Damage Management, 4) deer damage management methods available for use or recommendation by WS in Illinois, 5) alternatives considered but not in detail, with rationale, and 6) mitigation measures and standard operating procedures (SOP) for deer damage management.

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992), “*Methods of Control*” (USDA 1997 Appendix J) and the “*Risk Assessment of Wildlife Damage Control Methods Used by the USDA Animal Damage Control Program*” (USDA 1997, Appendix P) of USDA (1997).

The four alternatives analyzed in detail are:

- Alternative 1 – Integrated Deer Damage Management Program (Proposed Action/No Action).
- Alternative 2 – Non-lethal Deer Damage Management only by WS.
- Alternative 3 – Lethal Deer Damage Management only by WS.
- Alternative 4 – No Deer Damage Management by WS.

3.2 ALTERNATIVES CONSIDERED, INCLUDING THE PROPOSED ACTION

3.2.1 Alternative 1. Integrated Deer Damage Management Program (Proposed Action/No Action)

Under this alternative, Wildlife Services would continue the current program that administers an Integrated Wildlife Damage Management (IWDM) approach to alleviate white-tailed deer damage to agriculture, property, natural resources, and human health and safety in Illinois. An IWDM approach would be implemented on all private and public lands of Illinois where a need exists, a request is received, and funding is available. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, other species, and the environment. Under this action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, habitat modifications, harassment, repellants, and physical exclusion could be recommended and utilized to reduce deer damage. In other situations, deer would be removed as humanely as possible by sharpshooting or live capture followed by euthanasia under permits issued by the IDNR. 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 there could be instances where application of lethal methods alone would be the most appropriate strategy. Appendix B describes the methods available for recommendation and use by WS under this alternative. Deer damage management would be conducted in the State, when requested, on private or public property after an *Agreement for Control* or other comparable document has been completed. All deer damage management would be consistent with other uses of the area and

would comply with appropriate federal, State, and local laws.

3.2.2 Alternative 2. Non-lethal Deer Damage Management only by WS

This alternative would require WS to use and recommend non-lethal methods only to resolve all deer damage problems. Requests for information regarding lethal management approaches would be referred to IDNR, local animal control agencies, or private businesses or organizations. Persons receiving deer damage could still resort to lethal methods or other methods not recommended by WS, use contractual services of private businesses that were available to them, or take no action. Appendix B describes a number of non-lethal methods available for recommendation and use by WS under this alternative.

3.2.3 Alternative 3. Lethal Deer Damage Management only by WS

This alternative would require WS to use and recommend lethal methods only to resolve all deer damage problems. Requests for information regarding non-lethal management approaches would be referred to IDNR, local animal control agencies, or private businesses or organizations. Individuals might choose to implement WS lethal recommendations, implement non-lethal methods or other methods not recommended by WS, contract for WS lethal direct control services, use contractual services of private businesses, or take no action. Appendix B describes lethal methods available for recommendation and use by WS under this alternative.

3.2.4 Alternative 4. No Deer Damage Management by WS

This alternative would eliminate WS involvement in all deer damage management activities. WS would not provide direct operational or technical assistance and requestors of WS services would have to conduct their own deer damage management without WS input.

3.3 DEER DAMAGE MANAGEMENT STRATEGIES AND METHODOLOGIES AVAILABLE TO 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 WS technical assistance and operational deer damage management by WS. Appendix B is a more thorough description of the methods that could be used or recommended by WS.

3.3.1 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 a cost-effective² manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM

² The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

may incorporate cultural practices (i.e., restricting flying times, no feeding policy), habitat modification (i.e., exclusion), animal behavior modification (i.e., scaring), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific damage problem. WS supports and implements the IWDM approach (WS Directive 2.105) to reduce damage through the WS Decision Model (Slate et al. 1992).

3.3.2 Technical Assistance Recommendations

"Technical assistance" as used herein is information, demonstrations and advice on available and appropriate wildlife damage management methods. Technical assistance is generally provided during on-site visits or verbal consultations with the requester. WS personnel may provide technical assistance such as general information, instructional sessions and demonstrations on available deer damage management techniques. Technical assistance may include information on the proper use of devices (e.g., pyrotechnics, exclusion devices, etc.), habits and biology, habitat management, exclusion and animal behavior modification. In some cases, WS provides supplies or materials that are of limited availability for non-WS entities to use. Generally, several management strategies are described to the requestor 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. Technical assistance may require substantial effort by WS personnel in the decision making process, but the actual work is the responsibility of the requestor.

Under APHIS NEPA implementing regulations, 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 wildlife damage problems.

3.3.3 Direct Operational Damage Management Assistance

This is the implementation or supervision of damage management activities 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 provide for WS direct damage management. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of WS personnel are often required to effectively resolve problems, if the problem is complex.

3.3.4 Education

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

3.3.5 WS Decision Making

The procedures used by WS personnel to determine management strategies or methods applied to specific damage problems can be found in USDA (1997 Appendix N).

WS personnel use a methodical thought process for evaluating and responding to damage complaints and requests for assistance that are depicted by the WS Decision Model described by Slate et al. (1992) (Figure 3-1). WS personnel are frequently contacted after requesters have tried or considered nonlethal methods and found them to be impractical, too costly, or inadequate for reducing damage to an acceptable level. WS personnel assess the problem, evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic, and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management 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 may be ended. In some cases, continual conduct of effective wildlife damage management activities is necessary to relieve damage. 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 ongoing damage management strategy. The Decision Model is not necessarily a written process, but a mental problem-solving process common to most, if not all professions.

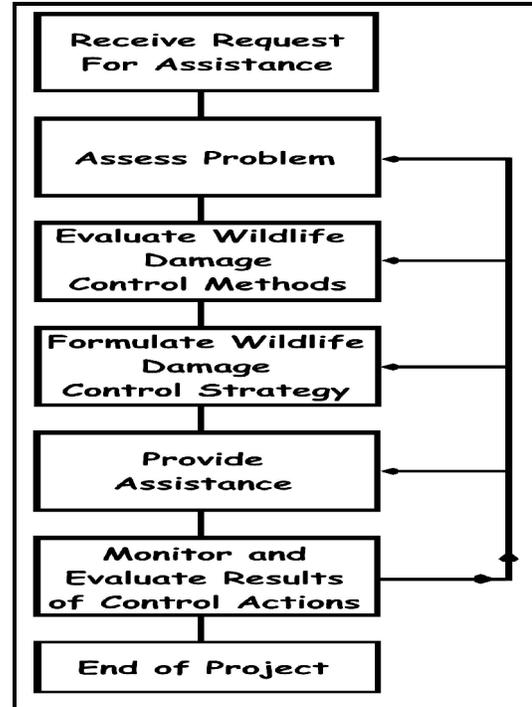


Figure 3-1. WS Decision Model.

3.3.6 Community Based Selection of a Deer Damage Management Program

3.3.6.1 Technical Assistance Provided by WS to Resource Owners for Selection of a Deer Damage Management Program.

The WS program in Illinois follows the “co-managerial approach” to solve wildlife damage or conflicts as described by Decker and Chase (1997). Within this management model, WS provides technical assistance regarding the biology and ecology of white-tailed deer and effective, practical, and reasonable methods available to reduce deer damage to local requesters. This includes non-lethal and lethal methods. WS and other State and federal wildlife or wildlife damage management agencies may facilitate discussions at local community meetings when resources are available. Resource owners/managers and others directly affected by deer damage or conflicts in Illinois have direct input into the resolution of such problems. They may implement management recommendations provided by WS

or others, or may request management assistance from WS, other wildlife management agencies, local animal control agencies, or private businesses or organizations.

Local authorities decide which methods should be used to solve a wildlife/human conflict. These decision makers include community leaders, private property owners/managers, and public property owners/managers.

3.3.6.2 Community Selection of a Deer Damage Management Program

The authority that selects damage management actions for the local community might be a mayor, city council, common council, park board, or for a homeowner or civic association would be the President or the President's or Board's appointee. These individuals are often times popularly elected residents of the local community who oversee the interests and business of the local community. These individuals would represent the local community's interest and make decisions for the local community or bring information back to a higher authority or the community for discussion and decision making. Identifying the authority that selects damage management actions for local business communities is more complex because the lease may not indicate whether the business must manage wildlife damage themselves, or seek approval to manage wildlife from the property owner or manager, or from a governing board. WS would provide technical assistance to the local community or local business community authority(ies) and recommendations to reduce damage. Direct damage management would be provided by WS if requested by the local community authority, funding was provided, and the requested direct damage management was consistent with WS recommendations, policy, and federal and State laws.

3.3.6.3 Private Property Selection of a Deer Damage Management Program

When one person privately owns a parcel of property, the authority selecting the damage management plan would be him or herself. WS would provide technical assistance and recommendations to this person to reduce damage.

If multiple property/resource owners are involved in a specific management action and no homeowner or civic association represents the affected property/resource owners of the local community, then WS would provide technical assistance to the self or locally appointed authority(ies). Direct damage management would be provided by WS if requested, funding was provided, and the requested direct damage management was consistent with WS recommendations, policy, and federal and State laws. Additionally, a majority of the affected property/resource owners, with concurrence from the IDNR, must agree to the direct damage management. The affected property/resource owners would also include those whose property is adjacent to the areas where the deer primarily inhabit or damage resources. Affected property/resource owners who disagree with the direct damage management may request WS not conduct this action on their property and WS will honor this request.

3.3.6.4 Public Property Selection of a Deer Damage Management Program

The authority selecting the damage management plan for local, State, or federal property would be the official responsible for or authorized to manage the public land to meet interests, goals, and legal mandates for the property. WS would provide technical assistance and recommendations to this person to reduce damage. Direct damage management would be provided by WS if requested, funding was provided, and the requested direct damage management was consistent with WS recommendations, policy, and federal and State laws.

3.3.7 Summary for Community Selection of a Deer Damage Management Program

This process for involving local communities and local stakeholders in the decisions for deer damage management assures that local concerns are considered before individual damage management actions are taken.

3.4 WILDLIFE DAMAGE MANAGEMENT METHODS AUTHORIZED FOR USE OR RECOMMENDED

USDA (1997 Appendix J) describes methods currently used by the WS program. Several of these were considered in this assessment because of their potential use in reducing deer damage to agriculture, property, natural resources, and public health and safety. A listing and more detailed description of the methods used by Illinois WS for deer damage management is found in Appendix B of this EA.

3.4.1 Non-lethal Methods

Habitat Modifications - Modifying or eliminating habitat utilized by deer may change deer behavior and reduce deer damage. This could include reducing vegetative cover, forage crops, or using less palatable landscape plants.

Physical Exclusion - Fencing, netting, or other barriers can limit deer access to a particular area. There are several types of fences that can inhibit deer access including: temporary electric, high tensile electric, woven wire, chain-link, and solid wall fencing.

Harassment/Behavioral Modifications - The proper use of harassment techniques including sirens, flashing lights, electronic distress sounds, pyrotechnics, propane exploders, and dogs could help reduce conflicts.

Repellents - Repellents fall under two categories, contact repellants and area repellants. Contact repellents are those repellents which are applied to vegetation to discourage deer from browsing. Area repellents are designed to repel deer by odor alone.

3.4.2 Lethal Methods

Sharpshooting - Sharpshooting is the practice of selectively removing deer by shooting.

Live-capture of deer followed by euthanasia - This can occur in areas where sharpshooting may

be inappropriate due to safety concerns. Capture methods for deer would include: darting with capture drugs, clover traps, box traps, drop nets, net guns, and rocket nets. Captured deer would be euthanized by methods recommended by the AVMA (Beaver et al. 2001) or the recommendations of a veterinarian.

Hunting Programs - WS may recommend the use of State regulated firearm and archery deer hunting programs to reduce deer damage in local areas.

3.5 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

3.5.1 Live Trap and Relocation

Under this alternative WS would capture deer alive using cage-type live traps or capture drugs administered by dart gun and then relocate the captured deer to another area. Numerous studies have shown that live-capture and relocation of deer is relatively expensive, time-consuming, and inefficient (Ishmael and Rongstad 1984, O'Bryan and McCullough 1985, Diehl 1988, Jones and Witham 1990, Ishmael et al. 1995). Population reduction achieved through capture and relocation is labor intensive and would be costly (\$273-\$2,876/deer) (O'Bryan and McCullough 1985, Bryant and Ishmael 1991). Additionally, relocation frequently results in high mortality rates for deer (Cromwell et. al. 1999, O'Bryan and McCullough 1985, Jones and Witham 1990, Ishmael et. al. 1995). Deer frequently experience physiological trauma during capture and transportation, (capture myopathy) and deer mortality after relocation, from a wide range of causes within the first year, has ranged from 25-89% (Jones and Witham 1990, Mayer et al. 1993). O'Bryan and McCullough (1985) found that only 15% of radio-collared black-tailed deer that were live-captured and relocated from Angel Island, California, survived for one year after relocation. Although relocated deer usually do not return to their location of capture, some do settle in familiar suburban habitats and create nuisance problems for those communities (Bryant and Ishmael 1991). High mortality rates of relocated deer, combined with the manner in which many of these animals die, make it difficult to justify relocation as a humane alternative to lethal removal methods (Bryant and Ishmael 1991). Chemical capture methods require specialized training and skill. A primary limitation of darting, the limited range at which deer can be effectively hit, is generally less than 40 yards. With modern scoped rifles, however, a skilled sharpshooter can hit the head or neck of a deer for a quick kill out to 200 yards and beyond. Thus, chemical capture is far less efficient, more labor intensive, and much more costly than lethal removal with rifles. Translocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, poor survival rates, potential for disease transfer, and difficulties in adapting to new locations or habitats.

3.5.2 Population Stabilization Through Birth Control.

Deer would be sterilized or contraceptives administered to limit the ability of deer to produce offspring. Contraceptive measures for deer can be grouped into four categories: surgical sterilization, oral contraception, hormone implantation, and immunocontraception (the use of contraceptive vaccines). Sterilization could be accomplished through surgical sterilization (vasectomy, castration, and tubal ligation), chemosterilization, and gene therapy. Contraception could be accomplished through hormone implantation (synthetic steroids such as progestins), immunocontraception (contraceptive vaccines), and oral contraception (progestin administered

daily). These techniques would require that deer receive either single, multiple, or possibly daily treatment to successfully prevent conception.

Use and effectiveness of reproductive control as a wildlife population management tool is limited by population dynamic characteristics (longevity, age at onset of reproduction, population size and biological/cultural carrying capacity, etc.), habitat and environmental factors (isolation of target population, cover types, and access to target individuals, etc.), socioeconomic and other factors. Population modeling indicates that reproductive control is more efficient than lethal control only for some rodent and small bird species with high reproductive rates and low survival rates (Dolbeer 1998). Additionally, the need to treat a sufficiently large number of target animals, multiple treatments, and population dynamics of free-ranging populations place considerable logistic and economic constraints on the adoption of reproduction control technologies as a wildlife management tool for some species. Research into reproductive control technologies, however, has been ongoing, and the approach will probably be considered in an increasing variety of wildlife management situations.

The use of this method would be subject to approval by federal and State Agencies. This alternative was not considered in detail because:

- It would take a number of years of implementation before the deer population would decline and therefore, damage would continue at the present unacceptable level for a number of years.
- Surgical sterilization would have to be conducted by licensed veterinarians, and would therefore be extremely expensive.
- It is difficult, time-consuming, and expensive to effectively live trap, chemically capture, or remotely treat the number of deer necessary to effect an eventual decline in the population.
- State and federal regulatory authorities have approved no chemical or biological agents for deer contraception for use.

3.6 MITIGATION AND STANDARD OPERATING PROCEDURES FOR WILDLIFE DAMAGE MANAGEMENT TECHNIQUES

3.6.1 Mitigation in Standard Operating Procedures (SOP)

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS program, nationwide and in Illinois, uses many such mitigation measures and these are discussed in detail in Chapter 5 of the FEIS (USDA 1997). Some key mitigating measures pertinent to the proposed action and alternatives that are incorporated into WS's standard operating procedures are listed in Table 3-1.

Table 3-1. Mitigation Measures

ALTERNATIVES CONSIDERED	1	2	3	4
<i>Animal Welfare and Humaneness of Methods Used by WS</i>				
Research on selectivity and humaneness of management practices would be monitored and adopted as appropriate.	X	X	X	
The Decision Model (Slate et al. 1992) is used to identify effective biological and ecologically sound deer damage management strategies and their impacts.	X	X	X	
Euthanasia procedure approved by the AVMA that cause minimal pain are used for live animals.	X		X	
The use of newly developed, proven non-lethal methods would be encouraged when appropriate.	X	X		
<i>Safety Concerns Regarding WS Damage Management Methods</i>				
The Decision Model (Slate et al. 1992), designed to identify the most appropriate damage management strategies and their impacts, is used to determine deer damage management strategies.	X	X	X	
<i>Concerns about Impacts of Damage Management on Target Species, T&E Species, Species of Special Concern, and Non-target Species</i>				
WS consulted with the USFWS regarding the nation-wide program and would continue to implement all applicable measures identified by the USFWS to ensure protection of T&E species.	X	X	X	
Management actions would be directed toward localized populations or groups and/or individual offending animals.	X	X	X	
WS personnel are trained and experienced to select the most appropriate methods for taking targeted animals and excluding non-target species.	X	X	X	
WS would initiate informal consultation with the USFWS following any incidental take of T&E species.	X		X	
WS take is monitored by species or species group and number of animals (i.e. blackbirds, raptors). Overall populations or trends in populations are also monitored to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of native species populations (See Chapter 4).	X		X	

4.0 CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Chapter 4 provides information for making informed decisions on the deer damage management program outlined in Chapter 1, and the issues and affected environment discussed in Chapter 2. This Chapter consists of: 1) analysis of environmental consequences, 2) analysis of each alternative against the issues considered in detail, and 3) summary of WS's impacts.

4.2 ENVIRONMENTAL CONSEQUENCES

This section analyzes the environmental consequences using Alternative 1 as the no action alternative and therefore will be used as the baseline when comparing the other alternatives to determine if the real or potential impacts are greater, lesser, or the same (Table 4-4). 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 the Council on Environmental Quality (CEQ) (1981).

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

4.2.1 Social and Recreational Concerns are discussed throughout the document as they relate to issues raised during public involvement, and they are discussed in USDA (1997).

4.2.2 Cumulative and Unavoidable Impacts are discussed in relationship to each of the wildlife species and the environmental impacts are analyzed in this chapter. This EA recognizes that the total annual removal of individual animals from wildlife populations by all causes is the cumulative mortality. Analysis of the Illinois WS "takes" during 1997, 1998, 1999, 2000, and 2001 and anticipated future WS take, in combination with other mortality, indicates that cumulative impacts are not adversely affecting the viability and health of populations. It is not anticipated that the WS program would result in any adverse cumulative impacts to T&E species, and deer damage management activities do not jeopardize public health and safety.

4.2.3 Irreversible and Irrecoverable Commitments of Resources: Other than minor uses of fuels for motor vehicles and electrical energy for office maintenance, there are no irreversible or irretrievable commitments of resources. Based on these estimates, the Illinois WS program produces very negligible impacts on the supply of fossil fuels and electrical energy.

4.3 ISSUES ANALYZED IN DETAIL

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

4.3.1 Alternative 1. Integrated Deer Damage Management Program (Proposed Action/No Action)

Effects on White-tailed Deer Populations. The current program removes only a very small number of deer from the statewide Illinois population (Table 4-1) (see Section 1.3). However, based upon an anticipated increase in requests for assistance, Illinois WS expects that no more than 2,500 deer would be lethally removed annually, under permits issued by the IDNR, while conducting WS direct control activities within the State. Therefore, 2,500 deer was used to analyze WS potential impacts to the statewide deer population in Illinois.

White-tailed Deer Population Impact Analysis.

The authority for management of resident wildlife species is the responsibility of the IDNR and deer are classified as game mammals. IDNR collects and compiles information on white-tailed deer population trends and take, and uses this information to manage deer populations. This information has been provided to WS to assist in the analysis of potential impacts of WS activities on the deer herd in Illinois.

The number of deer taken by WS, taken by non-WS personnel under IDNR issued depredation permits, and harvested by hunters in Illinois is shown in Table 4-1 (MIS 1995-2001, and IDNR) The 1998 take of 511 deer was the highest number ever removed in one year by the Illinois WS program. The ADC FEIS (USDA 1997) determined using qualitative information (population trend indicators and harvest data) that if WS deer kill is less than or equal to 33% of the total harvest, the magnitude is considered low. Magnitude is defined as a measure of the number of animals killed in relation to their abundance. Using the harvest data and the annual lethal take of 2,500 deer by WS, the magnitude is considered extremely low for WS take of deer in Illinois. Thus, cumulative take appears to be far beneath the level that would begin to cause a decline in the deer population. This is supported by the IDNR, which is the agency with responsibility for managing wildlife in the State (Illinois Department of Natural Resources pers. comm., 2002).

Table 4.1 Deer Harvest Data for Illinois 1995-2000.

Deer Harvest Data	1995	1996	1997	1998	1999	2000
# taken during State regulated harvest season + under IDNR Depredation Permits	141,035	131,274	131,608	133,194	134,058	146,543
% WS lethal take (% of total take)	0.227%	0.234%	0.025%	0.387%	0.275%	0.153%

Effects on plants and other wildlife species, including T&E species. WS personnel are trained and experienced to select the most appropriate tools and methods for taking target animals and excluding nontargets. WS take of nontarget species is expected to be minimal or nonexistent.

Other wildlife populations would not be negatively affected, except for the occasional scaring effect from the sound of gunshots. In these cases, birds and other mammals may temporarily leave the immediate vicinity of shooting, but would most likely return after conclusion of the action.

Nationally, WS has consulted with the USFWS regarding potential impacts of control methods on T&E species, and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion see the ADC FEIS, Appendix F (USDA 1997). Further consultation on species not covered by or included in that formal consultation process has been initiated with the USFWS and WS will abide by any RPAs, RPMs, and terms and conditions that result from that process to avoid jeopardizing any listed species. The USFWS office has provided a list of federal T&E species in Illinois counties. WS has determined that the proposed WS actions will not likely adversely affect federal T&E species or their critical habitat in Illinois. WS could positively benefit T&E species by reducing deer browsing damage to listed plant species and to habitat that is being used by T&E species. The USFWS provided a letter of concurrence with this determination. Recovery plans for five federally listed species, in fact, have deer herbivory listed as a threat to these species (Rogner, 2002). WS will contact USFWS if the proposed action changes in the future.

This alternative has the greatest potential of reducing the damaging effects that deer are having on native flora and fauna, including the recovery of State and federally listed T&E species, to acceptable levels since all available deer damage management methods, tools, and methodology would be available for consideration and use.

Effects on Human Health and Safety. WS methods of shooting and trapping pose minimal or no threat to human and pet health and safety (USDA 1997). Firearm safety precautions are followed by WS when conducting damage management and WS complies with all laws and regulations governing the lawful use of firearms. Shooting with rifles or shotguns is used to reduce deer damage when lethal methods are determined to be appropriate. Shooting is selective for target species. WS could use firearms to humanely euthanize deer captured 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 their presence.

This alternative has the greatest potential of reducing threats to public health and safety since all available deer damage management methods, tools, and methodology would be available for consideration and use.

Humaneness of methods to be used. WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Under this alternative, deer would be shot or trapped as humanely as possible by experienced WS personnel using the best method available. Deer live-captured in traps would be euthanized. Some individuals may perceive this method as inhumane because they oppose all lethal methods of damage management. However, this alternative allows WS to consider non-lethal methods, and WS would implement non-lethal methods for deer damage management when appropriate.

Effects on Aesthetic Values. The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife and compassion for their neighbors. This alternative

would likely be favored by most resource owners who are receiving damage and by WS as it allows for an IWDM approach to resolving damage problems. An IWDM approach allows for the use of the most appropriate damage management methods. Most stakeholders without damage would also prefer this alternative to Alternative 3, where all deer are killed, because non-lethal methods could be appropriate to resolve damage problems in some situations. Some individuals would strongly oppose this alternative, and most action alternatives, because they believe it is morally wrong to kill or use animals for any reason or they believe that the benefits from deer outweigh the associated damage.

The ability to view and aesthetically enjoy deer at a particular site could be limited if the deer are removed. New deer, however, would likely use the site in the future, although the length of time until new animals arrive is variable, depending on the habitat, time of year, and population densities in the area. The opportunity to view deer is available if a person makes the effort to visit sites with adequate habitat outside of the damage management area.

Public reaction would be variable and mixed because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife. The IWDM approach, which includes non-lethal and lethal methods as appropriate, provides relief from damage or threats to human health or safety to those people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. Many people directly affected by problems and threats to human health or safety caused by deer insist upon their removal from the property or public location when the wildlife acceptance capacity is reached or exceeded. Some people will have the opinion that deer should be captured and relocated to a rural area to alleviate damage or threats to human health or safety. Some people would strongly oppose removal of the deer regardless of the amount of damage. Individuals not directly affected by the threats or damage may be supportive, neutral, or totally opposed to any removal of deer from specific locations or sites. Some people that totally oppose lethal damage management want WS to teach tolerance for deer damage and threats to public and pet health or safety, and that deer should never be killed.

Effects on Regulated White-tailed Deer Hunting. Shooting of deer by WS under the Proposed Action would only occur after a permit has been issued by the IDNR to remove deer that are causing damage or in those situations where deer are a potential human health and safety threat or are a threat of spreading diseases. This activity would result in reduced deer densities on project areas and may reduce densities in some project area deer management zones, hence slightly reducing the number of deer that may otherwise be available to hunters during hunting seasons. The impact of this, however, is expected to be minimized due to:

- The number of deer expected to be lethally taken by WS is minimal when compared to the number taken by hunters across the State.
- The number of deer expected to be taken by WS would not cause a statewide deer population reduction.

In most cases where WS may conduct deer removal projects, the landowners, or land administrators, have not permitted regulated deer hunting, but would allow WS employees to shoot deer. This would have only a minimal impact on deer hunting, since the land was not previously accessible to hunters.

4.3.2 Alternative 2. Non-lethal Deer Damage Management Only by WS

Effects on White-tailed Deer Populations. No deer would be killed by WS under this alternative. The effects on deer populations could reduce, stay the same, or increase depending on actions taken by others. Some resource owners may kill deer, or allow other hunters access to kill deer during the legal harvest season. Resource owners may also obtain special permits from the IDNR to allow them to shoot deer outside of the regular season and in those areas where regulated hunting is not allowed. Deer populations could continue to increase where hunting pressure is low or when an insufficient number of deer are removed under special permits issued by IDNR. Some local populations of deer would temporarily decline or stabilize where hunting pressure and permitted removal activities were adequate. Some resource owners may take illegal, unsafe, or environmentally harmful action against local populations of deer out of frustration or ignorance. While WS could only provide non-lethal assistance under this alternative, other individuals or entities could conduct lethal damage management resulting in impacts similar to the proposed action alternative.

Effects on plants and other wildlife species, including T&E species. In the absence of an integrated deer damage management program by WS that includes the option of lethal removal of deer from damage sites, some resource owners with little or no shooting experience may attempt to remove deer. These resource owners would be more likely than WS personnel to take a non-target species and not report non-target take.

WS take of nontarget species is expected to be minimal or nonexistent. The effects of WS use of non-lethal methods would be similar to those described under the proposed action. However, unless lethal means are implemented by the resource owners, damage caused by deer to wildlife and plants (both individual species and whole communities), including T&E species, may increase in those situations where the use of nonlethal methods do not reduce damage to acceptable levels resulting in impacts similar to Alternative 4.

Effects on Human Health and Safety. The effects of WS use of non-lethal methods would be similar to those described under the proposed action. In those situations where non-lethal methods are effective at reducing threats to human health and safety impacts would be similar to the proposed action. However, non-lethal methods would not be efficient or successful in resolving many deer damage situations. In those situations where non-lethal methods were ineffective, impacts to human health and safety could possibly remain the same or increase resulting in impacts similar to Alternative 4. Additionally, resource owners may attempt to lethally resolve deer damage problems through illegal use of chemicals/pesticides, trapping, and shooting without WS expertise. In these situations there may be some risk to human and pet health and safety from improper or inexperienced use of these methods.

Humaneness of methods to be used. WS personnel are experienced and professional in their use and application of management methods. Some individuals may perceive this approach as humane because they oppose all lethal methods of damage management. However, in those situations where non-lethal methods do not reduce deer damage to acceptable levels, resource owners may take illegal action against some local populations of deer out of frustration of continued damage. Some of these illegal actions may be less humane than methods used by WS personnel. Other

individuals or entities could conduct lethal damage management in the absence of WS assistance under this alternative, which could result in similar impacts to Alternative 4.

Effects on Aesthetic Values. The impacts of this alternative to stakeholders would be variable depending upon the effectiveness of non-lethal methods, the damage management efforts employed by resource owners, their values toward deer, and compassion for their neighbors. Resource owners who are receiving damage from deer would likely oppose this management alternative. Some people would support this alternative because they believe resource owners would do little to remove deer. If nonlethal damage control efforts are ineffective, some people would have a negative view of the absence of native plants, the fencing/netting around ornamental plants and gardens and possibly the higher number of deer carcasses along the roadways. Others would oppose this alternative because they believe resource owners would use illegal, inhumane, or environmentally unsafe methods. While WS could only provide non-lethal assistance under this alternative, other individuals or entities could conduct lethal damage management resulting in impacts similar to Alternative 4.

Effects on Regulated White-tailed Deer Hunting. WS would have no direct impact on regulated deer hunting since WS would not lethally remove deer under this alternative. However, resource owners may remove deer under special permits issued by IDNR resulting in impacts similar to the proposed action.

4.3.3 Alternative 3. Lethal Deer Damage Management Only by WS

Effects on White-tailed Deer Populations. This alternative could result in a localized decrease in the deer population at the specific site where the damage management occurs. Even if WS lethally removed deer at all project sites, it is not anticipated that more than 2,500 deer would be killed annually by WS. Therefore, the impacts on deer populations are expected to be similar to those described in the Proposed Action. New deer would likely re-inhabit the site as long as suitable habitat exists. The amount of time until new deer move into the area would vary depending on the habitat type, time of year, and population densities in the area.

Effects on plants and other wildlife species, including T&E species. WS impacts would be similar to those described in the proposed action, except in those situations where lethal methods could not be used effectively. In those situations the impacts from this alternative would be similar to Alternative 4.

Effects on Human Health and Safety. WS methods of shooting and trapping pose minimal or no threat to human and pet health and safety (USDA 1997). All firearm safety precautions are followed by WS when conducting damage management and WS complies with all laws and regulations governing the lawful use of firearms. Impacts would be similar to those described under the proposed action where lethal methods are effective. In those situations where lethal methods do not reduce damage and human health and safety threats to an acceptable level, impacts would be similar to Alternative 4.

Humaneness of methods to be used. WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Under this alternative, deer would be shot or trapped as humanely as possible by experienced WS personnel using the best

method available. Some individuals could perceive these methods as inhumane because they oppose all lethal methods of damage management. Overall impacts would be similar to the Proposed Action alternative.

Effects on Aesthetic Values. The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife and compassion for their neighbors. This alternative would likely be favored by resource owners who are receiving damage when lethal methods are effective at reducing damage to acceptable levels. Although, some resource owners would be saddened if the deer were removed. Some individuals would strongly oppose this alternative because they believe it is morally wrong to kill or use animals for any reason or they believe the benefits from deer would outweigh the associated damage. The ability to view and aesthetically enjoy deer at a particular site could be limited if the deer are removed. New animals, however, would most likely use the site in the future, although the length of time until new deer arrive is variable, depending on the habitat type, time of year, and population densities of deer in the area. The opportunity to view deer is available if a person makes the effort to visit sites with adequate habitat outside of the damage management area.

Effects on Regulated White-tailed Deer Hunting. Shooting of deer by WS under this alternative would only occur after a permit has been issued by the IDNR to remove deer that: are causing damage, pose a potential human health and safety threat, or are a threat to spread diseases. This activity would result in reduced deer densities on project areas and may reduce densities in some project area deer management zones, hence slightly reducing the number of deer that may otherwise be available to hunters during hunting seasons. The impact of this, however, is expected to be minimized due to:

- The number of deer expected to be lethally taken by WS is minimal when compared to the number taken by hunters across the State.
- The number of deer expected to be taken by WS would not cause a statewide deer population reduction.

In most cases where WS may conduct deer removal projects, the landowners, or land administrators, have not permitted regulated deer hunting, but would allow WS employees to shoot deer. This would have only a minimal impact on deer hunting, since the land was not previously accessible to hunters. Overall impacts of this alternative would be similar to the Proposed Action alternative.

4.3.4 Alternative 4. No Deer Damage Management by WS

Effects on White-tailed Deer Populations. No deer damage management activities would be conducted by WS under this alternative. The effects on deer populations could reduce, stay the same, or increase depending on actions taken by others. Some resource owners may kill deer, or allow other hunters access to kill deer during the legal harvest season. Resource owners may also obtain special permits from the IDNR to allow them to shoot deer outside of the regular season and in those areas where regulated hunting is not allowed. Deer populations could continue to increase where hunting pressure was low or when an insufficient number of deer are removed under special permits issued by IDNR. Some local populations of deer would temporarily decline or stabilize where hunting pressure and permitted removal activities were adequate. Some resource owners

may take illegal, unsafe, or environmentally harmful action against local populations of deer out of frustration or ignorance. While WS would provide no assistance under this alternative, other individuals or entities could conduct lethal damage management resulting in impacts similar to the proposed action alternative.

Effects on plants and other wildlife species, including T&E species. In the absence of a deer damage management program by WS some resource owners with little or no shooting experience may attempt to remove deer. These resource owners would be more likely than WS personnel to take a non-target species and not report non-target take.

Damage caused by deer to wildlife species, including T&E species, may increase in those situations where the resource owner does not implement their own deer damage management program.

Effects on Human Health and Safety. Without an effective deer damage management program in place, there is potential for increased threats to public health and safety. Additionally, inexperienced resource owners may attempt to solve deer damage problems through trapping and shooting resulting in increased risks to human health and safety from improper or inexperienced use of damage management methods.

Humaneness of methods to be used. This alternative would be considered humane by many people since WS would not be taking part in any management actions. However, resource owners could still use available lethal and non-lethal methods to reduce deer damage. In addition, some resource owners may take illegal action against localized populations of deer out of frustration of continued damage. Some of these illegal actions may be less humane than methods used by experienced WS personnel.

Effects on Aesthetic Values. The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife and compassion for their neighbors. Resource owners receiving damage from deer would likely strongly oppose this alternative because they would bear the damage caused by deer. Some individuals would prefer this alternative because some activist groups believe it is morally wrong to kill or use animals for any reason and the damage to plants or landscaping is an acceptable cost for the benefit of potentially viewing more wildlife. Some people would support this alternative because they enjoy seeing deer, or having deer nearby. However, while WS would take no action under this alternative, other individuals or entities could, and likely would, conduct deer damage management activities in the absence of WS.

Effects on Regulated White-tailed Deer Hunting. WS would have no direct impact on regulated deer hunting. However, resource owners may remove deer under special permits issued by IDNR resulting in impacts similar to the proposed action

Table 4-2 summarizes the expected impacts of each of the alternatives on each of the issues.

Table 4.2 Comparisons of Issues/Impacts and Alternatives

<i>Issues/Impacts</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>
Effects on White-tailed deer population.	Local population could be reduced and sustained at a lower level. No effect on statewide deer population.	Populations would not be affected by WS. If resource owner conducts deer management, effect would be similar to Alternative 1.	Local population could be reduced and sustained at a lower level. No effect on statewide deer population.	Populations would not be affected by WS. If resource owner conducts deer management, effect would be similar to Alternative 1.
Effects on plants and other wildlife species, including T&E species.	No adverse impacts by WS. Positive impact to those species that are being negatively impacted by deer.	No adverse impacts by WS. Positive impact to those species that are being negatively impacted by deer if nonlethal methods are effective.	No adverse impacts by WS. Positive impact to those species that are being negatively impacted by deer if lethal methods are effective.	No impact by WS. Positive impact to those species being negatively impacted by deer if resource owner implements damage reduction program.
Effects on Human Health and Safety.	No probable direct negative effect. Positive effect from reduced deer strikes and disease transmission.	No probable direct negative effect. Slight positive effect from reduced deer strikes and disease transmission.	No probable direct negative effect. Moderate positive effect from reduced deer strikes and disease transmission.	No impact by WS. Probable increase in risks associated from deer strikes and disease transmission. If resource owner conducts deer management activities, effect would be variable.
Humaneness of methods to be used.	Some would view as inhumane. Others would view as more humane than deer injured or killed by aircraft or vehicle collisions.	Most would view as humane. If resource owners conduct lethal deer management activities, effects would be similar to Alternative 4.	Some would view as inhumane. Others will view as more humane than deer injured or killed by aircraft or vehicle collisions.	No impact by WS. Most would view as humane. If resource owner conducts deer management activities, effects would be variable.
Effects on Aesthetic Values.	Variable. Local populations could be reduced, less opportunity to view deer. Positive effects on individuals receiving damage.	Variable. Population would remain the same or increase. Increased opportunity to view deer. If resource owner conducts deer damage management activities, effect would be similar to Alternative 4.	Variable. Local populations could be reduced, less opportunity to view deer. Positive effects on individuals receiving damage.	Variable. Population would remain the same or increase. Increased opportunity to view deer. If resource owner conducts deer damage management activities, effects would be similar to Alternative 1.
Effects on Regulated White-tailed Deer Hunting.	Minimal impact. Slight reduction in the number of deer that may otherwise be available to hunters during hunting seasons.	Minimal impact. No impact by WS. If land owner implements lethal control, impacts are similar to Alternative 1.	Minimal impact. Slight reduction in the number of deer that may otherwise be available to hunters during hunting seasons, similar to Alternative 1.	Minimal impact. No impact by WS. If land owner implements lethal control, impacts are similar to Alternative 1.

4.4 CUMULATIVE IMPACTS

No significant cumulative environmental impacts are expected from any of the 4 alternatives. Under the Proposed Action and Alternative 3, the lethal removal of deer would not have a significant impact on overall deer populations in Illinois, but some local reductions may occur. This is supported by the IDNR, which is the agency with responsibility for managing wildlife in the State. No risk to public safety is expected when WS' services are provided and accepted by requesting individuals in Alternatives 1, 2, and 3, since only trained and experienced wildlife biologists/specialists would conduct and recommend deer damage management activities. There is a slight increased risk to public safety under Alternative 4 and when a person rejects WS assistance and recommendations in Alternatives 1, 2, and 3. Although some persons will likely be opposed to WS' participation in deer damage management activities, the analysis in this EA indicates that WS IWDM program will not result in significant cumulative adverse impacts on the quality of the human environment.

5.0 CHAPTER 5: LIST OF PREPARERS AND PERSONS CONSULTED

Glen Dunn, USDA/APHIS/WS, Chicago, IL
Kirk Gustad, USDA/APHIS/WS, Springfield, IL
Todd Grimm, USDA/APHIS/WS, Springfield, IL
Jack Sengl, USDA/APHIS/ WS, Springfield, IL
Tim Wilson, USDA/APHIS/WS, Okemos, MI
Tony Duffiney, USDA/APHIS/WS, Okemos, MI
Dave Reinhold, USDA/APHIS/WS, Raleigh, NC
Noel Myers, USDA/APHIS/WS, Riverdale, MD
Marty Jones, IL Department of Natural Resources, Elgin, IL
John D. Rogner, USDI/US Fish & Wildlife Service, Barrington, IL

APPENDIX A

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APPENDIX B

WHITE-TAILED DEER DAMAGE MANAGEMENT METHODS AVAILABLE FOR USE OR RECOMMENDATIONS BY THE ILLINOIS WILDLIFE SERVICES PROGRAM

NONLETHAL METHODS:

Nonlethal preventive methods, such as habitat modification, physical exclusion, and animal behavior modification, are a basic component of WDM. Resource owners/managers may be encouraged to use these methods, based on the level of risk, need, and professional judgment on their effectiveness and practicality. These methods include, but are not limited to:

Environmental/Habitat Modification: Environmental/Habitat Modification can be an integral part of WDM. Wildlife production and/or presence are directly related to the type, quality and quantity of suitable habitat. Therefore, habitat can be managed to reduce or eliminate the production or attraction of certain wildlife species. The property owner/manager is responsible for implementing habitat modifications. WS only provides advice on the type of modifications that have the best chance of achieving the desired effect. Habitat management is most often a primary component of WDM strategies at or near airports to reduce problems by eliminating loafing, bedding and feeding sites. Generally, many problems on airport properties can be minimized through management of vegetation and water on areas adjacent to aircraft runways.

Physical Exclusion (Wildlife Fence): A fence around the area where deer are not desirable, like an airfield, can limit the entry of deer into the area. There are several types of fences that inhibit the movement of deer into protected areas if properly installed, including electric fencing, woven wire, and chain link fencing. The height of a fence required to exclude deer is a very debated topic. One study reported that a 2.1-meter fence (7 feet) reduced deer/vehicle collisions by 44.3 to 83.9 percent along a New York Thruway (Smith, Coggin 1984). Although this is a clear reduction, this would not satisfy the objectives stated in 1.3.2. A USDA WS Biologist at [REDACTED] [REDACTED] witnessed a deer that jumped from a parallel embankment over the airport's 10-foot fence topped with two feet of serpentine wire. This is clearly an isolated incident. (per comm. Mark Jensen, WS District Supervisor, California). Dolbeer and Cleary recommend in a joint USDA/FAA airport manual, Wildlife Hazards Management at Airports, that a 10-foot chain link fence with barbed-wire outriggers should be installed to prevent mammal entry to an airport (Cleary, E. C. and Dolbeer, R. A. 1999). For the purpose of this EA, WS recommends a fence height of 12-feet, with an additional three feet buried below the ground, to exclude deer from the areas to be protected.

Animal Behavior Modification: This refers to tactics that alter the behavior of wildlife to reduce damage. Animal behavior modification may involve use of pyrotechnics, propane cannons, sirens, flashing lights, dogs, and visual techniques to help deter or repel animals that cause loss or damage.

Auditory scaring devices: The proper use of frightening devices and harassment techniques including sirens, flashing lights, electronic distress sounds, pyrotechnics, propane exploders, dogs, and rubber projectiles fired from a shotgun could help reduce

conflicts (Craven and Hygnstrom 1994). Used in the proper context, these devices can help keep deer away from conflict areas. Some disadvantages are that these methods can be labor intensive and expensive. Also, frightening methods must be continued indefinitely unless the deer population is reduced or excluded from the resource.

Pyrotechnics: Pyrotechnics are specialized fireworks that are shot out of a 12-gauge shotgun or starters pistol to deter deer and other wildlife. To be successful, pyrotechnics should be carried by wildlife control personnel at all times and used whenever the situation warrants. Continued use of pyrotechnics, alone may lesson the effectiveness.

Propane Cannons: Propane cannons are mechanical devices that use propane gas and an igniter to produce a loud explosive sound. Propane cannons are often suggested as effective frightening agents for deer (Craven and Hygnstrom, 1994), and have been used frequently in attempts to reduce crop damage and encroachment on airports. Research has shown that propane cannons detonated systematically at 8-10 minute intervals are effective in frightening deer away from protected areas for two days. Motion-activated cannons however, detonate only when deer approach the area to be protected and have been shown to be effective up to 6 weeks (Belant et al 1996).

Repellents: There are several products and items that act as deer repellents but they fall into two basic types; contact and area (Craven and Hygnstrom, 1994). Contact repellents are those that are applied directly to plants that deer are feeding on. Deer are not “repelled” until they have eaten a portion of a treated plant. Contact repellents tend to be more effective, and expensive, than area repellents.

Area repellents repel by odor. They are applied, or hung, near areas where deer tend to feed. Besides several commercial products, objects like bags of human hair and bar soap can be used as area repellents. Area repellents tend to be less effective, but cheaper than contact repellents.

LETHAL METHODS:

When non-lethal preventive methods have proven ineffective or were not practical, removals using lethal methods may become necessary. Depending upon the views of the owners/managers of the resources to be protected, and State and local laws, any, or all, of the following lethal methods can be used to minimize damage caused by white-tailed deer.

Sharpshooting: Studies have suggested that localized (deer) management (deer removal) is an effective tool where deer are causing undesired effects (McNutly, S. A. et al 1997). This study supported the hypothesis that the removal of a small, localized group of white-tailed deer would create an area of persistent, low density in the population. The goal of sharpshooting, conducted by WS, would be to reduce the deer density(ies) to the established WAC(s) for the site(s).

WS would conduct sharpshooting, with center-fire rifles or shotguns, during daylight or at night using spotlights or night-vision equipment, as necessary. Rifles would be equipped with noise suppressors, to avoid disturbance to local residents, airport operations or other nearby functions and to facilitate success by minimizing the tendency of deer to flee from the sound of gunfire. Shots would be taken from elevated positions in tree stands or in the

beds of vehicles. Elevated positions cause a downward angle of trajectory, so that any bullets that inadvertently miss or pass through targeted deer, will hit into the ground or into earthen embankments to minimize the risk of stray bullets that, otherwise, would present a safety hazard to people, pets, or property. WS personnel would strive for head and neck shots when shooting deer to achieve quick, humane kills. Bait may be used, in accordance with State regulations, to attract deer to safe sites for shooting and to enhance success and efficiency.

The venison from deer killed by WS would be processed and donated for consumption, to one or more charitable organizations unless otherwise directed by the IDNR. WS, or their cooperators will be responsible for properly preparing deer and the delivery to a USDA approved meat processor.

Only WS personnel who have completed firearms safety training, have demonstrated skill and proficiency with the firearms used for deer removal, and have been approved for sharpshooting by the State Director of Illinois and certified by the IDNR will participate in sharpshooting deer.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program prior to the use of firearms in the conduct of official duties and a refresher course every 2 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. WS employees who are stationed in Illinois are also subject to Illinois' Firearms Owner's Identification requirements.

LIVE CAPTURE FOLLOWED BY EUTHANASIA: White-tailed deer can be captured a number of different ways (Craven & Hygnstrom, 1994). Deer can be drugged with a dart gun fired by a trained person on the ground, in a vehicle, or from an elevated platform. Once recovered, darted deer can be euthanized at the recovery point or at another site.

Deer can be trapped using a baited cage trap or by using a clover or corral trap that deer can either walk into by themselves or by be driven into by people on foot or in vehicles. Trapped deer can be euthanized at the trap location or another site, if necessary.

Deer can also be captured using nets. Drop nets, rocket/cannon nets can be used by baiting deer into a specific zone and firing the rockets/cannons or dropping the net over the deer. This method can be used to catch multiple deer at one time. Nets can also be fired at individual animals using a net gun. The net gun can be fired from a person on the ground, in a vehicle, or from an elevated position. Netted deer can be euthanized at the capture site or another location, if necessary.

Deer captured using tranquilizing drugs and/or chemically euthanized would be unsuitable for human consumption thus precluding them from being harvested under a Deer Population Control Permit in Illinois. (Jones, 2002)

SPORT HUNTING: White-tailed deer hunting is a robust industry in Illinois. Since 1995, over 300,000 deer tags were issued to hunters in the State every year (IDNR, 2002). The State-wide archery season opens in early October and runs into mid-January, with temporary closures for the firearm season in all counties with the exception of Cook, DuPage, Kane, and Lake. There are two shotgun (slug) and muzzle-loading rifle combined seasons in late November and early December, a muzzle-loading rifle only season in mid-December, and a handgun season in mid-January in every county with the exception of Cook, DuPage, Kane, and Lake. Cook, DuPage, Kane, and Lake Counties all have a continuous archery season from October to mid-January. Bag limits are set at one deer per permit but some hunters may purchase multiple permits. No hunter can take more than two antlered bucks total during the year.

APPENDIX C

LIST OF FEDERALLY AND STATE LISTED THREATENED AND ENDANGERED SPECIES IN ILLINOIS

DEFINITIONS

- Federally Endangered (F/E) Species: Any species which is in danger of extinction throughout all or a significant portion of its range.
- Federally Threatened (F/T) Species: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
- Illinois Endangered Species: Any species which is in danger of extinction as a breeding species in Illinois.
- State Threatened Species: Any breeding species which is likely to become a state endangered species within the foreseeable future in Illinois.

CRITERIA FOR STATE LISTING

A species shall be included on the official list of endangered and threatened species when one or more of the following criteria exists: (1) Species included in the Federal list of Endangered or Threatened Species, (2) Species proposed for Federal Endangered or Threatened Species which occur in Illinois, (3) Species which formerly were widespread in Illinois but have been nearly extirpated from the State due to habitat destruction, collecting, or other pressures resulting from the development of Illinois, (4) Species which exhibit very restricted geographic ranges of which Illinois is a part, (5) Species which exhibit restricted habitats or low populations in Illinois, or (6) Species which are significant disjuncts in Illinois (i.e., the Illinois population is far removed from the rest of the species' range).

FISH

Endangered

Acipenser fulvescens (lake sturgeon)
Etheostoma camurum (bluebreast darter)
Etheostoma exile (Iowa darter)
Etheostoma histrio (Harlequin darter)
Hybognathus hayi (cypress minnow)
Ichthyomyzon fossor (northern brook lamprey)
Macrhybopsis gelida (sturgeon chub)
Moxostoma valenciennesi (greater redhorse)
Nocomis micropogon (river chub)
Notropis anogenus (pugnose shiner)
Notropis boops (bigeye shiner)
Notropis heterolepis (blacknose shiner)
Notropis maculatus (taillight shiner)
Notropis texanus (weed shiner)
Noturus stigmosus (northern madtom)
Platygobio gracilis (flathead chub)
Pteronotropis hubbsi (bluehead shiner)
Scaphirhynchus albus (pallid sturgeon) (F/E)

Threatened

Catostomus catostomus (longnose sucker)
Coregonus artedi (cisco or lake herring)
Fundulus diaphanus (banded killifish)
Lampetra aepyptera (least brook lamprey)
Lepomis symmetricus (bantam sunfish)
Moxostoma carinatum (river redhorse)
Notropis chalybaeus (ironcolor shiner)
Notropis heterodon (blackchin shiner)

Endangered

Ambystoma x platineum (silvery salamander)
Cryptobranchus alleganiensis (hellbender)
Desmognathus fuscus (dusky salamander)

AMPHIBIANS

Threatened

Ambystoma jeffersonianum (Jefferson salamander)
Hemidactylium scutatum (four-toed salamander)
Hyla avivoca (bird-voiced treefrog)
Pseudacris streckeri illinoensis (Illinois chorus frog)

Endangered

Clemmys guttata (spotted turtle)
Kinosternon flavescens (Illinois mud turtle)
Macrochelys temminckii (alligator snapping turtle)
Masticophis flagellum (coachwhip)
Nerodia fasciata (broad-banded water snake)
Pseudemys concinna (river cooter)
Sistrurus catenatus catenatus (eastern massasauga)
Thamnophis sauritus (eastern ribbon snake)

REPTILES

Threatened

Clonophis kirtlandii (Kirtland's snake)
Crotalus horridus (timber rattlesnake)
Elaphe guttata emoryi (great plains rat snake)
Emydoidea blandingii (Blanding's turtle)
Heterodon nasicus (western hognose snake)
Nerodia cyclopion (Mississippi green water snake)
Tantilla gracilis (flathead snake)

BIRDS

Endangered

Ammodramus henslowii (Henslow's sparrow)
Asio flammeus (short-eared owl)
Bartramia longicauda (upland sandpiper)
Botaurus lentiginosus (American bittern)
Buteo swainsoni (Swainson's hawk)
Charadrius melodus (piping plover) (F/E)
Chlidonias niger (black tern)
Circus cyaneus (northern harrier)
Egretta caerulea (little blue heron)
Egretta thula (snowy egret)
Falco peregrinus (peregrine falcon)
Ictinia mississippiensis (Mississippi kite)
Laterallus jamaicensis (black rail)
Limnothlypis swainsonii (Swainson's warbler)
Nyctanassa violacea (yellow-crowned night-heron)
Nycticorax nycticorax (black-crowned night-heron)
Pandion haliaetus (osprey)
Phalaropus tricolor (Wilson's phalarope)
Rallus elegans (king rail)
Sterna antillarum (least tern) (F/E)
Sterna forsteri (Forster's tern)
Sterna hirundo (common tern)
Thryomanes bewickii (Bewick's wren)
Tympanuchus cupido (greater prairie-chicken)
Tyto alba (common barn-owl)
Xanthocephalus xanthocephalus (yellow-headed blackbird)

Threatened

Buteo lineatus (red-shouldered hawk)
Certhia americana (brown creeper)
Gallinula chloropus (common moorhen)
Grus canadensis (sandhill crane)
Haliaeetus leucocephalus (bald eagle) (F/T)
Ixobrychus exilis (least bittern)
Lanius ludovicianus (loggerhead shrike)
Podilymbus podiceps (pied-billed grebe)

MAMMALS

Endangered

Corynorhinus rafinesquii (eastern big-eared bat)
Myotis austroriparius (southeastern bat)
Myotis grisescens (gray bat) (F/E)
Myotis sodalis (Indiana bat) (F/E)
Neotoma floridana (eastern woodrat)

Threatened

Lontra canadensis (river otter)
Ochrotomys nuttalli (golden mouse)
Oryzomys palustris (marsh rice rat)

INVERTEBRATES

Endangered

Snails

Discus macclintocki (pleistocene disc) (F/E)

Mussels

Cumberlandia monodonta (spectacle case mussel)
Cyprogenia stegaria (fanshell mussel) (F/E)
Epioblasma triquetra (snuffbox mussel)
Lampsilis abrupta (pink mucket) (F/E)
Lampsilis fasciola (wavy-rayed lampmussel)
Lampsilis higginsii (Higgins eye) (F/E)
Obovaria subrotunda (round hickorynut mussel)

Threatened

Mussels

Alasmodonta viridis (slippershell mussel)
Cyclonaias tuberculata (purple wartyback)
Ellipsaria lineolata (butterfly)
Elliptio crassidens (elephant-ear mussel)
Elliptio dilatata (spike)
Fusconaia ebena (ebonyshell)
Ligumia recta (black sandshell)

Plethobasus cooperianus (orange-foot pimpleback) (F/E)
Plethobasus cyphus (sheepnose mussel)
Pleurobema clava (clubshell mussel) (F/E)
Pleurobema cordatum (Ohio pigtoe)
Pleurobema rubrum (pyramid pigtoe)
Potamilus capax (fat pocketbook pearly mussel) (F/E)
Ptychobranthus fasciolaris (kidneyshell mussel)
Quadrula cylindrica (rabbitsfoot mussel)
Simpsonaias ambigua (salamander mussel)
Toxolasma lividus (purple lilliput mussel)
Villosa fabalis (rayed bean mussel)
Villosa iris (rainbow mussel)
Villosa lienosa (little spectacle case mussel)

Crustaceans

Caecidotea lesliei (isopod)
Crangonyx anomalus (amphipod)
Crangonyx antennatus (amphipod)
Crangonyx packardi (amphipod)
Gammarus acherondytes (Illinois cave amphipod) (F/E)
Orconectes indianensis (Indiana crayfish)
Orconectes kentuckiensis (Kentucky crayfish)
Orconectes lancifer (oxbow crayfish)
Orconectes placidus (crayfish)
Stygobromus iowae (Iowa amphipod)

Dragonflies

Somatochlora hineana (Hine's emerald dragonfly) (F/E)

Leafhoppers

Paraphlepsius lupalus (leafhopper)

Butterflies and Moths

Atrytone arogos (arogos skipper)
Calephelis muticum (swamp metalmark)
Lycaeides melissa samuelis (Karner blue butterfly) (F/E)
Papaipema eryngii (rattlesnake-master borer moth)

Crustaceans

Gammarus bousfieldi (Bousfield's amphipod)

Dragonflies

Nannothemis bella (elfin skimmer)

Leafhoppers

Aflexia rubranura (redveined prairie leafhopper)

Butterflies and Moths

Hesperia metea (cobweb skipper)
Hesperia ottoe (ottoe skipper)
Speyeria idalia (regal fritillary)

LICHENS

Endangered

Phaeophyscia leana (Lea's bog lichen)

PLANTS

Endangered

Adoxa moschatellina (moschatel)
Alnus incana ssp *rugosa* (speckled alder)
Amelanchier interior (shadbush)
Amelanchier sanguinea (shadbush)
Ammophila breviligulata (beach grass)
Amorpha nitens (smooth false indigo)
Arctostaphylos uva-ursi (bearberry)
Artemisia dracunculus (false tarragon)
Asclepias lanuginosa (woolly milkweed)
Asclepias meadii (Mead's milkweed) (F/T)
Asclepias ovalifolia (oval milkweed)
Asclepias stenophylla (narrow-leaved green milkweed)
Asplenium bradleyi (Bradley's spleenwort)
Asplenium resiliens (black spleenwort)
Astragalus crassicaarpus var *trichocalyx* (large ground plum)
Astragalus tennesseensis (Tennessee milk-vetch)
Bartonia paniculata (screwstem)
Beckmannia syzigachne (American slough grass)
Berberis canadensis (Allegheny barberry)
Berchemia scandens (supple-jack)
Betula alleghaniensis (yellow birch)
Betula populifolia (gray birch)
Bidens beckii (water marigold)
Botrychium matricariifolium (daisyleaf grape fern)
Botrychium multifidum (northern grape fern)
Botrychium simplex (grape fern)
Bouteloua gracilis (blue grama)
Bumelia lanuginosa (wooly buckthorn)
Calamagrostis insperata (bluejoint grass)
Calla palustris (water arum)
Calopogon tuberosus (grass pink orchid)
Camassia angusta (wild hyacinth)
Cardamine pratensis var *palustris* (cuckoo flower)
Carex alata (winged sedge)
Carex arkansana (Arkansas sedge)
Carex aurea (golden sedge)
Carex brunnescens (brownish sedge)
Carex canescens var *disjuncta* (silvery sedge)
Carex chordorrhiza (cordroot sedge)
Carex crawfordii (crawford sedge)
Carex cryptolepis (sedge)
Carex decomposita (cypress-knee sedge)
Carex disperma (shortleaf sedge)
Carex echinata (little prickly sedge)
Carex garberi (elk sedge)
Carex gigantea (large sedge)
Carex lucorum (sedge)
Carex nigromarginata (black-edged sedge)
Carex oligosperma (few-seeded sedge)
Carex physorhyncha (Bellow's-beak sedge)
Carex reniformis (reniform sedge)
Carex striatula (lined sedge)

Threatened

Agalinis skinneriana (pale false foxglove)
Arenaria patula (slender sandwort)
Aristolochia serpentaria var *hastata* (narrow-leaved snakeroot)
Aster furcatus (forked aster)
Besseyia bullii (kitten tails)
Boltonia decurrens (decurrent false aster) (F/T)
Botrychium biternatum (southern grape fern)
Cakile edentula (sea rocket)
Carex communis (fibrous-rooted sedge)
Carex intumescens (swollen sedge)
Carex oxylepis (sharp-scaled sedge)
Carex prasina (drooping sedge)
Carex viridula (little green sedge)
Carex willdenowii (Willdenow's sedge)
Carex woodii (pretty sedge)
Chamaedaphne calyculata (leatherleaf)
Cimicifuga rubifolia (black cohosh)
Cirsium hillii (Hill's thistle)
Cirsium pitcheri (Pitcher's (dune) thistle) (F/T)
Corallorhiza maculata (spotted coral-root orchid)
Cyperus grayioides (Gray's umbrella sedge)
Cypripedium candidum (white lady's-slipper orchid)
Drosera intermedia (narrow-leaved sundew)
Eleocharis rostellata (beaked spike rush)
Epilobium strictum (downy willow herb)
Equisetum pratense (meadow horsetail)
Erythronium mesochoreum (white dog-tooth violet)
Eupatorium incarnatum (thoroughwort)
Galium labradoricum (bog bedstraw)
Helianthus angustifolius (narrow-leaved sunflower)
Juniperus communis (common juniper)
Lactuca hirsuta (wild lettuce)
Larix laricina (tamarack)
Lathyrus ochroleucus (pale vetchling)
Lechea intermedia (pinweed)
Liatris scariosa var *nieuwlandii* (blazing star)
Matelea obliqua (climbing milkweed)
Melanthium virginicum (bunch-flower)
Melothria pendula (squirting cucumber)
Oenothera perennis (small sundrops)
Orobanche ludoviciana (broomrape)
Planera aquatica (water elm)
Potamogeton gramineus (pondweed)
Quercus montana (rock chestnut oak)
Quercus phellos (willow oak)
Ranunculus rhomboideus (prairie buttercup)
Rhynchospora alba (beaked rush)
Rubus pubescens (dwarf raspberry)
Salvia azurea ssp *pitcheri* (blue sage)
Scirpus hallii (Hall's bulrush)
Scirpus polyphyllus (leafy bulrush)
Solidago sciaphila (cliff goldenrod)

Carex trisperma (three-seeded sedge)
Carex tuckermanii (Tuckerman's sedge)
Carya pallida (pale hickory)
Castilleja sessiliflora (downy yellow painted cup)
Ceanothus herbaceus (redroot)
Chamaesyce polygonifolia (seaside spurge)
Chimaphila maculata (spotted wintergreen)
Chimaphila umbellata (pipsissewa)
Cimicifuga americana (American bugbane)
Cimicifuga racemosa (black cohosh)
Circaea alpina (small enchanter's nightshade)
Cladrastis lutea (yellowwood)
Clematis crispa (blue jasmine)
Clematis occidentalis (mountain clematis)
Clematis viorna (leatherflower)
Collinsia violacea (violet collinsia)
Comptonia peregrina (sweet-fern)
Conioselinum chinense (hemlock parsley)
Cornus canadensis (bunchberry)
Corydalis aurea (golden corydalis)
Corydalis halei (Hale's corydalis)
Corydalis sempervirens (pink corydalis)
Corylus rostrata (beaked hazelnut)
Cynoscadium digitatum (finger dog-shade)
Cyperus lancastricensis (galingale)
Cypripedium acaule (lady's-slipper orchid)
Cypripedium parviflorum (small yellow lady's-slipper orchid)
Cypripedium reginae (showy lady's-slipper orchid)
Cystopteris x laurentiana (laurentian fragile fern)
Dalea foliosa (leafy prairie clover) (F/E)
Dennstaedtia punctilobula (hay-scented fern)
Draba cuneifolia (whitlow grass)
Drosera rotundifolia (round-leaved sundew)
Dryopteris celsa (log fern)
Echinodorus tenellus (small burhead)
Eleocharis olivacea (capitate spike rush)
Eleocharis pauciflora (few-flowered spike rush)
Equisetum scirpoides (dwarf scouring rush)
Equisetum sylvaticum (horsetail)
Eriophorum virginicum (rusty cotton grass)
Eryngium prostratum (eryngo)
Euonymus americanus (strawberry bush)
Euphorbia spathulata (spurge)
Filipendula rubra (queen-of-the-prairie)
Fimbristylis vahlii (Vahl's fimbristylis)
Galactia mohlenbrockii (Boykin's dioclea)
Galium lanceolatum (wild licorice)
Galium virgatum (dwarf bedstraw)
Gaultheria procumbens (wintergreen)
Geranium bicknellii (northern cranesbill)
Glyceria arkansana (manna grass)
Gymnocarpium dryopteris (oak fern)
Gymnocarpium robertianum (scented oak fern)
Hackelia americana (stickseed)
Styrax americana (storax)
Sullivantia renifolia (sullivantia)
Thuja occidentalis (arbor vitae)
Tofieldia glutinosa (false asphodel)
Tomanthera auriculata (earleaf foxglove)
Tradescantia bracteata (prairie spiderwort)
Trientalis borealis (star-flower)
Triglochin maritimum (arrow-grass)
Triglochin palustris (arrow-grass)
Urtica chamaedryoides (nettle)
Veratrum woodii (false hellebore)
Veronica scutellata (marsh-speedwell)
Viburnum molle (arrowwood)
Viola conspersa (dog violet)

Halesia carolina (silverbell tree)
Helianthus giganteus (tall sunflower)
Heliotropium tenellum (slender heliotrope)
Heteranthera reniformis (mud plantain)
Hexalectris spicata (crested coral-root orchid)
Hudsonia tomentosa (false heather)
Hydrocotyle ranunculoides (water-pennywort)
Hydrolea uniflora (one-flowered hydrolea)
Hymenoxys acaulis (lakeside daisy) (F/T)
Hypericum adpressum (shore St. John's wort)
Hypericum kalmianum (kalm St. John's-wort)
Iliamna remota (Kankakee mallow)
Iresine rhizomatosa (bloodleaf)
Isoetes butleri (quillwort)
Isotria medeoloides (small whorled pogonia)
Isotria verticillata (whorled pogonia) (F/T)
Juncus alpinus (Richardson's rush)
Juncus vaseyi (Vasey's rush)
Juniperus horizontalis (trailing juniper)
Justicia ovata (water willow)
Lathyrus japonicus var *glaber* (beach pea)
Lespedeza leptostachya (prairie bush clover) (F/T)
Lesquerella ludoviciana (silvery bladder pod)
Lonicera dioica var *glaucescens* (red honeysuckle)
Lonicera flava (yellow honeysuckle)
Luzula acuminata (wood rush)
Lycopodium clavatum (common clubmoss)
Lycopodium dendroideum (ground pine)
Lycopodium inundatum (bog clubmoss)
Lysimachia fraseri (loosestrife)
Lysimachia radicans (creeping loosestrife)
Malus angustifolia (narrow-leaved crabapple)
Matelea decipiens (climbing milkweed)
Medeola virginiana (indian cucumber root)
Melanthera nivea (white melanthera)
Melica mutica (two-flowered melic grass)
Milium effusum (millet grass)
Mimulus glabratus (yellow monkeyflower)
Mirabilis hirsuta (hairy umbrella-wort)
Nothocalais cuspidata (prairie dandelion)
Opuntia fragilis (fragile prickly pear)
Orobanche fasciculata (clustered broomrape)
Oxalis illinoensis (Illinois wood sorrel)
Panicum boreale (northern panic grass)
Panicum columbianum (panic grass)
Panicum jorii (panic grass)
Panicum ravenelii (Ravenel's panic grass)
Panicum yadkinense (panic grass)
Paspalum dissectum (bead grass)
Penstemon brevisepalus (short-sepaled beardstongue)
Penstemon grandiflorus (large-flowered beardstongue)
Phacelia gilioides (phacelia)
Phlox pilosa ssp *sangamonensis* (sangamon phlox)
Pinus banksiana (jack pine)

Pinus echinata (shortleaf pine)
Pinus resinosa (red pine)
Plantago cordata (heart-leaved plantain)
Platanthera ciliaris (yellow fringed orchid)
Platanthera clavellata (wood orchid)
Platanthera flava var *flava* (tuberclad orchid)
Platanthera flava var *herbiola* (tuberclad orchid)
Platanthera leucophaea (prairie white fringed orchid) (F/T)
Platanthera psycodes (purple fringed orchid)
Poa alsodes (woodland bluegrass)
Poa languida (woodland bluegrass)
Poa wolfii (meadow bluegrass)
Pogonia ophioglossoides (snake-mouth)
Polanisia jamesii (James clammyweed)
Polygala incarnata (pink milkwort)
Polygonatum pubescens (small solomon's seal)
Polygonum arifolium (half-bred-leaved tearthumb)
Polygonum careyi (Carey's smartweed)
Populus balsamifera (balsam poplar)
Potamogeton praelongus (pondweed)
Potamogeton pulcher (pondweed)
Potamogeton robbinsii (pondweed)
Potamogeton strictifolius (pondweed)
Potentilla millegrana (cinquefoil)
Primula mistassinica (bird's-eye primrose)
Ptilimnium nuttallii (mock bishop's weed)
Puccinellia pallida (pale manna-grass)
Pycnanthemum albescens (white mountain mint)
Pycnanthemum torrei (mountain mint)
Quercus nuttallii (Nuttall's oak)
Ranunculus cymbalaria (seaside crowfoot)
Rhamnus alnifolia (alder buckthorn)
Rhynchospora glomerata (clustered beaked rush)
Ribes hirtellum (northern gooseberry)
Rosa acicularis (rose)
Rubus odoratus (purple flowering raspberry)
Rubus setosus (bristly blackberry)
Rudbeckia missouriensis (Missouri orange coneflower)
Sabatia campestris (prairie rose gentian)
Sagittaria longirostra (arrowleaf)
Salix serissima (autumn willow)
Salix syrticola (sand-dune willow)
Sambucus pubens (red-berried elder)
Sanguisorba canadensis (American burnet)
Sarracenia purpurea (pitcher plant)
Saxifraga virginiana (early saxifrage)
Schizachne purpurascens (false melic grass)
Scirpus cespitosus (tufted bulrush)
Scirpus hattorianus (bulrush)
Scirpus paludosus (alkali bulrush)
Scirpus purshianus (weak bulrush)
Scirpus smithii (Smith's bulrush)
Scirpus verecundus (bashful bulrush)
Shepherdia canadensis (buffalo berry)

Silene ovata (ovate catchfly)
Silene regia (royal catchfly)
Silphium trifoliatum (rosinweed)
Sisyrinchium atlanticum (blue-eyed grass)
Sisyrinchium montanum (blue-eyed grass)
Sorbus americana (American mountain-ash)
Sparganium americanum (bur-reed)
Sparganium chlorocarpum (greenfruited bur-reed)
Spiranthes lucida (yellow-lipped ladies' tresses)
Spiranthes romanzoffiana (hooded ladies' tresses)
Spiranthes vernalis (ladies' tresses)
Stellaria pubera (great chickweed)
Stenanthium gramineum (grass-leaved lily)
Stylisma pickeringii (patterson bindweed)
Styrax grandifolia (bigleaf snowbell bush)
Symphoricarpos albus var *albus* (snowberry)
Synandra hispidula (hairy synandra)
Talinum calycinum (large flower-of-an-hour)
Thalia dealbata (powdery thalia)
Thelypteris noveboracensis (New York fern)
Thelypteris phegopteris (long beech fern)
Tilia heterophylla (white basswood)
Triadenum virginicum (marsh St. John's wort)
Trichomanes boschianum (filmy fern)
Trifolium reflexum (buffalo clover)
Trillium cernuum (nodding trillium)
Trillium erectum (purple trillium)
Trillium viride (green trillium)
Ulmus thomasii (rock elm)
Utricularia cornuta (horned bladderwort)
Utricularia intermedia (flatleaf bladderwort)
Utricularia minor (small bladderwort)
Vaccinium corymbosum (highbush blueberry)
Vaccinium macrocarpon (large cranberry)
Vaccinium oxycoccos (small cranberry)
Valeriana uliginosa (marsh valerian)
Valerianella chenopodiifolia (corn salad)
Valerianella umbilicata (corn salad)
Veronica americana (American brookline)
Viola canadensis (Canada violet)
Viola incognita (hairy white violet)
Viola primulifolia (primrose-leaf violet)
Viola viarum (plains violet)
Waldsteinia fragarioides (barren strawberry)
Woodsia ilvensis (rusty woodsia)
Zigadenus glaucus (white camass)

Source: IL. ENDANGERED SPECIES PROTECTION BOARD, 524 South Second Street, Springfield, Illinois 62701