DECISION AND

FINDING OF NO SIGNIFICANT IMPACT FOR THE

EVIRONMENTAL ASSESSMENT:

WHITE-TAILED DEER DAMAGE MANAGEMENT IN OHIO

June 2009

INTRODUCTION

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) released an Environmental Assessment (EA) on "White-tailed Deer Damage Management in Ohio" for public review and comment in November 2008 which analyzed potential environmental impacts of alternatives for reducing white-tailed deer damage problems in Ohio (USDA 2008). The WS program receives and responds to a variety of requests for assistance from individuals, organizations, and agencies experiencing damage and other problems related to wildlife. Wildlife damage management is the alleviation of damage or other problems caused by or related to the presence of wildlife, and is recognized as an integral part of wildlife management (The Wildlife Society 1992). Ordinarily individual WS damage management actions are categorically excluded and do not require an EA (7 CFR 372.5(c), 60 Fed. Reg. 6000-6003, 1995). However, WS decided to prepare an EA to facilitate planning, interagency coordination, and the streamlining of program management, and to clearly communicate with the public the analysis of individual and cumulative impacts of the proposed deer damage management (DDM) alternatives. The EA also was used to determine if there might be any potentially significant impacts to the human environment from the proposed DDM program. After reviewing the EA and the comments provided by the public, WS has decided to implement an Integrated Deer Damage Management Program (Alternative 1). This document provides notice of WS' response to comments provided during the public review period, choice of a management alternative, and determination regarding the magnitude of the environmental impacts associated with the chosen alternative.

The Ohio Department of Natural Resources, Division of Wildlife (ODW) and the Cuyahoga Valley National Park were consulting agencies in the preparation of the EA and provided valuable information for the analysis. Management of resident wildlife species is the responsibility of the ODW. The ODW collects and compiles information on white-tailed deer population trends, deer taken, and deer damage complaints, and uses this information to manage deer populations. The Cuyahoga Valley National Park is developing a plan and associated EIS to manage white-tailed deer and deer damage to natural resources in the park. Information from their project has also been included in this EA. Wildlife Services also consulted with the ODW and the U.S. Department of the Interior, Fish and Wildlife Service (USFWS) regarding potential risks to state and federally-listed species from the proposed action. The multi-agency approach helped to met NEPA's interdisciplinary team requirement; ensured that the analysis adequately addressed potential environmental impacts of DDM alternatives, and ensured that all proposed actions would be in compliance with relevant laws and regulations. All WS DDM activities will be conducted consistent with applicable federal state and local laws and regulations.

II. BACKGROUND

The determination of a need for WS assistance with DDM in Ohio is based on requests for assistance with white-tailed deer damage from agencies, organizations and private individuals in Ohio. The proposed program is intended to reduce damage and conflicts associated with white-tailed deer impacts on agricultural resources, urban/suburban landscaping, property, natural resources, deer-vehicle and deer-aircraft collisions; risks to human health and safety; and concerns about the spread of disease among wildlife and livestock. The DDM activities proposed in this EA could be conducted on private,

federal, state, tribal, county, and municipal lands in the state of Ohio where a need exists, a request for assistance is received and resources are available.

The ODW provides advice and issues permits to address deer damage, but generally does not conduct DDM for landowners/managers. Private companies provide some management services, but they may not be geographically available, or the company may not be knowledgeable about a particular damage situation. In addition, some resource owners/managers feel more comfortable with WS as the federal authority in DDM, or may have security reasons for preferring to work with a federal agency. Public entities may prefer to work with WS because WS' deer damage management program has been subject to environmental impact analysis and made available for public comment through the NEPA process.

Subject to Ohio Administrative Code, the ODW establishes deer damage control permits for persons having sustained actual and substantial nursery, orchard, farm crop or other property damage by deer (Ohio Administrative Code (OAC) 1501:31-15-08). Consequently, property owners/managers do not need to use WS to take action to resolve deer damage problems, and are likely to take action to resolve their problems with or without WS assistance. The EA only evaluated alternatives for WS involvement in DDM and cannot change Ohio Administrative Code and ODW policy permitting private landowners access to lethal and nonlethal alternatives for managing deer damage. Therefore, a major factor in determining how to analyze potential environmental impacts of WS' involvement in DDM is that, with the exception of actions taken on Federal property such as Cuyahoga Valley National Park, such management will likely be conducted by state, local government, or private entities that are not subject to compliance with NEPA, even if WS is not involved. Other Federal property managers are not dependent upon WS for DDM. They can conduct their own NEPA analysis and may choose to implement a DDM program without the assistance of WS. This means that the WS program has limited ability to affect the environmental outcome (*status quo*) of DDM in the state, except that the WS program is likely to have lower risks to nontarget species and less impact on wildlife populations than some actions that may be taken by resource owners/managers. In the absence of a WS program, some private individuals experiencing damage may take illegal or unsafe action against the problem species either unintentionally due to lack of training, or deliberately out of frustration with continued damage. In these instances, adverse impacts on the environment may be greater than with a professional DDM program. Despite the limitation to WS' influence on the environmental *status quo* and associated limit to federal decision-making, the EA process is valuable for informing the public and decision-makers of the substantive environmental issues and alternatives relevant to the management of mammal damage in Ohio.

III. ISSUES ANALYZED IN THE EA

The following issues were identified as important to the scope of the analysis (40 CFR 1508.25) and each of the proposed alternatives was evaluated relative to its impacts on these issues.

- Effects on white-tailed deer populations
- Effects on plants and other nontarget wildlife species, including T&E species
- Effects on human health and safety
- Humaneness of methods to be used
- Effects on aesthetic values
- Effects on regulated white-tailed deer hunting

IV. ALTERNATIVES ANALYZED IN DETAIL

Chapter 3 of the EA describes four potential alternatives that were developed to address the issues identified above. A detailed discussion of the anticipated effects of the alternatives on the issues is provided in Chapter 4 of the EA. The following summary provides a brief description of each alternative.

Alternative 1: Integrated Deer Damage Management (Preferred Alternative): Under this alternative, Wildlife Services, in consultation with the ODW, would implement an IWDM approach to alleviate white-

tailed deer damage to agriculture, property, natural resources, and risks to human health and safety on all private and public lands of Ohio where a need exists, a request is received, and funding is available. The IWDM strategy would encompass the use of practical and effective nonlethal and lethal methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, white-tailed deer, other species, and the environment. Wildlife Services would provide site-specific technical assistance (advice) and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, habitat modifications, harassment, repellants, legal hunting, and physical exclusion could be recommended and utilized to reduce deer damage. In other situations, deer would be removed as humanely as possible by sharpshooting or live capture followed by euthanasia under permits issued by the ODW. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. All WS DDM programs would be conducted in accordance with applicable federal, state and local laws.

Alternative 2: No Deer Damage Management by WS: This alternative would eliminate WS involvement in all DDM activities. Wildlife Services would not provide direct operational or technical assistance and all requesters for assistance with DDM would be referred to ODW, state and local extension agents, local animal control agencies, and/or private organizations. Individuals, organizations and agencies with deer damage problems could conduct their own DDM, contract for assistance from others, or choose to take no action.

Alternative 3: Technical Assistance
This alternative would only allow Ohio WS to provide technical assistance to individuals or agencies with deer damage. Individuals might choose to implement WS lethal and non-lethal recommendations on their own, implement methods not recommended by WS, use contractual services of private businesses, or take no action.

Alternative 4: Only Non-lethal Deer Damage Management by WS
This alternative would only allow WS to use and recommend non-lethal methods for DDM. Requests for information regarding lethal management approaches would be referred to the ODW, state and local extension agents, local animal control agencies, and/or private businesses or organizations. Persons incurring deer damage could still resort to lethal methods or other methods not recommended by WS, use contractual services of private businesses or take no action.

V. FEDERAL & STATE THREATENED AND ENDANGERED SPECIES CONSULTATIONS

WS conducted an informal Section 7 consultation with the USFWS and ODW regarding potential risks to federal & state-listed threatened and endangered species. Wildlife Services determined that the proposed action would either have no effect on or may affect but will not adversely affect federal or state-listed threatened and endangered species in Ohio. On January 18, 2008 WS received notice that the USFWS concurred with this determination. On November 7, 2007 WS received similar concurrence from the ODW regarding state-listed species.

VI. MONITORING

The Ohio WS program will annually monitor the impacts of its actions relative to each of the issues analyzed in detail in the EA. This evaluation will include reporting the WS take of all target and nontarget species to help ensure there are no adverse impacts on the viability of State native wildlife populations or non-target species including state and federally-listed threatened or endangered species.

VII. PUBLIC INVOLVEMENT

The pre-decisional EA was available for public review and comment during a 30-day period (11/3/2008 – 04/14/08), which complies with public involvement guidelines/policies contained in NEPA, CEQ regulations, and APHIS NEPA Implementing Regulations, as well as all pertinent agency laws, regulations, and policies. A Legal Notice of Availability was placed in The Columbus Dispatch on November 3, 2008 and made the EA available on the WS website http://www.aphis.usda.gov/wildlife_damage/nepa.shtml. Wildlife Services also sent notices of availability and/or copies of the pre-decisional EA to individuals and organizations that WS knew might have an interest in the EA. Wildlife Services received two comments on the EA during the comment period. No additional comments were received during the interval between the end of the EA and WS issuance of a final Decision on the alternative to be selected and its environmental impacts. Wildlife Services' responses to issues raised in the comment letters are provided in Appendix A.

VIII. AGENCY AUTHORITIES

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

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

United States Department of the Interior, Fish and Wildlife Service. The primary responsibility of the USFWS is fish, wildlife, and plant conservation. While some of the USFWS's responsibilities are shared with other federal, state, tribal, and local agencies, the USFWS has special authorities in managing the National Wildlife Refuge System; conserving migratory birds, endangered species, certain marine mammals, and nationally significant fisheries; and enforcing federal wildlife laws. The USFWS is charged with implementation and enforcement of the Endangered Species Act of 1973, as amended and with developing recovery plans for listed species.

Ohio Department of Natural Resources, Division of Wildlife (ODW). As authorized by Ohio Revised Code (ORC) 1531.04, "the ODW, at the direction of the chief of the division, shall do all of the following: (A) Plan, develop, and institute programs and policies based on the best available information, including biological information derived from professionally accepted practices in wildlife and fisheries management, with the approval of the director of natural resources; (B) Have and take the general care, protection, and supervision of the wildlife in the state parks known as Lake St. Marys, The Portage Lakes, Lake Loramie, Indian Lake, Buckeye Lake, Guilford Lake, such part of Pymatuning Reservoir as lies in this state, and all other state parks and lands owned by the state or in which it is interested or may acquire or become interested, except lands and lakes the care and supervision of which are vested in some other officer, body, board, association, or organization; (C) Enforce by proper legal action or proceeding the laws of the state and division rules for the protection, preservation, propagation, and management of wild animals and sanctuaries and refuges for the propagation of those wild animals, and

adopt and carry into effect such measures as it considers necessary in the performance of its duties" (ORC §1531.04).

Ohio Department of Agriculture. Ohio Department of Agriculture and its Division of Animal Industry is charged with protecting and promoting the health of Ohio's livestock and poultry industries. Responsibilities include livestock and poultry testing and inspection, licensing, controlling animal diseases in Ohio, and providing veterinary diagnostic laboratory services (http://www.ohioagriculture.gov/animal/). The ODA is also responsible for regulation of captive cervids.

IX. DECISION and RATIONALE

I have carefully reviewed the EA. I believe the issues identified in the EA are best addressed by selecting Alternative 1, *Integrated Deer Damage Management (Preferred Alternative)* and applying the associated Standard Operating Procedures and monitoring measures discussed in Chapter 3 of the EA. Alternative 1 provides the best range of damage management methods considered practical and effective, best addresses the issues identified in the EA, provides safeguards for public safety, and accomplishes WS' Congressionally directed role in protecting the Nation's agricultural and other resources including meeting its obligations to the ODW, and the residents of Ohio. Wildlife Services policies and social considerations, including humane issues, will be considered while conducting DDM. Although Alternative 1 does not require non-lethal methods to be used, WS will continue to provide information and encourage the use of practical and effective non-lethal methods (WS Directive 2.101). I have also adopted the EA as final because WS did not receive any comments that changed the analysis.

X. FINDING OF NO SIGNIFICANT IMPACT

The EA indicates that there will not be a significant impact, individually or cumulatively, on the quality of the human environment because of this proposed action, and that these actions do not constitute a major federal action. I agree with this conclusion and therefore determine that an EIS will not be necessary or prepared. This determination is based on the following factors:

1. Deer Damage Management, as conducted by WS in the State of Ohio, is not regional or national in scope. Although DDM projects may occur anywhere in the state, individual activities will occur at localized properties.

2. Based on the analysis documented in the EA and response to public comments, the impacts of the Proposed Action will have no negative affects on public health or safety. The Proposed Action is expected to result in a direct beneficial impact on human health and safety, natural resources, property, and livestock health by reducing the potential health and safety risks posed by white-tailed deer at airports, municipal sites, industrial sites, agricultural sites, public and private land in Ohio. Risks to the public from WS' methods were determined to be low in a formal risk assessment (USDA 1997 Revised, Appendix P).

3. The Proposed Action will not have a significant adverse impact on unique characteristics such as park lands, prime farm lands, wetlands, wild and scenic areas, or ecologically critical areas. Built-in mitigation measures that are part of WS' standard operating procedures and adherence to laws and regulations that govern impacts on elements of the human environment will assure that significant adverse impacts are avoided.

4. The effects on the quality of the human environment are not highly controversial. Although there may be opposition to killing mammals, this action is not controversial in relation to size, nature or effects.

5. Standard Operating Procedures adopted and/or described as part of the Proposed Action minimize risks to the public, prevent adverse effects on the human environment, and reduce uncertainty and risks. Effects of methods and activities, as proposed, are known and do not involve uncertain or unique risks.

6. The Proposed Action does not establish a precedent for future actions. This action would not set a precedent for future DDM actions that may be implemented or planned within the state. Effects of the Proposed Action are minor and short-term in nature and similar actions have occurred previously in the state without significant effects.

7. No significant cumulative effects were identified through this assessment. The EA discussed cumulative effects of WS on target and non-target species populations and concluded that such impacts were not significant for this or other anticipated actions to be implemented or planned within the state. Adverse effects on wildlife or established wildlife habitats would be minimal.

8. This action will not affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places and will not cause loss or destruction of significant scientific, cultural, or historic resources. The proposed DDM program would not disturb soils or any structures and therefore would not be considered a federal undertaking as defined by the National Historic Preservation Act.

9. Wildlife Services determined that the Proposed Action would not result in any adverse effects on federally-listed threatened or endangered species.

10. The Proposed Action is consistent with local, state, and federal laws that provide for and/or restrict WS' DDM activities. Therefore, WS concludes that this project is in compliance with federal, state and local laws for environmental protection.

For additional information regarding this decision, please contact Andrew Montoney, State Director, APHIS, WS, 6929 Americana Pkwy., Reynoldsburg, OH 43068 or by phone @ 614-861-6087.

for Charles S. Brown, Regional Director
USDA-APHIS-WS – Eastern Region

6/17/09
Date

APPENDIX A

RESPONSES TO COMMENTS

Two letters on the predecisional EA were received during the comment period. This appendix contains issues raised during the comment period for this EA and WS' response to each issue. Comments are numbered and are written in bold text. The WS response follows each comment and is written in standard text.

1. The EA should address new "new paradigm" whereby animals are equal to humans.

While there are various philosophies relating to the relationship between humans and animals, the philosophy referred to by the commenter appears to be one generally classified as an Animal Rights perspective. One of the fundamental principles of this philosophy is that animals should have the same rights and protections as people. According to this philosophy, no use of animals, e.g. for research, food and fiber production, recreational uses such as hunting and trapping, zoological displays and animal damage management, etc. should be conducted or considered acceptable unless that same action is morally acceptable when applied to humans (Schmidt 1989). Advocates of this philosophy consider the use of lethal damage management methods as morally reprehensible. However, it should be noted that opposition to the use of lethal damage management methods is not exclusive to adherents of this philosophy. The EA acknowledges that the public relationship with wildlife and reaction to DDM is variable and mixed because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to manage conflicts/problems between humans and wildlife. The EA analyzes this issue relative to each of the alternatives and acknowledges that some people would strongly oppose removal of the deer regardless of the amount of damage they cause, because they feel it is morally wrong to kill animals to resolve a damage problem or that lethal methods are disproportionate to the nature of the problem.

2. WS should elaborate on the nutritional value of deer as edible meat.

The purpose of the EA is not to advocate for the use and consumption of venison. While we acknowledge that, for individuals who have chosen to include meat in their diet, venison has been found to be a nutritious alternative to meat from domestic animals, we also acknowledge that meat is not essential to a healthy diet. (Alaska Department of Fish and Game 2005, USDA 2009)

3. Please provide more information on the safety record of urban/suburban hunting and culling programs.

Chapter 4 of the EA provides a review of the risks to human health and safety from WS actions, including the use of shooting, for each of the alternatives analyze in detail. As noted in the EA, the risks associated with actions by non-WS personnel will depend on the training of the individuals involved and the rules governing the proposed actions. There is limited published information on the safety of urban/suburban deer removal programs. The Northeast Deer Technical Committee provides information on measures which may be incorporated into urban/suburban hunting programs to enhance the safety of the project including use of elevated platforms, public notification, shooting proficiency and hunter safety courses for participants, etc. (H. Kilpatrick, Connecticut Division of Wildlife, pers. comm.). The exact combination of safety measures implemented varies depending upon the site characteristics and the wishes of the affected community. Consultation with the Northeast Deer Technical Committee indicates that although many communities in the Northeast have used these types of programs to reduce deer density in their area, there have been no reports of injuries resulting from the programs.

4. The EA should contain more information on human health risks associated with proximity to deer and deer feces.

The EA provides information on risks to human health and safety from deer-vehicle collisions and diseases transmissible from deer to humans in Sections 1.4.5 and 1.4.2. In research studies*, Escherichia coli* O157:H7 and serovars of *Salmonella* known to cause illness in humans have been detected in feces collected from hunter-killed white-tailed deer. However, the proportion of infected deer has been very low. *E. coli* O157:H7 was detected in only 4 of 1,608 samples (0.25%) collected from deer killed by Nebraska hunters in 1998 (Renter et al 2001). In a study of hunter-killed deer in Louisiana, only one of 338 samples (0.3%) collected tested positive for *E. coli* O157:H7 (Dunn et al. 2004). Salmonella spp. were detected in 5 of 500 fecal samples (1%) collected from white-tailed deer killed by hunters in Nebraska during the same period as the survey for *E. coli* (Renter et al. 2006). All 4 of the *Salmonealla* serovars isolated (Litchfield, Infantis, Enteritidis, and Dessau) have been associated with clinical disease in humans. All but Dessau have also been reported to cause disease in cattle. Because of limitations with the study designs and tests used to detect *Salmonella* and E choli, actual prevalence may have been higher than detected by the surveys. The level of *Salmonella* and E. coli occurrence in deer was similar to that found in surveys of cattle (Hancock et al. 1994, Dargatz et al. 2000). Results from the studies indicated that feces from apparently healthy deer can be a source of pathogens that infect humans, livestock and other animals.

Deer populations in urban/suburban environments become accustomed to (habituated to) the presence of humans and vice versa. In most situations, this familiarity is unlikely to result in risks to human safety, but in very rare situations, this may not be the case. During the fawning season, does may aggressively defend their fawns/fawning territory from other deer and predators (Ozaga et al. 1982, Mech and McRoberts 1990). In 2005 and 2006, at least one doe at the Southern Illinois University-Carbondale appears to have extended this behavior towards humans (Hubbard and Nielsen 2009). During June 7-15, 2005 and May 23 – June 5, 2006, 13 different adult humans reported being attacked by a doe. Most injuries were minor to moderate scrapes, but more severe injuries including broken bones were reported in a few instances. Exact reasons for the incidents are not known, but the clustered nature of the events (spatially and temporally) may indicate that they were caused by a doe being overly stressed or antagonized during a given time. The heavy cover in the area may have made it possible for people to be in close proximity to a fawn without being aware of the fawn. Some people reported seeing fawns prior to the attack, but others reporters the doe “came out of nowhere”. The authors were uncertain whether the deer may have been provoked by humans attempting to pick up or otherwise touch a fawn, because only one police report mentioned this activity. In at least one instance a fawn was reported following a victim prior to the attack by a doe. Hubbard and Nielsen (2009) note that the factors contributing to the attacks (e.g., high human use, high deer density) may be found in many similar settings and that the possibility of white-tailed deer does attacking humans during fawning season in surburban areas other than SIUC should not be discounted. The authors assert that the situation at SIUC should provide additional impetus for deer population management in urban/suburban environments.

Public education is an essential component of urban deer management program. Individuals need to understand that feeding animals can have undesirable consequences for the humans and animals involved. Several instances of people being injured or even killed by hand-reared or habituated animals have been reported from around the country (Colorado Division of Wildlife 2001). These incidents almost invariably have resulted in the death of the deer involved.

5. The EA should have more information on the relationship between deer density and deer-vehicle collisions.

A number of factors have been identified which may influence deer-vehicle collision rates including deer density (Bissonette and Kassar 2008, Grovenburg et al. 2008, Mastro et al. 2008, McShea et al. 2008, Ng et al. 2008). Sharpshooting programs in Iowa, New Jersey and Ohio resulted local deer herd size 54-76% and reduced deer vehicle collisions 49-78% (DeNicola and Williams 2008). Grovenburg et al. (2008) identified a positive correlation between deer hunter success rates and vehicle collisions. Deer hunter success rates are likely to be highest in areas with high deer densities. Rutberg and Naugle (2008) identified the impact of the use of a deer immunocontraceptive (porcine zona pellucida) on deer population and deer-vehicle

collision rates. The reduction in the deer population observed during their study was associated with a reduced frequency of deer-vehicle collisions. However, in a study by McShea et al 2008, deer density and deer harvest level were not significantly correlated with deer-vehicle collisions. The authors hypothesized that the difference may have been related, in part, to differences in the degree of development in the study areas. Deer density may be more important in urban suburban areas with high deer densities but less of a factor in rural or exurban counties.

6. The EA should contain more information on the economics of urban/suburban deer population reduction alternatives.

Cost is only one of several factors which need to be considered when creating an urban/suburban deer management plan. Other factors may include legal and/or logistical limits on the use of firearms or hunting, community values regarding the proposed management methods (e.g., lethal methods and reproductive control), safety concerns, concerns about wounded deer, and community willingness to accept increased deer mortality associated with deer relocation/handling (Kilpatrick and Walter 1999, Henderson et al. 2000, Decker et al. 2004, Kilpatrick et al. 2007). The magnitude and nature of the damage problem will also impact community perceptions and willingness to use specific damage management methods. The costs of implementing a specific management alternative will vary considerably depending upon local conditions, the degree of population reduction desired, and the restrictions and site specific modifications necessary for an effective program that is acceptable to the local community (Kilpatrick and Walter 1999). We have provided some examples from the literature below.

Hunting programs tend to be among the least expensive alternatives to implement as many of the costs may be passed on to hunters. In a comparison of deer damage management methods prepared for the Greater Springfield, Missouri Metropolitan Area (Greater Springfield Urban Deer Action Committee 2007), planners estimated that a bow hunting alternative could be implemented with little to no cost to city and/or landowners. In Groton Long Point, Connecticut, a highly controlled archery hunt was used to reduce the deer herd 50-52% during the first year of the program (Kilpatrick and Walter 1999). The first year of the hunt cost landowners $86.16 per deer. Most of the cost of the program was attributed to law enforcement to deal with protesters from outside the community (none of the protesters were from the community that conducted the program. A controlled hunt conducted in Bloominton, Minnesota cost approximately $117 per deer killed (Doerr et al 2001).

The Greater Springfield Urban Deer Action Committee (2007) estimated that the use of professional sharpshooters and the use of trapping and euthanasia would cost $300 or more per deer. Sharpshooters from a private company were used to effectively reduce three suburban deer herds over a period of several years at a cost of approximately $354 per deer removed (DeNicola and Williams 2008). In Bloomington Minnesota, park staff, conservation officers, and city police were used as sharpshooters to help reduce local deer population (Doerr et al. 2001). Police officers and park staff shot deer at bait piles with established shooting lanes and also shot deer during deer drives. Conservation officers used bait but also shot deer opportunistically as they made their designated rounds. Costs per deer for the three types of sharpshooters were $108 per deer for park rangers, $121 per deer for conservation officers and $194 per deer for police officers.

Reproductive control and trapping and relocation tend to be the most expensive alternatives to implement. Mathews et al. (2005) evaluated the logistics of using surgical sterilization to reduce reproduction in free-ranging deer in Highland Park, IL. The study concluded that it was possible to use surgical sterilization under field conditions. However, the system was likely to be expensive to implement (approximately $750 per deer). Walter et al. (2002) estimated that cost per deer to treat 30 free-ranging suburban white-tailed deer with the immunocontraceptive porcine zona pellucida (PZP) would average $1,128 per deer.
The Greater Springfield Urban Deer Action Committee (2007) estimated that trapping and relocation would cost $300 - $400 or more per deer. In a test of deer translocation conducted in Town and Country, Missouri, trapping and relocation cost $387 per deer (Beringer et al. 2002). Other studies have reported costs for translocation programs ranging from $434 – $1,251 per deer (Drummond 1995, Mayer et al. 1995, Beringer et al. 2002).

7. EA needs to clarify WS' authorities relative to other agencies especially ODW. WS is the federal agency authorized by law to help reduce damage caused by wildlife. The primary statutory authorities for the APHIS-WS program are the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). Wildlife Services does not have any regulatory authority. All WS' DDM actions in Ohio must be conducted in accordance with authority and permits granted by the ODW and other applicable regulatory authorities (e.g., Ohio Department of Agriculture). Wildlife Services also obtains the consent of the landowner/manager prior to conducting DDM.

8. EA should provide a more detailed discussion of the impacts of harassment on nontarget species.

Frightening devices which involve the use of sounds, lights and/or sprinkler systems are sometimes recommended for management of deer damage (Craven and Hygnstrom 1994, Gilsdorf et al. 2002). However, these techniques are generally only effective for short periods of time, because the deer quickly become accustomed to (habituated to) the devices. Moving the devices and changing the type of frightening device may help enhance the efficacy of the devices. Using devices that are only activated in the presence of the target species (instead of activating at set intervals) may also reduce problems with habituation (Belant et al. 1996). One deer-activated device which used a combination of visual, auditory and physical stimuli (touch) has shown promise in repelling deer from cattle feeders (Seward et al. 2007). However, many systems have proven ineffective in reducing damage (Romin and Dalton 1992; Curtis et al. 1995; Belant et al. 1998; Gilsdorf et al. 2004a, b; VerCauteren et al. 2005; Vercauteren et al. 2006; Mastro 2008). Use of frightening devices is further limited by the fact that they are not recommended for areas where the noise and lights may adversely impact use and enjoyment of neighboring properties. Frightening devices may also scare nontarget species. In these cases, affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. Like deer, nontarget species are also likely to rapidly become accustomed to frightening devices. Because of the limited efficacy of the method and the limitations on where frightening devices may be used, WS' is only likely to recommend the technique for a relatively low number of isolated situations. Given the limited number of sites where the method is likely to be used, the relatively short time the devices will be in place and and that nontarget species are expected to quickly habituate to the devices, WS proposed use and recommendation of frightening devices is unlikely to have an adverse impact on nontarget species populations.

APPENDIX B

LITERATURE CITED

Alaska Department of Fish and Game. 2005. Nutrition of wild game meat. Alaska Fish and Wildlife News. October. http://www.wildlife.alaska.gov/index.cfm?adfg=wildlife_news.view_article&issue_id=31&articles_id=172

Belant, J. L., T, W, Seamans, and C. P. Dwyer. 1996. Evaluation of propane exploders at white-tailed deer deterrents. Crop Protection 15:575-578.

Belant, J. L., T. W. Seamans, and L. A. Tyson. 1998. Evaluation of electronic frightening devices as white-tailed deer deterrents. Proceedings of the Vertebrate Pest Conference 18:107-110.

Beringer, J., L. P. Hansen, J. A. Demand, J. Sartwell, M. Wallendorf, and R. Mange. 2002. Efficacy of transloction to control urban deer in Missouri: Costs, efficiency, and outcome. Wildlife Society Bulletin 30:767-774.

Bissonette, J. A., and C. A. Kassar. 2008. Locations of deer-vehicle collisions are unrelated to traffic volume or posted speed limit. Human-Wildlife Conflicts 2:122-130.

Colorado Division of Wildlife. 2001. State biologists plead: Let wildlife be wild. Press Release. June 28, 2001. http://wildlife.state.co.us/NewsMedia/PressReleases/

Craven, S. R., and S. E. Hygnstrom. 1994. Deer. Pages D25-D50 in S. E. Hygnstrom, R. M. Timm, and G. E. Larson, eds. Prevention and Control of Wildlife Damage. University of Nebraska-Lincoln, Coooperative Extension Service.

Curtis, P. D., C. Fitzgerald, and M. E. Richmond. 1995. Evaluation of the Yard Gard Ultrasonic Yard Protector for repelling white-tailed deer. Proceedings of the Eastern Wildlife Damage Control Conference 7:172-176.

Dargatz, D. A., P. J. Fedorka-Cray, S. R. Ladely, and K. E. Ferris. 2000. Survey of Salmonella serotypes shed in feces of beef cows and their antimicrobial susceptibility patterns. Journal of Food Protection 63: 1648-1653.

Decker, D. J., D. B. Raik, and W. F. Siemer. 2004. Community-based deer management: a practitioners' guide. Northease Wildlife Damage Management Cooperative, Cornell University, Ithica, NY.

DeNicola, A. J., and S. C. Williams. 2008. Sharpshooting suburban white-tailed deer reduces deer-vehicle collisions. Human-Wildlife Conflicts 2:28-33.

Doerr, M. L., J. B. MaAninch, E. P. Wiggers. 2001. Comparison of 4 methods to reduce white-tailed deer abundance in an urban community. Wildlife Society Bulletin 29:1105-1113.

Drummond, R. 1995. Lethal and nonlethal deer management at Ryerson Conservation Area, northeastern Illinois. Pages 105-109 *in* J. B. McAninch, ed. Urban deer: a manageable resource? Proceedings of the 1993 Symposium of the North Central Section, the Wildlife Society, 12-14 December 1993. St. Louis, MO.

Dunn, J. R., J. E. Keen, D. Moreland, and R. A. Thompson. 2004. Prevalence of Escherichia coli O157:H7 in white-tailed deer from Louisiana. Journal of Wildlife Diseases 40:361-365.

Gilsdorf, J. M., S. E. Hygnstrom and K. C. VerCauteren. 2002. Use of frightening devices in wildlife management. Integrated Pest Management Reviews 7:29-45.

Gilsdorf, J. M., S. E. Hygnstrom, K. C. Vercauteren, G. M. Clements, E. E. Blankenship and R. M. Engeman. 2004*a.* Evaluation of a deer-activated bio-acoustic frightening device for reducing deer damage in cornfields. Wildlife Society Bulletin 32:515-523.

Gilsdorf, J. M., S. E. Hygnstrom, K. C. Vercauteren, E. E. Blankenship and R. M. Engeman. 2004*b.* Propane exploders and electronic guards were ineffective at reducing deer damage in cornfields. Wildlife Society Bulletin 32:524-531.

Greater Springfield Urban Deer Action Committee. 2007. Deer management in the Greater Springfield Metropolitan Area: Final report. Missouri Department of Conservation

Grovenburg, T. W., J. A. Jenks, R. W. Klaver, K. L. Monteith, S. H. Galster, R. J. Schauer, W. W. Morlock, and J. A. Delger. 2008. Factors affecting road mortality of white-tailed deer in eastern South Dakota. Human-Wildlife Conflicts 2:48-59.

Hancock, D. D., T. E. Besser. M. L. Kinsel, P. I Tarr, D. H. Rice, and M. G. Paros. 1994. The prevalence of Escherichia coli O157:H7 in dairy and beef cattle in Washington State. Epidemiology and Infection 113:199-207.

Henderson, S. W., R. J. Warren, D. H. Newman, J. M. Bowker, J. S. Cromwell and J. J. Jackson. 2000. Human perceptions before and after a 50% reduction in an urban deer herd's density. Wildlife Society Bulletin 28:911-918.

Hubbard, R. D., and C. K. Nielsen. 2009. White-tailed deer attacking humans during the fawning season: a unique human-wildlife conflict on a university campus. Human Wildlife Conflicts 3:129-135.

Kilpatrick, H. J., A. M. Labonte, and J. S. Barclay. 2007. Acceptance of deer management strategies by suburban homeowners and bowhunters. Journal of Wildlife Management 71:2095-2101.

Kilpatrick, H. J., and W. D. Walter. 1999. A controlled archery deer hunt in a residential community: cost, effectiveness, and deer recovery rates. Wildlife Society Bulletin 27:115-123.

Mastro, L. L., M. R. Conover, and S. N. Frey. 2008. Deer-vehicle prevention techniques. Human-Wildlife Conflicts 2:80-92.

Mathews, N. E., J. Paul-Murphy, and E. S. Frank. 2005. Evaluation of a trap-sterilize-release program for white-tailed deer management in Highland Park, Illinois 2002-2005. Report prepared for the Higland Park City Council. 34pp.

Mayer, K. E., J. E. DiDonato and D. R. McCullough. 1995. California urban deer management: two case studies. Pages 51-57 *in* J. B. McAninch, ed. Urban deer: a manageable resource? Proceedings of the 1993 Symposium of the North Central Section, the Wildlife Society, 12-14 December 1993. St. Louis, MO.

McShea, W. J., C. M. Stewart, L. J. Kearns, S. Liccioli and D. Kocka. 2008. Factors affecting autumn deer-vehicle collisions in a rural Virginia county. Human-Wildlife Conflicts 2:110-121.

Mech, , L. D., and R. E. McRoberts. 1990. Survival of white-tailed deer fawns in relation to maternal age. Journal of Mammology 71:465-467.

Ng, J. W., C. Nielsen, and C. C. St Clair. 2008. Landscape and traffic factors influencing deer-vehicle collisions in an urban environment. Human-Wildlife Conflicts 2:34-47.

Ozoga, J. J., L. J. Verme and C. S. Bienz. 1982. Parturition behavior and territoriality in white-tailed deer: impact on neonatal mortality. Journal of Wildlife Management 46:1-11.

Renter, D. G., J. M. Sargeant, S. M. Hygnstrom, J. D. Hoffman and J. R. Gillespie. 2001. Estrichia coli O157:H7 in free-ranging deer in Nebraska. Journal of Wildlife Diseases 37:755-760.

Renter, D. G. D. P. Gnad, J. M. Sargeant, and S. M. Hygnstrom. 2006. Prevalence and serovars of Salmonella in the feces of free-ranging white-tailed deer (*Ococoileus virginianus*) in Nebraska. Journal of Wildlife Diseases. 42:699-703.

Romin, L. A. and B. Dalton. 1992. Lack of responseby mule deer to wildlife warning whistles. Wildlife Society Bulletin 20:382-384.

Rutberg, A. T., and R. E Naugle. 2008. Deer-vehicle collision trends at a suburban immunocontraception site. Human-Wildlife Conflicts 2:60-67.

Schmidt, R. H. 1989. Vertebrate pest control and animal welfare. Vertebrate Pest Control and Management Materials, ASTM STP 1055, American Society for Materials and Testing. Philadelphia, PA 6:63-68.

Seward, N. W., G. E. Phillips, J. F. DuQuette, and K. C. VerCauteren. 2007. A frightening device for deterring deer use of cattle feeders. Journal of Wildlife Management 71:271-276.

Slate, D. A., R. Owens, G. Connolly, and G. Simmons. 1992. Decision making for wildlife damage management. Transactions of the North American Wildlife and Natural Resources Conference 57:51-62.

USDA (United States Department of Agriculture). 2009. Vegetarian diets. http://www.mypyramid.gov/tips_resources/vegetarian_diets.html

USDA (United States Department of Agriculture). 2008. White-tailed deer damage management in Ohio. USDA, APHIS, WS State Office, 6929 Americana Pkwy., Reynoldsburg, Ohio 43068.

USDA (United States Department of Agriculture). 1997 (revised). Animal Damage Control Program Final Environmental Impact Statement. USDA, APHIS, WS Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737.

USDA (United States Department of Agriculture). 1999. United States Department of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control Strategic Plan. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services Operational Support Staff. Riverdale, Maryland.

VerCauteren, K. C., J. A. Shivik and J. and M. J. Lavelle. 2005. Efficacy of an animal-activated frightening device on urban elk and mule deer. Wildlife Society Bulletin 33:1282-1287.

VerCauteren, K. C., J. M. Gilsdorf, S. E. Hygnstrom, P. F. Fioranelli, J. A. Wilson, and S. Barras. 2006. Green and blue lasers are ineffective for dispersing deer. Wildlife Society Bulletin 34:371-374.

Walter, W. D., P. J. Perkins, A. T. Rutberg, and H. J. Kilpatrick. 2002. Evaluation of immunocontraception in a free-ranging suburban white-tailed deer herd. Wildlife Society Bulletin 30:186-192.

Wildlife Society. 1992. Conservation policies of the wildlife society: a stand on issues important to wildlife conservation. The Wildlife Society, Bethesda, Md. 24 pp.