SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT: WHITE-TAILED DEER DAMAGE MANAGEMENT IN PENNSYLVANIA

United States Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services

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I. INTRODUCTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program prepared an Environmental Assessment (EA) to analyze the potential environmental and social effects of managing damage to property, agricultural commodities, natural resources, and threats to human safety caused by white-tailed deer (*Odocoileus virginianus*) in the Commonwealth of Pennsylvania (USDA 2003). The EA evaluated the need for white-tailed deer damage management and assessed potential impacts on the human environment of five alternatives to address that need. WS' proposed action in the EA implements an integrated wildlife damage management program in Pennsylvania to fully address the need for deer damage management while minimizing impacts to the human environment.

Comments from the public involvement process were reviewed for substantive issues and alternatives which were considered in developing the Decision for the EA. After consideration of the analysis contained in the EA and review of public comments, a Decision and Finding of No Significant Impact (FONSI) for the EA was issued on September 24, 2003. The Decision and FONSI selected the proposed action alternative to implement an integrated damage management program using multiple methods to adequately address the need for deer damage management.

II. PURPOSE

The purpose of the EA will remain as addressed in Section 1.3 of the EA (USDA 2003). This supplement to the EA examines potential environmental impacts of WS' program as it relates to: 1) conducting disease surveillance and monitoring in deer populations, 2) new information that has become available from research findings and data gathering since the issuance of the FONSI in 2003, 3) the analyses of WS' wildlife damage management activities in Pennsylvania since the Decision/FONSI was issued in 2003 to ensure program activities are within the impact parameters analyzed in the EA, and 4) an increase in the number of requests for assistance to manage deer damage and threats in the Commonwealth.

III. NEED FOR ACTION

A description of the need for action to address threats and damages associated with deer in the Commonwealth is provided in Section 1.4 of the EA (USDA 2003). The need for action addressed in the EA remains applicable to this supplement to the EA. The need for action to manage damage and threats associated with deer in Pennsylvania arises from requests for assistance[1] received by WS to reduce and prevent damage associated with deer from occurring to four major categories: agricultural resources, natural resources, property, and threats to human safety.

WS continues to receive requests for both operational and technical assistance by those persons

[1]WS only conducts damage management activities after receiving a request for assistance. Before initiating activities, a Memorandum of Understanding, cooperative service agreement, or other comparable document must be signed between WS and the cooperating entity which lists all the methods the property owner or manager will allow to be used on property they own and/or manage.

experiencing damage or threats of damage caused by deer in the Commonwealth. Table 1 shows the number of technical assistance projects conducted by WS by federal fiscal year[2] (FY). Technical assistance was provided to those persons requesting assistance through the dissemination of handouts and information regarding damage management techniques, deer biology, methods demonstrations, and site visits. Through technical assistance, WS made recommendations on the appropriate methods available for use that a requestor could employ to resolve damage or reduce threats without WS' direct involvement. Technical assistance as provided by WS to resolve damage or threats associated with deer in the Commonwealth under the proposed action was discussed in the EA under Section 3.3.2 (USDA 2003).

As shown in Table 1, WS has conducted 492 technical assistance projects since FY 2004 involving deer damage to agricultural resources, natural resources, property, and human safety in the Commonwealth through the dissemination of information and handouts on deer damage management. Technical assistance projects were conducted to resolve damage occurring to primarily property. Nearly 38% of the requests for technical assistance received by WS since FY 2004 involved deer damage to property in the Commonwealth. Damage to property is often associated with damage to vehicles or aircraft that occurs when colliding with deer. Damage can also occur to property from deer browsing excessively on flowers, shrubs, and trees. From FY 2004 through FY 2010, WS conducted 101 technical assistance projects involving deer damage to agricultural resources, 66 projects involving damage to natural resources, 186 technical assistance projects involving damage to property, and 139 projects to resolve threats to human safety.

Table 1 – Technical assistance requests received by WS involving deer in Pennsylvania by year

Resource Type	Fiscal Year							TOTAL
	2004	2005	2006	2007	2008	2009	2010	
Property	8	2	3	36	72	32	33	**186**
Agriculture	5	1	5	58	23	3	6	**101**
Natural Resources	0	4	4	18	14	1	25	**66**
Human Safety	2	0	10	12	36	24	55	**139**
TOTAL	**15**	**7**	**22**	**124**	**145**	**60**	**119**	**492**

During requests for assistance received by WS, cooperators often report or WS verifies through site visits damage associated with deer in the Commonwealth. Since FY 2004, damage has been reported to WS or WS has verified over $15.7 million in damages caused by deer in the Commonwealth (see Table 2). Damages have been reported or verified as related primarily to human health and safety. More than $7 million in damages have been attributed to threats to human health and safety, primarily costs associated with Lyme disease infection. Nearly $4.4 million in damages to property have been reported to or were verified by WS in the Commonwealth since FY 2004 with damage to agricultural resources exceeding $1.2 million and damage to natural resources exceeding $3 million.

Table 2 only reflects damage that has been reported to or was verified by WS based on requests received for assistance. Assigning monetary damage to natural resources can be difficult especially when factoring in the lost aesthetic value when natural resources are damaged by deer. Similarly, placing a monetary value on threats to human safety can be difficult. Monetary damage reported in Table 2 reflects damage that has occurred and that has been reported to WS, but is not reflective of all deer damage occurring in the Commonwealth since not all deer damage or threats are reported to WS.

WS has also conducted direct operational assistance to manage and prevent damage associated with deer.

[2]The federal fiscal year begins on October 1 and ends on September 30 the following year.

Operational assistance occurs when WS is directly involved with employing methods to resolve or alleviate damage occurring, to prevent damage from occurring, and/or to reduce threats of damage associated with deer. As directed by the selected alternative, WS continues to apply multiple methods as part of an integrated damage management program to resolve requests for assistance based on WS' Decision Model. WS' direct operational assistance involves providing direct management to prevent deer damage. As part of an integrated management program that includes the employment of non-lethal methods, WS employed lethal methods to take deer in the Commonwealth to alleviate or prevent damage. WS' direct operational assistance was discussed in Section 3.3.3 of the EA (USDA 2003). The procedures used by WS' personnel to determine management strategies or methods applied to specific requests for assistance using WS' Decision Model can be found in Section 3.3.5 of the EA (USDA 2003) and is discussed in detail in WS' programmatic Final Environmental Impact Statement (FEIS; USDA 1997).

Table 2 – Reported or WS' verified monetary damage by resource caused by deer in Pennsylvania

Resource Type	Fiscal Year							TOTAL
	2004	2005	2006	2007	2008	2009	2010	
Property	$0	$10,100	$0	$2,165,500	$72,050	$216,200	$1,962,000	**$4,425,850**
Agriculture	$65,000	$2,500	$190,000	$658,408	$62,382	$250,000	$0	**$1,228,290**
Nat. Res.	$0	$73,500	$190,000	$694,000	$44,356	$5,000	$2,000,000	**$3,006,856**
H. Safety	$0	$0	$0	$0	$1,066	$785,000	$6,300,000	**$7,086,066**
TOTAL	**$65,000**	**$86,100**	**$380,000**	**$3,517,908**	**$179,854**	**$1,256,200**	**$10,262,000**	**$15,747,062**

As stated previously, requests for assistance associated with deer are primarily related to damage and threats to property. Many of those requests are associated with the threats posed by deer at airports and the damage to aircraft that occurs when aircraft strike deer on runways and taxiways. Airports provide ideal conditions for feeding and bedding sites for deer due to the large grassy areas adjacent to brushy, forested habitat used as noise barriers. Deer living within airport boundaries are usually protected from hunting and many other human disturbances. The civil and military aviation communities have acknowledged that the threat to human health and safety from aircraft collisions with wildlife is increasing (Dolbeer 2000, MacKinnon et al. 2001). Collisions between aircraft and wildlife are a concern throughout the world because wildlife strikes threaten passenger safety (Thorpe 1996), result in lost revenue, and repairs to aircraft can be costly (Linnell et al. 1996, Robinson 1996). Aircraft collisions with wildlife can also erode public confidence in the air transport industry as a whole (Conover et al. 1995). In several instances, wildlife-aircraft collisions in the United States have resulted in human fatalities.

Deer colliding with aircraft during the most vulnerable phases of flight, takeoff or landing, can cause the aircraft to crash or sustain physical damage. Deer are characteristically unpredictable in their initial response to approaching aircraft. Deer may wander onto runway surfaces and may be startled into the path of oncoming aircraft, and at night, they may freeze when caught in the beams of landing lights, resulting in a strike. The majority of deer-aircraft strikes occur at night and in the fall during the mating season for deer (Dolbeer et al. 2009). Of the deer strikes reported, 32% occurred in October and November (Dolbeer et al. 2009) which coincides with the mating season of deer. Aircraft strikes involving terrestrial mammals occur primarily during the landing roll of the aircraft and takeoff run (Dolbeer et al. 2009). More aircraft strikes involving mammals result in damage being reported to aircraft when compared to bird strikes. Approximately, 59% of the aircraft strikes involving mammal species resulted in damage to the aircraft compared to 14% of bird strikes reporting damage to the aircraft (Dolbeer et al. 2009). Deer have been involved in 41% of the reported terrestrial mammal strikes with aircraft in the United States (Dolbeer et al. 2009).

White-tailed deer are a commonly encountered problem at airfields in Pennsylvania, threatening the safe operation of aircraft at those facilities. Serious consequences are also possible if pilots lose control of the aircraft while attempting to avert a collision with deer. From 1990 through 2008, there were 782 reported deer-aircraft strikes to civil aircraft in the United States resulting in 206,175 hours in aircraft down time and nearly $30 million in reported repair costs (Dolbeer et al. 2009). From January 1990 through October 2011, there were 67 reported deer-aircraft strikes involving civil aircraft in Pennsylvania (Federal Aviation Administration 2011). Reporting of wildlife strikes is not mandatory and it is estimated that less than 20% of aircraft strikes are reported (Cleary et al. 2005, Wright and Dolbeer 2005).

Deer-vehicle collisions are a serious concern nationwide because of losses to property and the potential for human injury and death (Conover et al. 1995, Romin and Bissonette 1996, Conover 1997). The economic costs associated with deer-vehicle collisions include vehicle repairs, human injuries and fatalities, and picking up and disposing of deer (Drake et al. 2005). Often, deer-vehicle collisions in which a deer carcass was not recovered or little vehicle damage occurred go unreported. A Cornell University study estimated that the actual number of deer-vehicle collisions could be as high as six times the reported number (Decker et al. 1990). The Insurance Institute for Highway Safety (2005) estimated that 1.5 million deer-vehicle collisions occur annually in the United States causing approximately 150 fatalities and $1.1 billion in damage to property. In 1995, the damage to vehicles associated with vehicles striking deer was estimated at $1,500 (Conover et al. 1995). In comparison, damage costs associated with deer collisions in 2009 was estimated at $3,050 which was an increase of 103% over the 2008 estimate (State Farm Insurance 2009). An estimated 105,843 deer-vehicle collisions occurred in Pennsylvania from July 1, 2008 through June 30, 2009 (State Farm Insurance 2009). Based on the average repair costs associated with vehicle strikes estimated at $3,050 and the number of strikes that have occurred in the Commonwealth estimated at 105,843 from July 2008 through June 2009, deer-vehicle collisions resulted in nearly $323 million in damage to property in the Commonwealth. From 1996 through 2007, State Troopers in the Commonwealth reported 21 human fatalities occurred from deer-vehicle collisions in Pennsylvania (PGC 2009).

Proposed Supplement to the EA

WS continues to receive requests for assistance to manage damage and threats to human safety caused by deer in the Commonwealth. This supplement to the EA analyzes the affected environment and potential impacts as the proposed activities relate to the need for an increase in damage management activities to address increasing requests for assistance. To assist with communicating to the public the individual and cumulative impacts associated with managing increasing damage and threats associated with deer; those activities are being further analyzed and addressed in this supplement to the EA.

A review of threatened and endangered (T&E) species listed by the United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the Pennsylvania Game Commission (PGC) showed that additional listings of T&E species in the Commonwealth have occurred since the completion of the EA. This supplement analyzes any potential impacts deer damage management activities may pose to T&E species in Pennsylvania.

Addressing Increasing Requests for Assistance Received by WS in Pennsylvania

As shown in Table 1, the number of requests received for technical assistance with resolving damage and threats associated with deer in the Commonwealth has increased since FY 2004. Requests for technical assistance increased from 15 requests for assistance in FY 2004 to a high of 145 requests for assistance in FY 2008. The amount of damage reported to WS and verified by WS associated with deer in the Commonwealth increased from $65,000 in damage reported or verified in FY 2004 to over $10.2 million in FY 2010. A similar increase in the number of requests for direct operational assistance received by

WS has also occurred from FY 2004 through FY 2010. As part of the requests for assistance, WS reasonably anticipates an increase in the number of deer requested to be lethally removed as part of an integrated damage management strategy. WS also anticipates an increase in non-lethal harassment and dispersal of those deer addressed in the proposed supplement as part of the increasing requests for assistance.

The increases in requests received by WS for assistance to manage deer damage and threats make it likely that WS would be requested to lethally remove deer to alleviate damage and threats that would exceed the annual take of up to 1,000 deer in the Commonwealth as analyzed under the proposed action in the EA. Therefore, this supplement will evaluate the proposed action as it relates to an increase in deer damage management activities in the Commonwealth, which could include an annual take of up to 1,500 deer as part of the integrated damage management approach as described in the proposed action in the EA.

Additional Deer Damage Management Methods

A description of the wildlife damage management methods that could be used or recommended by WS to manage damage associated with deer in the Commonwealth is provided in Appendix B of the EA (USDA 2003) and in Appendix J of WS' programmatic FEIS (USDA 1997). Since the completion of the EA, additional methods have become available and could be used or recommended as part of the alternatives to alleviate deer damage by WS.

Trap monitors are devices that send a radio signal to a receiver if a set trap is disturbed that alerts field personnel that an animal may be captured. Trap monitors can be attached directly to the trap or attached to a string or wire and then placed away from the trap in a tree or shrub. When the monitor is hung above the ground, it can be detected from several miles away, depending on the terrain in the area. There are many benefits to using trap monitors, such as lessening the time animals are in traps, saving considerable time when checking traps, decreasing fuel usage, prioritizing trap checks, and decreasing the need for human presence in an area. Trap monitors could be used under the proposed supplement where appropriate.

Forward Looking Infra Red (FLIR) and night vision equipment are used in combination with shooting to remove deer at night or are used to conduct wildlife surveys. FLIR and night vision equipment allow personnel to view deer at night when deer are active and when human activities are minimal. This approach is often more selective when compared to other activities since WS' personnel are present on-site during application and target animals are identified prior to application. FLIR and night vision equipment could be used under the alternatives where appropriate.

Scientists with the National Wildlife Research Center have developed GonaCon™, a new single dose immunocontraceptive vaccine that has been developed as a wildlife infertility agent. Recent studies have demonstrated the efficacy of this single-shot Gonadotropin-releasing hormone (GnRH) vaccine on California ground squirrels, Norway rats, feral cats and dogs, feral swine, wild horses, and white-tailed deer. Infertility among treated female white-tailed deer lasted up to two years without requiring a booster vaccination (Miller et al. 2000). This vaccine overcomes one of the major obstacles of previous two dose vaccines, which is the need to only capture animals once to vaccinate them. A single-injection vaccine is much more practical as a field delivery system for use on free-ranging animals.

GonaCon™ was officially registered by the Environmental Protection Agency (EPA) on September 29, 2009 for use in reducing fertility in female white-tailed deer under EPA registration number 56228-40. GonaCon™ is registered as a restricted-use pesticide, and all users must be Certified Pesticide Applicators. Only WS or State wildlife management agency personnel or individuals working under their authority can use the reproductive inhibitor. In order for GonaCon™ to be used in any given state, the

product must also be registered with the state and approved for use by the appropriate state agency responsible for managing wildlife.

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 NWRC 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 potential 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.

T&E Species Evaluation

Since the completion of the EA, additional species have been listed as threatened or endangered in the Commonwealth. As part of this supplement to the EA, WS will evaluate deer damage management activities under the proposed action alternative as described in the EA and as proposed in the supplement to the EA to ensure activities are not likely to jeopardize the continued existence of any T&E species listed by the USFWS, the NMFS, and the PGC. Further evaluation of T&E species will occur under Issue 2 below.

Disease Surveillance and Monitoring

Public awareness and health risks associated with zoonoses (*i.e.*, diseases of animals that can be transmitted to humans) have increased in recent years. Several zoonotic diseases associated with deer were addressed in Section 1.4.8 of the EA (USDA 2003). Those zoonotic diseases remain a concern and continue to pose threats to human safety where people encounter deer. As part of the activities conducted to alleviate damage or threats of damage associated with deer, WS also receives requests for assistance with conducting disease monitoring and surveillance activities as part of those activities. Most disease sampling occurs ancillary to other wildlife damage management activities (*i.e.*, disease sampling occurs after deer have been captured or lethally taken for other purposes). For example, WS may sample deer harvested during the annual hunting season for Chronic Wasting Disease (CWD) or collect blood samples to determine the prevalence of Lyme disease. Although CWD has not been identified in deer populations in Pennsylvania, WS could be requested to conduct surveillance activities in the Commonwealth for

CWD, such as taking lymph node samples from deer culled from captive deer herds in the Commonwealth, when requested.

IV. FRAMEWORK FOR DEER DAMAGE MANAGEMENT IN PENNSYLVANIA

The alleviation of damage or other problems caused by or related to the behavior of wildlife is termed wildlife damage management and is recognized as an integral component of wildlife management (The Wildlife Society 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated and the need for damage management is derived from the specific threats to resources. Deer have no intent to do harm. They utilize habitats (*e.g.*, reproduce, walk, forage) where they can find a niche. If their activities result in lost economic value of resources or threaten human safety, people characterize this as damage. When damage exceeds or threatens to exceed an economic threshold and/or pose a threat to human safety, people often seek assistance. The threshold triggering a request for assistance is unique to the individual person requesting assistance and can be based on many factors (*e.g.*, economic, social, aesthetics). Therefore, how damage is defined is often unique to the individual person and damage occurring to one individual may not be considered damage by another individual. However, the term "*damage*" is consistently used to describe situations where the individual person has determined the losses associated with wildlife is actual damage requiring assistance (*i.e.*, has reached an individual threshold). The term "*damage*" is most often defined as economic losses to resources or threats to human safety but could also include a loss in aesthetic value and other situations where the actions of wildlife are no longer tolerable to an individual person.

WS' Objectives

The EA identified two objectives for deer damage management conducted by WS in Pennsylvania (see Section 1.5.1 of the EA). Those objectives were to: (1) respond to requests for assistance with the appropriate action as determined by WS' personnel in the Commonwealth, applying the WS Decision Model (Slate et al. 1992, USDA 1997, USDA 2003) in consultation with the PGC, and (2) prevent the take of non-targets during direct operational assistance where WS is directly involved with the deer damage management activities. Those objectives will remain appropriate to activities proposed in this supplement to the EA.

Relationship of the EA and this Document to Other Environmental Documents

Information from the following documents has been incorporated by reference into the EA and this supplement:

WS' Programmatic Final Environmental Impact Statement: WS has developed a programmatic FEIS that addresses the need for wildlife damage management in the United States (USDA 1997). The FEIS contains detailed discussions of potential impacts to the human environment from wildlife damage management methods used by WS. In addition, the FEIS contains a detailed risk assessment of many of the methods that would be available to WS to manage wildlife damage. Pertinent information available in the FEIS has been incorporated by reference into the EA and this supplement to the EA.

***Environmental Assessment – Shooting white-tailed deer to assist the City of Philadelphia, Fairmont Park Commission in achieving deer population reductions on park properties located in the Pennsylvania Counties of Delaware, Montgomery, and Philadelphia*:** The WS program in Pennsylvania has developed an EA to evaluate deer damage management activities as requested by the Fairmont Park Commission to manage deer populations on park properties in the Commonwealth (USDA 2001). Based on the analyses in the EA, a Decision and FONSI were signed on January 18, 2001, which selected the proposed action alternative. The proposed action in the EA evaluated the use of shooting to manage the

deer population in the Park. The EA and activities conducted pursuant to the EA were re-evaluated and a new Decision and FONSI were signed for the EA on November 4, 2005. Activities conducted by WS as part of the proposed action under this EA will be considered in this supplement to address cumulative impacts of activities conducted by WS.

Management and biology of white-tailed deer in Pennsylvania 2009 – 2018: The management plan developed by the PGC with public input establishes five deer management goals in the Commonwealth. Those goals include "*...(1) manage deer for a healthy and sustainable deer herd; (2) manage deer-human conflicts at levels considered safe and acceptable to Pennsylvanians; (3) manage deer impacts for healthy and sustainable forest habitat; (4) manage deer to provide recreational opportunities; and (5) improve the public's knowledge and understanding of deer and the deer management program.*" Each goal is further defined and more specific measures to achieve those goals in the Commonwealth are identified in the management plan (PGC 2009).

White-tailed deer management plan and Environmental Impact Statement – Valley Forge National Historical Park: The National Park Service has developed an Environmental Impact Statement (EIS) and a deer management plan to protect, preserve, and restore the native natural resources and cultural resources of the Park. The number of deer that are present in the Park reached a level where damage and threats of damage occurred to the native vegetation and cultural resources. The selected alternative in the EIS continued the current deer management actions in the Park using lethal and non-lethal methods to meet the objective of the deer management plan (National Park Service 2009).

Decisions to be Made

Based on agency relationships, MOUs, and legislative authorities, WS was the lead agency for the EA, and therefore, responsible for the scope, content, and decisions made. The PGC is responsible for managing wildlife in the Commonwealth, including the establishment and enforcement of regulated hunting seasons for deer. WS' activities to reduce and/or prevent deer damage in the Commonwealth would be coordinated with the PGC, which ensures WS' actions are incorporated into management objectives established by the PGC for deer in the Commonwealth.

Based on the scope of the EA and this supplement to the EA, the decisions to be made are: 1) should WS continue to conduct deer damage management to alleviate damage and threats in Pennsylvania, when requested, 2) should WS conduct disease surveillance and monitoring in the wildlife population when requested by the PGC, 3) should WS continue to implement an integrated wildlife damage management strategy, including technical assistance and direct operational assistance, to meet the need for deer damage management in the Commonwealth, 4) should WS continue to implement the standard operating procedures (SOPs) as addressed in the EA, 5) should WS attempt to implement one of the alternatives to an integrated damage management strategy as described in the EA, and 6) would continuing the proposed action result in adverse impacts to the environment requiring the preparation of an EIS based on activities conducted since the completion of the EA, based on activities associated with addressing an increasing number of requests for assistance, and/or based on new information available.

V. SCOPE OF ANALYSIS

The EA and this supplement to the EA evaluate deer damage management activities in the Commonwealth of Pennsylvania. The scope of analysis remains valid as addressed in the EA for those activities to manage damage and threats associated with deer in the Commonwealth. This supplement analyzes additional activities as a result of an increase in the number of requests received for assistance, new listings of T&E species, and additional methodologies.

Actions Analyzed

The EA and this supplement evaluate the need for deer damage management to reduce threats to agricultural resources, natural resources, property, and threats to human safety wherever such management is requested by a cooperator. The EA and this supplement discuss the issues associated with conducting deer damage management in the Commonwealth to meet the need for action. In addition, the EA and this supplement evaluate different alternatives to meeting the need for action while addressing the issues associated with managing damage caused by deer.

WS uses a decision model based on a publication by Slate et al. (1992) which involves evaluating each threat situation, taking action, evaluating the action, and monitoring results of the actions taken. The published article provides more detail on the processes used in the WS Decision Model. WS' programmatic FEIS (USDA 1997) provides more detail and examples of how the model is used. WS' personnel use the Decision Model to develop the most appropriate strategy to reduce damage and to determine potential environmental effects from damage management actions (Slate et al. 1992, USDA 1997, USDA 2003).

The methods available for use under the alternatives evaluated are provided in Appendix B of the EA. The alternatives and Appendix B in the EA also discuss how methods would be employed to manage damage and threats associated with deer in the Commonwealth. Therefore, the actions evaluated in the EA and this supplement to the EA would be the use of those methods available under the alternatives and the employment of those methods by WS to manage or prevent damage and threats associated with deer.

Native American Lands and Tribes

The WS program in Pennsylvania would only conduct damage management activities on Native American lands when requested by a Native American Tribe and only after a MOU or cooperative service agreement has been signed between WS and the Tribe requesting assistance. Therefore, the Tribe would determine when WS' assistance is required and what activities would be allowed. Because Tribal officials would be responsible for requesting assistance from WS and determining what methods would be available to alleviate damage, no conflict with traditional cultural properties or beliefs would be anticipated. Those methods available to alleviate damage associated with deer on federal, Commonwealth, county, municipal, and private properties under the alternatives analyzed in the EA would also be available for use to alleviate damage on Tribal properties when the use of those methods have been approved for use by the Tribe requesting WS' assistance. Therefore, the activities and methods addressed under the alternatives would include those activities that could be employed on Native American lands, when requested and agreed upon.

Period for which the EA is Valid

If the analyses in this supplement indicates an EIS is not warranted, the EA, as supplemented, would remain valid until WS, in consultation with the PGC, determines that new needs for action, changed conditions, new issues, or new alternatives having different environmental impacts must be analyzed. At that time, the analysis in the EA and this supplement would be reviewed pursuant to the NEPA. Review of the EA and this supplement would be conducted to ensure that the EA and supplement are sufficient. This process ensures the EA is complete and still appropriate to the scope of deer damage management activities conducted in the Commonwealth by WS.

Site Specificity

As mentioned, WS has previously and would only conduct damage management activities when

requested by the appropriate property owner or manager. In addition, WS' activities that could involve the take of deer under the alternatives would only occur when permitted by the PGC, when required, and only at levels permitted.

The EA and this supplement to the EA analyze the potential impacts of deer damage management based on previous activities conducted on private and public lands in Pennsylvania where WS and the appropriate entities have entered into a MOU, cooperative service agreement, or other comparable document. The EA also addresses the impacts of deer damage management on areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional deer damage management efforts could occur. Thus, the EA and this supplement to the EA anticipate the potential expansion and analyze the impacts of such efforts as part of the alternatives.

White-tailed deer can be found statewide and throughout the year in the Commonwealth; therefore, damage or threats of damage can occur wherever deer occur. Planning for the management of deer damage must be viewed as being conceptually similar to other federal or agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they would 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, and insurance companies. Although some of the sites where deer damage could occur can be predicted, all specific locations or times where such damage would occur in any given year cannot be predicted. The threshold triggering an entity to request assistance from WS to manage damage associated with deer is often unique to the individual; therefore, predicting where and when such a request for assistance would be received by WS is difficult. The EA and this supplement to the EA emphasize major issues as those issues relate to specific areas whenever possible; however, many issues apply wherever deer damage and the resulting management actions occurs and are treated as such.

Chapter 2 of the EA identifies and discusses issues relating to deer damage management in Pennsylvania. The standard WS Decision Model (Slate et al. 1992, USDA 1997, USDA 2003) would be the site-specific procedure for individual actions conducted by WS in the Commonwealth (see Chapter 3 of the EA for a description of the Decision Model and its application). Additional information on the Decision Model is available in WS' programmatic FEIS (USDA 1997). Decisions made using the model would be in accordance with WS' directives and SOPs described in the EA as well as relevant laws and regulations.

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

Public Involvement

The EA was made available to the public for review and comment by a legal notice published for three days (August 18-20, 2003) in the *Pittsburgh Post-Gazette*, *The Scranton Times*, *The Patriot News*, and *The Philadelphia Daily News*. A letter of availability for the EA was also mailed directly to agencies, organizations, and individuals with probable interest in the proposed program. Public review and comment occurred during a 30-day comment period. During the 30-day comment period, one comment letter was received. The comment letter received during the public involvement process was reviewed for substantive issues and alternatives which were considered in developing the Decision for the EA. Based upon the comment letter received, several minor editorial changes were incorporated into the EA. Those minor changes enhanced the understanding of the proposed program, but did not change the analysis

provided in the EA.

After consideration of the analysis contained in the EA and review of the one comment letter received, a Decision and FONSI for the EA was issued on September 24, 2003. The Decision and FONSI selected the proposed action which implemented an integrated damage management program in the Commonwealth using multiple methods to adequately address the need to manage damage and threats associated with deer.

This supplement to the EA along with the EA and the 2003 Decision/FONSI will be made available for public review and comment through the publication of a legal notice announcing a minimum of a 30-day comment period. The legal notice will be published at a minimum in *The Patriot News* and posted on the APHIS website located at http://www.aphis.usda.gov/wildlife_damage/nepa.shtml according to WS' public notification requirements (72 FR 13237-13238). A letter of availability will also be directly mailed to agencies, organizations, and individuals with probable interest in deer damage management in the Commonwealth. Comments received during the public involvement process will be fully considered for new substantive issues and alternatives.

VI. AUTHORITY AND COMPLIANCE

WS' activities to reduce threats associated with deer in Pennsylvania are regulated by federal, Commonwealth, and local laws and regulations. The authority of WS is discussed in Section 1.7 of the EA (USDA 2003), along with the authorities of other federal, Commonwealth, and local entities. WS' compliance with relevant laws and regulations are also discussed in Section 1.7 of the EA (USDA 2003). WS' authorities and those of federal, Commonwealth, and local entities for the proposed supplemental activities would remain as addressed in the EA, including compliance with all applicable federal, Commonwealth, and local laws and regulations. WS would continue to coordinate activities to alleviate or prevent deer damage with the PGC to ensure WS' activities are considered as part of the population objectives established for deer. Compliance with laws and regulations not directly addressed in the EA are discussed in this supplement.

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

This law established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans. Funds were authorized for cost-sharing grants to States to develop their programs. Subsequent to federal approval of their plans, grants would be awarded for implementation purposes. In order to be eligible for federal approval, each state's plan was required to define boundaries of the coastal zone, identify uses of the area to be regulated by the State, determine the mechanism (criteria, standards or regulations) for controlling such uses, and develop broad guidelines for priorities of uses within the coastal zone. In addition, this law established a system of criteria and standards for requiring that federal actions be conducted in a manner consistent with the federally approved plan. The standard for determining consistency varied depending on whether the federal action involved a permit, license, financial assistance, or a federally authorized activity.

VII. AFFECTED ENVIRONMENT

Upon receiving a request for assistance, the proposed action or those actions described in the other alternatives could be conducted on private, federal, Commonwealth, tribal, and municipal lands in Pennsylvania to reduce damages and threats associated with deer to agricultural resources, natural resources, property, and threats to human safety. The analyses in the EA and this supplement are intended to apply to actions taken under the selected alternative that could occur in any locale and at any

time within the analysis area. The EA and this supplement analyzes the potential impacts of deer damage management and addresses activities in Pennsylvania that are currently under a MOU or cooperative service agreement with WS where activities have been and currently are being conducted. The EA and this supplement also addresses the impacts of deer damage management in the Commonwealth where additional agreements may be signed in the future.

Airports

Of all mammal species, deer are ranked as the most hazardous to aircraft, especially to smaller general aviation aircraft (Dolbeer et al. 2000) which represent a serious threat to human health and safety. Airports are often secured areas with chain-link security fencing. Sometimes deer gain entrance into these airports where there is adequate cover and food, and they live there for all or part of the year. Because deer are ubiquitous throughout the Commonwealth, it is possible for deer to be present at nearly any airport or military airbase. WS may be requested to remove deer from airport properties at any of the airports or airbases in the Commonwealth where deer pose a threat to aircraft and passenger safety. Deer confined inside a perimeter fence on airport property originate from deer populations outside the perimeter fence. Therefore, deer confined on airport property would not be considered a unique population.

Federal Property

Many federal properties are controlled access areas with security fencing. Those properties often are unconcerned with the presence of deer until the herd is large enough to negatively impact vegetation on the facility and the growth of the confined deer population exceeds the biological and social carrying capacity of the facility. Examples of these types of fenced federal facilities include, but are not limited to, military bases, research facilities, and federal parks. WS may be requested to assist facilities managers in the management of deer damage at such facilities. In those cases where a federal agency requests WS' assistance with managing damage caused by deer, the requesting agency would be responsible for analyzing those activities in accordance with the NEPA. However, the EA and this supplement would cover such actions if the requesting federal agency determined the analyses and scope of the EA were appropriate for those actions and the requesting federal agency adopted the EA through their own Decision based on the analyses in the EA. Therefore, actions taken on federal lands have been analyzed in the scope of the EA and this supplement to the EA.

Similar to deer found on airport properties, deer confined inside a perimeter fence at federal facilities originate from deer populations outside of the perimeter fence and thus, are not considered a unique population.

Commonwealth Property

Activities could be conducted on properties owned and/or managed by the Commonwealth when requested, such as parks, forestland, historical sites, natural areas, scenic areas, conservations areas, and campgrounds. Deer damage management activities could be requested to occur on highway right-of-ways and interstate right-of ways.

Municipal Property

Activities under the alternatives could be conducted on city, town, or other local governmental properties when requested by those entities. Those areas could include, but would not be limited to city parks, landfills, woodlots, cemeteries, greenways, treatment facilities, utilities areas, and recreational areas. Similar to other areas, deer can cause damage to natural resources, agricultural resources, property, and

threaten human safety in those areas. Areas could also include properties in urban and suburban areas of the Commonwealth.

Private Property

Requests for assistance to manage deer damage and threats could also occur from private property owners and/or managers of private property. Private property could include areas in private ownership in urban, suburban, and rural areas, which could include agricultural lands, timberlands, pastures, industrial parks, residential complexes, subdivisions, businesses, railroad right-of-ways, and utility right-of-ways.

VIII. 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 for WS' programmatic FEIS (USDA 1997) and were considered in the preparation of the EA. Issues related to managing damage and threats associated with deer in the Commonwealth were developed by WS in consultation with the PGC. The EA was also made available for public review and comment to identify additional issues.

The major issues are discussed in detail in Chapter 2 of the EA (USDA 2003). Alternatives identified during the development of the EA to address those issues are discussed in Chapter 3 of the EA (USDA 2003). The following issues were identified during the scoping process for the EA:

- Issue 1 – Effects on White-tailed Deer Populations
- Issue 2 – Effects on Plants and other Wildlife Species, including T&E Species
- Issue 3 – Effects on Human Health and Safety
- Issue 4 – Humaneness of Methods to be Used
- Issue 5 – Effects on Aesthetic Values
- Issue 6 – Effects on Regulated White-tailed Deer Hunting

IX. ISSUES ADDRESSED BUT NOT 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 rationale provided in the EA. WS has reviewed the issues not considered in detail as described in the EA and has determined that the analyses provided in the EA are still appropriate regarding those issues.

X. ALTERNATIVES ANALYZED IN DETAIL

The alternatives considered and evaluated using the identified issues are described and discussed in detail in Chapter 3 of the EA (USDA 2003). In addition, the EA contains a detailed description and discussion of the alternatives and the effects of the alternatives on the issues identified (USDA 2003). Appendix B of the EA provides a description of the methods that could be used or recommended by WS under each of the alternatives. The EA describes five potential alternatives that were developed to address the issues identified above. Alternatives analyzed in detail include:

Alternative 1 – No Deer Damage Management by WS
Alternative 2 – Technical Assistance Only
Alternative 3 – Lethal Deer Damage Management only by WS
Alternative 4 – Non-lethal Deer Damage Management only by WS

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

XI. WILDLIFE DAMAGE MANAGEMENT METHODS

This supplement to the EA also evaluates additional methods available to resolve deer damage that have become available since the completion of the EA. Since the completion of the EA, trap monitors, FLIR, and night vision equipment have become available and could be used or recommended as part of an integrated damage management strategy to alleviate deer damage by WS. In addition, the reproductive inhibitor GonaCon™ has become registered with the EPA to manage local deer populations. A description of additional wildlife damage management methods that could be used or recommended by WS is also provided in Section 3.4 of the EA (USDA 2003), Appendix B of the EA (USDA 2003), and in Appendix J of WS' programmatic FEIS (USDA 1997).

XII. ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Two additional alternatives were considered, but were not analyzed in detail in the EA. Alternatives considered but not analyzed in detail are discussed in Section 3.5 of the EA (USDA 2003). WS has reviewed the alternatives not analyzed in detail in the EA and has determined that the analyses provided in the EA have not changed and are still appropriate.

XIII. STANDARD OPERATING PROCEDURES

The current WS program uses many SOPs which are discussed in Chapter 3 (see Section 3.6) of the EA (USDA 2003) and Chapter 5 of WS' programmatic FEIS (USDA 1997). The SOPs discussed in the EA remain appropriate for WS' deer damage management activities conducted in the Commonwealth.

XIV. ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

The major issues are discussed in detail in Chapter 2 of the EA (USDA 2003). Alternatives developed and identified during the development of the EA to address those issues are discussed in Chapter 3 of the EA (USDA 2003). Potential impacts of Alternative 1, Alternative 2, Alternative 3, and Alternative 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 supplement. Chapter 4 of the EA contains a detailed discussion and comparison of the identified alternatives and the major issues (USDA 2003). 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, addresses requests for deer damage management in the Commonwealth using an integrated damage management approach by WS to reduce damage to agricultural resources, property, natural resources, and threats to human safety. The following is an analysis of potential impacts for each of the major issues analyzed in the EA since the completion of the EA and this supplement to the EA as related to Alternative 5 (proposed action/no action alternative):

Issue 1 - Effects on White-tailed Deer Populations

A common issue when addressing damage caused by wildlife are the potential impacts of management actions on the population of target species. Methods used to resolve damage can involve altering the behavior of target species and may require the use of lethal methods when appropriate. Under the proposed action alternative (Alternative 5), WS provides technical and direct damage assistance using methods described in Appendix B of the EA in an integrated approach in which all or a combination of methods may be employed to resolve a request for assistance (USDA 2003). Those methods that have become available since the EA was developed could also be employed by WS in addition to those methods addressed in Appendix B of the EA.

Non-lethal methods can disperse or otherwise make an area unattractive to deer causing damage or posing a threat of damage; thereby, reducing the presence of deer at the site and potentially the immediate area around the site where non-lethal methods are employed. Non-lethal methods would be given priority when addressing requests for assistance pursuant to WS Directive 2.101. However, non-lethal methods would not necessarily be employed to resolve every request for assistance if deemed inappropriate by WS' personnel using the WS Decision Model. For example, if a cooperator requesting assistance has already attempted to disperse deer using non-lethal harassment methods, WS would not necessarily employ those methods again during direct operational assistance since those methods have already been proven to be ineffective in that particular situation. Non-lethal methods are used to exclude, harass, and disperse target deer from areas where damage or threats are occurring. When effective, non-lethal methods would disperse those deer from the area resulting in a reduction in the presence of deer at the site where those methods were employed. However, deer responsible for causing damage or threats are moved to other areas with minimal impact on populations of deer. Non-lethal methods are not employed over large geographical areas or applied at such intensity that essential resources (*e.g.*, fawning sites, shelter, food sources) would be unavailable for extended durations or over a wide geographical scope that long-term adverse effects would occur to the population of deer in the Commonwealth.

Non-lethal methods are generally regarded as having minimal impacts on overall populations of deer since deer are unharmed and the actual number of individuals of a population is not reduced. WS' previous and continued use of non-lethal methods would have no adverse impacts on deer populations in the Commonwealth. The only non-lethal method currently available that if used could result in population reductions is GonaCon™ which is registered with the EPA to manage local deer populations. The use of a reproductive inhibitor could reduce local deer populations through attrition (*i.e.*, deer that die are not replaced through reproductive output leading to a decline in the overall number of deer). Although GonaCon™ is registered with the EPA, the reproductive inhibitor is not currently registered for use to manage local deer populations in Pennsylvania. If GonaCon™ becomes registered in the Commonwealth and is approved for use by the PGC, further evaluation could occur pursuant to the NEPA.

Of primary concern is the magnitude of take on a species' population from the use of lethal methods. Lethal methods are employed to remove an individual of a target species or those individuals of a target species responsible for causing damage or the threat of damage and only after requests for such assistance are received by WS. The use of lethal methods would therefore result in local population reductions in the area where damage or threats were occurring depending on the number of individuals removed. The number of individuals removed from the deer population using lethal methods under the proposed action would be dependent on the number of requests for assistance received, the number of deer involved with the associated damage or threat, and the efficacy of methods employed.

The analysis for magnitude of impact generally follows the process described in Chapter 4 of WS' programmatic FEIS (USDA 1997). The magnitude of impact on a species' population is described in WS' programmatic FEIS as "*...a measure of the number of animals killed in relation to their abundance*." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after those species have caused damage or threaten to cause damage.

WS has provided direct damage management and technical assistance in response to requests for assistance in Pennsylvania since the completion of the EA. Descriptions and application of direct damage management and technical assistance projects are discussed in detail in Chapter 3 of the EA (USDA

2003). All deer damage management activities conducted by WS have been pursuant to relevant federal, Commonwealth, and local laws and regulations. Integrated damage management activities conducted under the selected alternative in the EA from FY 2004 through FY 2010 are discussed below.

Summary of WS' Deer Damage Management Activities in Pennsylvania

Since FY 2004, WS has continued to provide both technical and operational assistance to those persons requesting assistance with managing damage and threats associated with white-tailed deer in Pennsylvania. Damages reported and verified by WS occurred primarily to agricultural resources and property (see Table 2). WS continued to apply an integrated approach to resolving damage and threats associated with deer through the recommendation of non-lethal methods and the use of lethal methods.

Table 1 shows the number of technical assistance projects conducted by WS from FY 2004 through FY 2010 involving deer damage or threats of damage. Table 3 shows the number of direct operational assistance projects conducted by WS where WS was directly involved with applying methods to resolve damage or threats of damage. The cumulative lethal take of deer by WS to alleviate damage and threats is shown in Figure 1, including those deer lethally removed by WS to alleviate damage and threats occurring on properties owned by the Fairmont Parks Commission in the City of Philadelphia which was analyzed in a separate EA (see Section IV above; USDA 2001) and those deer that may have been unintentionally lethally taken during other wildlife damage management activities. The intentional take of deer from FY 2004 through FY 2010 primarily occurred through the use of firearms. Deer were primarily lethally taken to alleviate damage and threats of damage occurring to human safety and property. Deer can often pose threats of damage or cause damage to multiple resources. For example, deer confined inside the perimeter fence of an airport that are active near runways pose a threat of damage to property from aircraft strikes but also pose a threat to human safety if a catastrophic failure of the aircraft occurs from the strike leading to a crash.

Table 3 – WS' direct assistance projects to alleviate deer damage by resource type by year

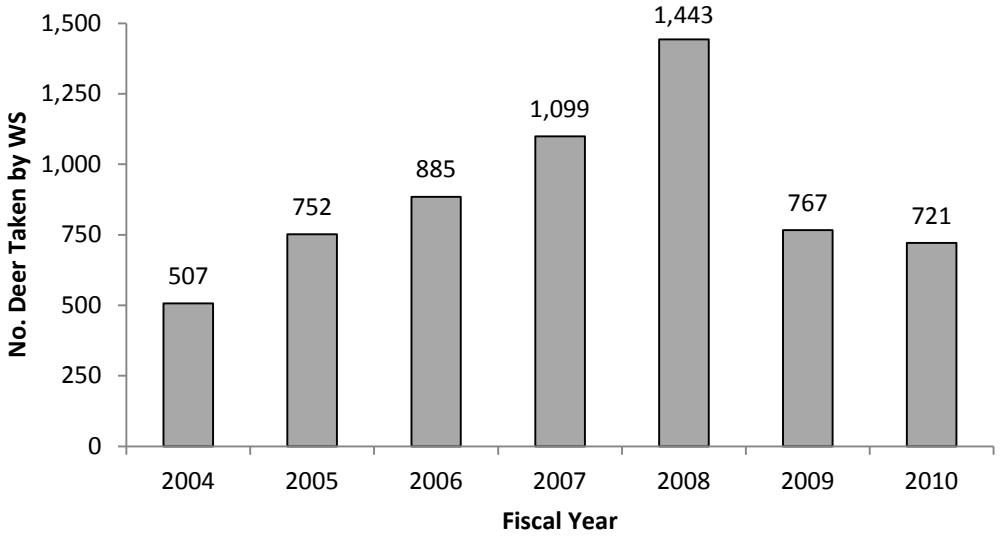
Fiscal Year	Resource				TOTAL
	Agriculture	Natural Resources	Property	Human Safety	
2004	1	3	0	6	**10**
2005	0	2	2	2	**6**
2006	0	0	1	1	**2**
2007	1	4	5	6	**16**
2008	1	3	3	7	**14**
2009	1	3	2	10	**16**
2010	0	2	5	11	**18**
TOTAL	**4**	**17**	**18**	**43**	**82**

From FY 2004 through FY 2010, WS conducted 34 unique projects where WS was requested to assist with reducing threats to human safety, primarily at airports in the Commonwealth. WS has also been requested to conduct direct operational assistance to alleviate damage or threats of damage to property, natural resources, and agricultural resources. WS has conducted 35 direct assistance projects involving deer damage or threats to natural resources and property. WS has conducted four projects involving deer damage to agricultural resources. The PGC currently can issue crop depredation permits to property owners to reduce damage or threats of damage to agricultural resources. In total, 82 direct assistance projects have been conducted by WS from FY 2004 through FY 2010. The highest number of projects conducted by year occurred in FY 2010 when 18 direct assistance projects were conducted.

The highest cumulative take of deer by WS occurred in FY 2008 when 1,443 deer were lethally removed

to alleviate damage or threats of damage in the Commonwealth. WS has removed an average of 882 deer per year between FY 2004 and FY 2010 during all wildlife damage management activities.

Figure 1 – Deer take by WS in Pennsylvania from FY 2004 through FY 2010



Deer Population Impact Analysis from WS' activities conducted during FY 2004 through FY 2010

The integrated approach of managing damage associated with deer described in the EA under the proposed action alternative uses both non-lethal and lethal methods to resolve requests for assistance. Although non-lethal methods can disperse wildlife from areas where application occurs, those individuals are generally unharmed. Therefore, adverse effects are not often associated with the use of non-lethal methods. However, methods used to lethally take deer can result in local reductions in the deer population in the area where damage or threats of damage are occurring. The EA evaluated a lethal take of up to 1,000 deer annually by WS in Pennsylvania to alleviate damage and threats. However, in the event of a disease outbreak (*e.g.*, CWD), the EA evaluated an annual take of up to 10,000 deer (at the request of the Pennsylvania Department of Agriculture (PDA) and/or the PGC) by WS. Therefore, the potential impact to the statewide deer population in Pennsylvania associated with the removal of up to 10,000 deer annually by WS was analyzed in the EA (USDA 2003).

As described previously, the analysis for magnitude of impact on populations from the use of lethal methods generally follows the process described in WS' programmatic FEIS (USDA 1997) where the magnitude of take on the deer population is determined based on the number of deer killed as that lethal take relates to deer abundance. Magnitude may be determined either quantitatively, which is based on population estimates, allowable harvest levels, and actual harvest data or qualitatively, which is based on population trends and harvest data when available. WS' take is monitored by comparing the number of deer killed with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of deer populations (USDA 1997).

WS' cumulative take of deer from FY 2004 through FY 2010 to alleviate damage or threats of damage is shown in Figure 1 and Table 4. The take of deer by WS from FY 2004 through FY 2010 occurred within the impact parameters analyzed in the EA (USDA 2003) and the EA for the Fairmont Parks Commission (USDA 2001). Deer are not considered to be of low density in the Commonwealth. When compared to other land mammals in North America, the white-tailed deer currently occupies the largest geographic

range of any other mammal (Pagel et al. 1991). Rural areas containing a matrix of forest and agricultural crops can contain the highest deer densities (Roseberry and Woolf 1998). Biologists and resource managers in Pennsylvania have been challenged with managing escalating populations of deer in suburban and natural areas (PGC 2009). As deer populations increase, there is an increasing occurrence of damage from white-tailed deer to agricultural crops (DeVault et al. 2007), increasing incidences of Lyme disease (Fernandez 2008), a rise in deer-vehicle collisions (Conover et al. 1995), and a disruption in forest health, regeneration, and forest dependent species (Tilghman 1989).

The PGC, with management authority over resident wildlife species, including deer, manages deer populations in the Commonwealth by allowing deer to be harvested during a regulated harvest season. In 2004, an estimated 409,320 deer were harvested during the regulated season in Pennsylvania compared with 316,240 deer harvested during the 2010 harvest season (see Table 4). In addition to the take of deer during the regulated season, the PGC also issues depredation permits for the take of deer that are causing damage to agriculture crops and other resources. As shown in Table 4, the take of deer under depredation permits has ranged from a minimum of 5,566 deer taken in 2009 to a high of 8,511 deer in 2005. Deer mortality in Pennsylvania also occurs from other causes (*e.g.*, poaching, vehicle collisions, disease, and predation). Based on studies conducted from 2002 through 2007, the PGC (2009) estimates that hunting mortality accounts for 71% of the total mortality of deer six months or older in the Commonwealth. Vehicle collisions account for 8% of the total deer mortality, while natural causes account for 7% of the total mortality (PGC 2009). Illegal activities account for 6% of the total mortality which is similar to the 6% mortality that occurred due to unknown causes (PGC 2009). Predation accounted for 1% of the deer mortality in the Commonwealth from 2002 through 2007 (PGC 2009).

WS' programmatic FEIS determined using qualitative information (population trend indicators and harvest data) that if WS' deer kill is less than or equal to 33% of the total harvest, the magnitude is considered low (USDA 1997). The highest level of take by WS occurred in FY 2008 when 1,443 deer were taken to alleviate damage. WS' highest level of take that occurred in FY 2008 was 0.4% of the total known take of deer in the Commonwealth.

Table 4 – Comparison of WS' take of deer with take from other known sources in Pennsylvania

	Year						
	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Take - Harvest Season[1]	409,320	354,390	361,560	323,070	335,850	308,920	316,240
Take - WS[2,3]	507	752	885	1,099	1,443	767	721
Take - Nuisance Permits[1]	6,250	8,511	8,409	5,989	6,746	5,566	N/A[4]
Take - TOTAL	**416,077**	**363,653**	**370,854**	**330,158**	**344,039**	**315,253**	**>316,961**
WS % Take of Total	0.1%	0.2%	0.2%	0.3%	0.4%	0.2%	<0.2%

[1] Harvest by sport hunters and take under nuisance permits reported by PGC are by Commonwealth FY, July 1 through June 30
[2] Take by WS is reported by Federal FY, October 1 through September 30
[3] WS' total deer take in the Commonwealth
[4] Data for take under nuisance permits during 2010 was not yet available from the PGC, but was likely similar to 2009

The Commonwealth of Pennsylvania is divided into 22 Wildlife Management Units by the PGC that represent basic differences in landscape features, land use practices, land ownership, and human density (PGC 2009). From 2005 through 2010, trend data on deer populations in 20 of the 22 Wildlife Management Units in the Commonwealth showed stable population trends, with only two units showing declining population trends (PGC 2011). In both Units where trend data indicates a declining population, the PGC chose to allow the harvest of antlerless deer during the 2011-2012 deer harvest season at levels that would begin to stabilize or continue decreasing deer populations in those Units instead of choosing allocations which would increase deer populations in those Units (PGC 2011). Therefore, declining deer population trends are often the result of management strategies established by the PGC for deer

populations within the Units. Nearly statewide stable population trend data provides an indication the cumulative take of deer, including take by WS, has not reached a level where declining deer populations have occurred.

The cumulative impact on the deer population from activities conducted by WS from FY 2004 through FY 2010 is negligible and therefore considered to be of extremely low magnitude. Based on the limited annual take occurring by WS compared to the statewide harvest of deer, the level of take by WS did not have adverse impacts on deer populations in Pennsylvania. WS' limited take of deer compared to the allowed harvest by the PGC has had no adverse impact on deer populations in Pennsylvania. WS would continue to coordinate with and report deer take to the PGC to ensure WS' take is considered as part of deer management objectives. WS' activities also did not limit the ability of those persons interested to harvest deer during the regulated deer season in Pennsylvania based on the low magnitude of WS' take when compared to the overall deer harvest in the Commonwealth.

While local populations of deer may be reduced, compliance with applicable Commonwealth laws and regulations authorizing take of white-tailed deer, would ensure that the regional and statewide population would not be adversely affected. The EA concluded that by maintaining ongoing contact with the PGC and submitting annual reports of WS' deer damage management activities to the PGC assures that local, Commonwealth, and regional knowledge of deer population trends are considered.

Deer Population Impact Analysis from the Proposed Supplement to the EA

Under the proposed action alternative, WS would continue to incorporate non-lethal and lethal methods described in Appendix B of the EA and those methods addressed in this supplement in an integrated approach in which a combination of methods may be employed to resolve a request for assistance. WS would only conduct damage management actions after receiving a request from a property owner or property manager and would target those deer identified as causing damage on property owned or managed by the requestor after a cooperative service agreement, MOU, or comparable document has been signed. WS' activities would also only occur after the PGC has issued a permit for those activities either to WS, to the property owner, and/or the property manager.

The authority for management of resident wildlife species is the responsibility of the PGC (see Section 1.7 of the EA). The PGC collects and compiles information on white-tailed deer population trends and take, and uses this information to manage deer populations. The primary tool for the management of deer populations in the Commonwealth is through adjusting the allowed lethal take during the deer harvest season which is determined and regulated by the PGC. Where deer damage is severe, the PGC also issues depredation permits for the take of deer outside of the regulated season to reduce damage.

The highest level of deer take during the annual hunting seasons from 2004 through 2010 occurred in 2004 when 409,320 deer were harvested (see Table 4). In 2010, the PGC estimated the number of deer killed during the regulated season to be 316,240 deer. Hunters in Pennsylvania have harvested over 2.4 million deer between 2004 and 2010 during the regulated harvest season. In addition to take occurring during the regulated season, deer populations are also regulated by other factors. Mortality also occurs from vehicle collisions, dogs, illegal take, tangling in fences, depredation permits, disease, and other causes (PGC 2009). However, the actual number of deer that die each year in Pennsylvania from mortality factors other than hunter harvest and for damage management is unknown.

The EA evaluated an annual take of up to 1,000 deer to address requests for assistance, which was based upon the number of requests received prior to the development of the EA and in anticipation of receiving additional requests. In addition, the EA evaluated the annual take of up to 10,000 deer by WS in the event of a disease outbreak when requested. After review of the number of requests for assistance to

resolve and prevent deer damage in the Commonwealth received by WS since FY 2004 and in consultation with the PGC, WS anticipates the number of requests for assistance to increase in the future; therefore, WS anticipates the use of non-lethal and lethal methods to resolve deer damage and threats to increase.

As stated previously, non-lethal methods are generally regarded as having minimal impacts on wildlife populations since no lethal take occurs and wildlife are dispersed to other areas. No population reduction is likely from the use of non-lethal methods, except for reproductive inhibitors which are currently not available for use in Pennsylvania. Therefore, the increased use of non-lethal methods to resolve and prevent damage would not adversely affect deer populations in the Commonwealth.

An increasing number of requests for assistance would likely result in the escalated use of lethal and non-lethal methods to resolve damage and threats associated with deer as permitted by the PGC. After review of previous activities conducted by WS and in anticipation of gradual increases in requests for lethal take, WS anticipates that future lethal take would not exceed 1,500 deer annually which is an increase of 500 deer above the level analyzed in the EA. As discussed in the EA, WS may be requested by the PGC and/or the PDA to assist with sampling and managing the spread of diseases found in free-ranging and/or captive deer populations. In the case of a disease outbreak, WS could lethally take up to 10,000 white-tailed deer for sampling and/or to prevent further spread of diseases. Therefore, WS' total annual take would not exceed 10,000 deer annually under the proposed action alternative which is the level of annual take analyzed in the EA (USDA 2003). Any take of deer by WS in Pennsylvania must be authorized and permitted by the PGC. Therefore, the number of deer taken annually by WS would only occur at levels authorized by the PGC.

If requested, WS could also assist with sampling and removing deer from captive facilities where deer are confined inside a perimeter fence. The detection of a disease at a captive facility often raises concerns of the potential spread of diseases to free-ranging herds. The spread of diseases among deer inside these facilities is often increased due to their close contact with one another. Often, once a disease is detected in a confined deer herd, the entire herd is destroyed to ensure the containment of the disease. Any involvement with the depopulation of deer confined inside a perimeter fence by WS would be at the request of the PGC and/or the PDA. As proposed in this alternative, in those cases where WS is requested to assist with the removal of a captive deer herd in Pennsylvania, the take would not exceed 10,000 for purposes of disease monitoring or surveillance. Deer confined inside perimeter fences for the purposes of non-traditional farming, including confinement for hunting, are not included in statewide deer population estimates or trending data. However, since take of deer by WS for disease surveillance or monitoring could occur in free-ranging or captive herds, the potential take of up to 10,000 deer for disease surveillance and monitoring by WS would be considered as part of the impact analysis on the statewide free-ranging deer population. Therefore, the analyses will evaluate the lethal take (killing) of up to 10,000 deer annually by WS at the request of cooperators and approved by the PGC.

In addition to WS' intentional take of deer to resolve or prevent damage, WS also conducts other wildlife damage management activities that pose a risk for the unintentional lethal take of deer, primarily projects that target coyotes (*Canis latrans*) and feral dogs (*Canis familiaris*) (USDA 2002) and other mammals (USDA 2007). WS' unintentional take of deer during other wildlife damage management projects is included in the total take of deer by WS presented in Figure 1 and Table 4. From FY 2004 through FY 2010, a total of two deer were unintentionally taken by WS during other wildlife damage management activities. SOPs discussed in the EA evaluating WS' activities to reduce and resolve damage caused by coyotes and feral dogs (USDA 2002) and other mammals (USDA 2007) are designed to minimize non-target take, including the take of deer. Based on the limited unintentional take that occurred from FY 2004 through FY 2010 during other program activities in Pennsylvania and after the review of program activities, the unintentional take of deer by WS during other activities is not expected to increase to any

appreciable extent. The unintentional take of deer by WS would continue to be non-existent to minimal when compared to the number of deer harvested annually. All take, including unintentional take, is reported to the PGC annually and evaluated by WS to ensure WS' take, whether intentional or unintentional, does not adversely affect deer populations in the Commonwealth.

Since deer harvest levels and other mortality events fluctuate annually in the Commonwealth, the analysis of impacts of WS' take on the statewide deer population under this alternative would be evaluated using several scenarios. WS' proposed take in response to an anticipated increase in requests for assistance would not exceed 1,500 deer annually under this supplement to the EA. In the event of a disease threat, the take of deer by WS for disease monitoring and surveillance would not exceed 10,000 deer when requested by the PGC and/or the PDA. Under a worst case scenario, a total of 10,000 deer could be taken by WS annually under this alternative. Since the worst case scenario would represent the highest level of annual take, the analyses will evaluate a take of 10,000 deer to determine the maximum possible potential impact although take of 10,000 deer annually is unlikely and would likely be less than 1,500 deer.

From 2004 through 2010, the highest deer harvest (409,320 deer) in Pennsylvania occurred in 2004 while the highest level of mortality from depredation permits (8,511 deer) occurred in 2005. If those highest take levels were combined and occurred during the same year, the total take of deer under a worst case scenario would be 417,831 deer taken in the Commonwealth during the annual hunting season and pursuant to depredation permits issued by the PGC. Under a worst case scenario, if WS' take had reached 10,000 deer, the combined take would be 427,831 deer if the highest take levels during the hunting season and the highest level of take that has occurred under depredation permits are combined. Under this scenario, WS' take, if the take reached 10,000 deer to alleviate damage and for disease surveillance, would represent 2.3% of the total take of deer in the Commonwealth. The lowest take of deer during the annual hunting season from 2004 through 2010 occurred in 2009 when 308,920 deer were harvested in the Commonwealth. The lowest number of deer taken pursuant to depredation permits occurred in 2009 when 5,566 deer were taken to alleviate damage or threats of damage. Therefore, a total take of 314,486 deer would have been taken under this scenario using the lowest take levels of deer from 2004 through 2010. If WS' take had reached 10,000 deer, WS' take would have represented 3.1% of the total take that occurred using the lowest take levels from 2004 through 2010.

The current statewide deer population is unknown. As stated previously, WS' programmatic FEIS determined using qualitative information (population trend indicators and harvest data) that if WS' deer kill is less than or equal to 33% of the total harvest, the magnitude is considered low (USDA 1997). Based on the best available information, if WS' take had reached 10,000 deer annually from 2004 through 2010, the take by WS would not have reached 33% of the total harvest of deer in the Commonwealth. Even during the lowest deer harvest level in the Commonwealth that occurred in 2009, if WS had lethally removed 10,000 deer, the take would have represented 3.1% of the total harvest of deer.

The take of deer unintentionally during other WS' wildlife damage management activities is not expected to greatly increase the potential impacts on the deer population in Pennsylvania even under the worst case scenario. With oversight of the PGC, the magnitude of take of deer by WS annually to resolve damage and threats would be low. All take by WS would continue to be reported to the PGC to ensure WS' activities are incorporated into deer population objectives for the Commonwealth. Since deer can be taken to alleviate damage through the issuance of depredation permits by the PGC, those deer taken by WS would likely be removed by those persons experiencing damage or threats in the absence of WS' involvement since they could obtain permits for the lethal take of deer. WS' deer damage management activities are carried out under a depredation permit issued by the PGC to a property owner and/or manager or directly to WS to conduct deer damage management activities for a property owner and/or manager. Therefore, WS' activities are removing deer that the property owner and/or manager could remove themselves under depredation permits but has chosen to request assistance from WS.

Even in the event of a disease threat, those deer that would be taken by WS would likely be taken whether WS was directly involved or not. Therefore, WS' activities under the proposed action would not likely be additive to the mortality that already occurs under depredation permits and that could occur during disease threats. The potential impacts to the statewide deer population under the proposed action would likely be similar to the other alternatives given that WS' activities would not substantially increase the take that could occur in the absence of WS' direct involvement since take could occur when permitted by the PGC. The deer that could be taken by WS under the proposed action are likely those deer that would be taken by other entities when permitted by the PGC in the absence of WS' direct involvement in the activities.

The magnitude of WS' activities to alleviate damage and threats associated with deer in the Commonwealth would be low with the oversight and permitting of WS' activities occurring by the PGC. If take by WS had reached 10,000 deer when the lowest known deer mortality occurred in the Commonwealth, WS' take would have represented 3.1% of the total known mortality. In 2010, if WS' take had reached 10,000 deer, the total known mortality would have increased only 3.2% when compared to total known mortality if 10,000 deer had not be taken by WS. Based on those worst case scenarios, WS' take of up to 10,000 deer under the proposed action would be insignificant when compared to the total known mortality from harvest data. WS would annually report to the PGC and would continue to monitor take to ensure WS' activities do not adversely affect deer. The permitting of WS' take by the PGC ensures WS' take would meet the objectives of the deer management plan.

Disease Surveillance and Monitoring

The ability to efficiently conduct surveillance for and detect diseases is dependent upon rapid detection of the pathogen if it is introduced. Effective implementation of a surveillance system would facilitate planning and execution at regional and state levels, and coordination of surveillance data for risk assessment. It would also facilitate partnerships between public and private interests, including efforts by federal, state, and local governments as well as non-governmental organizations, universities, and other interest groups.[3]

To provide the most useful information and a uniform structure for surveillance, strategies for collecting samples could be employed. Those strategies include:

Investigation of Illness/Death in Wildlife: A systematic investigation of illness and death in deer or other wildlife may be conducted to determine the cause of the illness or death. This strategy offers the best and earliest probability of detection if a disease is introduced. Illness and death involving wildlife are often detected by or reported to natural resource agencies and entities. This strategy capitalizes on existing situations of deer without additional deer being handled or killed.

Surveillance in Live Wild Deer: This strategy involves sampling live-captured, apparently healthy deer to detect the presence of a disease. Deer that represent the highest risk of being exposed to, or infected with, the disease because of their movement patterns, or deer that may be in contact with species from areas with reported outbreaks would be targeted. Where possible, this sampling effort would be coordinated with local projects that already plan on capturing and handling deer. Coordinating sampling with ongoing projects currently being conducted by state and federal agencies, universities, and others maximizes use of resources and minimizes the need for additional deer capture and handling.

Surveillance in Harvested Deer: Check stations for deer harvested provide an opportunity to sample deer

[3]Data collected by organizations/agencies conducting research and monitoring will provide a broad species and geographic surveillance effort.

to determine the presence of a disease, and could supplement data collected during surveillance of live deer. Sampling of deer harvested or taken as part of damage management activities would focus on deer that are most likely to be exposed to a disease.

Under the disease sampling strategies listed above that could be implemented to detect or monitor diseases, WS' implementation of those sampling strategies would not adversely affect deer populations in the Commonwealth. Sampling strategies that could be employed involve sampling live-captured deer that could be released on site after sampling occurs. The sampling (*e.g.*, drawing blood, hair sample, fecal sample) and the subsequent release of live-captured deer would not result in adverse effects since those deer are released unharmed on site. In addition, sampling of sick, dying, or harvested deer would not result in the additive lethal take of deer that would not have already occurred in the absence of a disease sampling program. Therefore, the sampling of deer for diseases would not adversely affect the populations of deer and would not result in any take of deer that would not have already occurred in the absence of disease sampling (*e.g.*, hunter harvest).

Analysis of the Availability of Additional Methods to Resolve Deer Damage and Threats

As described previously, since the completion of the EA, trap monitors, FLIR devices, and night vision equipment have become available for use while conducting deer damage management activities. Those methods aid in the use of other methods or allow other methods to be applied more selectively and efficiently. Since those methods are components of other methods, there would be no adverse effects on the populations of deer from the use of those methods.

Issue 2 - Effects on Plants and other Wildlife Species, including T&E Species

The issue of non-target species effects, including effects on T&E species arises from the use of non-lethal and lethal methods identified in the alternatives. The use of non-lethal and lethal methods has the potential to inadvertently disperse, capture, or kill non-target wildlife. WS' SOPs are designed to reduce the effects of damage management activities on non-target species' populations. To reduce the risks of adverse effects to non-target wildlife, WS selects damage management methods that are as target-selective as possible or applies such methods in ways that reduces the likelihood of capturing non-target species. Before initiating management activities, WS also selects locations which are extensively used by the target species and employs baits or lures which are preferred by those species. Despite WS' best efforts to minimize non-target take during program activities, the potential for adverse effects to non-targets exists when applying both non-lethal and lethal methods to manage damage or to reduce threats to safety.

While every precaution is taken to safeguard against taking non-targets during operational use of methods and techniques for resolving damage and reducing threats caused by wildlife, the use of such methods can result in the incidental take of unintended species. Those occurrences are minimal and should not affect the overall populations of any species. Since FY 2004, no non-target wildlife has been taken by WS during deer damage management activities in Pennsylvania. No adverse effects to non-targets were observed or reported to WS during deer damage management activities. WS would continue to monitor the take of non-target species to ensure program activities or methodologies used in deer damage management do not adversely impact non-targets. WS' activities are not likely to adversely affect the viability of any wildlife populations from damage management activities.

Managing damage caused by deer would likely some benefit to native plant communities. High densities of white-tailed deer have a detrimental effect on forest regeneration and species composition (Tilghman 1989). Loss of seedlings to browsing deer can lead to forests composed of less desirable tree species, resulting in a decrease in the diversity of wildlife foods available (Tilghman 1989), and a reduction in

breeding bird habitat (DeCalesta 1994). High densities of white-tailed deer reduced intermediate canopy nesting birds by reducing the height of woody vegetation in a managed forest in Pennsylvania (DeCalesta 1994). McShea and Rappole (2000) found that a reduction in deer density increased the diversity and density of understory vegetation and led to a corresponding increase in bird numbers. The PGC also measure forest regeneration in the Wildlife Management Units as part of the deer damage management plan in the Commonwealth (PGC 2009). Of those Wildlife Management Units surveyed in Pennsylvania, the PGC reports that all surveyed Units have "*poor*" to "*fair*" forest regeneration, with no Units reporting "*good*" regeneration (PGC 2011).

Deer can also damage property such as landscaping and ornamental plantings. As development expands into previously rural areas, deer habitat may actually be enhanced because fertilized lawns, gardens, and landscape plants serve as high quality sources of food (Swihart et al. 1995). Two-thirds of nursery producers and landscape firms and slightly less than one-fourth of homeowners reported damage by deer during a survey conducted in New York during 1989 (Sayre et al. 1992). Deer are prolific and adaptable, characteristics which allow them to exploit and prosper in most suitable habitat near urban areas, including residential areas (Jones and Witham 1995). Although damage to landscaping and ornamental plants has not been quantified, deer can cause severe and very costly property damage to homeowners and in parks.

WS' activities were selective for target white-tailed deer from FY 2004 through FY 2010. No T&E species were taken or adversely affected by WS' actions. A review of T&E species listed by the USFWS, the NMFS, and the PGC showed that additional listings of T&E species in Pennsylvania have occurred since the completion of the EA in 2003, which will be addressed in the following subsections.

Analysis of the Proposed Supplement to the EA on Non-targets

Non-target take can occur during deer damage management activities. SOPs discussed in the EA are intended to minimize non-target take. Those SOPs discussed in Chapter 3 of the EA would continue to be followed by WS when conducting deer damage management activities under this supplement to the EA. The supplement to the EA evaluates the need to address an increasing number of requests for assistance to address damage or threats associated with deer. Deer have been taken previously through the use of firearms and live-traps followed by euthanasia. Firearms are essentially selective for target species since identification of the target occurs prior to application. Live traps and other live-capture methods are also selective for target species. Live traps are baited using a bait source that is preferred by deer which can limit the attractiveness of bait to non-targets. Live traps also allow for any non-target live-captured to be released unharmed at the site of capture. Other live-capture methods (*e.g.*, drop nets, rocket nets, and cannon nets) require activation by personnel present at the site, which ensures that non-targets would not be captured during application or could be released on site if capture occurs.

Immobilizing drugs discussed in the EA are applied directly to target individuals through hand injection or through darts fired from dart guns. Therefore, identification of the target occurs prior to application so non-target capture can be avoided.

The increased take of deer proposed in the supplement to the EA would be expected to also increase the likelihood that the number of non-target taken on an annual basis would increase. From FY 2004 through FY 2010, no non-target take by WS has occurred during deer damage management activities. Based on previous activities and the selectivity of methods employed by WS, the take of other wildlife species is expected to be extremely low to non-existent. All non-target take would be evaluated to ensure non-target take does not reach a level that would cause adverse effects to non-target species. All non-target take is reported to the PGC to ensure WS' take is considered as part of the management objectives.

WS has reviewed the T&E species listed in the Commonwealth and has reaffirmed that those determinations for species listed during the development of the EA are still valid and applicable for activities conducted pursuant to the EA and those activities described in the supplement to the EA. In addition, WS has determined that those activities discussed in the EA and the proposed supplement to the EA would have no effect on those species or their critical habitats that have been listed since the completion of the EA, including the use of those methods addressed in the proposed supplement.

Those additional methods discussed in this supplement to the EA that are available to manage damage associated with deer that have become available since the completion of the EA allow for methods discussed in the EA to be employed more effectively and to be more target specific. Night vision equipment and FLIR equipment are most often used in association with the use of firearms and are employed to allow activities to be conducted at night. Night vision and FLIR equipment allow for the identification of target species during night activities, which reduces the risks to non-targets and reduces human safety risks. Since night vision equipment and FLIR equipment only aid in the identification of wildlife and are not actual methods of take, the use of visual aids would not contribute to the take of non-targets. Therefore, the use of night vision and FLIR equipment would not adversely affect non-targets.

Trap monitoring devices would be employed when applicable that indicate when a trap has been activated. Trap monitoring devices would allow personnel to prioritize trap checks and decrease the amount of time required to check traps, which decreases the amount of time captured non-targets would be restrained. By reducing the amount of time non-targets are restrained, pain and stress can be minimized and non-targets can be addressed in a timely manner, which could allow for non-targets to be released unharmed. Trap monitoring devices would be employed where applicable to facilitate monitoring of the status of traps in remote locations to ensure any captured wildlife is removed promptly to minimize distress and to increase the likelihood non-targets can be released unharmed.

Analysis of the Proposed Supplement to the EA on T&E species

Since the completion of the EA, the orangefoot pimpleback (*Plethobasus cooperianus*), cracking pearlymussel (*Hemistena lata*), and the Eskimo curlew (*Numenius boralis*) have been federally listed in the Commonwealth. In addition, the rayed bean (*Villosa fabalis*) and the sheepnose mussel (*Plethobasus cyphyus*) have been listed as candidate species in the Commonwealth. The following species analyses of those species listed since the completion of the EA will be discussed in relationship to the scope of the proposed action in the EA, including those activities analyzed in the proposed supplement to the EA. A current list of T&E species listed in the Commonwealth by the USFWS and the NMFS can be found in Appendix A of this supplement.

The Eskimo curlew is currently listed in the Commonwealth but is not known to occur in Pennsylvania. Based on the likely absence of the curlew from the Commonwealth and since WS' deer damage management activities do not cause habitat destruction or modification used during their migration through the Commonwealth, WS' activities to resolve damage caused by deer in Pennsylvania as addressed in the proposed supplement to the EA, including the use of new methods would have no effect on the status of Eskimo curlews.

The cracking pearlymussel is listed as an endangered species by the USFWS. The USFWS currently lists the cracking pearlymussel as occurring in Pennsylvania, but the cracking pearlymussel is not listed in the Commonwealth. WS has reviewed methods addressed in the EA including those methods addressed in the proposed supplement to the EA and has determined that activities conducted pursuant to the proposed action as supplemented would have no effect on cracking pearlymussels in the Commonwealth. Methods addressed in the EA and the proposed supplement to the EA would not be major sources of pollution into rivers, streams, or other bodies of water capable of supporting pearlymussels. Methods would not involve

major habitat destruction or cause sedimentation of rivers or streams where pearlymussels could occur in the Commonwealth.

The historical range of the orangefoot pimpleback included a portion of the Ohio River in western Pennsylvania (USFWS 2009). Currently, the pimpleback is only known to occur in the lower Ohio River in Illinois and in river systems in Alabama and Tennessee (USFWS 2009). Given the current known range of the orangefoot pimpleback and the use pattern of methods available to manage deer damage in the Commonwealth, WS' activities under the proposed supplement to the EA would have no effect on the orangefoot pimpleback.

The rayed bean was known historically to occur in the upper and lower Great Lakes systems along with the Ohio and Tennessee River systems. Known habitat of the rayed bean includes gravel and sand in or around shoals and riffle areas of creeks and rivers and shallow, wave-washed areas of glacial lakes (USFWS 2007*a*). In Pennsylvania, rayed beans are known to occur in French Creek, Cussewago Creek, and the Allegheny River (USFWS 2007*a*). Given the limited distribution of rayed beans in the Commonwealth and the use patterns of methods available to manage deer damage, including those addressed in the proposed supplement to the EA, WS' activities as addressed in the proposed supplement to the EA would have no effect on populations of rayed beans in the Commonwealth.

Another candidate for listing in Pennsylvania is the sheepnose mussel which is currently only known to occur in the Allegheny River and Tionesta Creek in the Commonwealth (USFWS 2007*b*). Sheepnose mussels are commonly found in river habitat with shallow shoals in moderate to swift currents over course sand and gravel (USFWS 2007*b*). Based on the limited distribution and the habitat requirements of sheepnose mussels, WS' deer damage management activities would have no effect on populations of mussels in the Commonwealth.

As stated previously, the use of night vision equipment, FLIR devices, and trap monitors would have no effect on T&E species listed in the Pennsylvania, including their designated critical habitats since those methods only aid in the use of other methods.

Issue 3 – Effects on Human Health and Safety

The EA concluded that the effects of WS' deer damage management activities when conducted within the scope analyzed would have no adverse impact on human safety. WS' implementation of the proposed action from FY 2004 through FY 2010 did not result in any adverse impacts to human safety.

In addition to the risks associated with methods used to resolve or prevent deer damage, concerns also arise from not conducting activities to resolve requests for assistance that involve human safety. There are numerous health risks associated with deer to both people and pets. Lyme disease is the most common zoonoses involving deer and is caused by the spirochete *Borrelia burgdorferi*. Research has shown a correlation between infected ticks, deer numbers, and Lyme disease cases (Magnarelli et al. 1984, Deblinger et al. 1993). Deer are an important reservoir for Lyme disease and are the primary host for the adult deer tick (Conover 1997).

Companion animals can become infected with Lyme disease and develop subclinical infections. In the northeast, infection rates can be as high as 85.2% in dogs and 47% in cats. Lyme disease in cats is currently poorly understood and little is known about disease manifestations (Companion Animal Parasite Council 2008). Chronic Lyme disease in dogs can lead to acute progressive renal failure and death.

In 1986, another serious tick-borne zoonoses known as human ehrlichiosis was discovered in the United States (McQuiston et al. 1999). Two distinct forms of the illness may affect humans: human monocytic

ehrlichiosis (HME) and human granulocytic ehrlichiosis (HGE) (Lockhart et al. 1997, McQuiston et al. 1999). The bacterial agents that cause ehrlichiosis are transmitted to humans by infected ticks, which acquire the agents from feeding on infected animal reservoirs (McQuiston et al. 1999). Ehrlichiosis in humans may result in fever, headache, myalgia, nausea, and occasionally death (Little et al. 1998, McQuiston et al. 1999). HME is the type of ehrlichiosis predominantly found in the southeastern, south-central, and mid-Atlantic United States. White-tailed deer are major hosts for *Amblyomma americanum*, the tick which transmits HME, and deer have been identified as a reservoir for HME (Lockhart et al. 1997, Little et al. 1998).

Deer-vehicle collisions are a serious concern nationwide because of losses to property and the potential for human injury or even death (Conover et al. 1995, Romin and Bissonette 1996, Conover 1997). Conover et al. (1995) estimated that 1.5 million deer-vehicle collisions occur each year in the United States and that the average cost to repair the vehicle after a collision with a deer was $1,500. Conover et al. (1995) thus estimated that the total damage to vehicles in the United States each year from deer-vehicle collisions is greater than $1 billion. Additionally, Conover et al. (1995) estimated that deer-vehicle collisions in the United States result in 29,000 injuries and 211 human fatalities annually. Nationwide Insurance (1993) estimated that 120 people are killed annually in animal-vehicle accidents in the United States.

Wildlife collisions with aircraft are a serious economic and safety problem (Dolbeer et al. 2000). Cleary et al. (1999) estimated that between 1990 and 1998 wildlife strikes cost the United States civil aviation industry a minimum of 92,233 hours/year of aircraft down time, $50.6 million/year in direct monetary losses, and $26.59 million/year in associated costs. In a study which ranked the hazards to aviation for wildlife species commonly involved in aircraft strikes, deer were ranked as the most hazardous species group (Dolbeer et al. 2000). This study found that 87% of reported deer-aircraft collisions resulted in damage. This was the highest percent of reported damage occurrence of any species studied. Also, 53% of deer-aircraft strike reports noted an effect on the flight (*e.g.*, aborted take-off, engine shutdown, precautionary landing) (Dolbeer et al. 2000).

Analysis of the Proposed Supplement to the EA on Human Safety

Activities proposed in the supplement to the EA are not expected to increase risks to human safety from WS' activities or methods. The supplement addresses those activities that would allow WS' to employ methods operationally to address threats to several resources. In those situations, WS' deer damage management activities would enhance human safety by reducing risks of injury and disease transmission associated with human, livestock, and companion animal encounters with deer. Trap monitoring devices are currently being evaluated for use under the supplement to the EA. Trap monitors are attached directly to a trap and emit a signal when the trap has been triggered that can be identified using a receiver which allows traps to be checked and monitored remotely. Trap monitors are designed to enhance trapping efforts by allowing timely trap checking, which allows live-captured wildlife to be addressed more quickly. Since trap monitors only emit a signal and do not result in the actual take of any wildlife species, the use of trap monitors would subsequently have no adverse impact on human safety. The use of FLIR and night vision equipment increases the safety of nighttime deer removal activities by ensuring proper target identification and that shooting is being done in a safe direction and that adequate backstops exist. The use of FLIR and night vision equipment would subsequently have no adverse impact on human safety. In addition, the FLIR and night vision equipment would allow WS to conduct activities at night when human activities are likely to be minimal, which reduces threats to human safety.

Management activities conducted by WS have not resulted in any injuries or illness to any members of the public or to WS' personnel. Program activities and their potential impacts on human health and safety have not changed from those analyzed in the EA. The possible increase in the number of direct

operational assistance projects addressed in the supplement to the EA would not increase risks associated with those activities nor employ additional methods that would increase the risks to human safety. Impacts of the program on this issue are expected to remain insignificant.

Issue 4 - Humaneness of Methods to be Used

As discussed in the EA, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal. People may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints of methods available.

Some individuals believe any use of lethal methods to resolve damage associated with wildlife is inhumane because the resulting fate is the death of the animal. Others believe that certain lethal methods can lead to a humane death. Others believe most non-lethal methods of capturing wildlife to be humane because the animal is generally unharmed and alive. Still others believe that any disruption in the behavior of wildlife is inhumane. With the multitude of attitudes on the meaning of humaneness, the analyses must consider the most effective way to address damage and threats caused by wildlife in a humane manner. WS is challenged with conducting activities and employing methods that are perceived to be humane while assisting those persons requesting assistance to manage damage and threats associated with wildlife. The goal of WS is to use methods as humanely as possible to effectively resolve requests for assistance to reduce damage and threats to human safety. WS continues to evaluate methods and activities to minimize the potential pain and suffering of those methods addressed when attempting to resolve requests for assistance.

As mentioned previously, some methods have been stereotyped as "*humane*" or "*inhumane*". However, many "*humane*" methods can be inhumane if not used appropriately. For example, a cage trap is generally considered by most members of the public as "*humane*" since an animal is captured alive. Yet, without proper care, live-captured wildlife in a cage trap can be treated inhumanely if not attended to appropriately.

Therefore, WS' mission is to effectively address requests for assistance using methods in the most humane way possible that minimizes the stress and pain of the animal. WS' personnel are experienced and professional in their use of management methods. When employing methods to resolve damage to resources or threats to human safety, methods are applied as humanely as possible.

Analysis of the Proposed Supplement to the EA on Humaneness

The issue of humaneness from those proposed activities in the supplement would remain as addressed in the EA since the methods available for use under the proposed supplement are the same as those methods addressed in Appendix B the EA. The potential increase in activities by WS to address damages and threats associated with deer proposed in the supplement would not result in humaneness issues outside of those addressed in the EA for the methods available for use. The proposed use of trap monitoring devices would likely result in methods being used more humanely since monitoring devices allow traps to be checked using a receiver that indicates whether a trap has been triggered and has potentially live-captured an animal. By allowing traps to be monitored remotely, traps can be checked more effectively and efficiently, which allows those animals live-captured to be addressed in a timelier manner, which minimizes the amount of time the animal is restrained. Therefore, the use of trap monitoring devices proposed under the supplement would likely result in traps being used more humanely. Additionally, the use of FLIR and night vision equipment to remove deer may improve the perceived humaneness of deer removal as shooting is generally considered to involve less stress to the animal than trapping when used appropriately.

Issue 5 – Effects on Aesthetic Values

The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. There is evidence that dogs and cats were domesticated around 3,000 B.C. (History World 2007). The American public is no exception and today a large percentage of households have pets. However, some people may consider individual wild animals as "*pets*" or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Therefore, the public reaction is variable and is mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife.

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

The EA concluded the effects on aesthetics would be variable depending on the damage situation, stakeholders' values towards wildlife, and their compassion for those persons who are experiencing damage from deer. The WS program in the Commonwealth only conducts activities at the request of the affected property owner or resource manager. Upon receiving a request for assistance, WS addresses issues/concerns and explanations are given for the reasons why a particular method or group of methods would be the most effective in reducing damage for the specific situation. Methods employed to reduce or resolve damage is agreed upon by the cooperator according to a cooperative service agreement.

Information in this supplement to the EA indicates that WS' take of deer has been minimal and of a low magnitude when compared to the number of deer harvested annually and trending data. WS' take has not reached a magnitude of take that would severely limit the ability to view and enjoy deer. Only deer identified as causing damage were targeted by WS during damage management activities and only after a request for such action was received. However, deer can be viewed outside the area where damage management activities were conducted if a reasonable effort is made to locate deer outside of the damage management area. WS receives requests to conduct damage management activities on only a small portion of the land area in Pennsylvania. Therefore, activities are not conducted over large areas that would greatly limit the aesthetic value of deer.

Analysis of the Proposed Supplement to the EA on the Aesthetic-value of Deer

The increased take of deer addressed in the supplement to the EA could result in a greater number of deer being lethally taken at a location or could result in an increase in the number of locations where deer are lethally removed. The use of lethal methods could result in temporary declines in local populations resulting from the removal of deer to resolve requests for assistance. WS' goal is to respond to requests for assistance and to manage those deer responsible for the resulting damage. Therefore, the ability to view and enjoy deer in the Commonwealth would still remain if a reasonable effort is made to locate deer outside the area in which damage management activities occurred.

The ability to view and enjoy the aesthetic value of deer at a particular site would be somewhat limited if those deer causing damage or posing threats were removed as part of an integrated approach to managing damage. However, deer would most likely use the site in the future, although the length of time until those deer arrive at the damage management site would be variable, depending on the site, time of year,

and population densities of deer in the surrounding areas. The opportunity to view deer is available if a person makes the effort to visit sites outside of the damage management area.

As shown under Issue 1, the magnitude of WS' proposed take of deer under the supplement to the EA could be considered low if take levels occurred at the levels proposed. WS' proposed activities addressed in the supplement would not result in declines of deer populations over a large geographical area, but would be limited to site-specific locations where deer damage has occurred or is likely to occur. Therefore, even with the proposed increased take of deer under the supplement, deer populations would remain high in the Commonwealth and the aesthetic value of deer could be enjoyed if a reasonable attempt is made to locate deer outside of the damage management area.

Issue 6 - Effects on Regulated White-tailed Deer Hunting

The EA concluded that the effects of WS' deer damage management activities on this issue would be insignificant. As noted in Table 4, WS' annual take of deer has not exceeded 0.4% of the deer harvested in Pennsylvania from 2004 through 2010. WS' activities are coordinated with the PGC to ensure WS' annual take does not exceed a level where an undesired decline in the deer population would occur due to cumulative impacts from harvest, damage management activities, and other sources of mortality. WS' limited take of deer in Pennsylvania did not occur at a magnitude that would adversely affect the ability of those persons interested to harvest deer in the Commonwealth. In most cases, WS removed deer at the request of a cooperator in areas where hunting is prohibited (*e.g.*, airports) or is severely restricted (*e.g.*, urban areas).

Analysis of the Proposed Supplement to the EA on White-tailed Deer Hunting in the Commonwealth

The magnitude of take of deer addressed in the proposed action would be low when compared to the deer mortality from all known sources. When WS' proposed take of 10,000 deer under a worst case scenario was included as part of the known mortality of deer and compared to deer harvest data, the impact on the deer population was below the level of removal required to lower population levels. The PGC would determine the number of deer taken annually by WS through the issuance of depredation permits.

Deer damage management activities conducted by WS would occur after consultation and approval by the PGC. With oversight by the PGC, the number of deer allowed to be taken by WS would not limit the ability of those persons interested to harvest deer during the regulated season. All take by WS would be reported to the PGC annually to ensure take by WS is incorporated into population management objectives established for the deer population. Based on the limited take proposed by WS and the oversight of the PGC, WS' take of up to 10,000 deer total under a worst case scenario would have no effect on the ability of those persons interested to harvest deer during the regulated harvest season.

XV. CUMULATIVE IMPACTS

Cumulative impacts, as defined by the Council on Environmental Quality (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 actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time.

WS would be the primary federal program with damage management responsibilities; however, other entities may conduct similar activities in the Commonwealth as permitted by the PGC. Through ongoing coordination with the PGC, WS is aware of such activities and may provide technical assistance in such efforts. WS does not normally conduct direct damage management activities concurrently with other

entities in the same area, but may conduct activities at adjacent sites within the same timeframe. The potential cumulative impacts analyzed below could occur either as a result of WS' program activities over time or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

Chapter 4 of the EA provides further information and analyses on potential cumulative impacts of the proposed action. The following resource values in the Commonwealth are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, critical habitats (areas listed in T&E species recovery plans), visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further. The activities proposed in the alternatives would have a negligible effect on atmospheric conditions including the global climate. Meaningful direct or indirect emissions of greenhouse gases would not occur as a result of any of the proposed alternatives. Those alternatives would meet the requirements of applicable laws, regulations, and Executive Orders including the Clean Air Act and Executive Order 13514.

Issue 1 - Effects on White-tailed deer Populations

Evaluation of WS' activities relative to deer management objectives in the Commonwealth indicated that program activities would have no cumulative adverse effects on deer populations in Pennsylvania. WS' actions would be occurring simultaneously, over time, with other natural processes and human-generated changes that are currently taking place. Those activities include, but are not limited to:

- Natural mortality of deer
- Mortality of deer from vehicle collisions, aircraft strikes, and illegal take
- Human-induced mortality of deer through private damage management activities
- Human-induced harvest during the regulated hunting season
- Human and naturally induced alterations of wildlife habitat
- Annual and perennial cycles in population densities

All of those factors play a role in the dynamics of deer populations. In many circumstances, requests for assistance arise when some or all of those elements have contrived to elevate deer populations at a juncture to cause damage to resources. WS' actions taken to minimize or eliminate damage are constrained as to scope, duration and intensity, for the purpose of minimizing or avoiding impacts to the environment. WS evaluates damage occurring, including other affected elements and the dynamics of the damaging species; determines appropriate strategies to minimize effects on environmental elements; applies damage management actions; and subsequently monitors and adjusts/ceases damage management actions (Slate et al. 1992, USDA 1997, USDA 2003). This process allows WS to take into consideration other influences in the environment, such as those listed above, in order to avoid cumulative adverse impacts on target species.

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

Historical outcomes of WS' activities to address deer damage in the Commonwealth

No cumulative adverse effects have been identified for deer as a result of program activities implemented over time based on analyses contained in the EA, from monitoring reports, or from analyses contained in this 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 deer causing damage and only after a request for assistance is received. All program activities are coordinated with

appropriate federal, Commonwealth, and local entities to ensure WS' activities do not adversely impact the populations of any native wildlife species.

With management authority over deer in Pennsylvania, the PGC can adjust take levels, including the take of WS, to ensure population objectives for deer are achieved. Consultation and reporting of take by WS would ensure the PGC considers any activities conducted by WS.

From FY 2004 through FY 2010, 6,174 deer have been taken by WS since the completion of the EA to alleviate damage in the Commonwealth. From 2004 through 2010, hunters have harvested over 2.4 million deer during the regulated hunting season in the Commonwealth. In addition, deer may be taken to alleviate agricultural damage and to meet management objectives of landowners in the Commonwealth. A total of 41,471 deer have been lethally taken in the Commonwealth from 2004 through 2009 under nuisance permits issued by the PGC. WS' annual take of deer has averaged 0.3% of the reported annual harvest of deer in Commonwealth with the highest level occurring in 2008 which represented 0.4% of the reported harvest.

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 PGC to meet management objectives for deer populations in the Commonwealth. Statewide deer populations in the Commonwealth continue to remain at 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 PGC ensures that fluctuations in the deer population across the Commonwealth occur with the knowledge of the PGC 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 of the Commonwealth 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.

SOPs built into WS' program

SOPs are designed to reduce the potential negative effects of WS' actions on deer populations, and are tailored to respond to changes in deer 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, USDA 1997, USDA 2003).

Issue 2 - Effects on Plants and other Wildlife Species, including T&E Species

Potential effects on non-target species from conducting deer damage management arise from the use of non-lethal and lethal methods to alleviate or prevent those damages or to alleviate threats of damage. The use of non-lethal methods during activities to reduce or prevent damage caused by deer has the potential to exclude, disperse, or capture non-target wildlife. However, the effects of non-lethal methods are often temporary and often do not involve the take (killing) of non-target wildlife species. When using exclusion devices and/or repellents, both target and non-target wildlife can be prevented from accessing the resource being damaged. Since exclusion does not involve lethal take, cumulative impacts on non-target species from the use of exclusionary methods would not occur but would likely disperse those individuals to other areas. Exclusionary methods are often expensive and require constant maintenance to ensure effectiveness. Therefore, the use of exclusionary devices would be somewhat limited to small, high-value areas and not used to the extent that non-targets are excluded from large areas that would cumulatively impact populations from the inability to access a resource, such as potential food sources or birthing sites. The use of visual and auditory harassment and dispersion methods are generally temporary with non-target species often returning after the cessation of those activities. Dispersal and harassment do

not involve the take (killing) of non-target species and similar to exclusionary methods are not used to the extent or at a constant level that would prevent non-targets from accessing critical resources that would threaten survival of a population.

The use of lethal methods or those methods used to live-capture target species followed by euthanasia also have the potential to impact non-target wildlife through the take (killing) or capture of non-target species. Capture methods used are often methods that are set to confine or restrain deer after being triggered by a target individual. Capture methods are employed in such a manner as to minimize the threat to non-target species by placement in those areas frequently used by target wildlife, using baits or lures that are as species specific as possible, and modification of individual methods to exclude non-targets from capture. Most methods described in Appendix B of the EA are methods that are employed to confine or restrain wildlife that are subsequently euthanized using humane methods since translocation of deer is currently not permitted by the PGC. With all live-capture devices, non-target wildlife captured can be released on site if determined to be able to survive following release. SOPs are intended to ensure take of non-target wildlife is minimal during the use of methods to capture target wildlife.

The use of firearms, immobilizing chemicals, and euthanasia chemicals are essentially selective for target species since identification of an individual is made prior to the application of the method. Both euthanasia and immobilizing drugs are applied through direct injection to target wildlife. Therefore, the use of those methods would not impact non-target species.

The methods described in Appendix B and this supplement all have a high level of selectivity and can be employed using SOPs to ensure minimal impacts to non-targets species. No non-targets were taken by WS during deer damage management activities from FY 2004 through FY 2010. Based on the methods available to resolve deer damage and/or threats, WS does not anticipate the number of non-targets taken to reach a magnitude where declines in those species' populations would occur. Therefore, take under the proposed action of non-targets would not cumulatively impact non-target species. WS has reviewed the T&E species listed by the USFWS and the NMFS and has determined that deer damage management activities proposed by WS in this supplement would have no effect on T&E species. WS has also determined that deer damage management activities proposed in this supplement would have no effect on T&E species and species of concern that are listed by the PGC. Cumulative impacts would be minimal on non-targets from any of the alternatives discussed.

Issue 3 – Effects on Human Health and Safety

Non-Chemical Methods

All non-chemical methods described in Appendix B are used within a limited time frame, are not residual, and do not possess properties capable of inducing cumulative adverse impacts on human health and safety. All non-chemical methods are used after careful consideration of the safety of those employing methods and to the public. All capture methods are employed where human activity is minimal and warnings signs are placed in conspicuous areas, when appropriate, to ensure the safety of the public. Capture methods also require direct contact to trigger ensuring that those methods, when left undisturbed would have no effect on human safety. All methods are agreed upon by the requesting entities, which are made aware of the safety issues of those methods when entering into a MOU, cooperative service agreement, or other comparable document between WS and the cooperating entity. SOPs also ensure the safety of the public from those methods used to capture or take wildlife. A formal risk assessment conducted by APHIS determined that WS' non-chemical methods, when used as intended, pose a low risk to human safety (USDA 1997). Firearms used to alleviate or prevent damage, though hazards do exist, are employed to ensure the safety of employees and the public.

WS has received no reports or documented any adverse effects to human safety from WS' deer damage management activities conducted from FY 2004 through FY 2010. Personnel employing non-chemical methods would continue to be trained to be proficient in the use of those methods to ensure safety of the applicator and to the public. Based on the use patterns of non-chemical methods, those methods would not cumulatively impact human safety.

Questions have arisen about the deposition of lead into the environment from ammunition used in firearms to lethally remove deer. As described in Appendix B of the EA, the lethal removal of deer with firearms by WS to alleviate damage or threats would occur using a rifle or shotgun. In an ecological risk assessment of lead shot exposure in non-waterfowl birds, ingestion of lead shot was identified as the concern rather than just contact with lead shot or lead leaching from shot in the environment (Kendall et al. 1996). Hunt et al. (2009) also found that deer killed with rifles using lead bullets may pose a risk of lead exposure to scavengers from ingestion of lead fragments in the carcass.

Take of deer by WS in Pennsylvania occurs primarily from the use of rifles. To reduce risks to human safety and property damage from bullets passing through deer, the use of firearms is applied in such a way (*e.g.*, caliber, bullet weight, distance) to ensure the bullet does not pass through deer. Since deer that are removed using firearms would occur within areas that are fenced and/or areas with restricted access, retrieval of all deer carcasses for proper disposal is highly likely. With risks of lead exposure occurring primarily from ingestion of shot and bullet fragments, the retrieval and proper disposal of deer carcasses would greatly reduce the risk of scavengers ingesting or being exposed to lead.

However, deposition of lead into soil could occur if, during the use of firearms, the projectile(s) passes through a deer, if misses occur, or if the deer carcass is not retrieved. In general, hunting tends to spread lead over wide areas and at low concentrations (Craig et al. 1999). Laidlaw et al. (2005) reported that, because of the low mobility of lead in soil, all of the lead that accumulates on the surface layer of the soil is generally retained within the top 20 cm (about 8 inches). In addition, concerns occur that lead from bullets or shot deposited in soil from shooting activities could lead to contamination of water, either ground water or surface water, from runoff. Stansley et al. (1992) studied lead levels in water that was subjected directly to high concentrations of lead shot accumulation because of intensive target shooting at several shooting ranges. Lead did not appear to "*transport*" readily in surface water when soils were neutral or slightly alkaline in pH (*i.e.*, not acidic), but lead did transport more readily under slightly acidic conditions. Although Stansley et al. (1992) detected elevated lead levels in water in a stream and a marsh that were in the shot "*fall zones*", the study did not find higher lead levels in a lake into which the stream drained, except for one sample collected near a parking lot where it was believed the lead contamination was due to runoff from the parking lot, and not from the shooting range areas. The study also indicated that even when lead shot is highly accumulated in areas with permanent water bodies present, the lead does not necessarily cause elevated lead contamination of water further downstream. Muscle samples from two species of fish collected in the water bodies with high lead shot accumulations had lead levels that were well below the accepted threshold standard of safety for human consumption (Stansley et al. 1992).

Craig et al. (1999) reported that lead levels in water draining away from a shooting range with high accumulations of lead bullets in the soil around the impact areas were far below the "*action level*" of 15 parts per billion as defined by the EPA (*i.e.*, requiring action to treat the water to remove lead). The study found that the dissolution (*i.e.*, capability of dissolving in water) of lead declines when lead oxides form on the surface areas of the spent bullets and fragments (Craig et al. 1999). Therefore, the transport of lead from bullets or shot distributed across the landscape is reduced once the bullets and shot form crusty lead oxide deposits on their surfaces, which serves to naturally further reduce the potential for ground or surface water contamination (Craig et al. 1999). These studies suggest that, given the very low amount of lead being deposited and the concentrations that would occur from WS' activities to reduce deer damage

using firearms, as well as most other forms of dry land small game hunting in general, lead contamination of water from such sources would be minimal to nonexistent.

Since depredation permits that include the allowed method of lethal removal are issued by the PGC directly to entities experiencing damage or threats of damage, WS' assistance with removing deer would not be additive to the environmental status quo since those deer removed by WS using firearms could be lethally removed by the entities receiving the depredation permit using the same method in the absence of WS' involvement. The amount of lead deposited into the environment may be lowered by WS' involvement in deer damage management activities due to efforts by WS to ensure projectiles do no pass through but are contained within the deer carcass, which limits the amount of lead potentially deposited into soil from projectiles passing through the carcass. The proficiency training received by WS' employees in firearm use and accuracy increases the likelihood that deer are lethally removed humanely in situations that ensure accuracy and that misses occur infrequently, which further reduces the potential for lead to be deposited in the soil from misses or from projectiles passing through carcasses. In addition, WS' involvement ensures deer carcasses lethally removed using firearms would be retrieved and disposed of properly to limit the availability of lead in the environment and ensures deer carcass are removed from the environment to prevent the ingestion of lead in carcasses by scavengers. Based on current information, the risks associated with lead bullets or shot that are deposited into the environment from WS' activities due to misses, the bullet or shot passing through the carcass, or from deer carcasses that may be irretrievable would be below any level that would pose any risk from exposure or significant contamination of water.

Chemical Methods

Chemical methods available for use under the proposed action are repellents, immobilizing drugs, and euthanizing drugs described in Appendix B of the EA. Immobilizing drugs are administered to target individuals using devices or methods that ensure the identification of the target animal. The immobilizing drugs discussed in Appendix B require injection of the drug directly into an animal. Injection would occur through hand injection via a syringe, by jabstick, or by a dart fired from a projector that mechanically injects the drug into the animal upon impact. Immobilizing drugs temporarily sedate an animal to minimize stress of handling and to reduce the risks to human safety. Immobilized animals may also be euthanized using a euthanizing drug described in Appendix B of the EA. Euthanasia drugs would only be administered after the deer has been properly restrained and immobilized and would occur through direct injection. WS' personnel are required to attend training courses and be certified in the use of immobilizing and euthanizing drugs to ensure proper care and handling occurs, to ensure the proper doses are administered, and to ensure human safety under WS Directive 2.430. WS' personnel would continue to be trained in the proper handling and administering of immobilizing and euthanasia drugs to ensure human safety.

Direct application of chemical methods to target species would ensure that there are no cumulative impacts to human safety. All chemical methods would be tracked and recorded to ensure proper accounting of used and unused chemicals occurs. All chemicals would be stored and transported according to relevant regulations, including the directives of WS. The amount of chemicals used or stored by WS and cooperating agencies would be minimal to ensure human safety.

Repellents available for use to disperse deer from areas of application must be registered with the EPA according to Federal Insecticide, Fungicide, Rodenticide Act. Many of the repellents currently available for use have active ingredients that are naturally occurring and are generally regarded as safe. Although some hazards exist from the use of repellents, hazards occur primarily to the handler and applicator. When repellents are applied according to label requirements, no adverse effects to human safety are expected.

No adverse effects have been reported to or identified by WS from the use of chemical methods during deer damage management conducted by WS from FY 2004 through FY 2010. When chemical methods are applied as intended and when safety guidelines are followed, no adverse effects to human safety are expected. The primary risk of exposure to chemical methods occurs to handlers and applicators. WS' personnel who use and apply chemical methods would be trained according to federal, Commonwealth, and local laws and regulations, including WS' directives. Based on this information, the use of chemical methods as part of the proposed action by WS would not have cumulative impacts on human safety.

Issue 4 - Humaneness of Methods to be Used

WS continues to seek new methods and ways to improve current technology to improve the humaneness of methods used to manage damage caused by wildlife. Cooperation with individuals and organizations involved in animal welfare continues to be an agency priority for the purpose of evaluating strategies and defining research aimed at developing humane methods.

All methods not requiring direct supervision during employment (*e.g.*, live traps) would be checked and monitored at least every 12 hours to ensure any deer confined or restrained are addressed in a timely manner to minimize distress of the animal. Live-captured deer would be immobilized to minimize stress of handling. All euthanasia methods used for live-captured deer would be applied according to WS Directive 2.505. Shooting would occur in limited situations and personnel would be trained in the proper use of firearms to minimize pain and suffering of deer taken by this method.

WS employs methods as humanely as possible by applying measures to minimize pain and that allow wildlife captured to be addressed in a timely manner to minimize distress. Through the establishment of SOPs that guide WS in the use of methods to address damage and threats associated with deer in the Commonwealth, the cumulative impacts on the issue of method humaneness are minimal. All methods would be evaluated annually to ensure SOPs are adequate to ensure those methods continue to be used to minimize suffering and that wildlife captured are addressed in a timely manner to minimize distress.

Issue 5 – Effects on Aesthetic Values

The activities of WS would result in the removal of deer from those areas where damage or threats were occurring. Therefore, the aesthetic value of deer in those areas where damage management activities were being conducted would be reduced. However, for some people, the aesthetic value of a more natural environment would be gained by reducing deer densities, including the return of native wildlife and plant species that may be suppressed or displaced by high deer densities.

Some people experience a decrease in aesthetic enjoyment of wildlife because they feel that overabundant species are objectionable and interfere with their enjoyment of wildlife in general. Continued increases in numbers of individuals or the continued presence of deer may lead to further degradation of some people's enjoyment of any wildlife or the natural environment. The actions of WS could positively affect the aesthetic enjoyment of wildlife for those people that are being adversely affected by deer.

Deer population objectives are established and enforced by the PGC through the regulating of deer take during the statewide hunting season and through the issuance of depredation permits after consideration of other known mortality factors. Therefore, WS has no direct impact on the status of the deer population since all take by WS occurs at the discretion of the PGC. Since those persons seeking assistance could remove deer from areas where damage is occurring through depredation permits issued by the PGC, WS' involvement would have no effect on the aesthetic value of deer in the area where damage was occurring. When a depredation permit has been issued by the PGC to a property owner and/or manager that is

experiencing damage caused by deer, the removal of deer under that permit would likely occur whether WS was involved with taking the deer or not.

Therefore, the activities of WS are not expected to have any cumulative adverse effects on this element of the human environment if occurring at the request of a property owner and/or manager and a permit has been issued by the PGC who are responsible for regulating a resident wildlife species, like deer.

Issue 6 - Effects on Regulated White-tailed Deer Hunting

The magnitude of WS' deer take for damage management purposes from FY 2004 through FY 2010 was low when compared to the total take of deer and when compared to statewide population trending data. Since all take of deer is regulated by the PGC, the take of deer by WS that would occur annually and cumulatively would occur pursuant to deer population objectives established in the Commonwealth. WS' take of up to 10,000 deer annually to alleviate damage and as part of disease surveillance and monitoring would be a minor component to the known take that occurs annually from other known mortality factors. With oversight of deer take, the PGC maintains the ability to regulate take by WS to meet management objectives for deer in the Commonwealth. Therefore, the cumulative take of deer is considered as part of the objectives established by the PGC for deer populations in the Commonwealth.

XVI. SUMMARY OF CUMULATIVE IMPACTS

No significant cumulative environmental impacts are expected from any of the five alternatives, including the proposed action. Under the proposed action, the lethal removal of deer by WS would not have significant impacts on statewide deer populations. No risk to public safety is expected when activities are provided and accepted by requesting individuals in Alternative 2, Alternative 3, Alternative 4, and Alternative 5 since only trained and experienced personnel would conduct and recommend damage management activities. There is a slight increased risk to public safety when persons who reject assistance and recommendations conduct their own activities, and when no assistance is provided in Alternative 1. In all Alternatives, however, risk to public safety would not be increased to the point that the impacts would be significant. Although some persons would likely be opposed to deer damage management activities in the Commonwealth, the analysis in this EA indicates that an integrated approach to managing damage and threats caused by deer would not result in significant cumulative adverse impacts on the quality of the human environment.

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APPENDIX A
FEDERALLY LISTED T&E SPECIES IN PENNSYLVANIA

Listings and occurrences for Pennsylvania

Notes:

- This report shows the listed species associated in some way with this state.
- This list does not include experimental populations and similarity of appearance listings.
- This list includes non-nesting sea turtles and whales in State/Territory coastal waters.
- This list includes species or populations under the sole jurisdiction of the National Marine Fisheries Service.

Summary of Animals listings

Animal species listed in this state and that occur in this state

Status	Species
E	Bat, Indiana (*Myotis sodalis*)
E	Clubshell Entire Range; Except where listed as Experimental Populations (*Pleurobema clava*)
E	Mucket, pink (pearlymussel) (*Lampsilis abrupta*)
E	Pigtoe, rough (*Pleurobema plenum*)
E	Pimpleback, orangefoot (pearlymussel) (*Plethobasus cooperianus*)
E	Plover, piping Great Lakes watershed (*Charadrius melodus*)
E	Riffleshell, northern (*Epioblasma torulosa rangiana*)
E	Ring pink (mussel) (*Obovaria retusa*)
E	Sturgeon, shortnose (*Acipenser brevirostrum*)
T	Turtle, bog (=Muhlenberg) northern (*Clemmys muhlenbergii*)
E	Wedgemussel, dwarf (*Alasmidonta heterodon*)

Animal species listed in this state that do not occur in this state

Status	Species
E	Beetle, American burying (*Nicrophorus americanus*)
E	Butterfly, Karner blue (*Lycaeides melissa samuelis*)
E	Fanshell (*Cyprogenia stegaria*)
E	Puma (=cougar), eastern (*Puma (=Felis) concolor couguar*)
E	Squirrel, Delmarva Peninsula fox Entire, except Sussex Co., DE (*Sciurus niger cinereus*)
T	Tiger beetle, northeastern beach (*Cicindela dorsalis dorsalis*)
E	Wolf, gray Lower 48 States, except where delisted and where EXPN. Mexico. (*Canis lupus*)

Animal listed species occurring in this state that are not listed in this state (1 species)

Status	Species
E	Pearlymussel, cracking Entire Range; Except where listed as Experimental Populations (*Hemistena lata*)

Summary of Plant listings

Plant species listed in this state and that occur in this state

Status	Species
E	Bulrush, Northeastern (*Scirpus ancistrochaetus*)
T	Pogonia, small whorled (*Isotria medeoloides*)
T	Spiraea, Virginia (*Spiraea virginiana*)

Plant species listed in this state that do not occur in this state

Status	Species
E	Coneflower, smooth (*Echinacea laevigata*)
T	Joint-vetch, sensitive (*Aeschynomene virginica*)
T	Orchid, eastern prairie fringed (*Platanthera leucophaea*)

Last updated: July 16, 2010