ENVIRONMENTAL ASSESSMENT

FOR

CERVID DAMAGE MANAGEMENT

IN KENTUCKY

USDA / APHIS / WILDLIFE SERVICES

September 2001

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ii. ACRONYMS

ADC	**Animal Damage Control***
APHIS	**Animal and Plant Health Inspection Service**
ARD	**Assistant Regional Director**
AVMA	**American Veterinary Medical Association**
CEQ	**Council on Environmental Quality**
CFR	**Code of Federal Regulations**
EA	**Environmental Assessment**
EIS	**Environmental Impact Statement**
EJ	**Environmental Justice**
EPA	**U.S. Environmental Protection Agency**
ERO	**Eastern Regional Office**
ESA	**Endangered Species Act**
FDA	**Food and Drug Administration**
FIFRA	**Federal Insecticide, Fungicide, and Rodenticide Act**
FY	**Fiscal Year**
GPRA	**Government Performance Results Act of 1993**
IWDM	**Integrated Wildlife Damage Management**
KAR	**Kentucky Administrative Regulations**
KDA	**Kentucky Department of Agriculture**
KDFWR	**Kentucky Department of Fish And Wildlife Resources**
MOU	**Memorandum of Understanding**
NEPA	**National Environmental Policy Act**
NWRC	**National Wildlife Research Center**
SOP	**Standard Operating Procedure**
T&E	**Threatened and Endangered**
USC	**United States Code**
USDA	**U.S. Department of Agriculture**
USDI	**U.S. Department of Interior**
USFWS	**U.S. Fish and Wildlife Services**
WS	**Wildlife Services***

*** 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.**

1.0 CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program is authorized by Congress to manage a program to reduce human/wildlife conflicts. 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. WS's activities are directed at the protection of America's agricultural, industrial and natural resources, and to safeguard public health and safety. This is accomplished through:

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

This Environmental Assessment (EA) evaluates ways for WS to reduce damage caused by various species of the family Cervidae, in Kentucky. Species of concern are white-tailed deer (*Odocoileus virginianus*), elk (*Cervus elaphus*), European fallow deer (*Dama dama*), and other captive-bred or captive-reared cervids which may include Sika deer (*Cervus nippon*), and Sambar deer (*Cervus unicolor*). The primary focus of the proposed action will be to address cervid damage in urban and industrial environments and special habitats or in special circumstances as described in Subsection 1.2.

WS is a cooperatively funded, service oriented program. Before any operational wildlife damage management is conducted, *Agreements for Control of Animals* are completed by WS and the land owner/administrator. WS cooperates with private property owners and managers and with appropriate land and wildlife management agencies, as requested, with the goal of effectively and efficiently resolving wildlife damage problems in compliance with all applicable Federal, State, and Local laws. WS uses an integrated wildlife damage management (IWDM) approach, as described in the Final Environmental Impact Statement (FEIS) developed by WS for the national program (USDA 1997). WS uses and recommends appropriate legal, effective, practical, and environmentally acceptable methods to address wildlife damage problems. IWDM provides a means of reducing future losses or damage associated with, or caused by, wildlife.

WS activities consist of both operations and research pursuits. The majority of the program's research is conducted by the National Wildlife Research Center (NWRC) through its central location in Fort Collins, CO and its research stations around the country. WS's operational work is conducted through its two regional offices (Lakewood, CO and Raleigh, NC) and State/District offices in the fifty states. The WS program in Kentucky is administered through the State Office in Nashville Tennessee (TN) with the Louisville, Kentucky District Office having responsibility for most areas of the State. Some work in the WS program is accomplished through the efforts of the Knoxville, Nashville, and Jackson, TN District Offices. The work of WS consists primarily of technical and operational assistance to reduce migratory bird damage caused by such species as blackbirds, Canada geese, and ducks. In addition, WS manages damage caused by European

starlings, feral domestic pigeons and other nuisance species in the State. Assistance is also provided for mammal damage management pursuant to funded agreements, permits, authorizations, and requests from State wildlife management and other agencies and affected individuals, and organizations.

1.2 PURPOSE

The purpose of this EA is to analyze the potential effects of WS activities in conducting a cervid damage management program to reduce damage to property and natural resources, and threats to human health and safety. The proposed program will focus primarily on urban and industrial environments and special habitats and circumstances as described below.

- Urban and industrial environments shall be construed to be any location in Kentucky where land use is principally that of providing residential housing, industrial sites or other business sites not identified as farming. In contrast, land use identified as "farming" shall be construed to be any land use where more than 5 acres are dedicated to cropping, livestock, livestock produce, or timber production, but excluding plant nurseries or other horticulture industries located in areas which would otherwise be defined as "urban" based on the land use profile on adjacent properties. Fallow or non-crop fields adjacent to residential, industrial, or business park sites will also be construed to be a part of the urban or industrial environment.

- Cervid damage management in special habitats or special circumstances may include, but not be limited to, programs for reducing cervid populations on private lands where landowners restrict public hunting because of liability concerns, limited access areas where hunting by the public is prohibited by owner policy, for any reason, parklands, recreational areas or other special areas where unique objectives or concerns by regulatory or managing agencies preclude the use of public hunting as a population management tool.

Throughout the remainder of this EA, environments, habitats, and circumstances described above shall be referred to as "special management habitats."

The word "cervid(s)" shall be used in statements in this EA when referring to all species of the family Cervidae in the State, as a group.

1.2.1 Overview of Kentucky Department of Fish and Wildlife Resources Integrated Cervid Management Program

1.2.1.1 White-tailed Deer

White-tailed deer damage in Kentucky has historically been addressed by the Kentucky Department of Fish and Wildlife Resources (KDFWR) as part of its overall cervid management program. Most cervid damage in the past has occurred in rural settings. KDFWR responded to requests for assistance on a case-by-case basis, has used various approaches including technical advice to complainants and granted landowner permits to remove problem animals. Legal hunting of cervids has also been a significant and successful method of preventing damage in rural environments.

White-tailed deer represent cervids as being the most abundant species in this family in the State, and as being the object of most cervid management activities by KDFWR, until recently. As with most white-tailed deer populations in the eastern United States, the successful expansion of numbers of this species in Kentucky has led to problems associated with their increased numbers in special management habitats. As populations of white-tailed deer have expanded near cities during a time

when human populations have likewise increased, some conflicts have arisen. This species is routinely observed along major interstate routes in Kentucky, and in city parks and suburbs. Collisions between cervids and automobiles have risen sharply in the State in the past five years and both wildlife managers and public safety officials are concerned with this problem. In addition, damage by cervids which feed on landscape plantings and hobby gardens has become a concern for many urban homeowners and local governments. By far, the majority of these damage scenarios have involved white-tailed deer.

In the interest of reducing threats to human health and safety and damage to property or natural resources by cervids in special management habitats, the United States Department of Agriculture, Animal And Plant Health Inspection Service, Wildlife Services (WS) began evaluating alternatives and strategies in June, 2000. The objective was to explore development of a program which would provide for procedures and methods for resolving cervid damage problems in specific areas and circumstances.

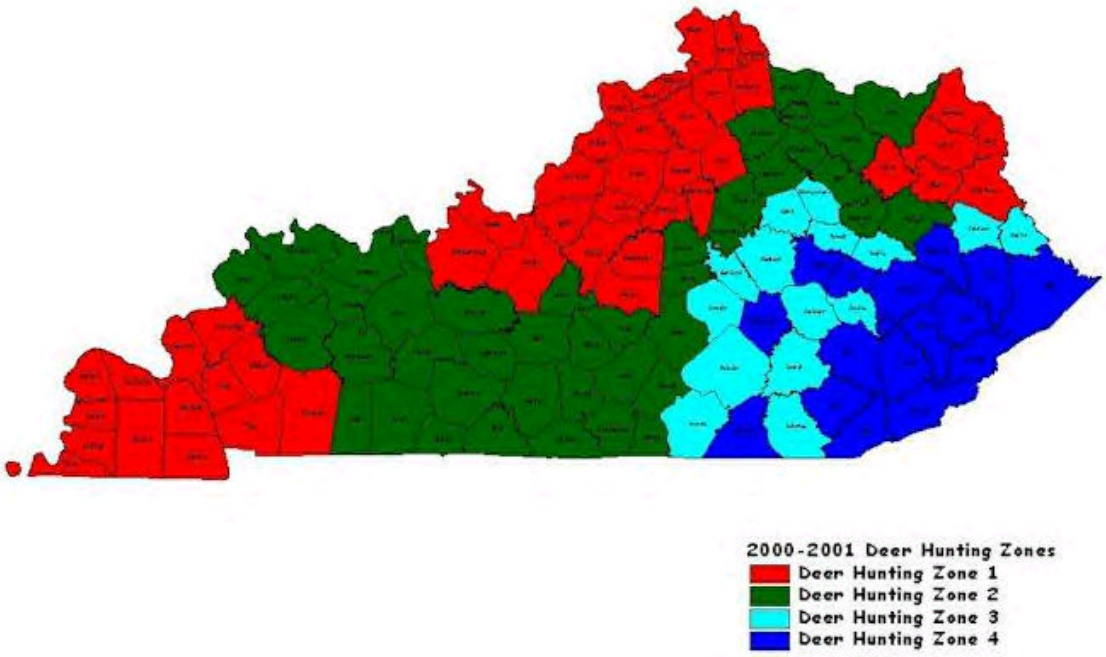
White-tailed deer populations in Kentucky have flourished during the past decade. This species was extremely rare during the early part of the 20th century as a result of intensive hunting in previous years which had reduced the Kentucky herd to 2,000 animals. Most of these deer were in the Jones-Keeney Refuge in Caldwell County, and at the old Kentucky Woodlands Refuge, later to become Land Between The Lakes Recreation Area. Deer were trapped and transplanted from these remnant populations to other core areas, which soon became sources themselves (Blackard 1971). The Kentucky Department of Fish and Wildlife Resources (KDFWR), responding to public interest in cervids began reintroduction efforts and management for cervids in the State in 1945 stocking the first white-tailed deer around that time. Between 1950-60, liberal hunting seasons had resulted in a significant decline in deer herds which stocking efforts had attempted to restore. By 1965 populations were at a critical low. KDFWR systematically stocked 50 - 75 deer per county from 1961-70 and regulated hunting with the objective of allowing herds to recover. Mandatory checking of deer by hunters began in 1976 at which time 3,476 deer were checked in at all stations in the State. High-density stocking of at least 500 deer per county was begun by KDFWR in east Kentucky in 1984 to enhance deer populations in that portion of the State.

From 1978-81, KDFWR biologists developed a “zone ” system of deer management (Figure One) designed to distribute deer populations evenly throughout the State. The early zone management system increased season length as antlered deer harvest increased. However, biologists began using population modeling in 1986 to predict deer population trends and began using deer densities figures to determine season lengths for each zone, and for the State. Such accuracy has enabled KDFWR to also plan for future deer management strategies and to predict impacts of deer populations.

As a result of a more comprehensive knowledge of deer populations in the State, and impacts of these populations, KDFWR completed its long-standing white-tailed deer stocking program in 1999 when all counties in the State were determined to have herds of at least 1,000 deer each. In addition, deer population monitoring efforts enabled KDFWR to determine that some counties had exceeded population densities and crop damage tolerance criteria, and were able to plan deer herd reduction programs for those affected counties in the same year. With a predicted statewide deer population of 690,000 animals in 2000, part of the scope of KDFWR programs to address those population increases are the introduction of some of the most liberal hunting seasons to date for affected counties.

KDFWR soon found that managing cervid species using population model predictions was a very

Figure One: The State of Kentucky, Which is The Project Area, With Zones by Color Scheme and Counties for Deer Hunting Seasons 2000-20001



successful program because of the accuracy of cervid density models. Since implementing cervid management using population models, predictions related to white-tailed deer densities and hunter harvests have been accurate within 3.5%. In 1998, using population models, KDFWR predicted hunter harvest within 276 animals actually taken.

Significant revenue has been generated through cervid hunting and associated activities in Kentucky. This revenue has benefitted wildlife management programs, industry, earnings, and other elements of Kentucky economy. In a publication by the U. S. Department of the Interior (USDI, Undated), based on data collected for the 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, the following summary was made regarding economic impacts for cervid hunting in Kentucky:

- Retail sales $125,629,223
- Multiplier Effect $231,654,181
- Earnings $59,763,128
- Jobs (numbers) 3,297
- KY Sales Tax $8,267,085
- KY Income Tax $3,453,236
- Fed. Income Tax $5,724,870

This summary does not include economic impacts which occur because people seek recreation by watching cervid. A report on 1996 National and State Economic Impacts of Wildlife Watching (USDI 1998), revealed that watching wildlife had a total economic impact of $275 million in Kentucky. Of this, 16% results from those who watch cervids. This means that in Kentucky, cervid watching had a total economic impact of at least $44 million during that year. Thus, the total impact to the Kentucky economy was more than $481 million in 1996.

1.2.1.2 Program Goals for Cervids

In Kentucky, the authority and responsibility for managing the State's fish and wildlife resources, including cervids, has been given by legislative mandate to the KDFWR. KDFWR's Cervid Management Program is directed toward achieving the following goals (R. Grimes KDFWR, Pers. Comm. 2000):

- Maintaining a healthy cervid population on suitable habitat throughout the State
- Maintaining cervid densities that are compatible with land uses, and
- Maximizing the recreational and economic benefits derived from this renewable natural resource.

Biological carrying capacity is generally referred to as the number of animals that an area can support in good condition over an extended period of time. It is determined by the quality and quantity of food, water, and cover within the area. Cultural carrying capacity is the number of cervids that can coexist compatibly with local human populations (Ellingwood and Spignesi 1986, Decker and Purdey 1988). In Kentucky, KDFWR manages the statewide cervid population through establishment of harvest and population objectives (increase, decrease, stabilize) within cervid management zones. Annually, KDFWR considers cultural carrying capacity of cervids and other factors in the determination of cervid management objectives for each zone. Kentucky's human population growth, and the increasing prevalence of urban/suburban landscapes in previously rural areas, may affect cultural carrying capacity for cervids, but management of these large-scale social circumstances is outside of KDFWR's authority. The threshold of wildlife damage acceptance is one of the primary limiting factors in determining cultural carrying capacity. KDFWR evaluates the nature and extent of cervid-vehicle collisions, agricultural and other property damage and other factors in determining cervid population management strategies. Values associated with cervid species and their management are diverse and extensive (Langenau et al. 1984), and include consumptive and non-consumptive uses. KDFWR's management goals for cervids emphasize the importance of such species to all Kentuckians, and support a wide variety of values.

Early cervid management efforts in the U.S., including Kentucky, were directed at protection of species of interest from unregulated exploitation, and towards the goal of population increase (Burke et al. 1990). Through the 1980's, KDFWR's objectives related to the management of white-tailed deer and focused on population increases in most zones. In the 1990's, objectives were changing to population stabilization and decreases due to increasing deer-vehicle collisions, crop damage, and other factors. In 2001-2002, white-tailed deer population decreases or stabilizations are the management objectives for all but two zones in the State. Increasing populations are management objectives for elk. KDFWR is authorized to evaluate changing factors, including cervid/automobile collisions, natural resource and property damage, and the public's tolerance/appreciation for cervids in its annual determination of the most appropriate population management objective for each zone. Past determinations of objectives and historic population levels do not restrict the choices available to KDFWR in determining the most appropriate current population objective. Therefore, past objectives of cervid population increase do not preclude KDFWR from selecting population decrease as the preferred objective for 2001and beyond.

KDFWR has determined that, based on current requests for assistance in managing cervid damage in special management habitats in Kentucky, some level of damage assistance could be requested from any location in the State. During 1999-2000, most requests were made in such locations as Boone, Daviess, Fayette, Jefferson, Kenton, Rowan, and Warren Counties, but were not restricted to these locations.

1.2.1.3 Abundance and Distribution of Cervids

The statewide minimum autumn pre-hunting population has increased from approximately 301,000 white-tailed deer in 1989 to approximately 611,000 in 1999. Current populations of elk are less than 1,000 animals, but reintroductions and reproductive recruitment among these animals are increasing the statewide population at a steady rate. Fallow deer are scattered throughout the State and populations have not been determined. The only known free-ranging herd occurs on the U.S. Forest Service's Land Between The Lakes National Recreation Area. White-tailed deer are present in all Kentucky counties, and occupy almost all undeveloped land that contains suitable habitat. The statewide cervid population has increased through much of the State in the past few years. An instance of this increase can be seen in white-tailed deer densities. Within Kentucky, there are 31,515 square miles of cervid range, with an autumn white-tailed deer population estimated at more than 600,000 (average of 33 deer/mi.^{2}).

Overall, the State's cervid population is healthy and productive, with statewide reproductive rates approaching maximums for fawns, and populations approaching maximums for yearlings, and adults, at least among white-tailed deer. Current information indicates that reproduction among elk populations is excellent and increasing (J. Gassett KDFWR, Pers. Comm. 2001).

1.2.1.4 Regulated Cervid Hunting

Regulated cervid hunting is one of the most common tools employed by wildlife management agencies to achieve cervid population goals and objectives. Historically, this has been a primary tool of KDFWR in managing white-tailed deer populations. Beginning as early as 1990, population levels of this species had reached significant densities in many counties in the State and some agricultural crop damage was occurring (J. Gassett KDFWR, Pers. Comm. 2000). At that time white-tailed deer damage management became necessary in some locations. Hunting has been the primary factor employed to control this species in the State since that time. If left unchecked, populations of white-tailed deer, or any other cervid species, could actually be substantially larger within a few years. However, in areas such as special management habitats where access and other factors limit hunting opportunities, this method has been negatively affected as a tool for achieving population objectives for reduction (J. Gassett, KDFWR, Pers. Comm. 2001). It is the intent of WS to develop a program which appropriately addresses objectives related to population levels for cervids in these zones.

KDFWR manages cervids within cervid management zones (Figure One). Presently, only zones for white-tailed deer are defined in the State, although similar zones are planned for elk. Annually, KDFWR determines population goals (increase, stabilize, decrease) for each of Kentucky's cervid management zones. Current Department objectives are outlined for white-tailed deer and are aimed at decreasing population of this species in Zone One areas, stabilizing them in areas Zone Two areas, achieving growth in Zone Three areas and fast growth in areas zoned four or higher. Regulations and hunting season formats are developed to achieve these goals. Principle factors considered in recommending white-tailed deer population reductions include the incidence of damage to agricultural crops and ornamental plants, threats to human safety and damage to natural resources. In many areas, and where access is not a problem, regulated hunting is the most effective means of

population management for the species. Currently, there are an estimated 181,000 deer hunters in Kentucky. There are three types of deer hunting seasons in Kentucky: Fall/Winter Bow, Modern Firearm, and Muzzleloader. Bow and Modern Firearm seasons overlap as do Bow and Muzzleloader seasons. During the 1999-2000 cervid seasons, 105,000 deer were reported taken by hunters.

1.2.2. Elk

Before colonists settled in Kentucky, eastern elk were fairly common in the State. Mixed forests and grasslands provided adequate habitat for this large cervid. However, by the middle of the 19th century, elk had disappeared as a result of unregulated hunting, encroaching civilization, and loss of habitat.

In 1996 KDFWR began investigating the possibility of bringing free-roaming wild elk back to Kentucky. Subsequent research and public query indicated that such a project could be successful and would be well received by Kentuckians. The project was formalized and approved in 1997 and substantial funding was provided by the Rocky Mountain Elk Foundation to help the process. Seven wild elk were subsequently trapped in Kansas and released on reclaimed coal mining land at the Cyprus Amax Wildlife Management Area in Breathitt, Knott, and Perry Counties, that year. The following year 160 elk were captured in Utah and released in the same area. Each elk released in the State during the first two years was fitted with a radio collar and tracked to gather population and behavior data (KDFWR 2000, K. M. Hermes, 2000).

As part of the management strategy designed for elk by KDFWR, it is the intent of the Department to identify potential damage problems associated with the species and to set in place a damage management program to address such problems. Strategies outlined in this work plan, will constitute an effort aligned with elk damage management objectives purposed by KDFWR as part of the overall wildlife management plan instituted by that agency for the species.

1.2.2.1 Program Goals for Elk

The elk restoration project is slated to run for nine years. During that period, present management plans are to release approximately 200 animals each year at selected sites in eastern Kentucky. Several such sites have been identified and elk have been released in some of these new locations. Animals which have been released are healthy and reproductive. Some indicators suggest that Kentucky's habitat has improved the health of newborn calves and adults alike. Target objectives by KDFWR are to provide a substantial population of these animals for recreational purposes, such as watching, photography, and hunting,, and to reinstate a native species type back into Kentucky's environment (KDFWR 2000a, KDFWR 2000b, K. M. Hermes, 2000).

1.2.3 Other Cervids

A number of captive-bred or captive-reared, non-native cervid species are present in Kentucky. In addition, wild herds of European fallow deer are present at the Land Between The Lakes National Recreation Area in western Kentucky, and are accessible to the public for wildlife watching, photography and limited hunting.

Importation of captive-bred /-reared cervids is currently regulated by State law, but legislation is pending whereby KDFWR will require permits to possess such species, prohibit some cervid species, and set standards for enclosures in which these species shall be kept.

Damage related to other cervid species includes disease threats to wild cervids in Kentucky as well as the threat of genetic alteration of wild species by free roaming non-natives. Other damage includes threats to

human safety posed by escaped exotics and non-natives becoming involved with vehicle traffic.

1.3 NEED FOR ACTION

Cervid-vehicle collisions are a serious concern nationwide because of losses to property and the potential for human injury or even death (Conover et al. 1995, Romin and Bissonette 1996, Conover 1997). In examining automobile accidents involving deer, Conover et al. (1995) estimated that 1.5 million deer-vehicle collisions occur each year in the United States and that the average cost to repair the vehicle after a collision with a deer was $1,500. Conover et al. (1995) thus estimated that the total damage to vehicles in the United States each year from deer-vehicle collisions is greater than $1 billion.

Deer / automobile collisions are a recurrent problem in Kentucky (Kentucky State Police 1995, 1996, 1997, 1998). Statistics further show that the number of incidents in which cervids are struck by vehicles has increased significantly during the past five years (Agent 1994). Although only approximately 20% of such accidents occur in special management habitats, such as urban areas (Agent 1994), addressing such incidents is of concern to the public, and State and Local governments.

Costs in damage from automobile collisions with cervids in Kentucky each year are unknown. However, Kentucky Farm Bureau Mutual Insurance Company, one of the largest automobile insurance providers in Kentucky, reports that costs in insurance settlements for cervid / vehicle collisions in Kentucky are significant (Greg Kosse, Kentucky Farm Bureau Mutual Insurance Co., Pers. Comm. 2000).

During the period from July 1, 1998 -May 2,000 the KDFWR recorded a total of 9,207 road-killed cervids in Kentucky. The magnitude of cervid related accidents reported and the number of these animals killed on the road indicates a need for a program to reduce threats to motorists where cervid numbers are large enough to present such dangers.

Property damage by cervids has exhibited an annual increase and is a recurrent problem in Kentucky's special management habitats. KDFWR received 1,257 complaints about cervid damage in 1997, of which the majority were related to property damage. This damage affected a variety of crops, landscape plants, flower and vegetable gardens, orchards, and nurseries, among other types of property (J. Gassett KDFWR, Pers. Comm. 2000). Cervids which find their way into residential areas are limited in what forage is available and almost always feed on plants found in neighborhood yards or gardens. Some landscape plants cost thousands of dollars per yard and are sometimes killed by browsing cervids. Urban citizens are often unable to prevent such damage and seek solutions by contacting local government public assistance entities who routinely refer these problems to KDFWR. In order to responsibly manage such problems, KDFWR either provides technical assistance advice, or in some cases, may seek to remove offending cervids from the locale.

During the last two years KDFWR found it necessary to implement activities to remove cervids causing damage in special management habitats in at least 28 instances throughout Kentucky (D. McChesney KDFWR, Pers. Comm. 2000). In these situations, evaluation of a number of factors indicated that removing cervids was the most biologically sound management decision, if damage was to be reduced. Increases in the number of instances of similar damage by cervids in the State is expected. To appropriately address such damage WS would conduct an integrated wildlife damage management program in which evaluation of damage and likely scenarios for reducing or eliminating it would be assessed. Based on criteria summarized on a case by case basis, WS would consult with KDFWR to decide what methods discussed in this EA in Subsection 1.4 might be used to reduce or eliminate threats to public safety or property damage posed by cervids in special management habitats in Kentucky.

1.4 PROJECT AREA AND CURRENT WILDLIFE DAMAGE MANAGEMENT PROGRAM BY KDFWR

1.4.1 Project Area Description

The project area (Figure One) consists of one hundred and twenty Counties which constitute the Commonwealth of Kentucky (State). Project sites will consist primarily of urban and industrial habitats, but may not be limited to these areas (see Subsection 1.2). Although some Counties do not yet exhibit significant cervid damage in urban settings and industrial locations, current white-tailed deer population trends in Kentucky make it likely that any special management habitat in the State could experience such damage in the near future, at least from this species. Typically, each county in the State has at least one city of more than 6,000 citizens, exhibiting an urban environment comprised of business centers and surrounding residential areas. Broken terrain and significant green space in these cities allow wildlife species, including cervids, to inhabit or use such zones for food and shelter. Perimeter communities and industrial and business complexes are usually first to experience cervid damage, with more central urban areas usually following as cervid populations increase. Man-made barriers such as interstate highways or fenced communities may deter or slow expansion of urban cervid populations under some conditions (J. Gassett KDFWR, Pers. Comm. 2001).

1.4.2 Current Cervid Damage Management Program

KDFWR has a staff of 46 wildlife biologists who carry out many of its wildlife damage management program activities. In addressing cervid damage, KDFWR provides technical assistance on wildlife control techniques and approaches, issues out-of-season permits to take white-tailed deer causing damage and also provides “antlerless only” depredation permits to landowners for this species. Technical assistance is ongoing and consists of information delivered over the telephone, through the mail, and via personal consultations. KDFWR handles more than 1,000 requests regarding white-tailed deer damage each year, but receives only a small number of requests for damage related to other cervid species. The following subsections discuss cervid damage management strategies, policies and procedures used by KDFWR, by species.

1.4.2.1 White-tailed Deer Damage Management

In response to increasing deer densities, management strategies are aimed at keeping both Kentucky’s deer herd and its habitat healthy. In response to increasing deer-human conflicts, KDFWR has continued to expand hunting opportunities to increase the total and antlerless segment of the annual harvest. Regulatory efforts to increase the antlerless harvest have included:

- Increasing the number of hunting days,
- Bonus tags for taking antlerless deer,
- Expanded daily and seasonal bag limits, and
- Limiting hunters to 1 buck per season.

Permits to kill wild deer are available year round, pursuant to regulation (Appendix B). Several such permits are issued each year, resulting in the shooting of individual deer causing damage at various sites throughout the State. Horton and Craven (1997) noted that judicious use of shooting permits in conjunction with hunting of antlerless deer and other control techniques may result in significant reduction of agricultural crop losses to cervids. Shooting cervids pursuant to permit is different from hunting cervids during hunting seasons. The goal of the permit program is to protect farmers’ crops by shooting cervids causing damage. The activities are conducted by the permittee and his/her agents, using

specialized tools and techniques. Hunting is conducted by licensed hunters pursuant to hunting regulations, and the primary objectives are cervid damage mitigation, recreation, and acquisition of food. Typically, hunting is accomplished with limited tools and techniques. Shooting to control damage is conducted with a wider range of available tools and techniques designed to maximize effectiveness and efficiency.

Nonlethal methods such as fencing and repellents are sometimes employed by landowners in Kentucky within the context of a comprehensive cervid management program. The effectiveness of repellents and electric fencing is highly variable and is usually dependent on cervid density (Ellingwood and Caturano 1988). Exclusive use of nonlethal methods such as exclusion, harassment, and repellents usually results in increased cervid damage on adjacent areas.

1.4.2.2 Elk Damage Management

Permits to kill elk causing damage are available to Kentucky residents pursuant to regulation (Appendix B). Although little damage currently results from elk, KDFWR has begun to establish processes whereby such damage can be addressed. This process is evolving.

1.4.2.3 Damage Management For Other Cervids

A brief discussion of proposed regulation which will serve to address damage caused by other cervids in Kentucky is presented in Subsection 1.2.3. KDFWR provides technical advice for damage complaints related to any cervid species in the State. In addition, unusual damage scenarios resulting from other cervids are sometimes investigated by KDFWR for the purpose of determining damage management strategies.

1.5 WS CERVID DAMAGE MANAGEMENT PROGRAM

WS would consult with KDFWR in the implementation of cervid damage management projects in Kentucky. WS would implement damage management activities as prescribed by, and in conformity with, both KDFWR and WS policy and procedure and pursuant to wildlife management objectives of KDFWR. The following subsections define resources to be protected pursuant to the proposed action and outlines general procedures for cervid damage management pursuant to larger wildlife management objectives of KDFWR for Kentucky.

1.5.1 Resources To Be Protected Under The Proposed Action

Subsection 1.2 identifies the kinds of habitats and circumstances in which WS would conduct cervid damage management, and defines them as “special management habitats.” Such areas shall be of concern to KDFWR because some resource or multiple resources are threatened by activities of cervids. For instance, cervids may damage landscaping in a residential area, while at the same time threatening vehicular traffic and consequently, human safety at the same site. The following is a list of circumstances of cervid damage or damage threats to resources that could occur in the State which might result in damage management activities by WS, as part of the proposed cervid damage management program:

- cervids cause or threaten damage to threatened or endangered plants or animals,
- cervids damage landscape plants or gardens in a residential community, urban area, or industrial complex or cause a significant increase of ticks in the area, presenting a potential human health threat,
- cervid/vehicle collisions occur along a portion of a highway in the State or in an urban or suburban area,

- cervids threaten aircraft traffic and endanger the lives of air passengers by feeding or other activities in proximity to an airport runway,
- cervids cause damage to the products of a nursery, tree farm, or landscape industry,
- cervids cause damage to plants in a natural area, park, recreational area, or area where hunting is not allowed, or where hunting or killing of deer by special permits has not sufficiently addressed the damage,
- cervids are observed or reported near an area of high automobile traffic, such as an interstate highway, and their presence is judged by KDFWR or Local government to pose a threat to human safety, or
- non-native cervids, captive-bred/-reared cervids, or unregulated cervids escape into the wild and are judged by KDFWR to pose a threat to native cervid gene pools or native cervid health.

WS activities could occur, but not be limited to, any of the above described circumstances at any location in Kentucky, as part of the proposed action.

1.5.2 Assessment and Response To Cervid Damage Complaints

WS would consult with KDFWR to make determinations about levels of cervid damage in special management habitats throughout Kentucky. Magnitude of cervid damage would be initially assessed based on requests by the public for assistance made either to KDFWR or WS. KDFWR may recommend that complainants in special management habitats seek assistance from WS. As a preliminary step in addressing all cervid damage complaints, WS would confer with designated KDFWR personnel regarding the nature of the complaint, and strategies for addressing them. WS may make further field investigations through phone consultations and site visits to determine appropriate courses of action to adequately address the damage problem. WS would then consult with KDFWR concerning methods to be used in resolving cervid damage on a case by case basis. In resolving cervid damage, WS would also communicate with Local government agencies, when appropriate, to determine if special permits or considerations are needed in order to conduct operations. If permits or waivers are needed from Local City or County governing bodies, WS would apply through appropriate channels and obtain them as needed. WS would further coordinate with Local law enforcement when conducting cervid damage management activities likely to cause public concern or unusual interest. WS may request local law enforcement presence during certain damage management activities where WS operations might affect automobile traffic or where monitoring and directing of the public is needed for overall safety. Law enforcement personnel may direct local traffic in such situations in order to minimize risk of conflict between cervids and vehicles, or detour human pedestrians around the project site.

1.5.3 Cervid Damage Response By WS According To Priorities

Resolution of cervid damage threats to human health or safety would have priority status under the proposed program. If contacted about a cervid damage problem, under ordinary circumstances WS would provide on-site services to resolve such an issue within 24 hours at any location in Kentucky. Contingency conditions at the damage site might hinder resolution of the damage threat during the 24-hour period although WS personnel were able to inspect the sites during that time. However, implementation of methods aimed at reducing or eliminating the human health and safety threat would occur as soon as all contingency issues could be addressed. Complaints about damage to property by cervids would be investigated by WS within one working week of receiving the request for assistance. Methods to reduce or eliminate the damage problem would be implemented as quickly as possible.

1.5.4 Cervid Damage Resolution by Methods

In resolving cervid damage, WS may:

A. Conduct an on-site investigation to assess damage and discover strategies for reducing or eliminating damage which can be implemented by the complainant. When such strategies are determined and have been implemented, the damage site would be monitored by WS through requests for phoned-in updates from the complainant, or by brief site visits by WS biologists to verify that damage has been eliminated or abated to an acceptable degree. Strategies may include one or a combination of methods as might be determined by consultation with KDFWR. The following list is a summary of methods that would be recommended to complainants in situations where such strategies would be likely to resolve damage caused by cervids:

- fencing,
- application of repellents,
- scaring of damaging cervids using noise or visual harassment,
- or alteration of cultural practices such as selecting unpalatable landscape plants.

B. Conduct an on-site investigation to assess damage and discover strategies for reducing or eliminating damage and make a determination that direct damage management activities should be implemented. Such activities might include any of the following:

- Conduct harassment activities to disperse cervids using noise or visual harassment in situations where such methods could be followed by exclusionary methods implemented by landowners which would prevent re-entry of the damage site by the animals,

- Install and monitor cervid traps or snares to collect damaging animals. This method would be employed when human traffic at the affected site is minimal or nonexistent or where posting of signs appropriately identifying traps or snares can be expected to protect the public, or when WS biologists are able to monitor traps or snares during daylight hours, or when traps or snares can be tripped during the day and reset at night.

- Immediately remove damaging cervids through lethal methods or through chemical immobilization and euthanasia or translocation. Lethal methods may include the use of rifles, shotguns, crossbows, arrow guns, or bows and arrows. Procedures for protecting the public and notifying appropriate officials as outlined in “Assessment and Response To Cervid Damage Complaints” would be used. Chemical immobilization strategies would be conducted only by WS or KDFWR personnel trained in chemical immobilization techniques using FDA approved immobilizing chemicals registered for use on large mammals.

In cases where damage complaints involve imminent threat to human safety, such as the threat of free roaming cervids near a major highway or thoroughfare, WS would only use methods which can be reasonably expected to provide for the removal of the threat within 48 hours of the assessment.

1.5.5 Handling And Disposal Of Cervids Collected

Decisions about disposition of live-captured cervids would be mutually derived by KDFWR and WS. KDFWR shall determine release sites for cervids which are relocated. WS would transport animals to release sites according to best wildlife transport practices in appropriate transport devices. WS would assume responsibility for euthanizing cervids which are not suitable for release or those animals for which

KDFWR does not have release sites. If euthanasia following chemical immobilization were necessary, it would usually be performed by gunshot as described for mechanical euthanasia (AVMA 1993). Other euthanasia methods approved by AVMA in its 1993 evaluation (AVMA 1993) may be employed in some circumstances in the Cervid Damage Management Program. Although gunshot as an AVMA approved method has lately stirred controversy because of more current opinions by some members of AVMA (Nettles, 2000) and a recent report by AVMA on euthanasia (AVMA 2000), many wildlife professionals still consider this to often be the most practical, if not only, means of euthanasia for some wild animals (Kreeger 1996). This view is held by both KDFWR and WS wildlife professionals in Kentucky (D. McChesney, KDFWR and R. Myers WS, Pers. Comm. 2001) . Therefore, gunshot, as well as other methods summarized in "Cervid Damage Resolution By Methods" may be employed in damage management activities which require the removal of cervids by lethal means.
KDFWR and WS would collaborate to dispose of cervid carcasses. Under ordinary conditions, prior arrangement to donate cervids to non-profit organizations for distribution as human food would occur, where appropriate. These donations would be in compliance with Kentucky Revised Statute (KRS) 413.247-248. Licensed processors would be used to prepare cervid meat for donations. In situations where cervids cannot be processed in a timely manner or in which spoilage of meat is suspected, or animals are determined by KDFWR or WS to be unfit for human consumption because of the condition of animals, carcasses would be incinerated or buried. Any animals euthanatized rather than released, after capture through the use of immobilizing chemicals, will not be used for human consumption, but will also be incinerated or buried.

Under the proposed action, all other cervid damage management activities as described in Subsection 1.4.2 (Current Cervid Damage Management Program) would continue to occur. The only new addition to the program would be WS activities designed to address cervid damage in special management habitats, a component already being conducted to a lesser extent by KDFWR at such sites. This EA also contemplates the potential for WS involvement in addressing cervid damage in rural and agricultural settings. This might occur if shooting of cervids in these habitats by farmers/landowners who have permission and permits issued by KDFWR, and/or legal hunting of cervids did not achieve harvest objectives within the cervid management zone. WS participation would only occur in rural habitats after consultation with KDFWR, and contingent on invitation, request and permission of the landowner(s) and/or farmer(s). Such sites shall be recognized by KDFWR and WS as special management habitats because of special circumstances requiring additional damage management actions.

1.6 RELATIONSHIP OF THIS ENVIRONMENTAL ASSESSMENT TO OTHER ENVIRONMENTAL DOCUMENTS

WS conducted a NEPA process and developed a Final Environmental Impact Statement (FEIS) on the national APHIS/WS program (USDA 1997). The FEIS contains detailed discussions of potential environmental impacts from various wildlife damage management methods. The Council on Environmental Quality (CEQ) regulations for implementing NEPA authorize agencies to eliminate repetitive discussions of issues addressed in programmatic documents by tiering to the broader document (CFR 1500.4(I);1502.20). Therefore, this EA is tiered to the FEIS, and pertinent information available in the FEIS has been incorporated by reference into this EA. The FEIS may be obtained by contacting: USDA APHIS WS Operational Support Staff, 4700 River Rd., Unit 87, Riverdale, MD 20737-1234.

1.7 DECISIONS TO BE MADE

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

- Should WS remove cervids at selected special management habitat sites in Kentucky?

- What mitigation measures should be implemented?
- Would the proposed action have significant impacts requiring an EIS analysis?

1.8 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

1.8.1 Actions Analyzed

This EA evaluates potential environmental impacts of various methods used by WS to enhance the current integrated cervid damage management program through IWDM strategies applied in special management habitats.

1.8.2 Period for Which this EA is Valid

This EA will remain valid until WS determines that new needs for action or new alternatives having different environmental effects must be analyzed. WS monitoring procedures direct that State or Station Directors within the agency assure that each EA for which they are responsible, the Decision associated with the EA, and the activities specified in the Decision will be reviewed annually for applicability and accuracy of the documents, monitoring compliance, and the need for further analysis and documentation due to new information or changes in activities. A report of this review is prepared and filed in the respective State or Station WS office and with the appropriate WS Regional Director. Results of the review and monitoring report will be noticed to the public, including the affected interests within five years of the Decision date for any EA's analyzing ongoing projects. This process insures that each EA is complete and still appropriate to the scope of the State wildlife damage management activities.

1.8.3 Site Specificity

This EA analyzes potential impacts of WS's involvement in the overall Kentucky cervid management program that would occur on private and/or public property in the State. The standard WS Decision Model (Slate et al. 1992) and WS Directive 2.105 is the decision-making process for determining methods and strategies to use or recommend for individual actions conducted by WS (See USDA 1997, Chapter 2 and Appendix N for a more complete description of the WS Decision Model and examples of its application). Decisions made using this process will be in accordance with mitigation measures and standard operating procedures described herein and adopted or established as part of the decision. WS may receive requests for assistance in managing cervid damage in any location in any county in Kentucky.

1.9 AUTHORITY AND COMPLIANCE

1.9.1 Authority of Federal and State Agencies in Cervid Damage Management in Kentucky

1.9.1.1 WS Legislative Mandates

WS is directed by law to protect American agriculture and other resources from damage associated with wildlife. Wildlife damage management is directed toward alleviating damage or other problems caused by, or related to, the presence of wildlife. It is an integral component of wildlife management (Leopold 1933, The Wildlife Society 1990, Berryman 1991).

The primary statutory authority for the WS program is the Animal Damage Control Act of 1931 (7 U.S.C. 426-426c; 46 Stat. 1468), which provides that:

"The Secretary of Agriculture is authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State, Territory or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jackrabbits, brown tree snakes and other animals injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, and birds, and for the protection of stock and other domestic animals through the suppression of rabies and tularemia in predatory or other wild animals; and to conduct campaigns for the destruction or control of such animals. Provided that in carrying out the provisions of this Section, the Secretary of Agriculture may cooperate with States, individuals, and public and private agencies, organizations, and institutions."

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

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

Therefore, activities related to direct management programs to reduce wildlife damage may be conducted by WS pursuant to funded contracts and agreements with other agencies, organizations, corporations, groups, and individuals.

1.9.1.2 Kentucky Department of Fish and Wildlife Resources (KDFWR)

The KDFWR consists of a Commissioner, a Fish and Wildlife Resources Commission, the Division of Law Enforcement, and other agents and employees provided for in Kentucky Revised Statutes (KRS) Chapter 150. KDFWR is responsible, under KRS 150 Title XII initiated by Acts 1952 ch. 200, for managing most wildlife species in the State. Statutes pertinent to such activities are contained in KRS 150.010 - 150.990. Some KRS germane to the lawful killing of cervids and for various purposes follow with brief summaries of salient points. Entire subsections found in Appendix B provides more detailed information.

KRS 150.105
Under this statute, the Commissioner may, with the approval of the Commission, authorize conservation officers or any other persons to destroy or bring under control in such a manner as he deems necessary any wild animal, fish or wild birds, protected or unprotected which are causing damage to persons, property, or other animals, fish or birds or spreading diseases and which in his judgment should be eliminated or controlled to prevent further damage.

KRS 150.170
This section provides statutory guidance to landowners and tenants for the lawful killing of wildlife both during regular hunting seasons and in cases where wildlife cause damage to the lands or

personal property situated thereon.

KRS 150.175
This section identifies the kinds of licenses and tags required for lawful taking of wildlife.

Kentucky Amended Regulations (KAR) 2:030 - 10:010 provide the basis of law by which KDFWR regulates activities related to wildlife and wildlife habitat in the State. Reference to these regulations should be made for specific information related to wildlife. Copies of KAR 2:030 - 10:0100 may be obtained by contacting The Kentucky Department of Fish and Wildlife Resources, #1 Game Farm Rd. Frankfort, KY 40601. Some KAR found in Appendix B and pertinent to cervid damage management are as follows:

301 KAR 2:132 ELK DEPREDATION PERMITS

301 KAR 2:111 DEER AND TURKEY HUNTING ON SPECIAL AREAS

301 KAR 2:172 DEER HUNTING SEASONS AND REQUIREMENTS

301 KAR 2:178 DEER HUNTING ON WILDLIFE MANAGEMENT AREAS

301 KAR 2:174 DEER HUNTING ZONES

301 KAR 2:176 DEER CONTROL TAGS

301 KAR 2: 179 STATE PARK DEER HUNTS

301 KAR 2:083 HOLDING LIVE CERVIDS

1.9.2 Compliance With Other Federal Laws

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

1.9.2.1 National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) of 1969 (42 USC Section 4231 et seq.) is implemented by Federal Agencies pursuant to 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 need for action, alternatives, and environmental impacts, and includes a list of agencies/persons consulted.

1.9.2.2 Endangered Species Act (ESA)

It is Federal policy, under the ESA, that all Federal agencies seek to conserve threatened and endangered (T&E) species and utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). 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 USFWS BO. In addition to these programmatic efforts to comply with the ESA, individual WS programs may confer with USFWS 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.

1.9.2.3 Executive Order on Environmental Justice

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. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires Federal agencies to analyze disproportionately high and adverse environmental effects of proposed actions on minority and low-income populations.

1.9.2.4 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 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.

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

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

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

The Clean Water Act provides regulatory authority and guidelines for the EPA and the U.S. Army Corps Of Engineers related to wetlands. Several Sections of the Clean Water Act pertain to regulating effects to wetlands. Section 101 specifies the objectives of this Act which are implemented largely through Subchapter III (Standards and Enforcement), Section 301 (Prohibitions). The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Subchapter IV (Permits and Licenses) of this Act. Section 401 (Certification) specifies additional requirements for permit review particularly at the State level. WS consults with

appropriate regulatory authorities when wetlands exist in proximity to proposed activities or when such activities might impact wetland areas. Such consultations are designed to determine if any wetlands will be affected by proposed actions.

1.9.2.7 Executive Order 13112 On Invasive Species

Executive Order 13112 - Invasive Species directs Federal agencies to use their programs and authorities to prevent the spread or to control populations of invasive species that cause economic or environmental harm, or harm to human health. In Kentucky, WS responds to a number of requests for assistance with human health and safety threats associated with large populations of feral domestic pigeons, European starlings, and English sparrows, all invasive non-native species in the United States. To comply with Executive Order 13112, WS may cooperate with other Federal, State, or Local government agencies, or with industry or private individuals to reduce damage to the environment or threats to human health and safety caused by any invasive or non-native species, including mammals.

2.0 CHAPTER 2 - ISSUES

Chapter 2 contains discussions of issues that are addressed in the analysis of alternatives and impacts, and issues not considered in detail (with rationale).

2.1 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES

The following issues have been identified as areas of concern requiring consideration in this EA.

- Effects on Target Cervid Populations
- Effects on Nontarget Species Populations, Including Threatened and Endangered Species
- Effects on Human Health and Safety
- Effects on Aesthetics
- Humaneness of Lethal Methods Used To Take Cervids
- Effects on Regulated Cervid Hunting

2.1.1 Effects on Target Cervid Populations

A common concern among members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. In Kentucky, where cervids pose damage problems in various habitats and where populations have exceeded acceptable levels, KDFWR usually selects population reduction as the management strategy. In other instances, the presence of individual animals of a species in a given locale can present unacceptable damage or risk to local habitats or humans and KDFWR considers reduction or elimination of this damage or risk to be an integral part of its wildlife management program. The extent to which each of the alternatives contributes towards this strategy is considered a positive impact, and is described in this EA.

2.1.2 Effects on Nontarget Species Populations, Including Threatened and Endangered Species

WS, KDFWR, and the public are concerned about the potential impact of damage management methods and activities on nontarget wildlife, particularly threatened and endangered (T&E) Species. WS's standard operating procedures include measures intended to mitigate or reduce the effects on nontarget species populations and are presented in Chapter 4.

Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of mitigation measures. KDFWR's Endangered Species and Wildlife Diversity Program provided a list of State T&E species (Appendix C), and information regarding effects of the proposed action on T&E species and their habitats or ecosystems. USFWS Ecological Services has provided a list of Federal T&E species that occur in Kentucky. That list appears on the next page.

T&E species that are Federally listed (or proposed for listing) for the State of Kentucky are:

Mammals:

Virginia big-eared bat (*Corynorhinus townsendii virginianus*)
Gray bat (*Myotis grisescens*)
Indiana bat (*Myotis sodalis*)

Birds:

Bald eagle (*Haliaeetus leucocephalus*)
Red cockaded woodpecker (*Picoides borealis*)
Interior least tern (*Sterna antillarum athalassos*)

Reptiles:

Copperbelly water snake (*Nerodia erythrogaster neglecta*)

Fish:

Relict darter (*Etheostoma chienense*)
Duskytail darter (*Etheostoma percnurum*)
Palezone shiner (*Notropis albizonatus*)
Blackside dace (*Phoxinus cumberlandensis*)
Pallid sturgeon (*Scaphirhynchus albus*)

Mussels:

Cumberland elktoe (*Alasmidonta atropurpurea*)
Fanshell (*Cyprogenia stegaria*)
Cumberlandian combshell (*Epioblasma brevidens*)
Oyster mussel (*Epioblasma capsaeformis*)
Catspaw (*Epioblasma obliquata obliquata*)
Northern riffleshell (*Epioblasma torulosa rangiana*)
Pink mucket (*Lampsilis abrupta*)
Ring pink (*Obovaria retusa*)
Little-wing pearlymussel (*Pegias fabula*)
Orange-foot pimpleback (*Plethobasus cooperianus*)
Clubshell (*Pleurobema clava*)
Rough pigtoe (*Pleurobema plenum*)
Fat pocketbook (*Potamilus capax*)
Cumberland bean (*Villosa trabalis*)

Crustaceans:

Kentucky cave shrimp (*Palaemonias ganteri*)

Insects:

American burying beetle (*Nicrophorus americanus*)

Plants:

Price's potato-bean (*Apios priceana*)
Braun's rock cress (*Arabis perstellata* var. *perstellata*)
Cumberland rosemary (*Conradina verticillata*)
Eggert's sunflower (*Helianthus eggertii*)
Cumberland sandwort (*Minuartia cumberlandensis*)
White-haired goldenrod (*Solidago albopilosa*)
Short's goldenrod (*Solidago shortii*)
Virginia spiraea (*Spiraea virginiana*)
Running buffalo clover (*Trifolium stoloniferum*)

2.1.3 Effects on Human Health and Safety

Some people may be concerned that WS's use of firearms could impact human safety (scaring cervids into traffic, accidentally shooting a person, etc.).

2.1.4 Effects on Aesthetics

The effects of alternatives on human affectionate bonds with individual cervids and on general aesthetic values of cervids vary widely among people. Some cervids live in very close proximity to humans, and people in these situations feed cervids and/or develop emotional/affectionate attitudes toward the animals. Other people do not develop emotional bonds with individual cervids, but experience aesthetic enjoyment from observing them and/or the knowledge of the existence of cervids nearby.

Public reaction to wildlife damage management is variable because individual members of the public may have very different attitudes toward wildlife. Some individuals that are negatively affected by wildlife support removal or relocation of damaging wildlife. Other individuals affected by the same wildlife may oppose removal or relocation. Individuals unaffected by wildlife damage may be supportive, neutral, or opposed to wildlife removal depending on their individual values and attitudes.

2.1.5 Humaneness and Animal Welfare Concerns

Research indicates that the public may be willing to accept lethal wildlife management methods if they are humane (i.e., minimize apparent pain and suffering of the target animal) (Kellert 1993, Schwartz et al. 1997). The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife, is an important and complex concept. Wildlife damage management for societal benefits could be compatible with animal welfare concerns, if *" the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process" (Schmidt 1989).* Suffering is described as a *" . . . highly unpleasant emotional response usually associated with pain and distress."* However, suffering *" . . . can occur without pain . . . ,"* and *" . . . pain can occur without suffering . . . "* (AVMA 1987). Because suffering carries with it the implication of a time frame, suffering is considered to be minimized where death is immediate, such as occurs with shooting. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology.

Mitigation measures and standard operating procedures used to maximize humaneness are listed in Chapter 4.

2.1.6 Effects on Regulated Cervid Hunting

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

2.2 ISSUES NOT CONSIDERED IN DETAIL (WITH RATIONALE)

2.2.1 Impact on Biodiversity

The impacts of the current WS program on biodiversity are not significant nationwide or statewide (USDA 1997). The goal of integrated wildlife damage management programs is to reduce damage, and some programs contain a component of reducing the local target species population. The proposed action would have no effect on biodiversity at the State, cervid management zone or community (local) level. Regarding cervids, local areas may have lower densities after the project, but no area would be devoid of

individuals of a species as a result of proposed program activities. No other wildlife species would be taken or otherwise affected. Habitats and ecosystems are not affected, and no secondary impacts on other species would be created.

2.2.2 Threshold of Loss

Some people believe that wildlife damage is a cost of doing business, and that a “threshold of loss” should be established before wildlife damage management is conducted. Some wildlife damage is expected and accepted by those experiencing damage, but in many cases, the economic losses or threats to human safety caused by cervids have exceeded the acceptable level and have created serious economic or safety impacts to communities, local governments, or individuals. WS is directed by law to respond to requests for wildlife damage management assistance, and it is program policy to aid each requester with the goal of minimizing losses.

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

2.2.3 Wildlife Damage Management Should be Fee Based

WS was established by Congress as the program responsible for providing wildlife damage management to the people of the United States. Nationwide, funding for WS comes from Federal appropriations and a wide variety of other sources. These other sources include State and Local (County or Municipal) governments, Indian tribes, airports, agricultural commodity groups, and private corporations and individuals. In the United States, wildlife is a publically-owned resource that is managed in trust for the people by Federal and State wildlife management agencies. Wildlife damage management is an integral component of wildlife management. One common belief regarding funding for wildlife damage management is that it should be all taxpayers’ shared responsibility to pay for wildlife damage to private property, since wildlife is a public resource. Cervid species which will be addressed in Kentucky are not afforded Federal protection, and Federal wildlife management agencies have no direct regulatory authority pertaining to management of them on private or non-Federally-owned public lands. Resident mammals, such as cervids are managed by State wildlife agencies in trust for the citizens of the State. However, Federal agencies, such as WS, may contract with states to conduct cervid damage management projects. The proposed action would be funded entirely by non-Federal sources.

2.2.4 American Indian and Cultural Resource Concerns

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. The proposed WS cervid damage management actions do not cause ground disturbances nor do they otherwise have the potential to affect visual, audible, or atmospheric elements of historic properties and are thus not undertakings as defined by the NHPA.

2.2.5 Cost Effectiveness of Addressing Cervid Damage

The CEQ regulations (40 CFR 1502.23) do not require a formal, monetized cost-benefit analysis to comply with NEPA. Consideration of this issue is not essential to making a reasoned choice among the alternatives being considered. The ADC EIS, Appendix L, p. 32 (USDA 1997) stated:

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

An analysis of cost-effectiveness in many cervid damage situations is exceedingly difficult if not impossible to perform because the value of benefits, especially quantifying future losses that are prevented due to cervid damage management actions, is not readily determined.

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

Children may suffer disproportionately from environmental health and safety risks for many reasons. Cervid damage management actions as proposed in this EA would include only safe, legal, effective and environmentally sound methods and tools, and would be conducted in areas and under circumstances where it is highly unlikely that children would be present or adversely affected. Therefore, implementation of the proposed action would not increase environmental health or safety risks to children.

2.2.7 Executive Order 12898: Environmental Justice

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 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 safe, legal, effective, and environmentally prudent wildlife damage management methods, tools, and approaches. The proposed action would not result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations. Additionally, the donation of venison to charitable organizations would be a benefit to the economically disadvantaged, and to other persons in need.

3.0 CHAPTER 3: OBJECTIVES

Chapter Three examines objectives of the cervid damage management program in Kentucky. The Government Performance and Results Act of 1993 requires that Federal agencies develop program strategies and set goals which are measurable. Further, KDFWR has developed objectives related to resolving cervid damage in Kentucky, and the WS program is designed to be responsive to those objectives. WS pursues goals related to wildlife damage management as set forth in the WS programmatic Strategic Plan (USDA - APHIS - ADC, 1989). Such goals may be reflected in local and state level wildlife damage management programs conducted by WS throughout the United States. Goals discussed in this EA reflect the most reasonable outcome of an effective special management habitat cervid damage management program which WS proposes to conduct.

3.1 SUMMARY OF OBJECTIVES

Objectives for cervid damage management in Kentucky are:

- To Provide a Reasonable Response To, And Resolution of, Immediate Human Safety Threats Caused By Cervids To Requesters In Kentucky

- To Provide a Source Of Assistance For Mitigation Or Resolution Of Cervid Damage To Property or Natural Resources To Requesters In Kentucky

Objectives will be accomplished in accordance with procedures outlined in Subsection 1.3.1.

3.1.1 Measuring Accomplishment of Objectives

Measuring objective accomplishments will be performed through a two step process:

1. A record will be kept by WS of all requests made for assistance with cervid damage problems. Part of this record will contain information about the action taken by WS to assist in addressing the problem.

2. The record will be evaluated each year to determine what percent of requests were responded to by WS. If 95% of requests received a response aimed at reducing cervid damage, objectives will have been met.

Acceptable responses by WS which would meet objectives would be:

- A visit to the damage site, followed by providing the requester with verbal or written recommendations likely to resolve the cervid damage,

- A visit to the damage site, followed by a direct damage management action by WS personnel to reduce or eliminate the damage,

- A phone consultation by WS in which the complainant is provided cervid damage management advice likely to resolve the damage for the particular situation.

4.0 CHAPTER 4: ALTERNATIVES INCLUDING THE PROPOSED ACTION

NEPA and CEQ regulations (1502.14) require that the EA contain a description of alternatives, including a No Action alternative which will serve as a baseline against which other alternative(s) are evaluated. At least one other alternative must be considered, and a "Preferred Alternative" identified. This section objectively evaluates the reasonable alternatives, and briefly describes alternatives not given detailed analysis.

Alternatives analyzed in detail are:

- Alternative 1 - No Action/ Current Program

- Alternative 2 - Proposed Action/WS Conducts a Cervid Damage Management Program which pursues objectives in agreement with KDFWR's broader Cervid Management Program to reduce threats to public safety, and damage to property and natural resources, or to resolve cervid damage in special circumstances.

4.1 DESCRIPTION OF THE ALTERNATIVES

4.1.1 Alternative 1 - No Action/Current Program

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternative(s).

Under the No Action/Current Program Alternative, there would be no WS involvement in activities to reduce cervid damage to agriculture, human safety, property, or natural resources in Kentucky. Local governments, businesses, organizations and individuals requesting assistance with reduction of cervid damage to special management habitats would contact KDFWR and be provided with information on techniques, tools, and programs. KDFWR would continue to issue permits to landowners/farmers in rural settings for shooting some cervid species to reduce agricultural damage and would continue to administer hunting seasons aimed at achieving cervid population objectives for zones and for the State.

4.1.2 Alternative 2 - Proposed Action/WS Conducts a Cervid Damage Management Program Which Pursues Objectives in Agreement With KDFWR's Broader Cervid Management Program

The Proposed Action would act to further enable KDFWR to meet their cervid management goal of maintaining species densities that are compatible with land use by further reducing population densities of cervids in selected habitats and under certain conditions. Such activities would be conducted at sites in Kentucky which are experiencing threats or damage to human safety, natural resources, or property. WS could address cervid damage through any methods previously discussed in any location in Kentucky. Specifics regarding such activities are discussed in Subsection 1.4. Under the proposed action, all other cervid damage management activities, as described in Subsection 1.3.2 (Current Cervid Damage Management Program), would continue. The only new addition to the program would be WS's participation in managing cervid damage in special management habitats for which requests for assistance might be received. Examples of such special habitats or circumstances are outlined in Subsection 1.2.

4.2 STRATEGIES AND METHODS AVAILABLE TO WS IN KENTUCKY

The strategies and methods described below include those that could be used under Alternative 2.

4.2.1 Integrated Wildlife Damage Management (IWDM)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of management methods in an effective manner while minimizing the potentially harmful effects on humans, target and nontarget species, property and the environment. IWDM may incorporate cultural practices (i.e., animal husbandry), 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.

4.2.2 WS Decision Making

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) and found in Appendix F. 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 and 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 application 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.

4.2.3 Cervid Damage Management Methods Available to WS In Kentucky

Pursuant to a request for assistance, IWDM would be employed in the overall cervid damage management program. Other methods that are legal, safe and available for use by KDFWR and farmers experiencing crop damage from cervids include fencing, pyrotechnics, propane cannons, chemical repellents, hunting, modification of agricultural practices (crop type, placement, and planting/harvest dates), and shooting of cervids by farmers. In attempting to resolve cervid damage in special management habitats in Kentucky, WS may recommend any or none of these to complainants. WS may also use trapping / chemical immobilization with relocation / euthanasia, trapping/snaring with euthanasia, and shooting of cervids as other methods to address cervid damage under the overall integrated cervid damage management program. Aspects of available methods and their application are addressed in Subsections 1.2.1.3 and 1.2.1.4.

4.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Several alternatives were considered but not analyzed in detail. These are discussed below as separate alternatives under Subsections 4.3.1 through 4.3.4.

4.3.1 WS Provision of Technical Assistance and/or Nonlethal Operational Assistance

KDFWR has the legal authority, expertise, and personnel to conduct and facilitate the current integrated cervid management program by providing technical information, establishing and monitoring regulated cervid hunting seasons, and administering a community-based cervid management program. WS has the

expertise, training, and legal authority to assist in conducting cervid damage management activities.

4.3.2 KDFWR Compensates Participants For Cervid Damage Losses

The compensation alternative would require the establishment of a system to reimburse State or Local governments, business, industry, and individuals for cervid damage. This alternative was eliminated from further analysis because no Federal or State laws, regulations, policies, programs, or funding currently exist to authorize such action. Aside from lack of legal authority, analysis of this alternative in the FEIS (USDA 1997), and discussion in the literature (Wagner et al.1997) indicates that the concept has many drawbacks:

- It would require large expenditures of money and labor to investigate and validate all damage claims, and to determine and administer appropriate compensation. A compensation program would likely cost several times as much as the current and proposed programs,

- Compensation for jeopardy to human safety posed by cervids in urban settings cannot reasonably be provided. The aim of this increment of the proposed action is to take steps to prevent human injury or death resulting from cervid/automobile collisions before losses occur,

- Compensation programs rarely pay producers for the full value of all indirect and direct costs associated with wildlife damage,

- Compensation would take from complainants incentive to control wildlife damage through harassment, improved cultural practices, husbandry, or other practices and management strategies,

- Not all resource owners would rely completely on a compensation program and lethal control would most likely continue as permitted by Kentucky law and regulation,

- Compensation does not reduce cervid damage to property or natural resources, and

- Compensation would increase over time in the absence of damage management, and with increasing cervid densities.

4.3.3 Cervid Population Reduction Through Reproductive Control

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

Reproductive control for wildlife could be accomplished either through sterilization (permanent) or

contraception (reversible, initial treatment usually followed by a booster and annual follow-up treatments).

Sterilization could be accomplished through :

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

Contraception could be accomplished through:

- Hormone implantation (synthetic steroids such as progestins)
- Immunocontraception (contraceptive vaccines)
- Oral contraception (progestin administered daily). Research into the use of these techniques would consist of laboratory/pen experimentation to determine and develop the sterilization or contraceptive material or procedure, field trials to develop the delivery system, and field experimentation to determine the effectiveness of the technique in achieving population reduction.

The use of hormones was investigated (Matschke 1976, 1977 a, b, c, Roughton 1979), and eventually rejected as an effective and efficient reproductive control technique for cervids. Additionally, concerns related to costs and logistics of widespread distribution of drugged baits, dosage control and ingestion of baits by children and nontarget animals make oral contraception (by steroids) largely impractical (Lowery et al. 1993). More recently, immunocontraception has been studied in various situations and locations, but its potential use appears limited due to considerable constraints regarding treatment and follow-up treatment of a sufficiently large number of target animals, varying immunogenecity of vaccines, genetic backgrounds of individual animals, age, nutritional status, stress and other factors (Becker and Katz 1997, Becker et al. 1999). Immunocontraceptive vaccines prevent conception by stimulating the production of antibodies that bioneutralize proteins or hormones essential for reproduction (Miller et al. 2000). The use of porcine zona pellucida (PZP) as a contraceptive agent in wildlife management has been investigated recently (Kirkpatrick et al. 1990, Turner and Kirkpatrick 1991, Turner et al. 1992 and 1996), but to date, there is no published documentation that immunocontraceptive vaccines have successfully reduced any free-ranging cervid herd or population. Additionally, Underwood and Verret (1998) reported that despite 5 years of PZP treatment, the Fire Island, NY white-tailed deer population continued to grow, albeit at a slower rate. Other components of the reproductive system have been studied for immunocontraception as well, such as GnRH (Becker and Katz 1997, Becker et al. 1999).

Recently, Canadian researchers at Dalhousie University (Halifax, Nova Scotia) have investigated the use of a single-dose immunocontraceptive vaccine based on liposome delivery of PZP antigens (Spay Vac ™), and reported a 90% reduction in pup production by gray seals (*Halichoerus grypus*) (Brown et al. 1997). Fraker et al. (in press) reported that fertility of an island population of fallow cervid (*Dama dama*) was greatly reduced by a single administration of Spay Vac ™ during the first year of treatment; a longer- term assessment is underway. Use of Spay Vac ™ on white-tailed deer is being investigated in Connecticut by private researchers (i.e. on an enclosed herd of approximately 20 animals), and preliminary results on the effectiveness of the material in reducing fawning will be available in 2001. Refinement of the delivery system and field application/experimentation on the ability of Spay Vac ™ to reduce free-ranging cervid populations will occur in subsequent years.

Turner et al. (1993) note that although contraception in white-tailed deer may be used to limit population growth, it will not reduce the number of animals in excess of the desired level in many circumstances. They further contend that initial population reductions by various other means may be necessary to achieve management goals, and that reproduction control would be one facet of an integrated program.

In sum, although immunocontraceptive technology has been variously effective in laboratories, pens, and in island field applications, it has not been effective in reducing populations of free-ranging white-tailed deer.

Development of a single-shot sterilization technique as an alternative to immunocontraception was investigated by Rutgers University scientists in 2000. One possible approach is gene therapy which could accomplish reproductive control via sterilization through producing death of the anterior pituitary cells that synthesize luteinizing hormone (LH), which triggers ovulation in females and spermatogenesis in males. Efficacy testing and development of a delivery system will be investigated over the next few years (L. Katz, Pers. Comm 1999.).

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

- No chemical or biological agent to accomplish reproductive control for free-ranging cervids has been approved by Federal and Kentucky authorities,

- For cervids, reproductive control has not been shown to reduce free-ranging populations or damage,

- If an effective tool was legally available, and if the project area was fenced, it would take many years for the cervid population to stabilize at a lower level, and ongoing damage would continue to occur at unacceptably high levels, and

- There are considerable logistic, economic and sociocultural limitations to trapping, capturing and chemical treatment of the hundreds or thousands of deer that would be necessary to effect an eventual decline in the population. Because there is no tool currently available for field application, and due to considerable logistic, economic, and sociocultural limitations to the use of fertility control on free-ranging cervids, this approach is not considered for further analysis in this EA.

4.3.4 Trap and Relocate Cervids

This alternative would involve capturing cervids alive using cage-type traps followed by relocation of the captured animals to another management zone. Trapping and relocating cervids is expensive ($273-$2,876/cervid) (O'Bryan and McCullough 1985, Bryant and Ishmael 1991), time-consuming and inefficient (Ishmael and Rongstad 1984, O'Bryan and McCullough 1985, Diehl 1988, Jones and Witham 1990, Ishmael et al. 1995, Cromwell et al. 1999). Physiological trauma and mortality during capture and transportation would be high and cervid mortality after relocation has ranged from 25-89% (Jones and Witham 1990, Mayer et al. 1993). Capture myopathy, a stress-related disease that results in delayed mortality of captured cervids is an important factor (Cromwell et al., 1999), and may be as high as 26% (Rongstad and McCabe 1984). Although relocated cervids usually do not return to their location of capture, some do settle in similar habitats and create the same types of problems as occurred in the original site. The American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists oppose relocation of mammals because of the risk of disease transmission (USDA 1997). High mortality rates of relocated cervids, combined with the manner in which many of these animals die, make it difficult to justify relocation as a humane alternative to removal methods (O'Bryan and McCullough 1985, Jones and Witham 1990, Bryant and Ishmael 1991, Ishmael et al. 1995, Cromwell et al. 1999).

There may be some instances in which consultation with KDFWR regarding strategies for addressing a specific cervid damage problem WS may determine that individual cervids should be live-captured and relocated. This might be in response to damage in a special circumstance, or to achieve specific

management goals. Some of these activities may be accomplished using traps. Such activity would be a component of the IWDM strategy selected under the proposed alternative, but would likely not be the method of choice under most circumstances for reasons discussed in this Subsection. In addition, stocking of white-tailed deer, the primary cervid species causing damage in Kentucky, has been suspended by KDFWR, as discussed in Subsection 1.2.1.1, since population objectives for all zones in Kentucky have been met or exceeded. Large scale live-capture and relocation of white-tailed deer would only be feasible if an active population enhancement program existed for the State. However, some relocation of elk may occur under the existing Integrated Cervid Management Program conducted by KDFWR. If WS became involved in elk damage management, consultation with KDFWR would be conducted to determine what strategies might be used to address offending animals.

4.4 MITIGATION AND STANDARD OPERATING PROCEDURES

4.4.1 Mitigation in Standard Operating Procedures (SOPs)

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 Kentucky, 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 below. Any decision that results from this EA that includes WS actions would also include mitigation measures contained in this section. They are:

- The WS Decision Model is used to identify effective wildlife damage management strategies and their impacts,

- Reasonable and prudent measures or alternatives are implemented to avoid impacts to T&E species, and

- Research is being conducted to improve wildlife damage management methods and strategies so as to increase selectivity for target species, to develop effective nonlethal control methods, and to evaluate nontarget hazards and environmental impacts.

Some additional mitigating factors specific to the current program include:

- Management actions would be directed toward individual cervids causing damage in special management habitats. Generalized population suppression across the State would not be conducted under this program, and

- WS uses methods and tools for which the risk of hazards to public safety and hazards to the environment have been determined to be low according to a risk assessment conducted in the programmatic EIS (USDA 1997, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazard to the public is even further reduced.

4.4.2 Additional Mitigation Specific to the Issues

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

4.4.2.1 Effects on Target Species Populations

WS activities would be directed at resolving cervid damage to special management habitats in Kentucky by reducing the local cervid population through IWDM, not by attempting to eradicate populations in the entire zone or State. WS take of cervids would be recorded by WS and monitored by KDFWR, to maintain it within the levels determined by KDFWR to achieve desired population objectives. Slightly fewer cervids may be available to hunters in subsequent years in areas where WS conducts the proposed activity. However, most take by WS would occur in areas which are not open to hunting, such as urban and industrial environments and lands closed to public hunting.

4.4.2.2 Effects on Nontarget Species Populations 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.

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.

In Kentucky, WS has conferred with KDFWR's Endangered Species and Wildlife Diversity Program, which has determined that the proposed WS action would have no effect on State T&E species or their habitats and ecosystems. The USFWS Ecological Services office provided a list of Federal T&E species in Kentucky counties and townships; WS has determined that the proposed WS actions will have no effect on Federal T&E species. WS will contact USFWS if the proposed action changes in the future.

4.4.2.3 Effects on Human Health and Safety

Trained and professional biologists employed by the WS program would conduct cervid shooting and trapping activities according to all safety guidelines and through use of safe and legal firearms and equipment.

Target animals would be positively identified before shots are taken. Shooting would be done in safe zones and in such a manner as to not scare cervids across roadways. Trapping would be performed in areas where no human traffic occurs and signs would be posted if traps used presented a potential safety hazard to humans.

4.4.2.4 Effects on Aesthetics

WS lethal removal and handling of cervids would be done professionally and discretely so as to minimize the impact on the public's aesthetic appreciation for cervids.

Overall, cervids would continue to be available for viewing and appreciation. It is unlikely that WS actions would affect cervid densities in any management zone in Kentucky. Cervids would not be eradicated from any zone.

4.4.2.5 Humaneness Of Lethal Methods Used By WS To Take Cervids

WS biologists attempt to kill target animals as quickly and humanely as possible.

Research continues within the WS program with the goal of improving the selectivity and humaneness of tools and methods.

All management methods would be used in a manner that minimizes pain and suffering of individual animals, to the extent that the method is effective and its use is practical.

4.4.2.6 Effects On Regulated Cervid Hunting

Lethal removal of cervids by WS would occur in special management habitats where hunting is limited, prohibited, or has failed to achieve local population objectives set by KDFWR. Cervids removed in these activities often would not be among the population of animals in Kentucky which could be hunted. Therefore, no effects on regulated hunting are expected from WS activities.

Non-lethal cervid damage management activities recommended or implemented by WS are not expected to have a significant effect on regulated cervid hunting.

The number of cervids expected to be lethally removed by WS would be a very small portion of those taken during regulated hunting in Kentucky.

5.0 CHAPTER 5: ENVIRONMENTAL CONSEQUENCES

Chapter 5 provides information needed for making informed decisions in selecting the appropriate alternative. The chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of the alternatives to determine if the potential impacts would be greater, lesser, or the same. Therefore, the no action alternative serves as the baseline for analysis and comparison.

The following resource values are not expected to be significantly impacted by either 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.

In evaluation of the potential for irreversible or irretrievable commitment of resources WS has determined that the proposed action would result only in the use of minimal quantities of fuels for motor vehicles and other materials. There would therefore be no irreversible or irretrievable commitment of resources.

In evaluating Impacts on sites or resources protected under the National Historic Preservation Act WS has determined that the proposed WS action would not be an undertaking that could adversely affect historic resources.

5.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

Table One summarizes impacts of the alternatives for each issue considered in detail.

5.1.1 Effects on Target Cervid Populations

Within cervid management zones in Kentucky where special management habitats are experiencing, or will experience cervid damage, species population management objectives established by KDFWR are usually population density reductions. Anticipated cervid harvests are determined for each such zone with the goal of achieving the population reduction objective.

5.1.1.1 Alternative 1 - No Action

The No Action Alternative consists of an integrated cervid management program with no WS involvement. Hunting and shooting of cervids by landowners is directed at population reduction or stabilization. In most zones in Kentucky, the objective of population density reduction has not been achieved in the past for white-tailed deer, although in some cases, local numbers have been reduced somewhat. No species of cervids would be eliminated from the State, zone, or local area and individuals of each species would continue to be present, although possibly at lower densities. KDFWR does not issue permits to shoot deer to complainants in urban environments and a few other special habitats, since hunting is usually prohibited in such areas and other factors must also be considered. Although under the No Action Alternative, landowner and hunter shooting of cervids may have a positive effect on KDFWR's harvest objectives, they would not result in objectives being met for special management habitats as outlined in this EA.

5.1.1.2 Alternative 2; Proposed Action

The Proposed Action consists of WS involvement in addressing cervid damage in special management habitats as part of the overall integrated cervid management program in Kentucky. KDFWR's objective is to fully implement these methods to achieve desired program goals for cervid

populations, both at the local level and the cervid management zone level. WS activities would increase the likelihood that KDFWR would achieve zone harvest objectives. WS lethal

Table One. Comparison of Consequences / Impacts for Issues Evaluated Under the No Action / Current Program and Proposed Action Alternatives

Issue	No Action/Current Program	Proposed Action (WS IWDM Cervid Damage Management Program)
Effects on Target Cervid Populations	Slight positive effect, but hunting and shooting of cervids by farmers in most management zones does not achieve KDFWR-established cervid management goals for special management habitats.	Positive effect, removal of cervids by WS biologists in special management habitats combines with farmer/hunter cervid removal to increase likelihood of achieving KDFWR established cervid population management goals.
Effects on Nontarget Species Populations, Including T&E	No negative effect	No negative effect; removal of some deer from areas of known state and/or federally listed T&E plants could have positive effect on survival of those species.
Effects on Human Health and Safety	Slight positive effect from reduced cervid-vehicle collisions. Minimal risk of human injury from hunter/farmer use of firearms.	Moderate positive effect from further reduced cervid-vehicle collisions in special management habitats thus increasing likelihood of achieving KDFWR-established cervid management goals. No probable risk of human health or safety effects from methods and techniques employed by WS.
Effects on Aesthetics	Cervids continue to occur in all zones. Effect of shooting cervids by hunters and farmers on aesthetics varies. Some people may have affectionate bonds with individual cervids, and they may be negatively affected if cervids shot by farmers/hunters.	Cervids continue to occur in all zones, but reduced slightly in special management habitats. Some people may have affectionate bonds with individual cervids, and they may be negatively effected if cervids are shot by WS biologists. Cervids will be shot and handled professionally and discretely, to minimize impacts on aesthetics.
Effects on Regulated Cervid Hunting	Positive effect. Hunting is an important aspect of cervid management to reduce crop losses in all zones, with cervid population reduction or stabilization as the management strategy.	No effect. Most cervids killed by WS would be in areas not open to public hunting. Take of cervids by WS would be a very small percentage of total animals killed by regulated hunting.
Humaneness and Animal Welfare Concerns	Shooting of cervids by hunters and farmers considered humane by most, others may consider any method of killing cervids to be inhumane.	Shooting of cervids by WS biologists considered humane by most, but others may consider any method of killing cervids to be inhumane. WS biologists are specifically trained and accountable for humane treatment of wildlife.

removal of cervids would be in addition to removals achieved through regulated cervid hunting, and shooting of cervids by landowners pursuant to permit, and would occur at various affected sites in special management habitats where the combination of other methods has failed to sufficiently reduce cervid density. This would be unlikely to reduce cervid density at the local level, and would have no impact on the zone's cervid density. However, reduction of damage at special management habitats is an element of the KDFWR wildlife management program's objectives, and is considered a positive impact of the proposed action. Cervids would not be eliminated from the State, zone, or local area, and they would continue to be present in comparable numbers. Compared to the No Action alternative, the Proposed Action will have a larger impact on the reduction of localized urban, industrial and special habitat damage caused by cervids. WS's cervid damage management program would increase KDFWR's likelihood of achieving their cervid population management objectives for Kentucky.

WS's role in increasing the likelihood that KDFWR could achieve population management objectives is especially important when considering cervid population densities. Many cervids, including white-tailed deer, do not exhibit self-regulatory mechanisms whereby compensatory reproduction (increased production of fawns) occurs following population reductions (accomplished through shooting, hunting, or other mechanisms) when the free-ranging population is well below biological carrying capacity (Keith 1974, Wagner et al. 1995). Kentucky cervid populations are below biological carrying capacity throughout most of the State (J. Gassett, KDFWR Pers.Comm. 2000). In sum, compensatory reproduction is not expected to follow the proposed removal of cervids by WS, since:

- Cervid populations are below biological carrying capacity.
- Cervid populations in Kentucky are not currently limited by competition for food, space, water, and/or breeding opportunities.
- Numbers of cervids removed by WS will be insignificant compared to the annual numbers killed during legal hunting seasons and damage management cervid reduction programs conducted by KDFWR and landowners in rural locations.

5.1.2 Effects on Nontarget Species Populations, including Threatened and Endangered Species

5.1.2.1 Alternative 1 - No Action

Under the No Action Alternative, KDFWR's current cervid management program to reduce crop damage would continue with the take of nontarget species expected to be 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. To date, no nontarget animals have been killed by farmers engaged in cervid damage control activities (shooting pursuant to permit). KDFWR's Endangered Species and Wildlife Diversity Program has determined that current KDFWR deer damage management activities, including shooting of cervids by farmers / landowners pursuant to permit, would not adversely affect any State-listed T&E species (Appendix C) or their habitats and ecosystems (T. Slone KDFWR, Pers. Comm. 2000). A list of Federal T&E species in Kentucky is provided in Subsection 2.1.2.

5.1.2.2 Alternative 2 - Proposed Action

Under the Proposed Action, the take of nontarget species by WS is expected to be minimal or

nonexistent. The consequences of the proposed action on nontarget species are the same as those identified for Alternative 1 (No Action Alternative).

Regarding T&E species (T. Slone KDFWR, Pers. Comm. 2000), WS has determined that the proposed action would have no adverse effect on any Federal T&E species. However, white-tailed deer damage has been documented for several state-listed plant species, notably a federal candidate for listing, the fringeless white orchid (*Platanthera integrilabia*), other orchids, and some state-listed lily species such as turks cap lily (*Lilium superbum*) and the wood lily (*Lilium philadelphicum*). In these damage scenarios deer seem to concentrate on large flowers characteristic of such species, and decimate them in some areas (D. White, Kentucy Nature Preserves Comm. Pers. Comm. 2001). It is possible that reductions in numbers of deer at sites where these plants grow could have a positive effect by enhancing survival of such valuable species.

White-tailed deer have also been implicated as having a positive effect on at least one federally listed endangered plant in Kentucky. Running buffalo clover (*Trifolium stoloniferum*) benefits from light grazing and disturbance (D. White, Kentucy Nature Preserves Comm. Pers. Comm. 2001), such as that created by occasional grazing by deer and by animals which create trails. In areas where deer are not overpopulated, they could produce this kind of effect. Damage management activities by WS would not eliminate deer from any sites in Kentucky where running buffalo clover is likely to occur, and thus would not be likely to prevent occasional use of such areas by deer. Other animals which might browse on these plants, or make trails such as woodchucks, rabbits, etc. would not be affected by cervid damage management activities. If deer overpopulate a site where running buffalo clover is known to exist, removal of excess deer from such an area could possibly prevent overbrowsing and might enhance survival of the plant.

In sum, implementation of a cervid damage management program in Kentucky would not increase the already minimal/nonexistent impacts of the overall program on nontarget species, and would have no negative effect on State or Federal T&E species.

5.1.3 Effects on Human Safety

5.1.3.1 Alternative 1 - No Action

The effects on human health and safety of landowner use/application of fencing, repellents, harassment, and modification of farming practices would be minimal, as long as repellents are applied according to label instructions, fencing is installed properly and is maintained and repaired, and harassment tools (pyrotechnics and propane cannons) are used according to standard safety guidelines. The public is more concerned about potential effects of the use of firearms on human safety, through accidentally shooting a person or through increased traffic hazards of cervids that may be frightened into roadways. There have been no reported instances of Kentucky landowners accidentally shooting a person while conducting cervid control activities (M.. Lang KDFWR, Pers. Comm. 2000). The extent to which cervid shooting activities conducted by landowners affect traffic safety is difficult to determine, but overall, shooting is expected to have a net positive impact on traffic safety by reducing the cervid densities in zones where shooting occurs. There is minimal risk of human injury from hunter/farmer use of firearms to shoot cervids.

5.1.3.2 Alternative 2 - Proposed Action

The consequences of the proposed action on human safety are similar to those identified for Alternative 1. WS actions aimed at reducing or eliminating human safety threats and damage to

property and natural resources, posed by cervids in special management habitats would increase the program's positive effects on these resources. As with the current program, some people may have concerns about some lethal aspects of the WS program, such as shooting. As outlined in Subsection 1.4 and discussed in Subsection 4.1, WS uses specific SOP's to minimize threats to the public from such activities. Some procedures specifically implemented for this purpose include:

- Involvement of local law enforcement to control and monitor access to project sites when members of the public are likely to enter the area
- Selecting shooting equipment appropriate to the situation and regulating shooting schedules and actions to eliminate threats to the public
- Notifying residents in the immediate vicinity of a WS action and providing instructions for their safety
- Using only trained sharpshooters for firearms actions and insuring that all personnel are trained in the use of equipment they will utilize in the program.

WS works in compliance with Federal and State laws, regulations, and policies regarding conduct of wildlife damage management, and use and transport of firearms. WS biologists would follow mitigation and SOP's to reduce or eliminate any potential negative impacts. 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 crime of domestic violence. A moderate positive effect from reduction in cervid-vehicle collisions is expected. There is no probable risk of human safety effects from methods used by WS. This alternative will increase the likelihood that KDFWR can achieve cervid damage management program objectives, including reduction in human safety threats, and damage to natural resources and property in special management habitats.

5.1.4 Effects on Aesthetics

5.1.4.1 Alternative 1 - No Action

Since the No Action alternative would not cause cervids to be extirpated from the local area or the cervid management zone, most people's aesthetic appreciation of cervids would not be affected. Cervids would continue to occur, although possibly at lower densities, and people would continue to gain enjoyment from viewing them, and from the knowledge of their existence nearby. People who may have formed affectionate bonds with individual cervids would be affected (emotional impact) if these individual animals are shot by farmers or hunters. However, this impact may be reduced by the continued existence of other cervids in the area. Cervid control activities conducted by farmers and hunters are typically conducted away from public view, at safe distances from roadways and homes or other buildings. This improves safety, and also accommodates aesthetic values of members of the public who do not want to observe harvested cervids.

5.1.4.2 Alternative 2 - Proposed Action

Consequences of the Proposed Action on aesthetics would be similar to those described for the No Action alternative (above) except more cervids would probably be removed from special management habitats through both lethal and non-lethal activities by WS. Additionally, WS lethal activities related to cervid damage management would be conducted primarily from dusk-dawn, to best

accomplish program objectives. A secondary benefit of this would be minimization of aesthetic impacts on members of the public who do not want to observe dead cervids. WS shooting of cervids could negatively effect individuals that have formed affectionate bonds with individual cervids, if the animals were shot. WS uses discretion in the removal of cervids for the express purpose of mitigating impacts to members of the public who would be emotionally affected by viewing dead cervids. Cervids are removed from the damage site is such a manner that there is minimal opportunity for the public to observe dead animals.

5.1.5 Humaneness of Methods To Remove Cervids

5.1.5.1 Alternative 1 - No Action

Under the No Action alternative, cervids would be shot by hunters and farmers. Shooting is considered to be a humane method of killing cervids if it results in immediate death. Hunters and farmers have varying values and beliefs about the need to maximize humaneness, although the majority would attempt to achieve quick kill of cervids. Some people may consider any lethal method to be inhumane.

5.1.5.2 Alternative 2 - Proposed Action

Under the Proposed Action, cervids would also be shot by WS biologists. Impacts regarding humaneness of shooting cervids under this alternative are similar to those described for the No Action Alternative.

There may also be occasions when cervids cannot be shot in some special management habitats because of safety or other concerns, but the animals can be live-captured and euthanatized or captured using neck snares or other traps without endangering the public. Some people consider live-capture with euthanasia or other methods to be inhumane. They would be offended by the use of these methods. Constraints related to public safety and expediency of wildlife management sometimes dictate the use of such methods to obtain objectives of a damage management program which may include reduction of threats to human safety, or excessive damage to property, or natural resources.

There may be some instances when, for specific wildlife management objectives, WS may decide to live-capture and relocate individual cervids. Some people object to live capture and relocation of cervids. They would consider these activities inhumane. Such activities may be conducted to fulfill research needs, or other wildlife management objectives defined in the KDFWR wildlife management program. Sometimes in order to accomplish objectives designed to improve the cervid population or to enhance public use of wildlife, it is necessary to live-capture and relocate cervids in Kentucky. WS uses the most acceptable and humane methods of live-capture and transport when handling animals.

5.1.6 Effects on Regulated Cervid Hunting

5.1.6.1 Alternative 1 - No Action

In Kentucky, cervid hunting typically occurs in September-January, during seasons established by KDFWR. Under the No Action alternative, cervid hunting would occur on most farms in the proposed project area, and is considered to be one of the most important aspects of integrated cervid damage management programs. KDFWR encourages farmers to maximize the extent to which hunting is employed. Individual landowners who rent land to farmers may restrict hunting because of personal opposition to hunting, the desire to provide hunting privileges to a select few people, or

safety and liability concerns. Shooting of cervids by landowners pursuant to permit would be another aspect of the integrated program on both farms and other rural lands, and would be used in combination with other methods, including hunting. Landowners would manage hunting and shooting of cervids to best contribute to a reduction in cervid damage to crops. The no action/current program has a positive effect on regulated cervid hunting.

5.1.6.2 Alternative 2 - Proposed Action

Shooting of cervids by WS biologists under the Proposed Action would only occur in special management habitats where regulated hunting does not occur and where KDFWR does not provide permits to urban residents, or where regulated hunting has not adequately met KDFWR's management objectives for the site. Because of the selectivity of locations where WS would remove cervids in Kentucky, there would be no significant effect on regulated hunting.

5.2 CUMULATIVE IMPACTS

No significant cumulative environmental impacts are expected for either of the two alternatives. Under the Proposed Action, shooting of cervids by WS would contribute to KDFWR's cervid management objective of reducing threats to human safety and damage to natural resources and property in special management habitats. Landowners have killed cervids for years in Kentucky under permits granted by KDFWR, and regulated hunts have been set and monitored by KDFWR for many years with no cumulative negative impacts to non-target wildlife, cervid populations, or the human environment. Additive reductions in cervid numbers, accomplished in Kentucky through the WS program, would have no significant effect on the overall population of cervids in the State, would result in no cumulative effects on cervid populations, non-target wildlife, including threatened and endangered species, or the human environment. Cervids would continue to occur in all parts of Kentucky, with no significant reduction in population densities in any management zones as a result of WS actions over time. The analysis in this EA indicates that WS actions to address cervid damage in special management habitats would not result in significant cumulative adverse impacts on the quality of the human environment.

6.0 CHAPTER 6 - LIST OF PREPARERS, REVIEWERS, AND PERSONS CONSULTED

6.1 LIST OF PREPARERS AND REVIEWERS

Robert P. Myers, District Supervisor, USDA APHIS Wildlife Services, Louisville, KY
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6.2 LIST OF PERSONS CONSULTED

Mr. Steve Alexander, USFWS, Ecological Services, Region 4, Cookeville, Tennessee
Mr. Mark Cramer, KDFWR, Special Projects, Frankfort, Kentucky
Mr. Tim Slone, Threatened and Endangered Species, KDFWR, Kentucky
Dr. Tom Barnes, Kentucky Cooperative Extension Service, University of Kentucky
Mr. Alex Barber, Kentucky Dept. For Environmental Protection

6.3 PUBLIC INVOLVEMENT

The Pre-Decisional EA was available for public review and comment during a 30-day period (July 19 - August 22, 2001), which complies with or exceeds public involvement guidelines/policies contained in NEPA, CEQ regulations, and APHIS WS's Implementing Regulations, as well as all pertinent agency laws, regulations, and policies. A Legal Notice of Availability was placed in The Louisville Courier Journal, a daily newspaper with geographic coverage of all of the proposed project area, for three days (July 18 - 20, 2001).

The Pre-Decisional EA was mailed directly to agencies, organizations, and individuals with probable interest in the proposed program:

Comments were received via mail and fax from interested individuals, organizations, and State agencies. Issues contained in the comment letters were analyzed and evaluated, and clarifications and modifications were made in the text. All comments received from the public during this period were fully considered in development of the EA and Decision.

APPENDIX A

LITERATURE CITED

AVMA (American Veterinary Medical Association). 1987. Panel report on the colloquium on recognition and alleviation of animal pain and distress. J. Am. Vet. Med. Assoc. 191:1186-1189.

_____. 1993. Report of the AVMA Panel on euthanasia. J. Am. Vet. Med. Assoc. 202:229-249

Becker, S.E. and L.S. Katz. 1997. Gonadotropin-releasing hormone (GnRH) analogs or active immunization against GnRH to control fertility in wildlife. Pp. 11-19 *in* Contraception in Wildlife Management. Tech. Bull. 1853. USDA APHIS Washington, DC.

_____, S.E., W.J. Enright, and L.S. Katz. 1999. Active immunization against gonadotropin-releasing hormone in female white-tailed deer. Zoo Biology 16:385-396.

Berryman, J.H. 1991. Animal damage management: responsibilities of various agencies and the need for coordination and support. Proc. East. Wildl. Damage Control Conf. 7:152-164.

Blackard, J. J. 1971. Restoration of the white-tailed deer in the southeastern United States. M. S. Thesis, La. State Univ., Baton Rouge. 170pp.

Brown, R.G., W.D. Bowen, J.D. Eddington, W.C. Kimmins, M. Mezei, J.L. Parsons, and B.Pohajdak. 1997. Evidence for long-lasting single administration contraceptive vaccine in wild grey seals. J. Repro. Immun. 35(1997): 43-51.

Bryant, B.K. and W. Ishmael. 1991. Movement and mortality patterns of resident and translocated suburban white-tailed deer. Pages 53-58 in L.W. Adams and D.L. Leedy, eds. Wildlife conservation in metropolitan environments. Natl. Inst. Urban Wildl. Symp. Ser. 2, Columbia, MD.

Burke, D., A. Deatly, R.E. Erickson, R.C. Lund, P.A. McConnell, and R.P. Winkel. 1990. An assessment of deer hunting in New Jersey. New Jersey Department of Environmental Protection, Division of Fish, Game and Wildlife. Federal Aid in Wildlife Restoration Project W-45-R-26.

Civil No. 92-C-0052A. January 1993. United States District Court of Utah, Civil No. 92-C-0052A, 1993.

Conover, M. R. 1997. Monetary and intangible valuation of deer in the United States. Wildl. Soc. Bull. 25:298-305.

_____, W. C. Pitt, K. K. Kessler, T. J. DuBow, and W. A. Sanborn. 1995. Review of human injuries, illnesses, and economic losses caused by wildlife in the United States. Wild. Soc.Bull. 23:407-414

Cromwell, J.A., R.J. Warren, and D.W. Henderson. 1999. Live-capture and small-scale relocation of urban deer on Hilton Head Island, South Carolina. Wildl. Soc. Bull. 27(4):1025-1031.

Decker, D.J. and K.G. Purdy. 1988. Toward a concept of wildlife acceptance capacity in wildlife management. Wildl. Soc. Bull. 16:53-57.

Diehl, S.R. 1988. The translocation of urban white-tailed deer. Pages 238-249 *in* L. Nielsen and R.D. Brown, editors. Translocation of wild animals. Wisconsin Humane Society, Inc., Milwaukee, and Caesar Kleberg Wildlife Research Institute, Kingsville, TX.

Dolbeer, R.A. 1998. Population dynamics: the foundation of wildlife damage management for the 21st century. Pp. 2-11 *in* Proc. 18th Vertebr. Pest Conf., Davis, CA.

Ellingwood, M.R. and J.V. Spignesi. 1986. Management of an urban deer herd and the concept of cultural carrying capacity. Trans. Of the Northeast Deer Tech. Comm. 22:42-45.

Ellingwood, M.R. and S.L. Caturano. 1988. An evaluation of deer management options. CT Dept. Envtl. Prot. DR-11. 12 pp.

Fraker, M.A., R.G. Brown, V.C. Hawkes, G.E. Gaunt, J.A. Kerr, and B. Pohajdak. In press. Immunocontraception of an island population of fallow deer (*Dama dama*) in British Columbia. J. Wildl. Manage.

Hermes, K. M. 2000. Wapiti returns to Kentucky. Available at internet site http://www.state.ky.us, Elk Reintroduction Site. 5pp.

Horton, R.R. and S.R. Craven. 1997. Perceptions of shooting-permit use for deer damage abatement in Wisconsin. Wildl. Soc. Bull. 25(2):330-336.

Ishmael, W.E. and O.J. Rongstad. 1984. Economics of an urban deer-removal program. Wildl. Soc. Bull. 12:394-398.

Ishmael, W.E., D.E. Katsma, T.A. Isaac, and B.K. Bryant. 1995. Live-capture and translocation of suburban white-tailed deer in River Hills, Wisconsin. Pages 87-96 *in* J.B. McAninch, editor. Urban deer: A manageable resource? Proceedings 1993 Symposium, North Central Section, The Wildlife Society, 12-14 December 1993, St. Louis, Missouri.

Jones, J.M. and J.H. Witham. 1990. Post-translocation survival and movements of metropolitan white-tailed deer. Wildl. Soc. Bull. 18:434-441.

KDFWR (Kentucky Department of Fish and Wildlife Resources). 2000a. Wild elk reintroduction program. Available at internet website http://www.kdfwr.state.ky.us, Elk Reintroduction Site. 2pp.

_____. 2000b. Reintroduction of elk in Kentucky. Available at internet website http://www.kdfwr.state.ky.us, Elk Reintroduction Site. 8pp.

Keith, L.B. 1974. Some features of population dynamics in mammals. Trans. International Congress of Game Biologists, Stockholm. 11:17-58.

Kellert, S.R. 1993. Public view of deer management. Pages 8-11 *in* R.L. Donald, ed. Deer management in an urbanizing region: problems and alternatives to traditional management. Proc. 1988 Conference, The Humane Society of the U.S., Washington, DC.

Kentucky State Police. 1995. Kentucky accident facts 1995 report. Commonwealth of Kentucky. 52pp.

_____. 1996. Kentucky accident facts 1996 report. Commonwealth of Kentucky. 52pp.

_____. 1997. Kentucky accident facts 1997 report. Commonwealth of Kentucky. 52pp.

_____. 1998. Kentucky accident facts 1998 report. Commonwealth of Kentucky. 52pp.

Kirkpatrick, J.F., I.K.M. Liu, and J.W. Turner. 1990. Remotely-delivered immunocontraception in feral

horses. Wildl. Soc. Bull. 18:326-330.

Langenau, E.E., S. R. Kellert, and J.E. Applegate. 1984. Values in management. Pages 699-720 *in* L.K. Halls, ed. White-tailed deer: Ecology and management. Stackpole, Harrisburg, PA.

Leopold, A.S. 1933. Game Management. Charles Schribner and Sons, NY, NY. 481 pp.

Lowery, M.D., J.W. Glidden, and D.E. Riehlman. 1993. Options for the management of locally overabundant and nuisance deer populations: a technical review. New York State Department of Environmental Conservation, Division of Fish and Wildlife. 26 pp.

Matschke, G.H. 1976. Oral acceptance and antifertility effects of microencapsulated diethylstilbestrol on white-tailed does. Proceedings of the Southeast Assoc. of Game and Fish Comm. 29:646-651.

_____. 1977a. Antifertility action of two synthetic progestins in female white-tailed deer. J. Wildl. Manage. 41:194-196.

_____. 1977b. Fertility control in white-tailed deer by steroid implants. J. Wildl. Manage. 41:731-735.

_____. 1977c. Microencapsulated diethystilbestrol as an oral contraceptive in white-tailed deer. J. Wildl. Manage. 41:87-91.

Mayer, K.E., J.E. di Donato, and D.R. McCullough. 1993. California urban deer management: two case studies. Urban Deer Symposium. St. Louis, Missouri.

Miller, L. A., B.E. Johns, and G.J. Killian. 2000. Long-term effects of PZP immunization on reproduction of white-tailed deer. Vaccine (2000):568-574.

Muller, L.I., R.J. Warren, and D.L. Evans. 1997. Theory and Practice of immunocontraception in wild animals. Wildl. Soc. Bull. 25(2):504-514.

O'Bryan, M.K., and D.R. McCullough. 1985. Survival of black-tailed deer following relocation in California J. Wildl. Manage. 49:115-119.

Romin, L. A., and J. A. Bissonette. 1996. deer-vehicle collisions: status of state monitoring activities and mitigation efforts. Wildl. Soc. Bull. 24:276-283.

Rongstad, O.J. and R.A. McCabe. 1984. Capture techniques. Pages 655-676 *in* L.K. Halls, ed. White-tailed deer: Ecology and management. Stackpole, Harrisburg, PA.

Roughton, R.D. 1979. Effects of oral melengestrol acetate on reproduction in captive white-tailed deer. J. Wildl. Manage. 43:428-436.

Schmidt, R. 1989. Wildlife management and animal welfare. Trans. N. Amer. Wildl. And Nat. Res. Conf. 54:468-475.

Schwartz, J.A., R.J. Warren, D.W. Henderson, D.A. Osborn, and D.J. Kesler. 1997. Captive and field tests of a method for immobilization and euthanasia of urban deer. Wildl. Soc. Bull. 25(2):532-541.

Slate, D.A., R. Owens, G. Connolly, and G. Simmons. 1992. Decision making for wildlife damage

management. Trans. No. Amer. Wildl. Nat. Res. Conf 57:51-62.

Turner, J.W. and J.F. Kirkpatrick. 1991. New developments in feral horse contraception and their potential application to wildlife. Wildl. Soc. Bull. 19:350-359.

_____. I.K.M. Liu, and J.F. Kirkpatrick. 1992. Remotely-delivered immunocontraception in captive white-tailed deer. J. Wildl. Manage. 56:154-157.

_____, J.F. Kirkpatrick, and I.K.M. Liu. 1993. Immunocontraception in white-tailed deer. Pages 147-159 *in* T.J. Kreeger, Technical Coordinator. Contraception in Wildlife Management. USDA APHIS Technical Bulletin No. 1853.

_____, J.F. Kirkpatrick, and I.K.M. Liu. 1996. Effectiveness, reversibility, and serum antibody titers associated with immunocontraception in captive white-tailed deer. J. Wildl. Manage. 60:873-880.

Underwood, H.B. and F.D. Verret. 1998. From fertility control to population control: improving efficacy of deer immunocontraceptive programs. A Workshop on the Status and Future of Wildlife Fertility Control. TWS Annual Meeting, Buffalo, NY, pp. 41-52.

USDA-APHIS-ADC. 1989. Strategic plan. USDA-APHIS-Animal Damage Control, Eastern Region.

USDA (U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control Program). 1997 (revised). Animal Damage Control Final Environmental Impact Statement. Vol. 1-3. Animal And Plant Health Inspection Servide, Hyattsville, MD.

USDI (U.S. Department of The Interior). Undated. The economic importance of hunting. Washington (DC): USDI, FWS. 11pp.

USDI (U. S. Department of The Interior), U. S. Fish and Wildlife Service (USFWS). 1998. 1996 national and state economic impacts of wildlife watching. Washington (DC): USDI, FWS. 11pp.

Wagner, F. H., R. Foresta, R.B. Gill, D.R. McCullough, M.R. Pelton, W.F. Porter, and H. Salwasser. 1995. Wildlife policies in the U.S. national parks. Island Press. 242 pp.

Wagner, K.K., R.H. Schmidt, and M.R. Conover. 1997. Compensation programs for wildlife damage in North America. Wildl. Soc. Bull. 25(2):312-319.

Wildlife Society, The. 1990. Conservation policies of The Wildlife Society. The Wildlife Society, Washington DC. 20 pp.

APPENDIX B

KENTUCKY STATUTES AND REGULATIONS RELATED TO CERVID DAMAGE MANAGEMENT

APPENDIX C

FEDERAL AND STATE THREATENED AND ENDANGERED SPECIES LISTS

APPENDIX D

THE WS DECISION MODEL