SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT

White-tailed Deer Damage Management in Maryland

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List of Acronyms

APHIS	Animal and Plant Health Inspection Service
BCC	Biological Carrying Capacity
BWI	Baltimore-Washington International Airport
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWD	Chronic Wasting Disease
DC	District of Columbia
DDOE	District Department of the Environment
DEA	Drug Enforcement Administration
DMP	Deer Management Permits
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Act
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
IWDM	Integrated Wildlife Damage Management
MAA	Maryland Aviation Authority
MDNR	Maryland Department of Natural Resources
MIS	Management Information Systems
MOU	Memorandums of Understanding
NASS	National Agricultural Statistics Service
NEPA	National Environmental Policy Act
NOA	Notice of Availability
SOP	Standard Operating Procedures
T&E	Threatened and Endangered (species)
USDA	United States Department of Agriculture
USFS	Unites State Forest Service
USFWS	United States Fish and Wildlife Service
WS	Wildlife Services (USDA, APHIS)

CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife that increases the potential for conflicting human/wildlife interactions. In addition, segments of the public desire protection for all wildlife. This protection can create localized conflicts between human and wildlife activities. Wildlife damage management is the science of reducing damage or other problems caused by wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1992).

Wildlife Services (WS) is a cooperatively funded, service-oriented program from which other governmental agencies and entities may request assistance. Before any wildlife damage management is conducted, Cooperative Service Agreements and Agreements for Control or other comparable documents are in place. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently according to applicable federal, State and local laws, and Memorandums of Understanding (MOUs) between WS and other agencies. WS's mission, developed through its strategic planning process, is: 1) *"to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and 2) to safeguard public health and safety."* WS's Policy Manual reflects this mission and provides guidance for engaging in wildlife damage management through:

- training of wildlife damage management professionals;
- development and improvement of strategies to reduce losses and threats to humans from wildlife;
- collection, evaluation, and dissemination of management information;
- informing and educating the public on how to reduce wildlife damage; and
- providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1999).

WS is a federal agency authorized to protect American resources from damage associated with wildlife (Act of March 2, 1931, as amended 46 Stat. 1486; 7 USC. 426-426c and the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988, Public law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 USC 426C) and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767)). To fulfill this Congressional direction, WS activities are conducted to prevent or reduce wildlife damage caused to agricultural, industrial and natural resources, property, and threats to public health and safety on private and public lands in cooperation with federal, state and local agencies, private organizations, and individuals. Therefore, wildlife damage management is not based on punishing offending animals but as one means of reducing damage and is used as part of the WS Decision Model (WS Directive 2.101). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to resources or the public. WS's vision is to improve the coexistence of people and wildlife, and its mission is to provide Federal leadership in managing problems caused by wildlife.

The US Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program completed an Environmental Assessment (EA) and issued a Finding of No Significant Impact (FONSI) in 2005 on alternatives for managing white-tailed deer (*Odocoileus virginianus*) in the state of Maryland (MD) for the protection of agriculture, natural resources, property, urban/suburban landscaping, and human safety on all private and public lands of MD where a need exists,

assistance is requested from landowners or public officials, and funding is available. The EA provided information on the need for action and evaluated the relative effectiveness and environmental impacts of resolving deer damage related to the protection of resources, human safety, and property on private and public lands in MD.

The MD WS program is also responsible for alleviating human-wildlife conflicts in the District of Columbia (DC). This supplement considers the impacts of extending the white-tailed deer management program to DC following increased requests for assistance from natural resource agencies. The current white-tailed deer management program is coordinated with the Maryland Department of Natural Resources (MDNR) and the inclusion of the DC area has resulted in the cooperation of the National Park Service. This supplement adds to the analysis in the 2005 EA and FONSI and all information and analyses in the 2005 EA remain valid unless otherwise noted.

In Maryland and the DC, the authority for management of resident wildlife species is the responsibility of the Maryland Department of Natural Resources (MDNR) and the District Department of the Environment (DDOE). The MDNR collects and compiles information on white-tailed deer population trends and take, and uses this information to manage deer populations. This information has been provided to WS to assist in the analysis of potential impacts of WS activities on the deer herd in Maryland. In DC, there is no recreational harvest of deer, and the only population data is found on federal properties, such as Rock Creek Park.

1.2 Background

Since the completion of the 2005 EA, WS has implemented a program of deer management to assist public and private entities with deer damage to natural resources, agriculture, human safety, and property. Table 1 shows the number of technical assistance (TA) requests for deer damage in MD and DC that were reported to WS during the time period since the EA was completed.

Table 1. Number of Technical Assistance requests for deer damage received by MD WS from FY05 through FY12.

	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	Total
Number of TAs	265	273	364	290	442	392	285	335	2646

WS uses an Integrated Wildlife Damage Management (IWDM) approach, known as Integrated Pest Management (WS Directive 2.105), in which a combination of methods may be used or recommended to reduce wildlife damage. These methods may include alteration of cultural practices and habitat and behavioral modification to prevent or reduce damage and were analyzed in the EA. The reduction of wildlife damage may require that the local populations of offending animal(s) be reduced through lethal means. WS' wildlife damage management program activities are not based on punishing offending animals but are a means of reducing damage and are used as part of the WS Decision Model (WS Directive 2.101). The imminent threat of damage or loss of resources is often deemed sufficient for wildlife damage management actions to be initiated (U.S. District Court of Utah 1993). This supplement has been prepared to evaluate and determine if there are any potentially significant or cumulative impacts from the proposed expanded damage management program. All wildlife damage management that would take place in Maryland and DC and would be undertaken according to relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA).

The purpose of this supplement is to evaluate the current MD-WS deer management program and evaluate the potential impacts to the human environment from the implementation of an expanded white-tailed deer damage management program. The need for action remains as described in the EA section

1.4, except as noted below. The program is primarily directed to the alleviation of deer damage and conflicts associated with agricultural resources, urban/suburban landscaping, property, natural resources, human safety from deer-vehicle and deer-aircraft collisions, and concerns about the spread of disease. Under the Preferred Alternative (Integrated Deer Damage Management Program), deer damage management is conducted on private, federal, state, tribal, county, and municipal lands in the State of Maryland and the DC upon request for WS assistance. This supplement adds to the analysis in the 2005 Environmental Assessment (EA) of the potential environmental effects of a proposed integrated white-tailed deer damage management program in Maryland DC, and considers the use of the reproductive inhibitor, GonaCon™.

1.2.1 Need for Action

Although white-tailed deer were relatively rare in DC at the beginning of the 20th century, increasing deer populations in the urban/suburban areas of DC have resulted in over browsing of landscaping and natural habitats as well as increased conflicts in urban areas, such as vehicle collisions and destruction or ornamental vegetation. Fragmented habitats have created "edge" which provides large amounts of food and cover for wildlife. The deer population remains largely unchecked by the lack of predators and hunting opportunities in the urban areas (NPS 2011). These interactions have led to an increased number of requests for assistance with white-tailed deer damage in the DC area.

The biological carrying capacity (BCC) of wildlife populations is defined as the number of animals an area can support without degradation to the animal's health and the environment (Decker and Purdy 1988). This term is useful because it defines when conflicts with deer have exceeded an acceptable level, and provides managers with a target for establishing management impacts, threats to public safety, the potential for illegal killing of deer, and personal attitudes an values. Vegetation studies were also conducted using multiple methods and established that deer were "affecting the integrity of the understory structure and species composition, diminishing the value of habitat for other wildlife" (NPS 2011).

Studies conducted at Rock Creek Park recently estimated the density of deer in the park to be 82 deer per square mile (NPS 2011). The multi-year sampling was in response to a documented substantial reduction in the quality and integrity of the vegetation in the park, including shrub cover, tree seedling regeneration, and herbaceous cover. Degradation of these elements results in lower quality habitat for other species (NPS 2011). Data collected from numerous parks in Montgomery County, MD in 1995 showed several effects of deer browsing;

> *Every park surveyed during this project had an overpopulation of deer. The severity of this problem varies from one park to another, but it represents a considerable threat to the native vegetation (Montgomery County 1995).*

Increasing deer populations in urban areas also contribute to vehicle-deer collisions (Table 2), and often browsing of ornamental vegetation is a complaint from home and business owners.

Table 2. Number of deer-vehicle collisions in MD from FY07 through FY12.

FY	2007	2008	2009	2010	2011	2012
Deer Killed by Vehicles	9,094	10,361	13,222	8,296	14,690	12,945

DC is approximately 70 square miles in area, between Maryland and the Chesapeake Bay/Potomac River. Its relatively small size necessitates the use of deer population data from Maryland to better understand the population of deer in the area.

MDNR cites urban and suburban deer management as significant challenges and one of the fastest growing deer management issues in the state (MDNR 2009). Urbanization is a challenge to regulating the deer population, as hunting is not allowed in urban areas. The use of non-lethal techniques, such as fencing and repellents, has been employed by MDNR. In highly urban counties, the deer populations have not dropped as significantly as desired under MDNRs plan to reduce and stabilize the deer populations. In these areas, MDNR will continue with liberal harvest levels to alleviate negative impacts that deer have on the communities (MDNR 2013).

1.2.2 Harvest Information for Deer in Maryland

The white-tailed deer population in Maryland was estimated to be 223,000 deer in 2012, a level considered "stabilized" by the MDNR (MDNR 2013). Maryland hunters harvested 87,541 deer during the 2012-2013 seasons, an 11% decline from the harvest of the previous year. The MDNR cites several factors for the decline, including a large acorn crop, disease and decreased hunter effort, but state that the population remains strong (MDNR 2013). Record-breaking deer harvests were recorded in previous years, allowing by the MDNR to stabilize the population at a reduced level.

Table 3. White-tailed deer take in MD 2005-2012 [1].

FY	WS MD Take	MD Hunter Harvest	MD Crop DMP Harvest	Vehicle Mortality	WS Take as % of harvest and vehicle mortality
2005	72	94,052	7,178	4,297	0.07%
2006	27	91,930	4,732	6,564	0.03%
2007	136	92,208	5,612	9,094	0.13%
2008	68	100,437	6,722	10,361	0.06%
2009	469	100,663	7,858	13,222	0.39%
2010	441	98,663	8,245	8,296	0.38%
2011	372	98,029	8,840	14,690	0.31%
2012	444	87,541	7,940	12,945	0.41%

[1] (MIS 2012, MDNR 2007, 2008, 2009, 2010, 2011, 2012, 2013)

1.2.3 Deer Damage to Agriculture

A 2012 report from the National Agricultural Statistics Service (NASS) MD Field Office shows that MD farmers suffered $10 million in wildlife-related losses to agriculture, with 77% of those losses were attributed to deer. A total of $410,000 was spent on preventative measures (NASS 2012). Although this represents a slight decrease in damage from the $11,464,000 estimate in 1996 (Drake et al. 2003), this level of damage is still considered to be a high magnitude. Table 4 shows the total deer damage reports to WS for all resources from 2005 to 2012.

1.2.4 Deer-Vehicle Collisions

In 2012, 12,945 deer-vehicle collisions were estimated to have occurred in MD[1] (Table 3) (MDNR 2013). Often, deer-vehicle collisions in which a deer carcass was not recovered or little vehicle damage occurred go unreported. One major insurance company estimates that there are 25,000 deer-vehicle collisions in MD each year (MDNR 2008). A Cornell University study estimates that the actual number of deer-vehicle collisions could be as high as six times the reported number (Decker et al. 1990).

[1] Data is collected/estimated from multiple agencies that collect such data.

1.2.5 Deer Hazards at Airports

White-tailed deer populations have increased in the U.S. from around 350,000 in 1900 to over 28 million in 2010 (VerCauteren et al. 2011). Deer were involved in 37 percent of the reported mammal-aircraft strikes, and 88 percent of the damaging strikes involving terrestrial mammals (Dolbeer et al. 2012). Of the 356 reported instances of human injury due to wildlife-aircraft strikes in the FAA database, deer were involved in 19 of the strikes, causing 27 injuries. In Maryland, from 1991-2003 a total of 1,633 wildlife strikes to aircraft were reported to the FAA, with 39 of these strikes involving white-tailed deer (FAA online strike database http://wildlife.faa.gov/database.aspx).

WS has an ongoing relationship with the Maryland Aviation Administration (MAA) to provide assistance with wildlife threats to aviation at Baltimore-Washington International Airport (BWI) which began in 2002. From 2003 - 2012, there was one deer-aircraft strike causing minor to significant damage to aircraft at BWI. WS provides both technical and operational assistance at BWI to alleviate conflicts associated with white-tailed deer. Methods used include providing input on airport development and landscaping projects, providing input on fencing options to exclude deer from the movement areas, training airfield personnel in hazardous wildlife identification and abatement measures, and managing hazardous animals on the airfield. As a result of this ongoing program, the threats to aviation safety have been significantly reduced.

Table 4. Total white-tailed deer damage incident and losses reported in MD and DC to WS from FY05 through FY12.

Resource	Incidents Reported t	Value of Da
Agriculture	**61**	**$56,222**
Commercial Forestry	7	$13,407
Field Crops	43	$39,515
Fruits and Nuts	11	$3,300
Health and Safety	**152**	**$30,500**
Human Health and Safety	152	$30,500
Natural Resources	**35**	**$181,050**
Forestry	28	$181,050
Other Natural Resources	6	$0
Wildlife	1	$0
Assorted Resources	**1,293**	**$0**
Other	1,003	$0
Other Natural Resources	290	$0
Property	**190**	**$44,730**
Equipment	8	$0
Landscaping	168	$42,730
Other	1	$500
Other Property	10	$300
Structures	3	$1,200
Total	**1,731**	**$312,502**

1.2.6 Damage to Landscaping and Natural Resources

Deer populations were exploited by European settlers, but have rebounded since the early 1900s to densities that exceed 100 deer per square mile in some parts of the eastern United States. This increase is attributed to improved habitat which allows for greater reproductive success, coupled with lower mortality rates (NPS 2010). Areas that experience deer damage, such as urban areas or National Parks, often have lower deer mortality rates due to the lack of predators and little, if any, hunting. Damage to natural resources may include over grazing of vegetation which alters the natural diversity of an area. Another negative aspect of deer over-browsing is the spread of non-native species through habitat alteration, trampling, and seed dispersal. Increases in non-native species increases competition for native plants and reduces the quality of the habitat for native wildlife (Bratton 1982). Damage to riparian areas, such as wetland and floodplains, associated with excessive deer browsing can limit the value of these areas generally attributed with high biodiversity (NPS 2011). Lands where over-browsing occurs may experience greater soil erosion and storm water runoff, negatively affecting wetlands and waterways (NPS 2011).

Studies of deer browsing in the Manassas Nation Battlefield Park in nearby Virginia by Rossell et al. (2005) indicated that deer were having a “significant impact” on the structure and composition of the

forests. The authors surmised that should the browsing continue unchecked, the forest structure would shift "towards stands with fewer species and a greater dominance of ash, black cherry, and hackberry". Studies in Rock Creek Park indicated a deer density of 82 deer/mi^2, which was much greater than the estimated carrying capacity of 6-10 deer/km (NPS 2011). Plots where deer were excluded from browsing showed a greater regeneration of oak species, while unfenced areas showed more American beech, which is susceptible to disease. The alteration and degradation of habitat from over-browsing by deer can have a detrimental effect on deer herd health and may displace other wildlife communities (e.g., neotropical migrant songbirds and small mammals) that depend upon the understory vegetative habitat destroyed by deer browsing (VDGIF 1999).

1.2.7 Threats to Human and Livestock Health and Safety from Disease Transmission

Diseases carried and transmitted by deer remain as analyzed in the EA. While WS may be asked to test for several diseases, WS primarily monitors for Chronic Wasting Disease (CWD) in deer taken in both MD and DC. CWD is a neurological disease found only in cervids (members of the deer family) in North America. The disease belongs to a family of diseases known as transmissible spongiform encephalopathies (TSE). The disease attacks the brain of infected animals and produces small lesions that result in death. In 2011, CWD was detected in MD in a yearling buck taken by a hunter the previous fall in the western portion of the state. While no CWD was detected in 2012 in MD, the disease is still present in West Virginia and Pennsylvania where it may enter Maryland. MDNR has tested 7,761 deer to date, with only the previously mentioned deer testing positive (MDNR 2013).

Maryland WS submits samples from deer killed during damage management activities for CWD testing. This testing could also include Tuberculosis, Foot and Mouth Disease, and Hemorrhagic Fever at the request of the MDNR, DDOE, or other agencies.

1.3 Relationship of this Supplement to Other Environmental Documents

<u>USDA 1994/97 FEIS: Animal Damage Control Programmatic Environmental Impact Statement</u>

WS has determined that this matter is best assessed at the State level in an EA. WS' decision and actions regarding deer damage management in Maryland rely solely and exclusively on the decision document and record on this supplement. The 2005 EA on deer damage management in Maryland incorporated by reference, sections, discussions, appendices, or other portions thereof, of WS 1994/97 programmatic Environmental Impact Statement (EIS) (hereinafter referred to as USDA 1994/97). This supplemental EA does not incorporate by reference to USDA 1994/97.

<u>Rock Creek Park Final White-tailed Deer Management Plan/Environmental Impact Statement (EIS)</u>

The National Park Service (NPS) at Rock Creek Park in DC completed an EIS on white-tailed deer management in the park in 2011. The EIS examined four alternatives to address the need for deer management to alleviate damage to the natural fauna from over-browsing. Alternative D was the selected alternative that proposed a combination of methods, including sharpshooting, capture/euthanasia, and reproductive control to quickly reduce the population and maintain it at an acceptable level. The EIS is incorporated by reference in this supplement.

1.4 Decisions to be Made

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

a. Should deer damage management as currently implemented by the WS program be continued in Maryland?
b. If not, should WS attempt to implement one of the alternatives to an IWDM strategy as described in the EA?

c. Might the continuing of WS's current program of deer damage management have significant impacts requiring preparation of an EIS?

1.5 Scope of this Environmental Assessment Analysis

1.5.1 Actions Analyzed

The EA and supplement evaluate white-tailed deer damage management by WS to protect human health, human safety, property, natural resources and agriculture on private land or public facilities whenever or wherever such management is requested from the WS program in Maryland and DC.

1.5.2 Period for which this Supplemented EA is Valid

Unless it is determined that an Environmental Impact Statement (EIS) is needed, the supplemented EA will remain valid until WS determines that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis will be revised as necessary. Review of the EA will be conducted each year to ensure that it is complete and still appropriate to the scope of deer damage management activities within Maryland and DC.

1.5.3 Site Specificity

This supplement analyzes the potential impacts of white-tailed deer damage management and addresses activities on all private and public lands in Maryland and DC under MOU, Cooperative Agreement, and in cooperation with the appropriate public land management agencies. It also addresses the impacts of deer damage management on areas where additional agreements may be signed in the future. Because the Preferred Alternative is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional wildlife damage management efforts could occur. Thus, this supplement anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

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

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

1.5.4 Public Involvement/Notification

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

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

1.5.5 Authority and Compliance

Authority of federal and state agencies to manage wildlife damage in the State of Maryland remains applicable as listed in the 2005 EA with the following addition.

1.5.5.1 National Park Service (NPS)

WS cooperated with the NPS to manage deer on federal lands. The NPS has broad authority to manage resources found on its lands, including wildlife. The NPS cites their authority to manage resources as follows (2011):

"The NPS has broad authority to manage wildlife and other natural resources within the boundaries of units of the national park system. See, generally, 16 USC 1 (NPS "shall promote and regulate the use of Federal areas known as national parks…by such mean and measures as conform with the fundamental purpose of the parks…to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations") and 16 USC 3 [The Secretary of the Interior] may… provide in his discretion for the destruction of such animals and of such plant life as may be detrimental to the use of any of [the parks, monuments, and reservations under the jurisdiction of the National Park Service]. In defining this discretion, the 10th Circuit Court of Appeals overturned a district court decision, holding in part that the NPS "need not wait until the damage through over-browsing has taken its toll on park plant life … before taking preventative action" New Mexico State Game Commission v. Udall, 410 F.2d 1197, 1201 (10th Cir. 1969). This discretion has been reinforced over time. In United States v. Moore, 640 F.Supp. 164, 166 (S.D. W.VA. 1986) the court found that Congress had given the Secretary great discretion in regulating and controlling wildlife within the national park system. This discretion is further defined by NPS management policy. Scientific Background: Deer and Vegetation Management FINAL WHITE-TAILED DEER MANAGEMENT PLAN / ENVIRONMENTAL IMPACT STATEMENT 13.

NPS Management Policies 2006, section 4.4.2, states that "[w]henever possible, natural processes will be relied upon to maintain native plant and animal species and influence natural fluctuations in populations of these species. The Service may intervene to manage populations or individuals of native species only when such intervention will not cause unacceptable impacts to the populations of the species or to other components and processes of the ecosystems that support them." In addition, the policy restricts management to times when certain conditions exist. One such condition is when "a population occurs in an unnaturally high or low concentration as a result of human influences (such as loss of seasonal habitat, the extirpation of predators, the creation of highly productive habitat through agriculture or urban landscapes), and it is not possible to mitigate the effects of the human influences." NPS policies also require that parks "assess the results of managing plant and animal populations by conducting follow-up monitoring or other studies to determine the impacts of the management methods on non-targeted and targeted components of the ecosystem" section 4.4.2. This strategy is described in this plan including specific thresholds for taking action and end points on management actions."

1.5.6 Compliance with Other Federal Laws

Several federal and state laws authorize, regulate, or otherwise affect WS wildlife damage management. Laws with particular relevance to the proposed action are described in EA Section 1.7.2. WS complies with applicable laws, and consults and cooperates with other agencies as appropriate. The section below provides additional information on regulations relevant to the supplement.

Wilderness Act of 1964 – An Act (Public Law 88-577; 88th Congress, S.4; September 3, 1964).
The Wilderness Act allows federally owned lands meeting specific criteria to be designated as "wilderness areas." The act prohibits and restricts certain uses of these designated lands. The act provides special provisions to allow certain activities to take place within designated wilderness areas such as the use of aircraft to control fire, insects, and diseases (Sec. 4 (d)). APHIS-WS obtains United State Forest Service (USFS) or BLM State Director approval to conduct control activities in Wilderness areas where necessary.

Federal Water Pollution Control Act (Commonly known as the Clean Water Act (CWA) (33 USC 1251-1376, October 18, 1972, as amended)).
The CWA is a statute aimed at restoring and maintaining the chemical, physical, and biological integrity of U.S. waters. The CWA is implemented and enforced by the EPA and authorizes the Public Health Service to prepare comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries and improving the sanitary condition of surface and underground waters. Additionally, the CWA authorizes water quality programs, requires federal effluent limitations and state water quality standards, requires permits for discharge of pollutants into navigable waters, and provides enforcement mechanisms. Military bases, national park, and federal facilities must comply with CWA provisions.

Archaeological Resources protection Act (ARPA) of 1979, as amended (16 USC 470).
The Archaeological Resources Protection Act expands the protections provided by the Antiquities Act of 1906 by protecting archaeological resources and sites located on public and Indian lands. The ARPA defines "archaeological resources" as items: 1) of archaeological interest over 100 years old; and 2) found in an archaeological context on federal or Indian lands and requires finders to obtain a federal permit before excavating these objects.

1.6 Affected Environments

The areas of the proposed action remain as analyzed in the 2005 EA to include the following:

1.6.1 National Parks and Federal Facilities

Lands owned and managed by the federal government are managed to meet goals and criteria prescribed out for each location. Lands are generally managed for multiple uses, such as camping, bird watching, fishing, hiking, biking, horseback, etc. These federal land managers have authority to manage natural resources, including wildlife, with in the land's boundaries. Over populations of deer may reduce the quality of the habitat, degrading the experience all users may have on the lands. Parks often provide habitat for listed or rare species. WS may be requested to provide assistance in reducing the population size or to provide technical assistance to protect resources.

1.7 Issues Analyzed in Detail

Issues are concerns raised regarding potential environmental problems that might occur from a proposed action. Such issues must be considered in the NEPA decision-making process. Issues relating to the reduction of wildlife damage were raised during the scoping process in the preparation of the EA. Issues related to managing damage and threats associated with deer in Maryland were developed by WS in consultation with the MDNR.

The major issues are discussed in detail in Chapter 2 of the EA (USDA 2005). Alternatives developed and identified during the development of the EA to address those issues are discussed in Chapter 3 of the EA (USDA 2005). Potential impacts of Alternatives 1, 2, 3, and 4 on the human environment related to the major issues have not changed from those described in the EA and thus do not require additional

analyses in this report or the proposed supplement. Chapter 4 of the EA contains a detailed discussion and comparison of the identified alternatives and the major issues (USDA 2005). The issues were identified as important to the scope of the analysis in the EA (40 CFR 1508.25). Alternative 5 (proposed action/no action), as described in the EA, describes an integrated deer management program in that responds to requests for deer damage management to protect property, agriculture resources, natural resources, and human health and safety. Chapter 3 of this supplement provides an analysis of potential impacts for each of the major issues analyzed in the EA since the completion of the EA and the proposed supplement to the EA as related to Alternative 5 (proposed action/no action alternative).

The following issues were identified as important to the scope of the analysis:

- Effects on White-tailed Deer Populations
- Effects on Plants and other Wildlife Species, including Threatened and Endangered Species
- Effects on Human Health and Safety
- Humaneness of methods to be used
- Effects on Aesthetic Values
- Effects on Regulated White-tailed Deer Hunting

1.8 ISSUES ADDRESSED BUT NOT ANALYZED IN DETAIL

In addition to the identified major issues considered in detail, two issues were considered in section 2.3 of the EA, but were not analyzed in detail with the rationale provided (USDA 2005). WS has reviewed the issues not considered in detail as described in the EA and has determined that the analyses provided are still appropriate regarding those issues.

The addition of GonaCon™ as a method could be added to Alternative 2, the Non-lethal Only alternative. However, the use of GonaCon™ without lethal control will not be further considered as studies have shown that in open populations of deer, sterilization is not sufficient to counter act the influence of immigration population size within a reasonable amount of time (Merrill et al. 2006). Merrill et al. found that in a closed population, the use of sterilization could take 2-3 years to reduce the population by 60%, but in an open population, sterilization "would not likely reduce the population size regardless of management effort. To control the population, the number of deaths must be higher than they number of births plus the number of immigrants (Merrill et al. 2006). To make the use of sterilization effective, lethal control must be implemented to achieve the necessary birth to death ratio. As most project sites in Maryland and DC are open deer populations, sterilization alone would not be an effective method and will not be considered in detail.

CHAPTER 2. ALTERNATIVES

Alternative 5 was selected by the decision maker in the Decision/FONSI (2005) to respond to the issues pertaining to deer damage management. Additionally, Chapter 3 of the EA discusses two additional alternatives that were considered but not analyzed in detail. A detailed discussion of the effects of the Alternatives is described in the EA and remains as analyzed. Below is a summary of Alternative 5.

<u>Alternative 5</u>: Integrated Deer Damage Management Program: No Action (Preferred Alternative)
Under this alternative, WS would continue the current damage management program that responds to requests for white-tailed deer damage assistance in the State of Maryland. An IWDM approach would be implemented in consultation and coordination with the Maryland Department of Natural Resources to alleviate white-tailed deer damage to agriculture, property, natural resources, and human health and safety on all private and public lands of Maryland where a need exists, a request is received, and funding is

available. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, white-tailed deer, other species, and the environment. Under this action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, habitat modifications, harassment, repellants, and physical exclusion could be recommended and utilized to reduce deer damage. In other situations, deer would be removed as humanely as possible by sharp shooting, using non-lead ammunition, and live capture followed by euthanasia under permits issued by the appropriate natural resource management agency. 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. Deer damage management would be conducted in the state, when requested, on private or public property after an *Agreement for Control* or other comparable document has been completed. All deer damage management would be consistent with other uses of the area and would comply with appropriate federal, state and local laws.

2.1 New Methods

A list of methods used and/or recommended by WS for deer damage management is found in Appendix B. WS is assessing the addition of GonaCon™, a reproductive inhibitor, to the list of methods for use in white-tailed deer in MD and federal properties in DC. This would necessitate increased use of live-capture devices, which were originally analyzed to be used only as a capture method for euthanasia.

2.1.1 GonaCon™

GonaCon™ is an immunocontraceptive vaccine that is registered for use in female white-tailed deer at least one year of age or older that targets the production of the GnRH hormone, which is a common hormone in many mammal species, including deer. The production of the GnRH hormone signals the animal's body to start producing sex hormones (*e.g*., estrogen, progesterone, and testosterone) (USDA 2010). The increasing presence of the sex hormones stimulates the reproductive organs of the animal causing the onset of the mating season. The vaccine developed by the APHIS National Wildlife Research Center attaches the hormone GnRH to a foreign protein, which is commonly referred to as an adjuvant. When the new, larger molecule created by joining the GnRH hormone with the adjuvant are introduced into the animal through injection, the immune system of the animal views the new molecule as one the body has never encountered before. In response, the animal's body begins to produce antibodies to neutralize the new molecule.

The adjuvant in the vaccine is the portion of the new molecule that elicits the production of the antibodies by the body. However, due to the presence of the GnRH hormone which is attached to the adjuvant, the antibodies developed by the body actively target and neutralize the GnRH hormone and the adjuvant. When the antibodies bind to the GnRH hormone produced naturally by the animal which effectively neutralizes the hormone, the ability of the body to stimulate the production of sex hormones declines or is prevented. Since the GnRH hormone is suppressed by the antibodies, the animal's body does not produce the sex hormones required to stimulate the reproductive organs of the deer. Therefore, sexual activity in deer that are vaccinated decreases and the animal remains non-reproductive as long as their body continues to produce a sufficient level of antibodies against the GnRH hormone (USDA 2010). Essentially, the GonaCon™ vaccine causes the body to produce antibodies that bind to the GnRH hormone causing the animal's immune response to work against its own production of the GnRH hormone. The use of GonaCon™ by WS to alleviate damage associated with deer under the alternatives will be discussed further below for each of the issues analyzed in detail in the EA.

GonaCon™ is registered for use in MD and is authorized on federal lands in DC, but is still limited by the need to live capture and inject the deer. Of concern with the use of reproductive inhibitors is the cost required to live-capture individual deer to administer the inhibitor and the cost of re-application once the effectiveness of the inhibitor declines. To address the cost effectiveness of reproductive inhibitors, methods need to be developed to administer the inhibitor to a large number of deer during a single application and/or that makes the inhibitor available to deer over a long period over time that does not require the re-occurring presence of personnel. To achieve this effectiveness, a bait formulation is a likely candidate. If a reproductive inhibitor is registered for use to be delivered as a bait, this EA will be reviewed and the method further evaluated as required by NEPA.

CHAPTER 3. ENVIRONMENTAL IMPACTS

This analysis is intended to update sections of the environmental impact analysis in the EA and only includes information on impacts which have changed since the EA was completed. This section summarizes the existing environment relative to the identified issues. The Maryland WS program has received increasing requests for assistance with deer damage management. The increased requests for assistance have not necessitated an increase in the allowed annual take, but have expanded the geographic areas in which WS may need to work.

3.1 Alternatives Analyzed in Detail by Potential Impacts

Six key potential impacts of this program were identified, and each of these impacts is discussed for each alternative. Each issue will be discussed for the chosen alternative, Alternative 5, to evaluate the addition of the land area in DC and the reproductive inhibitor, GonaCon™.

Alternative 5: Integrated Deer Damage Management Program: No Action (Preferred Alternative)

3.1.1 Effects on white-tailed deer populations.

From FY 2006 through FY 2012, WS implemented and employed an integrated damage management approach to reduce threats and damage caused by deer. As part of an integrated approach, WS lethally removed from 37 to 469 white-tailed deer annually (Table 3) in Maryland. This total includes the number of deer killed by WS in accordance with the FONSI issued for WS damage management activities at Baltimore/Washington International Airport (USDA 2003). The highest year of WS' take (469 deer in 2009) represented 0.47% of the 2009 hunter harvest and 0.21% of the current deer population estimate. WS' take, individually or cumulatively, never reached a level that had a significant impact on the statewide deer population.

The EA concluded that the effects of WS' damage management activities in Maryland would not adversely impact deer populations when damage management activities occurred within the scope analyzed. The 2005 EA analyzed the impacts to the human environment based on WS removing 10,000 deer annually. Analyses conducted during the annual monitoring of WS' activities in Maryland for the management of deer damage determined that WS' lethal take of deer was not adversely impacting populations based on the best available information on those species' populations.

WS' damage management activities were site specific, and although local populations of deer may have been reduced, there was no probable adverse impact on statewide or regional deer populations from FY 2005 through FY 2012. The potential impacts of program activities on wildlife species have not changed from those analyzed in the EA. Therefore, based on the annual monitoring of WS' activities being within the scope analyzed in the EA, WS' activities have not had an adverse impact on deer populations.

Based upon the anticipated requests for assistance, the Maryland WS program expects that no more than 1,500 deer would be lethally removed annually, under permits issued by the MDNR or DDOE, while conducting WS direct control activities in MD or DC. However, in the event of a disease outbreak (Foot and Mouth or CWD), WS could take up to 10,000 deer in coordination with other natural resource management agencies in Maryland and DC. Therefore, 10,000 deer is used to analyze WS potential impacts to the statewide deer population in Maryland.

The authority for management of resident wildlife species in Maryland is the responsibility of the MDNR, and deer are classified as protected big game. The MDNR collects and compiles information on white-tailed deer population trends and take, and uses this information to manage deer populations. This information has been provided to WS to assist in the analysis of potential impacts of WS activities on the deer herd in Maryland. There is no hunting in DC, including NPS lands. Currently, the MDNR estimates that there are about 223,000 deer in Maryland (MDNR 2013. There are no existing deer population's estimates for DC.

Using the 2012-2013 hunter harvest estimate (87,541), the number of deer killed under MDNR issued Deer Management Permits (7,940 in 2012), and the potential lethal take of 10,000 deer annually by WS (in case of a disease outbreak), the possibility of WS lethal deer damage management activities adversely affecting the overall Maryland deer population (223,000) is considered low. The cumulative take (4.48% of the overall populations and 10.5% of the total lethal take) appears to be far beneath the level that would begin to cause a continuous decline in the regional deer population.

The additional method, GonaCon™, is considered a non-lethal method. Therefore, the impacts to the statewide deer population from using reproductive inhibitors are negligible. The effects of white-tailed deer damage management activities on this issue are expected to remain insignificant.

3.1.2 Effects on plants and other wildlife species, including T&E species.

Direct impacts on non-target species occur if WS program personnel were to inadvertently kill, injure, or harass animals that are not target species. In general, these impacts result from the use of methods that are not completely selective for target species.

WS personnel are trained and experienced to select the most appropriate tools and methods for taking target animals and excluding non-targets. WS take of non-target species is expected to be minimal or nonexistent. Other wildlife populations would not be negatively affected, except for the occasional harassment effect from the sound of gunshots and non-lethal harassment methods. In these cases, birds and other mammals may temporarily leave the immediate vicinity, but would most likely return after conclusion of the action. Shooting is virtually 100% selective for the target species, and MD-WS utilized non-lead ammunition; therefore no adverse impacts are anticipated from use of this method. WS personnel set traps in locations that are conducive to capturing target animals while minimizing potential impacts to non-target species. Any non-target species captured unharmed in a live trap would be subsequently released on site. To date, no non-target animals have been killed by WS conducting deer damage management activities in Maryland.

Currently, reproductive inhibitors being evaluated for deer must be administered through injection which requires the live-capture of deer. Since reproductive inhibitors must currently be injected into target animals, the risks to non-targets arise from the capture methods. Non-targets could be captured in live-traps during attempts to capture deer but would be released on site.

Any operational uses of capture, sedating or euthanasia drugs, or immunocontraceptive vaccines would be used in accordance with applicable laws and regulations regulating their use. Adherence to these laws and regulations should avoid unreasonable adverse effects on the environment.

Federally Listed Species. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has reviewed the list of T&E species in MD and determined that the proposed actions will have no effect on any of those species.

State Listed Species. WS has determined that the proposed deer damage management program will not adversely affect any Maryland State listed threatened or endangered species or species of special concern.

WS could benefit listed species by reducing deer browsing damage to listed plant species and to habitats of listed animal species. This alternative would likely reduce the damaging effects that deer are having on native flora and fauna, including the recovery of threatened and endangered species to acceptable levels since all damage management methods could be considered for potential use.

3.1.3 Effects on human health and safety.

The EA concluded that the effects of WS' white-tailed deer damage management activities on this issue would be insignificant. WS's deer damage management methods, including shooting and trapping, pose minimal or no threat to human health and safety. There are no risks to human health and safety from the use of the proposed live-capture devises. The addition of the live-capture devices will improve WS' ability to assist with surveillance for diseases communicable to humans and would be beneficial to human health and safety. Based on the analysis in the EA and the above information, the proposed action will not adversely impact human health and safety and will better enable WS to respond to the need to protect human health and safety from risks associated with deer.

WS follows firearm safety precautions when conducting damage management and WS complies with all applicable laws and regulations governing the lawful use of firearms. Shooting with shotguns or rifles is used to reduce deer damage when lethal methods are determined to be appropriate. Live traps (e.g., cage traps, walk-in traps, corral traps) restrain wildlife once captured and are considered live-capture methods. Live traps have the potential to capture non-target species. Trap placement in areas where target species are active and the use of target-specific attractants possibly will minimize the capture of non-targets. If traps are attended to appropriately, any non-targets captured can be released on site unharmed. WS could use firearms to euthanize deer captured in live traps. WS' traps are strategically placed to minimize exposure to the public and pets. Appropriate signs are posted on all properties where traps are set to alert the public of their presence.

The use of firearms can be a politically sensitive issue because of the occasional carelessness and misuse of firearms by people. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety-and-use training program within three months of their appointment and a refresher course every two years afterwards (WS Directive 2.615). WS employees, who use firearms as a condition of employment, are required to certify that they meet the criteria as stated in the *Lautenberg Amendment*.

Per the EPA label, deer vaccinated with GonaCon™ will be marked. However, deer vaccinated with GonaCon™ are safe for human consumption. The EPA (Farwell 2009:2) stated "There is little likelihood of exposure to hormonally active compound from deer meat because GnRH is a protein that is digested and not absorbed intact." As with any controlled use pesticide, those administering GonaCon™ will take all label precautions including the use of proper PPE and proper storage, transportation, and disposal procedures of equipment and vaccine medium. Impacts of the program on this issue are expected to remain insignificant.

3.1.4 Humaneness of methods to be used.

WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Damage management methods viewed by some persons as inhumane would be employed by WS under this alternative. These methods would include shooting, trapping, and immobilization, vaccination, and euthanasia drugs. Under this alternative, deer would be shot or captured as humanely as possible by experienced WS personnel using the best method available. Deer live-captured would be subsequently euthanized or vaccinated (GonaCon™) and released. Some individuals may perceive some methods as inhumane because they oppose all lethal methods of damage management. However, this alternative allows WS to consider non-lethal methods, and WS would implement non-lethal methods for deer damage management when appropriate.

3.1.5 Effects on aesthetic values.

The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife and compassion for their neighbors. Most resource owners who are incurring damage would likely favor this alternative as it allows for an IWDM approach to resolving damage problems. The proposed IWDM approach allows for the use of the most appropriate damage management methods. Most stakeholders without damage would also prefer this alternative because non-lethal methods could be appropriate to resolve damage problems in some situations. Some individuals would strongly oppose this alternative, and most action alternatives, because they believe it is morally wrong to kill or use animals for any reason or they believe that the benefits from deer outweigh the associated damage.

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

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

3.1.6 Effects on regulated white-tailed deer hunting:

Lethal removal of deer by WS personnel would only occur after any necessary permits are issued by the MDNR, or other land management agency, to remove deer that are causing damage or in those situations where deer are a potential human health and safety threat or are a threat of spreading diseases. This activity would result in reduced deer densities on local project areas and may reduce densities in some project area deer management zones, hence slightly reducing the number of deer that may otherwise be available to hunters during hunting seasons. The impact of this activity, however, is expected to be minimal due to:

a. the number of deer expected to be killed by WS is minimal (0.7% of the 2012 statewide population estimate) when compared to the number taken by hunters (40% of the 2012 statewide population estimate).
b. the number of deer expected to be killed by WS would not cause a statewide reduction in deer populations.

There may be some cases where landowners have not permitted regulated deer hunting, but would allow WS employees to shoot deer. This would have a minimal impact on deer hunting since the land was not previously accessible to hunters.

3.2 Cumulative Impacts

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

3.2.1 Cumulative Impacts on Wildlife Populations

Deer damage management methods used or recommended by the WS program will likely have no cumulative adverse effects on target and non-target wildlife populations. WS limited lethal take of white-tailed deer is anticipated to have minimal impacts on overall populations in Maryland or DC, based on previous analysis of all known deer take. When control actions are implemented by WS, the potential lethal take of non-target wildlife species is expected to be minimal to non-existent.

No cumulative adverse impacts on wildlife populations are expected from WS' actions based on the following considerations:

Historical outcomes of WS' programs on wildlife
No cumulative adverse effects have been identified for wildlife as a result of program activities implemented over time based on analyses contained in the EA, from annual monitoring reports, or from analyses contained in the proposed supplement. WS continues to implement an integrated damage management program that adapts to the damage situation and the species involved with causing the damage. WS only targets wildlife causing damage and only after a request for assistance is received. All program activities are coordinated with appropriate federal, state, and local entities to ensure WS' activities do not adversely impact the populations of any native wildlife species.

WS' take has been and would continue to be a small component of the overall harvest of deer which is monitored and adjusted by the MDNR to meet management objectives for deer populations. Statewide deer populations continue to remain stable, which provides an indication that the cumulative take of deer has not reached a level where an undesirable decline in the deer population has occurred. WS' reporting of take to the MDNR ensures that fluctuations in the deer population across the state occur with the knowledge of the MDNR and is considered when setting allowable take levels for deer to meet objectives. WS' activities are conducted on a small portion of the land area in the State and although local declines in deer populations could occur from WS' activities, those activities would not reach a level where deer populations would be adversely affected from those actions.

Standard Operating Procedures (SOP) built into WS' program
SOPs are designed to reduce the potential negative effects of WS' actions on wildlife, and are tailored to respond to changes in wildlife populations which could result from unforeseen environmental

changes. This would include those changes occurring from sources other than WS. Alterations in program activities are defined through SOPs, and implementation is insured through monitoring, in accordance with WS' Decision Model (Slate et al. 1992).

3.2.2 Cumulative Impact Potential from Chemical Components

Repellants, reproductive inhibitors, and immobilization/euthanasia drugs may be used or recommended by WS. Characteristics and use patterns of these methods indicate that no significant cumulative impacts are expected from their use in WS deer damage management programs. The addition of a reproductive inhibitor is not expected to have any cumulative impacts as WS or other state agencies are the only entities authorized to administer that method.

3.2.3 Cumulative Impact Potential from Non-chemical Components

Non-chemical methods used or recommended by WS may include exclusion, habitat modification, trapping, harassment methods and shooting. No cumulative impacts from WS use of these methods are expected.

3.2.4 Summary

No significant cumulative environmental impacts are expected from activities considered under the supplement to the EA. Likewise, no significant cumulative impacts have been identified from the implementation of the proposed action in the EA since 2005. Under the proposed action, the lethal removal of deer would not have a significant impact on overall deer populations in Maryland, but some local reductions may occur. This is supported by the agencies responsible for managing wildlife in Maryland and DC. No risk to public safety is expected when WS' activities are conducted pursuant to the proposed action or the proposed supplement to the EA since only trained and experienced wildlife biologists would conduct and recommend deer damage management activities. The EA further describes and addresses cumulative impacts from the alternatives, including the proposed action. Although some persons will likely be opposed to WS' participation in deer damage management activities, the analysis in this supplement indicates that WS IWDM program will not result in significant, cumulative, adverse impacts on the quality of the human environment.

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APPENDIX A

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APPENDIX B

WHITE-TAILED DEER DAMAGE MANAGEMENT METHODS RECOMMENDED or AUTHORIZED for USE by the MARYLAND WILDLIFE SERVICES PROGRAM

NONLETHAL METHODS

Resource Management

These consist primarily of non-lethal preventive methods such as cultural methods and habitat modification. Resource owner/manager implements cultural methods and other management techniques. Resource owners/managers may be encouraged to use these methods, based on the level of risk, need, and professional judgment on their effectiveness and practicality. These methods include:

Changes in human behavior
These may include altering the flight times of departures and arrivals times so that flying is at a time period of low wildlife activity, or restricting flying during certain times of the day or restricting departures and arrivals on specific runways.

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

Livestock management
Modifying or eliminating habitat utilized by deer may change deer behavior and reduce some deer-human conflicts. This could include reducing vegetative cover and forage plants used or preferred by deer. One method, to eliminate habitat, is using cattle to consume the biomass that deer and other wildlife would feed upon. Reardon and Merrill report that continuous heavy grazing by cattle or by mixed classes of livestock eliminated preferred deer foods and adversely impacts other aspects of white-tailed deer habitat. (Reardon and Merrill 1976, Merrill et al. 1957, Merrill 1959) Crawford noted that livestock grazing affects the vigor and composition of plants and the direction and rapidity of plant succession. Thus, it can significantly influence carrying capacity of white-tailed deer habit (Crawford 1984).

Cultural practices
Studies in agriculture areas of Missouri indicate cultivated crops comprised 41 percent of deer diet by volume (Beringer and Hansen 1997). Thus, by reducing the amount of crops adjacent to the airports runways, deer densities next to these areas may decrease. For example, brome grass could be chosen to replace row crops, as brome is not a highly preferred plant species by deer,

relative to other row crops, alfalfa and clover and still provides the owner with a source of revenue.

Physical Exclusion

A fence can limit the entry of deer onto affected properties. There are several types of fences that inhibit the movement of deer if properly installed, including electric fencing, woven wire, and chain link fencing. The height of a fence required to exclude deer is a much debated topic. Smith and Coggin (1984) reported that a 7-foot fence (2.1-meters) reduced deer-vehicle collisions by 44.3 to 83.9 percent along a New York Thruway.

Cleary and Dolbeer (1999) recommend that airports install a 10-foot chain link fence with barbed-wire outriggers to limit deer entry. For the purpose of this EA, WS recommends a fence height of 12 feet, with an additional three feet buried below the ground, to exclude deer.

Behavior Modification

This refers to tactics that alter the behavior of wildlife to reduce damage. Effective behavior modification usually requires integrating two or more auditory scaring or visual scaring techniques.

Auditory scaring techniques

The proper use of frightening devices and harassment techniques including sirens, flashing lights, electronic distress sounds, pyrotechnics, propane exploders, dogs, and rubber projectiles fired from a shotgun could help reduce conflicts (Craven and Hygnstrom 1994). Used in the proper context, these devices can help keep deer away from conflict areas. Some disadvantages are that these methods can be labor intensive and expensive. Also, frightening methods must be continued indefinitely unless the deer population is reduced or excluded from the resource.

Pyrotechnics

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

Propane Cannons

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

Visual scaring techniques

Visual techniques such as use of mylar tape (highly reflective surface produces flashes of light), eye-spot balloons (the large eyes supposedly give deer a visual cue that a large predator is present), flags, effigies (scarecrows), sometimes are effective in reducing deer damage in a localized area for a limited time period.

Repellents

Repellents have had mixed results in reducing deer damage to shrubs and trees (Palmer et al. 1983, Matschke et al. 1984, Conover 1984, Hygnstrom and Craven 1988, Andelt et al. 1991, Craven and Hygnstrom 1994). Results are generally linked to deer numbers, availability of preferred food plant

species, alternate food sources, season, and weather. Commercial repellents are costly ranging from $20/gallon to $80/gallon.

Repellents require continuous applications and are limited in their effectiveness. The effectiveness of a topical repellent is directly related to residue present on the plant. Rain, heavy dew and watering will remove the residue requiring reapplication of the material. The use of repellents can cause a decrease in native vegetation by shifting browsing pressure from protected plants to native flora. The effectiveness of repellents decreases as deer numbers increase and available food plants decrease.

LIVE CAPTURE AND REPRODUCTIVE INHIBITORS

In some situations, shooting is not the preferred tool for population management, possibly due to a number of factors including, but not limited to safety, weather, or desired outcome of the management action. In such cases it may be appropriate to remove individual deer by live trapping animals. Deer that are live captured may be immunized with a reproductive inhibitor or may be dispatched using a handgun or a rifle.

Live capture

Clover traps, box traps, drop nets, and rocket nets are several methods that can be used to live capture deer. Capture devices are typically set in situations where human activity is minimal to ensure public safety. Restraining devices rarely cause serious injury and are triggered through direct activation of the device. Signs warning of the use of those methods in the area are posted for public view at access points to increase awareness that those devices are being used and to avoid the area, especially pet owners

GonaCon™

GonaCon™ is a single-shot immunocontraceptive that has shown great promise in pen and field tests for reducing fertility in white-tailed deer for up to five years without a booster vaccine. The vaccine prevents eggs from being released from the ovaries, eliminating estrus and some behaviors associated with the breeding period “or rut”. The tool is limited by the need to capture and inject each animal.

LETHAL METHODS

Sharp shooting

Studies have suggested that localized management by removing deer is an effective tool where deer are causing undesirable effects (McNutly et al.1997). This research supports the hypothesis that the removal of a small, localized group of white-tailed deer would create a population of low density in that localized area.

WS would conduct sharp shooting, with center-fire rifles, during daylight or at night using spotlights or night-vision equipment. Rifles would be equipped with sound suppressors, to avoid disturbance, and to facilitate success by minimizing the tendency of deer to flee from the sound of gunfire. Shots would be taken from elevated positions in tree stands, in the beds of trucks, or other vantage points. Elevated positions cause a downward angle of trajectory, so that any bullets that inadvertently miss or pass through targeted deer, will hit into the ground or into earthen embankments to minimize the risk of stray bullets presenting a safety hazard to people, pets, or property. WS personnel would strive for head and neck shots when shooting deer to achieve quick, humane kills. Bait may be used to attract deer to safe sites for shooting and to enhance success and efficiency. The venison from deer killed by WS would be, when possible, processed and donated for consumption, at one or more charitable organizations. WS will be

responsible for properly preparing deer and the delivery to a USDA approved meat processor. WS uses only non-lead ammunition for deer management activities.

Only WS personnel, who have completed firearms safety training, have demonstrated skill and proficiency with the firearms used for deer removal, and have been approved for sharp shooting by the State Director in Maryland will participate in sharp shooting deer.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety-and-use training program within three months of their appointment and a refresher course every two years afterwards (WS Directive 2.615). WS employees, who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Immobilization and Euthanasia

It is possible to live capture deer using chemical immobilization drugs. The following are immobilizing drugs that could be used to capture deer:

Ketamine
Ketamine (Ketamine HCl) is a dissociative anesthetic that is used to capture wildlife, primarily mammals, birds, and reptiles. It is used to eliminate pain, calms fear, and allay anxiety. Ketamine is possibly the most versatile drug for chemical capture, and it has a wide safety margin (Fowler and Miller 1999). When used alone, this drug may produce muscle tension, resulting in shaking, staring, increased body heat, and, on occasion, seizures. Usually, ketamine is combined with other drugs such as xylazine. The combination of such drugs is used to control an animal, maximize the reduction of stress and pain, and increase human and animal safety.

Telazol
Telazol (tiletamine) is another anesthetic used in wildlife capture. It is 2.5 to 5 times more potent than ketamine; therefore, it generally works faster and lasts longer. Currently, tiletamine can only be purchased as Telazol, which is a mixture of two drugs: tiletamine and zolazepam (a tranquilizer). Muscle tension varies with species. Telazol produces extensive muscle tension in dogs, but produces a more relaxed anesthesia in coyotes, wolves, and bears. It is often the drug of choice for these wild species (Fowler and Miller 1999). This drug is sold in a powder form and must be reconstituted with sterile water before use. Once mixed with sterile water, the shelf life is four days at room temperature and 14 days if refrigerated.

Xylazine
Xylazine is a sedative (analgesic) that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with ketamine to produce a relaxed anesthesia. It can also be used alone to facilitate physical restraint. Because xylazine is not an anesthetic, sedated animals are usually responsive to stimuli. Therefore, personnel should be even more attentive to minimizing sight, sound, and touch. When using ketamine/xylazine combinations, xylazine will usually overcome the tension produced by ketamine, resulting in a relaxed, anesthetized animal (Fowler and Miller 1999). This reduces heat production from muscle tension, but can lead to lower body temperatures when working in cold conditions.

Sodium Pentobarbital

Sodium Pentabarbitol is a barbiturate that rapidly depresses the central nervous system to the point of respiratory arrest. There are DEA restrictions on who can possess and administer this drug. Some states may have additional requirements for personnel training and particular sodium pentobarbital products available for use in wildlife. Certified WS personnel are authorized to use sodium pentobarbital and dilutions for euthanasia in accordance with DEA and state regulations.

Hunting Programs

WS sometimes recommends sport hunting as a viable damage management method when the deer can be legally hunted. A valid hunting license and other licenses or permits may be required by the MDNR. This method provides sport and food for hunters and requires no cost to the landowner.

APPENDIX C

STATE AND FEDERALLY LISTED SPECIES IN MARYLAND AND DC

Federally listed species in MD (USFWS 2013)

Animal species listed in this state and that occur in this state (16 species)

Status	Species
E	Amphipod, Hay's Spring Entire (*Stygobromus hayi*)
E	Bat, Indiana Entire (*Myotis sodalis*)
E	Darter, Maryland Entire (*Etheostoma sellare*)
T	Sea turtle, green except where endangered (*Chelonia mydas*)
E	Sea turtle, hawksbill Entire (*Eretmochelys imbricata*)
E	Sea turtle, Kemp's ridley Entire (*Lepidochelys kempii*)
E	Sea turtle, leatherback Entire (*Dermochelys coriacea*)
E	Squirrel, Delmarva Peninsula fox Entire, except Sussex Co., DE (*Sciurus niger cinereus*)
E	Sturgeon, shortnose Entire (*Acipenser brevirostrum*)
T	Tiger beetle, northeastern beach Entire (*Cicindela dorsalis dorsalis*)
T	Tiger beetle, Puritan Entire (*Cicindela puritana*)
T	Turtle, bog (=Muhlenberg) northern (*Clemmys muhlenbergii*)
E	Wedgemussel, dwarf Entire (*Alasmidonta heterodon*)
E	Whale, finback Entire (*Balaenoptera physalus*)
E	Whale, humpback Entire (*Megaptera novaeangliae*)
E	Whale, North Atlantic Right Entire (*Eubalaena glacialis*)

Animal species listed in this state that do not occur in this state (4 species)

Status	Species
E	Beetle, American burying Entire (*Nicrophorus americanus*)
T	Plover, piping except Great Lakes watershed (*Charadrius melodus*)
E	Puma (=cougar), eastern Entire (*Puma (=Felis) concolor couguar*)
E	Wolf, gray U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, KS, KY, LA, MA, MD, ME, MO, MS, NC, NE, NH, NJ, NV, NY, OK, PA, RI, SC, TN, VA, VT and WV; those portions of AZ, NM, and TX not included in an experimental population; and portions of IA, IN, IL, ND, OH, OR, SD, UT, and WA. Mexico. (*Canis lupus*)

Summary of Plant listings

Plant species listed in this state and that occur in this state (6 species)

Status	Species
E	Bulrush, Northeastern (*Scirpus ancistrochaetus*)
E	Dropwort, Canby's (*Oxypolis canbyi*)
E	Gerardia, sandplain (*Agalinis acuta*)
E	Harperella (*Ptilimnium nodosum*)
T	Joint-vetch, sensitive (*Aeschynomene virginica*)
T	Pink, swamp (*Helonias bullata*)

Plant species listed in this state that do not occur in this state (4 species)

Status	Species
T	Amaranth, seabeach (*Amaranthus pumilus*)
E	Chaffseed, American (*Schwalbea americana*)
E	Coneflower, smooth (*Echinacea laevigata*)
T	Pogonia, small whorled (*Isotria medeoloides*)

CURRENT and HISTORICAL RARE, THREATENED, and ENDANGERED SPECIES of MARYLAND

Common Name	Scientific Name	Status
Fishes:		
Shortnose sturgeon	*Acipenser brevirostrum*	E
Maryland darter	*Etheostoma sellare*	E
Reptiles:		
Green turtle	*Chelonia mydas*	T
Hawksbill turtle	*Eretmochelys imbricata*	E
Leatherback turtle	*Dermochelys coriacea*	E
Loggerhead turtle	*Caretta caretta*	T
Atlantic ridley turtle	*Lepidochelys kempi*	E
Bog turtle	*Clemmys muhlenbergii*	T
Birds:		
Bald eagle	*Haliaeetus leucocephalus*	T
Piping plover	*Charadrius melodus*	T
Red-cockaded woodpecker	*Picoides borealis*	E
Mammals:		
Indiana bat	*Myotis sodalis*	E
Delmarva fox squirrel	*Sciurus niger cinereus*	E
Blue whale	*Balaenoptera musculus*	E
Finback whale	*Balaenoptera physalus*	E
Humpback whale	*Megaptera novaeangliae*	E
Right whale	*Eubalaena spp.*	E
Sei whale	*Balaenoptera borealis*	E
Sperm whale	*Physeter catodon*	E
Mollusks:		
Dwarf wedge mussel	*Alasmidonta heterodon*	E
Arthropods:		
Hay's spring amphipod	*Stygobromus hayi*	E
American burying beetle	*Nicrophorus americanus*	E
Puritan tiger beetle	*Cicindela puritana*	T
Northeastern beach tiger beetle	*Cicindela dorsalis dorsalis*	T

Plants:

Northeastern bulrush	*Scirpus ancistrochaetus*	E
American chaffseed	*Schwalbea americana*	E
Smooth coneflower	*Echinacea laevigata*	E
Canby's dropwort	*Oxypolis canbyi*	E
Sandplain gerdardia	*Agalinis acuta*	E
Harperella	*Ptilimnium nodosum*	E
Sensitive joint-vetch	*Aeschynomene virginica*	T
Seabeach pigweed	*Amaranthus pumilus*	T
Swamp pink	*Helonius bullata*	T
Small-whorled pogonia	*Isotria medeoloides*	T

T = Threatened
E = Endangered