

**SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT:
MANAGEMENT OF VULTURE DAMAGE IN THE COMMONWEALTH OF VIRGINIA**

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

August 2012

INTRODUCTION

An environmental assessment (EA) was prepared by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program, in cooperation with the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF), to evaluate alternatives for the reduction of black vulture (*Coragyps atratus*) and turkey vulture (*Cathartes aura*) damage to property, agricultural resources, and threats to public health and safety in the Commonwealth of Virginia (USDA 2002). The EA evaluated the need for WS' activities and the relative effectiveness of five alternatives to meet that proposed need, while accounting for the potential environmental effects of those activities. The proposed action in the EA evaluates an integrated damage management program in the Commonwealth to fully address the need for resolving damage caused by vultures 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 January 15, 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 vulture damage management. An amendment to the EA¹ was developed in 2004 (USDA 2004) and a new Decision and FONSI were issued on February 10, 2005. The amendment to the EA addressed additional information on vultures and additional comments received after the close of the public involvement period for the EA.

PURPOSE

The purpose of the EA will remain as addressed in section 1.2 of the EA (USDA 2002). The amendment to the EA developed in 2004 addresses public comments received after the Decision and FONSI were signed for the EA and updates the data and population impact analysis in the original EA (USDA 2004). This supplement to the EA examines potential environmental impacts of WS' program as it relates to: 1) new information that has become available from research findings and data gathering since the issuance of the Decision and FONSI in 2005, 2) an increase in the number of requests for assistance to manage vulture damage and threats in Virginia, and 3) the analyses of WS' vulture damage management activities in Virginia since the Decision/FONSI was issued in 2005 to ensure program activities were within the impact parameters analyzed in the EA.

NEED FOR ACTION

A description of the need for action to address damage and threats associated with vultures in Virginia is provided in section 1.3 of the EA (USDA 2002) and in the amendment to the EA (USDA 2004). The need for action addressed in the EA and the amendment remains applicable to this supplement to the EA.

¹ The 2004 Supplement to the EA was titled as an Amendment. The terms Supplement and Amendment are used interchangeably in these NEPA documents.

The need for action to manage damage and threats associated with vultures in Virginia arises from requests for assistance² received by WS to reduce and prevent damage associated with vultures from occurring to four major categories: agricultural resources, property, and threats to human safety. From federal fiscal year³ (FY) 2006 through FY 2011, WS conducted 1,054 technical assistance projects involving black vultures and 298 technical assistance projects involving turkey vultures. Technical assistance is provided by WS to those persons requesting assistance with resolving damage or the threat of damage by providing information and recommendations on vulture damage management activities that can be conducted by the requestor without WS' direct involvement in managing or preventing the damage. The technical assistance projects conducted by WS are representative of the damage and threats that are caused by vultures in Virginia. WS' technical assistance activities are discussed further in Chapter 3 of the EA (USDA 2002, USDA 2004). Technical assistance projects do not include projects involving direct operational assistance provided by WS in which WS was requested to provide direct assistance with managing damage or threats of damage. Direct operational assistance provided by WS is discussed further in Chapter 3 of the EA (USDA 2002, USDA 2004).

During requests for assistance received by WS, cooperators often report to WS or WS verifies through site visits, damage associated with vultures. Since FY 2006, damage has been reported to WS or WS has verified a total of \$570,186 in damages caused by vultures in the Commonwealth. Damages have been reported or verified as occurring primarily to property and agricultural resources. Monetary losses reported only reflect damage that has been reported to or verified by WS based on requests received for assistance. Assigning monetary damage to resources can be difficult especially when factoring in the lost aesthetic value. Similarly, placing a monetary value on threats to human safety can be difficult. The monetary damage reported reflects damage that has occurred and that has been reported to or verified by WS, but is not reflective of all vulture damage occurring in Virginia since not all damage or threats are reported to WS.

Table 1 – Vulture damage losses reported to or verified by WS in Virginia, FY 2006 – FY 2011.

Species	Fiscal Year						TOTAL
	2006	2007	2008	2009	2010	2011 [†]	
Black Vultures	\$143,245	\$58,238	\$65,421	\$117,202	\$75,900	\$61,150	\$521,156
Turkey Vultures	\$5,900	\$2,250	\$10,750	\$9,130	\$5,500	\$15,500	\$49,030
TOTAL	\$149,145	\$60,488	\$76,171	\$126,332	\$81,400	\$76,650	\$570,186

[†]Data for FY 2011 is preliminary

Economic damage to agricultural resources can occur from vultures feeding on livestock and from the increased risks of disease transmission associated with large concentrations of vultures. Although individual or small groups of vultures can cause economic damage to livestock producers, most economic damage occurs when vultures congregate in large flocks at livestock operations. According to the National Agricultural Statistics Service (NASS), the market value of livestock, poultry, and their products in the Commonwealth during 2007 was estimated at over \$2 billion (NASS 2009). The cattle and calf inventory in Virginia during 2007 was nearly 1.6 million head with an estimated 371,000 hogs (NASS 2009).

Predation by black vultures on livestock has been reported since the 1930s, including domestic pigs in Kentucky (Lovell 1947, Lovell 1952) and Texas (Parmalee 1954), lambs in West Virginia (Roads 1936)

²WS 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.

³The federal fiscal year begins on October 1 and ends on September 30 the following year.

and Ohio (Sprunt 1946), and cattle in Texas (Parmalee 1954). Black vultures are gregarious (*i.e.*, form large flocks) and groups averaging 20 to 60 individuals can attack prey animals (Lowney 1999). Vultures can cause injuries and death to newborn lambs and calves during the birth of the animals. Vultures often attack the soft tissue areas of newborns as they are being expunged from the female. During the birthing process, newborns and mothers are vulnerable and often unable to prevent attacks by large groups of vultures. Vultures often attack the eyes and rectal area of newborns during delivery that results in serious injury to the lamb or calf which often leads to the death of the animal.

Livestock producers in the United States reported the loss of 11,900 head of cattle and calves from vultures in 2010 valued at \$4.6 million (NASS 2011). Livestock producers in Virginia reported that of those cattle and calves lost due to predators in 2010, 7.8% of the cattle and 12.9% of the calves were lost due to vultures (NASS 2011). Of all the cattle and calves reported as lost due to predators in Virginia during 2010, vultures were identified as the second leading cause of predation by predators behind only the coyote (*Canis latrans*) (NASS 2011).

In a study conducted by Milleson et al. (2006), Florida ranchers were surveyed to the extent and severity of cattle losses associated with vultures. Respondents of the survey reported that 82.4% of all livestock losses attributed to vultures were newborn calves which exceed the reported predation of all other livestock species and livestock age classes (Milleson et al. 2006). Ranchers reported during the survey period a total loss of 956 calves, 25 yearlings (cattle), and 101 adult cattle with a total value estimated at \$316,570 and a mean value lost estimated at \$2,595 (Milleson et al. 2006). Predation associated with vultures was reported to occur primarily from November through March, but predation was reported to occur throughout the year (Milleson et al. 2006).

Vultures are gregarious especially during the fall and spring migration periods. Although damage and threats can occur throughout the year, damage is highest during those periods when vultures are concentrated into large flocks such as migration periods and during winter months when food sources are limited. The flocking behavior of vultures during migration periods can pose increased risks when those species occur near or on airport properties. Aircraft striking multiple birds not only increases the damage to the aircraft but can also increase the risk that a catastrophic failure of the aircraft might occur, especially if multiple birds are ingested into aircraft engines.

Vultures when in large flocks entering or exiting a roost at or near airports present a safety threat to aviation. Vultures can also present a risk to aircraft because of their large body mass and slow-flying or soaring behavior. Vultures are considered to be the most hazardous bird for an aircraft to strike based on the frequency of strikes, effect on flight, and amount of damage caused by vultures throughout the country (Dolbeer et al. 2000).

Proposed Supplement to the EA

WS continues to receive requests for assistance to manage damage to property, agricultural resources, and threats to human safety caused by vultures in Virginia. 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 vulture populations. To assist with communicating to the public the individual and cumulative impacts associated with managing increasing damage and threats associated with vultures; those activities are being further analyzed and addressed in this supplement to the EA.

Between 1966 and 2010, the number of vultures observed in the State has increased (National Audubon Society 2010, Sauer et al. 2011). As the statewide population of vultures continues to increase, the number of vultures managed by WS to address requests for assistance is also likely to increase. Under the

proposed action alternative, WS would continue to employ non-lethal and lethal methods in an integrated approach to resolving requests for assistance associated with vultures in the Commonwealth. Therefore, if the number of vultures managed by WS annually continues to increase, the number of vultures addressed using lethal and non-lethal methods is also likely to increase.

Based on requests for assistance received by WS prior to the development of the EA and after further analysis in the amendment to the EA, WS anticipated that up to 1,000 black vultures could be lethally taken in the Commonwealth to address damage and threats of damage occurring, when requested (USDA 2002, USDA 2004). As the statewide population of black vultures has increased, the number of vultures addressed by WS to alleviate damage and threats has increased. In FY 2011, WS addressed a total of 7,231 black vultures in the Commonwealth using lethal and non-lethal methods to alleviate damage based on requests for assistance received. In comparison, during FY 2006, WS addressed a total of 821 black vultures to alleviate damage. Therefore, the number of black vultures addressed by WS during FY 2011 increased 781% from the number addressed in FY 2006. WS addressed a total of 1,774 black vultures using lethal and non-lethal methods during FY 2010; therefore, the number of vultures addressed by WS during FY 2011 represented an increase of nearly 308% compared to the number addressed in FY 2010.

WS' previous management actions have included non-lethal and lethal efforts to address requests to manage damage and threats as described under the proposed action alternative in the EA (USDA 2002, USDA 2004). As part of the requests for assistance, WS reasonably anticipates an increase in the number of birds requested to be lethally removed as part of an integrated damage management strategy to reducing damage and threats. Based on the anticipated need to address an increasing number of black vultures using lethal methods, WS anticipates that up to 2,500 black vultures could be lethally removed annually in the Commonwealth to address requests for assistance. WS also anticipates an increase in the need to non-lethally harass and disperse vultures as part of the increasing requests for assistance.

Although the number of turkey vultures observed in the State are also showing increasing trends (National Audubon Society 2010, Sauer et al. 2011), WS does not anticipate the number of turkey vultures addressed annually to increase above those levels analyzed during the development of the EA and amendment to the EA. Although turkey vultures are known to cause damage to resources and pose threats to human safety, most requests for assistance received by WS are associated with black vultures or with mixed flocks of vultures that are dominated by the presence of black vultures. Therefore, lethal take of turkey vultures is not expected to exceed the level analyzed in the amendment to the EA (USDA 2002, USDA 2004).

This supplement to the EA will evaluate the issues associated with an increase in the number of black vultures addressed by WS annually in the Commonwealth to address damage and threats associated with requests for assistance. The increase in the need to address black vultures in this supplement to the EA would allow WS to adequately address requests as needs were identified, as requested by cooperators experiencing threats to human safety and/or damage due to black vultures, and as funding permits. In addition, the use of paintballs to manage damage will be analyzed in this supplement to the EA.

RELATIONSHIP OF THIS DOCUMENT TO OTHER ENVIRONMENTAL DOCUMENTS

WS has developed a programmatic Final Environmental Impact Statement (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, including vulture damage management.

DECISIONS TO BE MADE

Based on the scope of the EA, the 2004 amendment, and this supplement to the EA, the decisions to be made are: 1) should WS continue to conduct vulture damage management to alleviate damage to agriculture, property, natural resources, and threats to human safety, 2) should WS continue to implement an integrated wildlife damage management strategy (proposed action), including technical assistance and direct operational assistance, to meet the need for vulture damage management in Virginia, 3) if not, should WS attempt to implement one of the alternatives to an integrated damage management strategy as described in the EA, and 4) would continuing the proposed action alternative or the alternatives under this supplement result in adverse impacts to the environment requiring the preparation of an Environmental Impact Statement (EIS) based on activities conducted since the completion of the EA and/or based on new information available.

RELATIONSHIPS OF AGENCIES DURING PREPARATION OF THIS EA SUPPLEMENT

Based on agency relationships, Memorandums of Understanding (MOUs), and legislative authorities, WS was the lead agency during the development of the EA and the amendment to the EA, and therefore, was responsible for the scope, content, and decisions made. Management of migratory birds is the responsibility of the USFWS under the Migratory Bird Treaty Act. As the authority for the management of migratory bird populations, the USFWS was involved in the development of the EA and provided input throughout the EA preparation process to ensure an interdisciplinary approach according to the NEPA and agency mandates, policies, and regulations. The take of migratory, native bird species can only occur pursuant to the Migratory Bird Treaty Act when authorized through the issuance of a depredation permit by the USFWS; therefore, the take of vultures by WS to alleviate damage or reduce threats of damage would only occur at the discretion of the USFWS. In addition, any lethal take of vultures to alleviate damage or threats of damage would only occur at levels authorized by the USFWS as specified in depredation permits. The VDGIF is responsible for managing wildlife in the Commonwealth of Virginia, including vultures. Any activities conducted by WS to reduce and/or prevent vulture damage in the Commonwealth would be coordinated with the USFWS which ensure WS' actions would be incorporated into population objectives established by the USFWS for vulture populations in Virginia.

SCOPE OF ANALYSIS

The EA, the amendment to the EA, and this supplement to the EA evaluate vulture damage management activities in the Commonwealth of Virginia to reduce damage to property, agriculture, and threats to human safety associated with vultures in the Commonwealth. The scope of analysis remains valid as addressed in the EA and the amendment to the EA unless otherwise discussed in this supplement.

Actions Analyzed

The EA and the amendment evaluate the need for vulture damage management to reduce threats and damage occurring to property, human health and safety, and agricultural resources on private or public land within the Commonwealth wherever such management was requested from the WS program (USDA 2002, USDA 2004). The EA, the amendment to the EA, and this supplement discuss the issues associated with conducting vulture damage management in the Commonwealth to meet the need for action and evaluate different alternatives to meeting that need while addressing those issues.

WS uses a decision model based on a publication by Slate et al. (1992) which involves evaluating each threat or damage situation, taking action, evaluating the action, and monitoring results of the actions taken. The published article provides more detail on the processes used in WS' Decision Model. 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 2002).

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 vultures in the Commonwealth. Therefore, the actions evaluated in the EA and this supplement to the EA are the use of those methods available under the alternatives and the employment of those methods by WS to manage or prevent damage associated with vultures from occurring when permitted by the USFWS.

The MBTA makes it unlawful to pursue, hunt, take, capture, kill, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or their parts, nests, or eggs (16 U.S.C 703-711). A list of bird species protected under the MBTA can be found in 50 CFR 10.13.

The MBTA does allow for the lethal take of those bird species listed in 50 CFR 10.13 when depredation occurs through the issuance of depredation permits or the establishment of depredation orders. Under authorities in the MBTA, the USFWS is the federal agency responsible for the issuance of depredation permits or the establishment of depredation orders for the take of those protected bird species when damage or threats of damage are occurring. Information regarding migratory bird permits can be found in 50 CFR 13 and 50 CFR 21.

The USFWS is a cooperating agency on this supplement to the EA to analyze cumulative take of those vultures from the issuance of depredation permits to entities within the Commonwealth. The USFWS has jurisdiction over the management of migratory birds and has specialized expertise in identifying and quantifying potential adverse effects to the human environment from bird damage management activities. The analyses in this supplement to the EA and the analyses in the EA along with the amendment to the EA would ensure the compliance of the USFWS with the NEPA for the issuance of depredation permits for the take of vultures in the Commonwealth.

Native American Lands and Tribes

The WS program in Virginia 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 had been signed between WS and the Tribe requesting assistance. Therefore, the Tribe would determine when WS' assistance was 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 vultures on federal, Commonwealth, county, municipal, and private properties under the alternatives analyzed in the EA, the amendment to the EA, and this supplement to 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 by WS and the Tribe.

Federal, Commonwealth, County, City, and Private Lands

Under four of the alternatives analyzed in detail, WS could continue to provide vulture damage management activities on federal, Commonwealth, county, municipal, and private land in Virginia when a request was received for such services by the appropriate property owner or manager. In those cases where a federal agency requests WS' assistance with managing damage caused by vultures, the requesting

agency would be responsible for analyzing those activities in accordance with the NEPA. However, the EA, the amendment, and this supplement would cover such actions if the requesting federal agency determined the analyses and scope of the EA, the amendment, and this supplement were appropriate for those actions and the requesting federal agency adopted the EA through their own Decision based on the analyses in the EA and supplements. Therefore, actions taken on federal lands have been analyzed in the scope of the EA, as amended, and this supplement to the EA.

Period for which this 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 USFWS and the VDGIF, determines that new needs for action, changed conditions, new issues, or new alternatives having different environmental impacts must be analyzed. At that time, the analyses in the EA, as amended, and this supplement would be reviewed and further supplemented pursuant to the NEPA. Review of the EA, as supplemented, would ensure that activities conducted under the selected alternative occurred within the parameters evaluated in the EA and the supplements. If the alternative analyzing no involvement in vulture damage management activities by WS were selected, there would be no monitoring of activities based on the lack of involvement by WS. Monitoring of activities ensures the EA remains appropriate to the scope of vulture damage management activities conducted by WS.

Site specificity

The site specificity of the EA will remain as addressed in section 1.7.3 of the EA (USDA 2002). The EA and the previous amendment analyzed the potential impacts of alternative approaches to managing damage associated with vultures that could be conducted on private and public lands in Virginia where damage management activities were occurring or have occurred previously under a MOU, cooperative service agreement, and in cooperation with the appropriate public land management agencies. The EA also addresses the potential impacts of conducting damage management approaches on areas where additional MOUs, cooperative service agreements, or other comparable documents may be signed in the future. Because the goals and directives of WS are to provide assistance when requested, within the constraints of available funding and workforce, it is conceivable that additional vulture damage management efforts under the alternatives could occur. Thus, the EA, as amended, and this supplement to the EA anticipate that potential increase and the impacts of such efforts are analyzed as part of the alternatives.

Black vultures and turkey vultures can be found statewide and throughout the year in Virginia; therefore, damage or threats of damage can occur wherever vultures occur. Planning for the management of vulture damage must be viewed as being conceptually similar to other entities 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 vulture 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 vultures 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 emphasizes major issues as those issues relate to specific areas whenever possible; however, many issues apply wherever vulture damage and the resulting management actions occurs and are treated as such.

Chapter 2 of the EA identifies and discusses issues relating to vulture damage management in Virginia. The standard WS Decision Model (Slate et al. 1992, USDA 2002) would be the site-specific procedure

for individual actions conducted by WS in the Commonwealth (see Chapter 3 in the EA for a description of the Decision Model and its application). Decisions made using the model would be in accordance with WS' directives and Standard Operating Procedures (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 Virginia. 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 address damage and threats associated with vultures in the Commonwealth.

Public Involvement

An invitation for public comment on the EA (USDA 2002) was sent to 403 individuals or organizations identified as interested in vulture damage management or WS' projects in Virginia. Notice of the proposed action and availability of the EA for public comment was also provided as legal notices in *The Richmond Times Dispatch*, *The Virginian Pilot*, *The Roanoke Times*, and *The Washington Times*. There was a 34-day comment period for the public to provide input on the EA. During the comment period, WS received 120 comment letters. Comments from the public involvement process were reviewed for substantive issues and alternatives which were considered in developing the Decision for the EA. A Decision and FONSI was signed for the EA on January 15, 2003. WS' response to specific comments were included in Appendix A of the Decision and FONSI signed in 2003 (USDA 2002).

In response to comments received after the close of the comment period, an amendment to the EA was prepared to address those comments and new information available (USDA 2004). Copies of the amendment were sent to 116 individuals or organizations identified as interested in vulture damage management in Virginia, including all persons who commented on the original EA and Decision, if they provided an address. Notice of the availability of the amendment to the EA was also published as a legal notice in *The Richmond Times Dispatch*, *The Virginian Pilot*, *The Roanoke Times*, and *The Washington Times* announcing a 32-day public comment period. WS received nine comment letters from the public during the comment period. After consideration of the analysis contained in the EA, the amendment, and review of public comments, a new Decision and FONSI for the amendment to the EA was issued on February 10, 2005. The Decision and FONSI selected the proposed action alternative which implemented an integrated damage management program in Virginia using multiple methods to resolve vulture damage. WS' responses to specific public comments on the amendment to the EA were included in Appendix A of the Decision and FONSI issued in 2005 (USDA 2004).

This supplement to the EA, along with the EA (USDA 2002), the amendment to the EA (USDA 2004), and the associated Decisions and 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 Richmond Times Dispatch*, *The Virginian Pilot*, and *The Roanoke Times* 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 notice of availability for this supplement to the EA will also be directly mailed to agencies, organizations, and individuals with probable interest in the proposed program. Comments received during the public involvement process will be fully considered for new substantive issues and alternatives.

AUTHORITY AND COMPLIANCE

WS' activities to reduce damage and threats associated with wildlife are regulated by federal, Commonwealth, and local laws and regulations. The authority of WS and other agencies along with

compliance with relevant laws and regulations are discussed in detail in section 1.8 of the EA (USDA 2002). Compliance with laws and regulations not directly addressed in the EA will be 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.

Responsibilities of Federal Agencies to Protect Migratory Birds - Executive Order 13186

Executive Order 13186 requires each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations, is directed to develop and implement, a MOU with the USFWS that shall promote the conservation of migratory bird populations. WS has developed a draft MOU with the USFWS as required by this Executive Order and is currently waiting for USFWS approval. WS will abide by the MOU once it is finalized and signed by both parties.

Protection of Children - Executive Order 13045

Children may suffer disproportionately for many reasons from environmental health and safety risks, including the development of their physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, WS has considered the impacts that this proposal might have on children. The proposed vulture damage management program would occur by using only legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing the selected alternative.

The Native American Graves and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act requires federal agencies to notify the Secretary of the Department that manages the federal lands upon the discovery of Native American cultural items on federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

ISSUES ADDRESSED IN DETAIL

The issues analyzed in detail are discussed in Chapter 2 of the EA (USDA 2002). Alternatives developed and identified during the development of the EA to address those issues are discussed in Chapter 3 of the EA (USDA 2002). The following issues were identified during the scoping process for the EA:

- Issue 1 - Effects on Target Bird Species Populations
- Issue 2 - Effects on Nontarget Wildlife Species Populations, including T&E Species

- Issue 3 - Effects on Human Health and Safety
- Issue 4 - Effects on Aesthetics
- Issue 5 - Humaneness of Lethal Bird Control Methods

Based on those damage management activities conducted previously by WS since the Decision and FONSI were signed in 2005 and in consultation with the USFWS and the VDGIF, no additional issues have been identified that require detailed analyses. Those issues identified during the development of the EA remain applicable and appropriate to resolving damage and threats of damage associated with vultures in the Commonwealth.

ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

In addition to the issues considered in detail, two other issues were considered in section 2.3 of the EA, but were not analyzed in detail with the 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 is still appropriate regarding those issues.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

The alternatives considered and evaluated using the identified issues are described and discussed in detail in Chapter 3 of the EA (USDA 2002). In addition, Chapter 4 of the EA analyzes the environmental consequences of each alternative as those alternatives relate to the issues identified (USDA 2002). 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 - Integrated Wildlife Damage Management/Vulture Damage Management Program (Proposed Action/No Action)
- Alternative 2 - Nonlethal Vulture Damage Management Only By WS
- Alternative 3 - Technical Assistance Only
- Alternative 4 - Lethal Vulture Damage Management Only By WS
- Alternative 5 - No Federal WS Vulture Damage Management

VULTURE DAMAGE MANAGEMENT AND METHODOLOGIES AVAILABLE

A description of the wildlife damage management methods that could be used or recommended by WS is provided in section 3.2 of the EA and Appendix B of the EA (USDA 2002). The use of paintballs as a non-lethal harassment and dispersal tool for vultures was not included in the 2002 EA, but is a method that has recently been identified by WS in Virginia as a method to disperse vultures and other wildlife that are causing damage.

Paintballs do not actually contain paint, but are marking capsules which consist of a gelatin shell filled with a non-toxic glycol and water-based coloring that rapidly dissipates and is not harmful to the environment. Although the ingredients may vary slightly depending on the manufacturer, paintball ingredients may include: polyethylene glycol, gelatin, glycerine (glycerol), sorbitol, water, ground pig skin, dipropylene glycol, mineral oil, and dye as the colorant (Donaldson 2003). A paintball marker (or gun) uses compressed carbon dioxide (CO₂) to propel paintballs an average of 280 feet per second; however, they are not very accurate. The discharge of the paintball marker combined with the sound of paintballs hitting the ground or trees may be effective in dispersing vultures, especially when combined with other harassment techniques. Although paintballs break easily and velocity rapidly decreases with

distance, firing at close range would be discouraged to avoid harming vultures. As with pyrotechnics, use of paintballs may be restricted in some areas by local ordinances.

Paintballs are considered non-toxic to people and do not pose an environmental hazard, as described on product labeling and Material Safety Data Sheets. However, consumption may cause toxicosis in dogs, which is potentially fatal without supportive veterinary treatment (Donaldson 2003). Little is known about the mechanism of action and lethal dose for dogs that consume paintballs, but it is suspected that there is an osmotic diuretic effect resulting in an abnormal electrolyte and fluid balance (Donaldson 2003). Most affected dogs recovered within 24 hours (Donaldson 2003).

WS would conduct operational assistance only when requested by the property owner or manager and only after cooperative service agreements, MOUs, or other comparable documents were signed between WS and the entity requesting assistance. Therefore, the property owner or manager would be informed of potential threats of paintballs to pet safety and WS would determine if pets were able to access the areas where paintballs would be used and whether or not paintballs were an appropriate dispersal method at that site. WS would not use paintballs to disperse vultures in areas where pets are likely to consume unbroken capsules.

ALTERNATIVES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

In addition to the alternatives considered in detail, one other issue was considered in section 3.3 of the EA, but was not analyzed in detail with the rationale provided in the EA. WS has reviewed the alternative not considered in detail as described in the EA and has determined that the analyses provided in the EA is still appropriate.

STANDARD OPERATING PROCEDURES FOR DAMAGE MANAGEMENT ACTIVITIES

SOPs improve the safety, selectivity, and efficacy of wildlife damage management activities. The WS program in the Commonwealth of Virginia uses many such SOPs which are discussed in detail in Chapter 3 of the EA (USDA 2002). Those SOPs would be incorporated into activities conducted by WS when addressing vulture damage in the Commonwealth.

ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

The major issues are discussed in detail in Chapter 2 of the EA (USDA 2002). Alternatives developed and identified during the development of the EA to meet the need for action and to address those issues are discussed in Chapter 3 of the EA (USDA 2002). Potential impacts of Alternative 2, Alternative 3, Alternative 4, and Alternative 5 on the human environment related to the major issues have not changed from those described and analyzed 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 2002). The issues were identified as important to the scope of the analysis in the EA (40 CFR 1508.25). Alternative 1 (proposed action/no action), as described in the EA, addresses requests for vulture damage management in the Commonwealth using an integrated damage management approach by WS. 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 the amendment to the EA, and this supplement to the EA as related to Alternative 1 (proposed action/no action alternative):

Issue 1 – Effects on Target Species Bird Populations

A common concern when addressing damage associated with wildlife species are the effects on the populations of those species from methods used to manage damage. Methods available to address vulture

damage or threats of damage in the Commonwealth that would be available for use or recommendation under the alternatives are either lethal methods or non-lethal methods. Non-lethal methods include, but are not limited to: habitat/behavior modification, effigies, visual deterrents, live traps, exclusionary devices, frightening devices, paintballs, and nets (see Appendix B in the EA for a complete list and description of potential methods).

Non-lethal methods can disperse or otherwise make an area unattractive to vultures causing damage; thereby, reducing the presence of vultures at the site and potentially the immediate area around the site where non-lethal methods were employed. Non-lethal methods would be given priority when addressing requests for assistance (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 cooperators requesting assistance had already used non-lethal methods, WS would not likely recommend or continue to employ those particular methods since their use has already been proven ineffective in adequately resolving the damage or threat. Non-lethal methods would be used to exclude, harass, and disperse target wildlife from areas where damage or threats were occurring. When effective, non-lethal methods would disperse vultures from the area resulting in a reduction in the presence of those vultures at the site where those methods were employed. The use of non-lethal methods in an integrated approach has been proven effective in dispersing vultures. For example, Avery et al. (2002) and Seamans (2004) found that the use of vulture effigies were an effective non-lethal method to disperse roosting vultures.

Non-lethal methods are generally regarded as having minimal impacts on overall populations of wildlife since those species are unharmed. Non-lethal methods would not be employed over large geographical areas or applied at such intensity that essential resources (*e.g.*, food sources, habitat) would be unavailable for extended durations or over a wide geographical scope that long-term adverse effects would occur to a species' population. The continued use of non-lethal methods often leads to the habituation of vultures to those methods which can decrease the effectiveness of those methods. For any management methods employed, the proper timing would be essential in effectively dispersing those vultures causing damage. Employing methods soon after damage begins or soon after threats were identified increases the likelihood that those damage management activities would achieve success in addressing damage. Therefore, coordination and timing of methods would be necessary to be effective in achieving expedient resolution of vulture damage.

Lethal methods considered by WS to address vulture damage include: live-capture followed by euthanasia, shooting, and nest/egg destruction. Euthanasia would occur in accordance with WS Directive 2.505. Lethal methods would be employed or recommended to resolve damage associated with those vultures identified by WS as responsible for causing damage or threats of damage only after receiving a request for the use of those methods. The use of lethal methods could result in local population reductions in the area where damage or threats were occurring since vultures would be removed from the population. Lethal methods would often be employed to reinforce non-lethal methods and to remove vultures that have been identified as causing damage or posing a threat to human safety, property, or agriculture. The use of lethal methods would result in local reductions of vultures in the area where damage or threats were occurring. The number of vultures removed from the population using lethal methods would be dependent on the number of requests for assistance received, the number of vultures involved with the associated damage or threat, and the efficacy of methods employed.

Most lethal methods are intended to reduce the number of vultures present at a location since a reduction in the number of vultures at a location can lead to a reduction in damage which is applicable whether using lethal or non-lethal methods. The intent of non-lethal methods is to harass, exclude, or to otherwise make an area unattractive to vultures which disperses those vultures to other areas leading to a reduction in damage at the location where those vultures were dispersed. The intent of using lethal methods would

be similar to the objective trying to be achieved when using non-lethal methods which is to reduce the number of vultures in the area where damage was occurring which can lead to a reduction in the damage occurring at that location.

Although the use of firearms can reduce the number of vultures using a location (similar to dispersing vultures), the use of a firearm is most often used to supplement and reinforce the noise associated with non-lethal methods. The capture of vultures using live-traps and subsequently euthanizing those vultures is employed to reduce the number of vultures using a particular area where damage was occurring.

Often of concern with the use of lethal methods is that vultures that were lethally taken would only be replaced by other vultures either during the application of those methods (from other vultures that migrate into the area) or by vultures the following year (increase in reproduction that could result from less competition). As stated previously, the use of lethal methods are not intended to be used as population management tools over broad areas. The use of lethal methods would be intended to reduce the number of vultures present at a location where damage was occurring by targeting those vultures causing damage or posing threats. Since the intent of lethal methods would be to manage those vultures causing damage and not to manage entire vulture populations, those methods would not be ineffective because vultures return at some point in time.

Most lethal and non-lethal methods currently available provide only short-term benefits when addressing vulture damage. Those methods are intended to reduce damage occurring at the time those methods were employed but do not necessarily ensure vultures would not return once those methods were discontinued or the following year when vultures return to an area. Long-term solutions to resolving vulture damage are often difficult to implement and can be costly. In some cases, long-term solutions involve exclusionary devices, such as wire grids, or other practices such as closing garbage cans. When addressing vulture damage, long-term solutions generally involve modifying existing habitat or making conditions to be less attractive to vultures. To ensure complete success, alternative sites in areas where damage was not likely to occur would often times be required to achieve complete success in reducing damage and to avoid moving the problem from one area to another. Modifying a site to be less attractive to vultures would likely result in the dispersal of those vultures to other areas where damage could occur or could result in multiple occurrences of damage situations. For example, WS could effectively disperse vultures roosting on support structures of power lines using non-lethal methods only to have those vultures begin roosting on the roof of a nearby residence where the accumulation of fecal droppings could cause damage to property and the vultures could begin tearing rooftop shingles.

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). Magnitude 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. Information on vulture populations and trends are often derived from several sources including the Breeding Bird Survey (BBS), the Christmas Bird Count (CBC), the Partners in Flight Landbird Population database, and published literature. Generally, WS only conducts damage management associated with species whose population densities are high. WS' take would be monitored by comparing numbers of animals killed with overall populations or trends in populations to assure the magnitude of take was maintained below the level that would cause significant adverse impacts to the viability of native species' populations. Lethal take of vultures by WS that could occur under the proposed action would only occur at the requests of a cooperator seeking assistance and only after the appropriate permit had been issued by the USFWS.

Breeding Bird Survey

Bird populations can be monitored by using trend data derived from data collected during the BBS. Under specific guidelines, observers count birds at established survey points along roadways for a set duration along a pre-determined route. The number and species of birds observed and heard within a quarter of a mile of the survey points are recorded. Surveys were started in 1966 and are conducted in June which is generally considered as the period of time when those birds present at a location are likely breeding in the immediate area. The BBS is a combined set of over 3,700 roadside survey routes conducted annually in the continental United States and southern Canada, across a large geographical area, under standardized survey guidelines. The BBS is a large-scale inventory of North American birds coordinated by the United States Geological Survey, Patuxent Wildlife Research Center (Sauer et al. 2011). The primary objective of the BBS has been to generate an estimate of population change for all breeding birds. Populations of birds tend to fluctuate, especially locally, as a result of variable local habitat and climatic conditions. Trends can be determined using different population equations and statistically tested to determine if a trend is statistically significant.

Current estimates of population trends from BBS data are derived from hierarchical model analysis (Link and Sauer 2002, Sauer and Link 2011) and are dependent upon a variety of assumptions (Link and Sauer 1998). The statistical significance of a trend for a given species is also determined using BBS data (Sauer et al. 2011).

Christmas Bird Count

The CBC is conducted in December and early January annually by numerous volunteers under the guidance of the National Audubon Society. The CBC reflects the number of birds frequenting a location during the winter months and is based on birds observed within a 15-mile diameter circle around a central point (177 mi²). The CBC data does not provide a population estimate, but can be used as an indicator of trends in the population. Researchers have found that population trends reflected in CBC data tend to correlate well with those from censuses taken by more stringent means (National Audubon Society 2010).

Partners in Flight Landbird Population Estimate

The BBS data are intended for use in monitoring bird population trends, but it is also possible to use BBS data to develop a general estimate of the size of bird populations. Using relative abundances derived from the BBS, Rich et al. (2004) extrapolated population estimates for many bird species in North America as part of the Partners in Flight Landbird Population Estimate database. The Partners in Flight system involves extrapolating the number of birds in the 50 quarter-mile circles (total area/route = 10 mi²) survey conducted during the BBS to an area of interest. The model used by Rich et al. (2004) makes assumptions on the detectability of birds, which can vary for each species. Some species of birds that are more conspicuous (visual and auditory) are more likely to be detected during bird surveys when compared to bird species that are more secretive and do not vocalize often. Information on the detectability of a species is combined to create a detectability factor which may be combined with relative abundance data from the BBS to yield a population estimate (Rich et al. 2004).

Population Impact Analysis from WS' activities in Virginia from FY 2006 through FY 2011

WS has provided direct damage management and technical assistance in response to requests for assistance with vulture damage in Virginia since the completion of the EA and the Decision/FONSI for the amendment signed in 2005. All vulture damage management activities conducted by WS were pursuant to relevant federal, Commonwealth, and local laws and regulations.

A common concern when addressing damage associated with wildlife species are the effects on the populations of those species from methods used to manage damage. The integrated approach of managing damage associated with vultures 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 vultures could result in local reductions of vulture populations in the area where damage or threats of damage were occurring.

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 a species' population is determined based on the number of animals killed as that lethal take relates to the species 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 was monitored by comparing numbers of animals killed with overall populations or trends in populations to assure the magnitude of take was maintained below the level that would cause significant adverse impacts to the viability of native species' populations.

WS continued to implement and employ an integrated damage management approach to reducing threats and damage caused by vultures between FY 2006 and FY 2011 through the recommendation and use of multiple methods. Technical assistance provides those persons seeking assistance with information on damage identification, species identification, available methods, and how to employ available methods to resolve or prevent damage. Operational assistance involves the direct application of methods and techniques by WS to alleviate damage caused by vultures when a request for such assistance is received. Descriptions and application of direct damage management and technical assistance projects are discussed in detail in Chapter 3 of the EA (USDA 2002). WS conducted 1,054 technical assistance projects involving black vultures and 298 technical assistance projects involving turkey vultures between FY 2006 and FY 2011 through the recommendation of methods to resolve damage and threats without WS' direct involvement (see Table 2).

Table 2 – WS' technical assistance projects conducted for vultures in Virginia, FY 2006 – FY 2011

Species	Fiscal Year						TOTAL
	2006	2007	2008	2009	2010	2011	
Black Vultures	118	156	195	234	171	180	1,054
Turkey Vultures	18	43	61	65	53	58	298
TOTAL	136	199	256	299	224	238	1,352

In addition to technical assistance, WS has also provided direct operational assistance in Virginia, when WS was requested to be directly involved with resolving damage associated with vultures. Direct operational assistance provided by WS included both non-lethal harassment and exclusion techniques and the lethal removal of vultures. Between FY 2006 and FY 2011, WS dispersed a total of 16,922 black vultures (see Table 3) and 11,141 turkey vultures (see Table 4) to resolve damage in Virginia. Additionally, from FY 2006 through FY 2011, WS employed live-capture methods and shooting to lethally remove 1,477 black vultures and 273 turkey vultures to alleviate damage or threats of damage. In addition, three black vulture nests were removed or destroyed between FY 2006 and FY 2011. During other damage management activities conducted by WS between FY 2006 and FY 2011, four turkey vultures and two black vultures were also unintentionally killed as non-targets.

Table 3 – Black vultures lethally removed and dispersed by WS during vulture damage management activities in Virginia, FY 2006 – FY 2011

Fiscal Year	Lethal Take by Method		Dispersed
	Live-Capture ¹	Shooting	
2006	543	12	266
2007	0	18	1,255
2008	0	32	4,886
2009	1	36	2,345
2010	201	34	1,539
2011	544	56	6,631
TOTAL	1,289	188	16,922

¹Vultures live-captured were subsequently euthanized pursuant to WS Directive 2.505

In FY 2008, WS partnered with the Center for Conservation Biology (CCB) at the College of William and Mary and the VDGIF to conduct a research project that evaluated vulture movement patterns as those movements relate to damage or threats of damage (Duerr 2009). WS assisted the CCB with the live-capture of vultures using walk-in traps so those vultures could be tagged and released to monitor movements and dispersal patterns. Vultures were tagged with conspicuous patagial tags attached over the leading edge of the wing in accordance with a bird banding permit issued by the United States Geological Survey. During FY 2008, WS and the CCB live-captured 100 black vultures in walk-in traps, which were banded using patagial tags and released on site. An additional 100 black vultures were live-captured during FY 2010, which were banded and released. The tagging of vultures enabled WS, the VDGIF, and the CCB to monitor vulture activity and dispersal patterns near a damage site.

Those methods employed by WS to alleviate damage and threats of damage associated with vultures from FY 2006 through FY 2011 were addressed in the EA in Appendix B (USDA 2002). Carcasses of vultures lethally removed by WS were disposed of in accordance with WS Directive 2.515.

The amendment to the EA (USDA 2004) evaluated an annual take of up to 1,000 black vultures and up to 500 turkey vultures by WS to manage damage and threats when a request for assistance was received. Based on the analyses in the EA and the amendment to the EA, take within the scope analyzed would not adversely affect the populations of those two species. WS' annual take of black vultures and turkey vultures from FY 2006 through FY 2011 was below the level of take analyzed in the EA and the amendment to the EA.

Table 4 – Turkey vultures lethally removed and dispersed by WS during vulture damage management activities in Virginia, FY 2006 - FY 2011

Fiscal Year	Take by Method		Dispersed
	Live-Capture ¹	Shooting	
2006	1	12	547
2007	0	21	1,656
2008	0	44	1,347
2009	0	33	776
2010	0	71	3,057
2011	1	90	3,758
TOTAL	2	271	11,141

¹Vultures live-captured were subsequently euthanized pursuant to WS Directive 2.505

According to the USFWS, a total of 2,241 black vultures and 499 turkey vultures were taken under migratory bird depredation permits in Virginia between 2005 and 2010 (see Table 5; P. Labonte, USFWS,

pers. comm. 2011). Authorized take and reported take of vultures for 2011 is currently unavailable. The USFWS has authorized the total lethal take of 10,120 black vultures in Virginia between 2005 and 2010, which is an average of 1,687 black vultures per year in the Commonwealth. The highest annual level of take authorized occurred in 2010 when 2,270 black vultures were authorized to be lethally taken by the USFWS. Between 2005 and 2010, the USFWS authorized the total take of 4,334 turkey vultures in the Commonwealth, which is an average of 723 black vultures per year. The highest authorized take occurred in 2005 when the USFWS authorized the take of 1,114 turkey vultures. The annual combined take of vultures by all entities in Virginia, including WS, airports, and other property owners, from 2005 through 2010 did not in any year exceed the take level of 1,000 black vultures or 500 turkey vultures analyzed in the amendment to the EA (USDA 2004).

Table 5 – Take authorized by the USFWS and reported take of black and turkey vultures in Virginia, 2005 - 2010[†]

Year ¹	Black Vultures		Turkey Vultures	
	Authorized Take ²	Reported Take ³	Authorized Take ²	Reported Take ³
2005	1,408	684	1,114	79
2006	1,093	179	437	70
2007	1,593	158	617	79
2008	1,578	128	553	115
2009	2,178	317	835	64
2010	2,270	775	778	92
TOTAL	10,120	2,241	4,334	499

[†] Data provided by USFWS Migratory Bird Permit Office, Region 5 (P. Labonte, USFWS, pers. comm. 2011)

¹ Data reported by calendar year

² Authorized take is the number of vultures permitted to be lethally taken by the USFWS

³ Reported take is the number of vultures reported by entities as the actual number of vultures lethally removed under depredation permits issued by the USFWS

The EA, as amended, concluded that the effects of WS’ damage management activities in Virginia would not adversely impact populations of black vultures and turkey vultures when damage management activities occurred within the scope analyzed. Analyses conducted during the monitoring of WS’ activities in Virginia for the management of vulture damage determined that WS’ lethal take of vultures in the Commonwealth was not adversely impacting populations based on the best available information on those species’ populations. Available trend data for both species of vultures continue to show the number of vultures observed in Virginia is increasing (National Audubon Society 2010, Sauer et al. 2011), which provides an indication that cumulative lethal take has not occurred at a magnitude where population declines have occurred in the Commonwealth. The permitting of those activities by the USFWS provides additional analyses and outside review that WS’ activities conducted since FY 2006 have not negatively impacted populations of vultures in the Commonwealth.

Population Impact Analysis of the Proposed Supplement to the EA

Turkey vultures and black vultures can be found throughout the year in Virginia and both species can be found statewide (Kirk and Mossman 1998, Buckley 1999). Along routes surveyed in the Commonwealth during the BBS, the number of black vultures observed has shown an increasing trend between 1966 and 2010 estimated at 3.4% annually, which is a statistically significant trend (Sauer et al. 2011). More recent trend data obtained during the BBS conducted from 2000 through 2010 shows the number of black vultures observed in Virginia along routes surveyed has increased at an annual rate of 3.0% (Sauer et al. 2011). Across their breeding range, the number of black vultures observed in areas surveyed during the

BBS has shown an increasing trend estimated at 4.5% annually from 1966 through 2010, while a 6.4% annually increase has been observed between 2000 and 2010 (Sauer et al. 2011).

The numbers of turkey vultures observed in areas surveyed during the BBS are also showing an increasing annual trend estimated at 3.3% in Virginia from 1966 through 2010 (Sauer et al. 2011). Between 2000 and 2010, the number of turkey vultures observed in areas surveyed during the BBS has shown an increasing trend estimated at 3.9% annually in the Commonwealth (Sauer et al. 2011). Across all routes surveyed, the number of turkey vultures observed has shown an increasing trend estimated at 2.3% annually between 1966 and 2010, with a 3.2% annual trend estimated between 2000 and 2010 (Sauer et al. 2011).

Between 1966 and 2010, the number of turkey vultures and black vultures observed in areas surveyed during the CBC has shown generally increasing trends in the Commonwealth (National Audubon Society 2010). Rich et al. (2004) used BBS data to estimate the statewide breeding black vulture population at 5,000 birds and estimated the breeding turkey vulture population at 22,000 birds in the Commonwealth. The population estimates provided by Rich et al. (2004) for some species are often poor due to high variance on BBS counts, low sample size, or due to other species-specific limitations of BBS methods. Estimates of bird populations calculated by Rich et al. (2004) were derived from BBS data for individual species. BBS survey data is derived from surveyors identifying bird species based on visual and auditory cues at stationary points along roadways. Vultures produce very few auditory cues that would allow for identification (Buckley 1999) and thus, surveying for vultures is reliant upon visual identification. For visual identification to occur during surveys, vultures must be either flying or visible while roosting. Coleman and Fraser (1989) estimated that black and turkey vultures spend 12 to 33% of the day in summer and 9 to 27% of the day in winter flying. Avery et al. (2011) found that both turkey vultures and black vultures were most active in the winter (January to March) and least active during the summer (July to September). Avery et al. (2011) found that across all months of the year, black vultures were in flight only 8.4% of the daylight hours while turkey vultures were in flight 18.9% of the daylight hours.

Most vultures during surveys are counted while flying since counting at roosts can be difficult due to obstructions limiting sight and due to the constraints of boundaries used during the surveys, especially the BBS since observers are limited to counting only those bird species observed or heard within a quarter mile of a survey point along a roadway. Bunn et al. (1995) reported vulture activity increased from morning to afternoon as temperatures increased. Avery et al. (2011) found turkey vulture flight activity peaked during the middle of the day. Three hours after sunrise, Avery et al. (2011) found only 10% of turkey vultures in flight and black vultures lagged about an hour behind turkey vultures in their flight activities. Therefore, surveys for vultures should occur later in the day to increase the likelihood of vultures being observed by surveyors. Observations conducted for the BBS are initiated in the morning since mornings tend to be periods of high bird activity. Since vulture activity tends to increase from morning to afternoon when the air warms and vultures can find thermals for soaring, vultures are probably under-represented in BBS data. The limitations associated with surveying for vultures under current BBS guidelines likely resulted in lower than expected population estimates of black vultures and turkey vultures. Given the limitations of current survey protocols, populations of vultures in Virginia are likely higher than derived by Rich et al. (2004) using data from the BBS.

The amendment to the EA included eight different analyses of impacts from WS' vulture damage management activities on statewide populations of black vultures and turkey vultures. Those analyses were based on the best available information at that time. Since the completion of the amendment to the EA in 2004 and the Decision and FONSI (USDA 2004), Runge et al. (2009) have developed a new method for determining allowable take levels and applied the method to assess population impacts to black vultures in Virginia.

Biological assessments for identifying the potential impact of harvest and/or removal programs on bird populations have a long history of application in the United States. Population modeling and extensive monitoring programs form the basis of an adaptive decision-making process used each year for setting migratory gamebird harvest regulations, while ensuring that levels of take are sustainable. Increasing human-wildlife conflicts caused by migratory bird species (both game and nongame), and their potential impacts on sensitive species and their habitats, has resulted in greater use of analytical tools to evaluate the effects of authorized take to achieve population objectives (Runge et al. 2009).

Runge et al. (2009) adapted a potential biological removal model to define a prescribed take level (PTL) and demonstrated this approach for the lethal take of black vultures in Virginia. Data from the BBS and other sources were used to estimate the black vulture population in Virginia in 2006 at 91,190 birds (95% credible interval = 44,520 – 212,100) (Runge et al. 2009). Using a population estimate of 66,620 black vultures (the lower 60% credible interval) to account for uncertainty, Runge et al. (2009) found that conservatively the PTL, or allowable take of black vultures, in Virginia would be up to 3,533 birds annually and that a sustainable harvest strategy would be maintained with a take as high as 7,066 black vultures annually.

As shown in Table 5, 2,241 black vultures have been reported as lethally taken under depredation permits to the USFWS from 2005 through 2010, which is an average of 374 black vultures reported as removed annually. If the black vulture population in the Commonwealth remains relatively stable, take of up to 2,500 black vultures annually by WS would represent 2.7% of the statewide population estimate derived by Runge et al. (2009) of 91,190 black vultures. Using the population derived by Runge et al. (2009) estimated at 66,620 black vultures to account for uncertainty, the lethal take of up to 2,500 black vultures would represent 3.8% of the estimated population. If the number of black vultures taken by other entities in the State remains similar to the number of black vultures taken from 2005 through 2010 and if 2,500 vultures were taken by WS, the annual take of vultures would be 2,874 vultures which would be below the allowable take level estimated by Runge et al. (2009) of 3,533 vultures. The highest reported level of take by all entities between 2005 and 2010 occurred in 2010 when 775 black vultures were lethally removed. If the highest level of take by all entities (which includes WS' take) of 775 vultures was combined with the take of 2,500 vultures, the total would equal 3,275 vultures which is below the allowable take of black vultures estimated by Runge et al. (2009) of 3,533 vultures.

The permitting of those activities by the USFWS provides additional analyses and outside review that WS' activities have not negatively impacted populations of vultures in Virginia. The PTL analysis conducted by Runge et al. (2009) for the take of black vultures in Virginia demonstrates that a greater number of black vultures than proposed in the 2004 amendment to the EA, up to 3,533 vultures, could be removed without adversely impacting the population in Virginia.

Issue 2 – Effects on Non-target Species Populations, Including Threatened and Endangered Species

The issue of non-target species effects, including effects on threatened and endangered (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 which were discussed in the EA (USDA 2002). 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 reduce threats to safety.

Non-lethal methods have the potential to cause adverse effects on non-targets primarily through exclusion, harassment, and dispersal. Any exclusionary device erected to prevent access of target species also potentially excludes species that are not the primary reason the exclusion was erected. Therefore, non-target species excluded from areas may potentially be adversely impacted if the area excluded is large enough. The use of auditory and visual dispersal methods used to reduce damage or threats caused by target species are also likely to disperse non-targets in the immediate area where the methods are employed. However, the potential impacts on non-target species are expected to be temporary with target and non-target species often returning after the cessation of dispersal methods. Like other non-lethal dispersal methods, the use of paintballs fired from paintball guns could result in the dispersal of non-targets from areas where application occurs. However, like other non-lethal dispersal methods, no adverse effects are expected from the use of paintballs and paintball guns since no lethal take would occur and the non-targets would be unharmed.

The lethal take of non-targets from the use of those methods described in the EA is unlikely with take never reaching a magnitude that a negative impact on populations would occur. The two lethal methods available to address vulture damage include the use of firearms and euthanasia following live-capture. The use of firearms and euthanasia methods is selective for target species since animals are identified prior to application; therefore, no adverse impacts would be anticipated from use of those methods. Any potential non-targets live-captured would be handled in such a manner as to ensure the survivability of the animal when released.

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 would be minimal and should not affect the overall populations of any species. Since the Decision and FONSI were signed for the amendment to the EA (USDA 2004), no non-target species were lethally taken during vulture damage management activities in the Commonwealth.

The EA, as amended, concluded that WS' damage management activities would have no adverse effects on other wildlife species (non-target), including T&E species throughout the Commonwealth when those activities were conducted within the scope analyzed. Methods used by WS are essentially selective for target species when applied appropriately. No adverse effects to non-targets were observed or reported to WS during vulture damage management activities. WS would continue to monitor the take of non-target species to ensure program activities or methodologies used in vulture damage management do not adversely impact non-targets. WS' take of non-target species during activities to reduce damage or threats to human safety caused by vultures is expected to continue to be extremely low to non-existent.

Threatened and Endangered Species

A review of T&E species listed by the USFWS and the National Marine Fisheries Service showed that additional listings of T&E species in the Commonwealth of Virginia have occurred since the completion of the EA. Those species listed since the completion of the EA include the American burying beetle (*Nicrophorus americanus*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), gray wolf (*Canis lupis*), seabeach amaranth (*Amaranthus pumilus*), and American chaffseed (*Schwalbea americana*). Of those species listed since the completion of the EA, only the leatherback seaturtle, loggerhead seaturtle, seabeach amaranth, and American chaffseed are listed as currently occurring in the Commonwealth. For those species not currently listed as occurring in Virginia, WS' activities to manage damage associated with vultures, including those activities described in this supplement to the EA would have no effect on those species. The leatherback and loggerhead seaturtles are marine turtles that spend time on land only to lay eggs. WS' activities to manage vulture damage

would have no effect on those marine turtles. Those methods described in the EA, including the use of paintballs and paintball guns described in this supplement to the EA, would not result in habitat destruction or damage to habitats used by the seabeach amaranth or the American chaffseed. Therefore, WS' activities to manage vulture damage would have no effect on seabeach amaranth or American chaffseed.

WS has also reviewed the Virginia state-listed T&E species and has determined that vulture damage management activities in Virginia would have no effect on any state listed species. Bald eagles (*Haliaeetus leucocephalus*) have been de-listed from the T&E species list by the USFWS. However, bald eagles are a state-listed threatened species in Virginia and are protected under the federal Bald and Golden Eagle Protection Act (Eagle Act). Eagles may occur in or near areas where vulture damage management activities are conducted. The walk-in, live traps (as described in Appendix B of the 2002 EA) used to capture vultures are baited with animal carcasses and therefore may attract scavenging bald eagles. Eagles that walk into these traps would be released unharmed by opening the trap to allow the birds to fly out. Based on previous activities conducted by WS⁴ and the selective nature of walk-in traps employed to live-capture vultures, the USFWS determined that no Eagle Act permit would be required relating to the use of walk-in traps and the potential to live-capture and release bald eagles (S. Hoskin, USFWS, pers. comm. 2012).

Although experience with eagle harassment at airports has shown that eagles are not responsive to harassment efforts (A. Duffiney, WS, pers. comm. 2012, B. Washburn, WS, pers. comm. 2012), the use of pyrotechnics may be considered a potential Category H (Blasting and other loud, intermittent noises) disturbance under the Eagle Act. WS would comply with the guidelines outlined in the Eagle Act and by the USFWS Virginia Field Office. These guidelines may be changed or updated, and WS would comply with the new guidelines as available. According to current guidelines, WS would not use pyrotechnics or shooting to harass vultures within ½ mile of an active eagle nest during the breeding season (December 15 – July 15) without further consultation with the USFWS and the VDGIF. Additionally, WS would consult with the USFWS and the VDGIF before using pyrotechnics or shooting to disperse vultures within ½ mile of designated bald eagle concentration areas during the summer (May 15 – August 31) or winter (December 15 – March 15) concentration periods (T. Dean, USFWS, pers. comm. 2012). WS vulture damage management methods conducted in compliance with these restrictions of the Eagle Act would have no effect on bald eagles in Virginia.

Issue 3 – Effects on Human Health and Safety

Based on the analyses in the EA, when WS' activities are conducted according to WS' directives, SOPs, and in accordance with federal, Commonwealth, and local laws those activities pose minimal risks to human safety (USDA 2002). The analyses in the EA also concluded that WS' activities to reduce threats and hazards associated with vultures were likely to provide some benefits to human health and safety by addressing safety issues and disease transmission associated with vultures. Positive benefits would include reducing threats associated with work place safety caused by accumulations of feces under vulture roosts in areas where people work and are likely to encounter feces or surfaces contaminated with feces. Other positive benefits include reducing potential bird strikes at airports. Bird strikes with aircraft can lead to extensive damage to aircraft and can threaten passenger safety.

No reports of injuries from vulture damage management activities were received since the completion of the EA and the Decision and FONSI (USDA 2002, USDA 2004), and no injuries to employees occurred from the implementation of methods under the proposed action. WS' vulture damage management

⁴ In 2012, a bald eagle was captured in a walk-in vulture trap and released unharmed. This was the first capture of an eagle in a vulture trap since WS first began using the method in Virginia in 1998.

activities did not cause any adverse impacts to public health and safety. Program activities and methods and their potential impacts on public health and safety have not changed from those analyzed in the EA.

Issue 4 – Effects on Aesthetics

As described in the EA, WS would employ methods when requested that would result in the dispersal, exclusion, or removal of individuals or groups of vultures to resolve damage and threats. In some instances where vultures were dispersed or removed, the ability of interested persons to observe and enjoy those birds would likely temporarily decline. However, the populations of those vultures in those areas would likely increase upon cessation of damage management activities.

Even the use of exclusionary devices can lead to the dispersal of vultures if the resource being damaged was acting as an attractant. Thus, once the attractant has been removed or made unavailable, vultures would likely disperse to other areas where resources are more vulnerable making them unavailable for viewing or enjoyment.

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 vultures. The WS program in Virginia 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 would be agreed upon by the cooperators according to a MOU, cooperative service agreement, or another similar document.

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

Issue 5 – Humaneness of Lethal Bird Control Methods

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 imposed by current technology and funding.

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 varied 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 wildlife 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 instance, a cage trap is generally considered by most members of the public as “*humane*”. 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, and methods are applied as humanely as possible. Methods used in wildlife damage management activities in Virginia since the completion of the EA and their potential impacts on humaneness and animal welfare have not changed from those analyzed in the EA. Therefore, the analyses of the humaneness of methods used by WS to alleviate vulture damage have not changed from those analyzed in the EA.

CUMULATIVE IMPACTS

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

WS’ wildlife damage management activities would be the primary federal program with damage management responsibilities; however, other private entities may conduct similar activities in Virginia as permitted by the USFWS. Through ongoing coordination with the USFWS, 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 from cumulative activities conducted pursuant to any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, critical habitats (areas listed in threatened and endangered species recovery plans), visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. Those resources will not be analyzed further. The activities proposed in the alternatives would have a negligible cumulative 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 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 Target Species Bird Populations

Evaluation of WS’ activities relative to vulture populations indicated that program activities would likely have no cumulative adverse effects on populations in Virginia. 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 vultures
- Mortality of vultures from illegal take
- Human-induced mortality through private damage management activities
- 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 wildlife populations. In many circumstances, requests for assistance arise when some or all of those elements have contrived to elevate target species populations or place target species 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 2002, USDA 2004). 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.

With management authority over vulture populations, the USFWS can adjust take levels, including the take by WS, to ensure population objectives for black and turkey vultures are achieved. Consultation and reporting of take by WS would ensure the USFWS considers any activities conducted by WS.

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

Historical Outcomes of WS' Activities to Address Vulture Damage in Virginia

No cumulative adverse effects have been identified for vultures as a result of program activities implemented over time based on analyses contained in the EA or the amendment to 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. WS only targets vultures 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. Population trend indices continue to indicate that black vulture and turkey vulture populations are increasing in Virginia despite previous levels of take (National Audubon Society 2010, Sauer et al. 2011).

WS continues to implement an integrated program that employs primarily non-lethal dispersal and harassment methods. WS would continue to provide technical assistance to those persons requesting assistance to identify and alleviate damage.

SOPs built into WS' program

SOPs are designed to reduce the potential negative effects of WS' actions on wildlife, and are tailored to respond to changes in wildlife populations which could result from unforeseen environmental changes. This would include those changes occurring from sources other than WS. Alterations in program activities are defined through SOPs and implementation is insured through monitoring, in accordance with WS' Decision Model (Slate et al. 1992, USDA 2002).

Migratory Bird Treaty Act, as amended

The Migratory Bird Treaty Act, as amended, places the protection of all bird species designated under the Act under the management authority of the USFWS. All take for damage management purposes is authorized by permit or order pursuant to the Act issued by the USFWS. Oversight of the allowed take of bird species by the USFWS ensures cumulative impacts are considered and addressed when determining the allowable take of bird species to ensure the viability of a population. The allowed take, including cumulative take, is analyzed and determined by the USFWS prior to the issuance of permits under the Act. Therefore, WS' allowed take, as authorized by the USFWS by permit, should not reach a level where cumulative take would adversely impact bird populations.

Issue 2 – Effects on Non-target Species Populations, Including Threatened and Endangered Species

Potential effects on non-target species from conducting wildlife 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 vultures 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, 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. 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 target wildlife 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. 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 and euthanasia methods are essentially selective for target species since identification of an individual is made prior to the application of the method. Euthanasia methods are applied through direct application to target wildlife. Therefore, the use of those methods would not impact non-target species.

The methods described in Appendix B of the EA (USDA 2002) all have a high level of selectivity and can be employed using SOPs to ensure impacts to non-targets are minimal. No non-targets have been lethally taken by WS during vulture damage management since the Decision and FONSI were signed for the amendment to the EA. Based on the methods available to resolve vulture damage and/or threats, WS does not anticipate the number of non-targets taken (killed) 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, including T&E species. WS has reviewed the T&E species listed by the USFWS and has determined that vulture damage management activities proposed by WS in this supplement would have no effect on T&E species listed since completion of the EA and the amendment to the EA. WS has also determined that vulture damage management activities proposed in this supplement would have no effect on T&E species and species of concern that are listed by the VDGIF. 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 of the EA would be 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 would be employed where human activity is minimal and warning signs would be 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. Firearms used to alleviate or prevent damage, though hazards do exist, would be employed to ensure the safety of personnel and the public.

WS has received no reports or documented any adverse effects to human safety from WS' vulture damage management activities conducted since the completion of the Decision and FONSI for the amendment to the EA. 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 vultures. As described in Appendix B of the EA, the lethal removal of vultures with firearms by WS to alleviate damage or threats would normally occur using a rifle or shotgun. Air rifles may also be used for the lethal take of vultures. 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).

To reduce risks to human safety and property damage from bullets passing through the target animal, the use of firearms is applied in such a way (*e.g.*, caliber, bullet weight, distance) to ensure the bullet does not pass through. When using firearms, the retrieval of 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 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) pass through, if misses occur, or if the 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, other concerns are 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). Those studies suggest that, given the very low amount of lead being deposited and the concentrations that would occur from WS’ activities to reduce vulture damage using firearms, lead contamination of water from such sources would be minimal to nonexistent.

Since permits can be issued by the USFWS directly to entities experiencing damage or threats of damage, WS’ assistance with removing vultures would not be additive to the environmental status quo since those vultures removed by WS using firearms could potentially be lethally removed by the entities receiving the migratory bird depredation permit using the same method in the absence of WS’ involvement. In addition, WS’ involvement ensures carcasses would be retrieved and disposed of properly to limit the availability of lead in the environment and ensures carcasses are removed from the environment to prevent the ingestion of lead 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 carcasses that may be irretrievable, would be below any level that would pose any risk from exposure or significant contamination of water.

Chemical Methods

The only chemical proposed for use by WS is carbon dioxide, which is an approved method of euthanasia for birds by the AVMA. Carbon dioxide is naturally occurring in the environment ranking as the fourth most abundant gas in the atmosphere. However, in high concentrations carbon dioxide causes hypoxia due to the depression of vital centers and is considered a moderately rapid form of euthanasia (AVMA 2007). Carbon dioxide is commercially available as a compressed bottled gas. Carbon dioxide is a colorless, odorless, non-flammable gas used for a variety of purposes, such as in carbonated beverages, dry ice, and fire extinguishers. Although some hazards exist from the inhalation of high concentrations of carbon dioxide during application for euthanasia purposes, when used appropriately, the risks of exposure are minimal. Since carbon dioxide is a common gas found in the environment, the use of and/or recommending the use of carbon dioxide for euthanasia purposes would not have cumulative impacts.

Issue 4 – Effects on Aesthetics

The activities of WS would result in the removal of vultures from those areas where damage or threats were occurring. Therefore, the aesthetic value of vultures 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 densities of vultures, including the return of native wildlife and plant species that may be suppressed or displaced by high densities of those species.

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 those species 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 vultures.

Vulture population objectives are established and enforced by the USFWS after consideration of all known mortality factors. Therefore, WS has no direct impact on the status of vulture populations since all take by WS occurs at the discretion of the USFWS. Since those persons seeking assistance could remove vultures identified as posing a threat without WS' direct involvement, WS' involvement would have no effect on the aesthetic value of vultures in the area where damage was occurring.

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.

Issue 5 – Humaneness of Lethal Bird Control Methods

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.

Those methods employed by WS to reduce or prevent damage caused by vultures are addressed in Appendix B of the EA (USDA 2002). WS continued to employ those methods as humanely as possible to minimize suffering and distress. WS also continues to implement SOPs to ensure methods are employed as humanely as possible. WS' SOPs are further discussed in Chapter 3 in the EA (USDA 2002).

All methods not requiring direct supervision during employment (*e.g.*, live traps) would be checked and monitored to ensure any vultures confined or restrained were addressed in a timely manner to minimize distress of the animal. All euthanasia methods used for live-captured vultures would be applied according to AVMA guidelines for free-ranging wildlife. Shooting would be conducted by personnel trained in the proper use of firearms to minimize pain and suffering of birds taken by this method.

SUMMARY OF CUMULATIVE IMPACTS

No significant cumulative environmental impacts are expected from activities considered under the supplement to the EA. Likewise, no significant cumulative impacts have been identified from the implementation of the proposed action in the EA since the Decision was signed. Under the proposed action alternative, the reduction of vulture damage or threats using an integrated approach employing both non-lethal and lethal methods would not have significant impacts on wildlife populations in Virginia or nationwide. WS continues to coordinate activities with federal, Commonwealth, and local entities to ensure activities do not adversely impact wildlife populations. No risk to public safety is expected when WS' activities are conducted pursuant to the proposed action or the proposed supplement to the EA. The

EA further describes and addresses cumulative impacts from the alternatives, including the proposed action.

LIST OF PREPARERS AND REVIEWERS

Jennifer Cromwell USDA-WS, Assistant State Director, Moseley, Virginia
Ryan Wimberly USDA-WS, Environmental Management Coordinator, Madison, Tennessee
Chris Dwyer USFWS- Migratory Game Bird Biologist, Region 5, Hadley, Massachusetts

LIST OF PERSONS CONSULTED

Tylan Dean USFWS - Ecological Services, Asst Field Office Supervisor, Gloucester, Virginia
Sumalee Hoskin USFWS – Ecological Services, Fish and Wildlife Biologist, Gloucester, Virginia
Ray Fernald VDGIF - Manager, Non-game Programs, Richmond, Virginia
Amy Ewing VDGIF - Environmental Services Biologist, Richmond, Virginia

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APPENDIX A

FEDERAL AND STATE LISTED THREATENED AND ENDANGERED SPECIES IN THE COMMONWEALTH OF VIRGINIA

Listings and occurrences for Virginia

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 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, gray (<i>Myotis grisescens</i>)
E	Bat, Indiana (<i>Myotis sodalis</i>)
E	Bat, Virginia big-eared (<i>Corynorhinus (=Plecotus) townsendii virginianus</i>)
E	Bean, Cumberland (pearlymussel) (<i>Villosa trabalis</i>)
E	Bean, purple (<i>Villosa perpurpurea</i>)
E	Bean, rayed (<i>Villosa fabalis</i>)
E	Blossom, green (pearlymussel) (<i>Epioblasma torulosa gubernaculum</i>)
T	Chub, slender (<i>Erimystax cahni</i>)
T	Chub, spotfin Entire (<i>Erimonax monachus</i>)
E	Combshell, Cumberlandian (<i>Epioblasma brevidens</i>)
E	Darter, duskytail Entire (<i>Etheostoma percnurum</i>)
E	Fanshell (<i>Cyprogenia stegaria</i>)
E	Isopod, Lee County cave (<i>Lirceus usdagalun</i>)
T	Isopod, Madison Cave (<i>Antrolana lira</i>)
E	Logperch, Roanoke (<i>Percina rex</i>)
T	Madtom, yellowfin (<i>Noturus flavipinnis</i>)
E	Monkeyface, Appalachian (pearlymussel) (<i>Quadrula sparsa</i>)
E	Monkeyface, Cumberland (pearlymussel) (<i>Quadrula intermedia</i>)
E	Mucket, pink (pearlymussel) (<i>Lampsilis abrupta</i>)
E	Mussel, oyster (<i>Epioblasma capsaeformis</i>)
E	Mussel, snuffbox (<i>Epioblasma triquetra</i>)
E	Pearlymussel, birdwing (<i>Lemiox rimosus</i>)
E	Pearlymussel, cracking (<i>Hemistena lata</i>)
E	Pearlymussel, dromedary (<i>Dromus dromas</i>)
E	Pearlymussel, littlewing (<i>Pegias fabula</i>)
E	Pigtoe, finerayed (<i>Fusconaia cuneolus</i>)
E	Pigtoe, rough (<i>Pleurobema plenum</i>)
E	Pigtoe, shiny Entire Range (<i>Fusconaia cor</i>)

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

Status	Species
T	Plover, piping (<i>Charadrius melodus</i>)
E	Rabbitsfoot, rough (<i>Quadrula cylindrica strigillata</i>)
E	Riffleshell, tan (<i>Epioblasma florentina walkeri</i> (=E. walkeri))
E	Salamander, Shenandoah (<i>Plethodon shenandoah</i>)
T	Sea turtle, green except where endangered (<i>Chelonia mydas</i>)
E	Sea turtle, hawksbill (<i>Eretmochelys imbricata</i>)
E	Sea turtle, Kemp's ridley (<i>Lepidochelys kempii</i>)
E	Sea turtle, leatherback (<i>Dermochelys coriacea</i>)
E	Snail, Virginia fringed mountain (<i>Polygyriscus virginianus</i>)
E	Spectaclecase (mussel) (<i>Cumberlandia monodonta</i>)
E	Spiny mussel, James (<i>Pleurobema collina</i>)
E	Squirrel, Delmarva Peninsula fox (<i>Sciurus niger cinereus</i>)
E	Squirrel, Virginia northern flying (<i>Glaucomys sabrinus fuscus</i>)
E	Sturgeon, shortnose (<i>Acipenser brevirostrum</i>)
E	Tern, roseate (<i>Sterna dougallii dougallii</i>)
T	Tiger beetle, northeastern beach (<i>Cicindela dorsalis dorsalis</i>)
E	Wedgemussel, dwarf (<i>Alasmidonta heterodon</i>)
E	Whale, finback (<i>Balaenoptera physalus</i>)
E	Whale, humpback (<i>Megaptera novaeangliae</i>)
E	Whale, North Atlantic Right (<i>Eubalaena glacialis</i>)
E	Woodpecker, red-cockaded (<i>Picoides borealis</i>)

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

Status	Species
E	Beetle, American burying (<i>Nicrophorus americanus</i>)
E	Puma (=cougar), eastern (<i>Puma</i> (=Felis) <i>concolor cougar</i>)
E	Wolf, gray (<i>Canis lupus</i>)

Animal listed species occurring in this state that are not listed in this state

Status	Species
E	Butterfly, Mitchell's satyr (<i>Neonympha mitchellii mitchellii</i>)
T	Dace, blackside (<i>Phoxinus cumberlandensis</i>)
E	Mussel, sheepnose (<i>Plethobasus cyphus</i>)
E	Spider, spruce-fir moss (<i>Microhexura montivaga</i>)
E	Squirrel, Carolina northern flying (<i>Glaucomys sabrinus coloratus</i>)

Summary of Plant listings

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

Status	Species
T	Amaranth, seabeach (<i>Amaranthus pumilus</i>)
T	Birch, Virginia round-leaf (<i>Betula uber</i>)
E	Bittercress, small-anthered (<i>Cardamine micranthera</i>)
E	Bulrush, Northeastern (<i>Scirpus ancistrochaetus</i>)
E	Chaffseed, American (<i>Schwalbea americana</i>)

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

Status	Species
E	Coneflower, smooth (<i>Echinacea laevigata</i>)
T	Joint-vetch, sensitive (<i>Aeschynomene virginica</i>)
E	Mallow, Peter's Mountain (<i>Iliamna corei</i>)
T	Orchid, eastern prairie fringed (<i>Platanthera leucophaea</i>)
T	Pink, swamp (<i>Helonias bullata</i>)
T	Pogonia, small whorled (<i>Isotria medeoloides</i>)
E	rock cress, shale barren (<i>Arabis serotina</i>)
T	Sneezeweed, Virginia (<i>Helenium virginicum</i>)
T	Spiraea, Virginia (<i>Spiraea virginiana</i>)
E	Sumac, Michaux's (<i>Rhus michauxii</i>)

Plant listed species occurring in this state that are not listed in this state

Status	Species
E	Harperella (<i>Ptilimnium nodosum</i>)
E	Lichen, rock gnome (<i>Gymnoderma lineare</i>)

Last updated: August 9, 2012

State listed Threatened and Endangered Species in the Commonwealth of Virginia¹

Common Name	Scientific Name	State status
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	SE
Leatherback sea turtle	<i>Dermochelys coriacea</i>	SE
Loggerhead sea turtle	<i>Caretta caretta</i>	ST
Wood turtle	<i>Glyptemys insculpta</i>	ST
Bachman's sparrow	<i>Aimophila aestivalis</i>	ST
Bachman's warbler (=wood)	<i>Vermivora bachmanii</i>	SE
Bald eagle	<i>Haliaeetus leucocephalus</i>	ST
Bewick's wren	<i>Thryomanes bewickii</i>	SE
Gull-billed tern	<i>Sterna nilotica</i>	ST
Henslow's sparrow	<i>Ammodramus henslowii</i>	ST
Kirtland's warbler (=wood)	<i>Dendroica kirtlandii</i>	SE
Loggerhead shrike	<i>Lanius ludovicianus</i>	ST
Peregrine falcon	<i>Falco peregrinus</i>	ST
Piping plover	<i>Charadrius melodus</i>	ST
Red-cockaded woodpecker	<i>Picoides borealis</i>	SE
Roseate tern	<i>Sterna dougallii dougallii</i>	SE
Upland sandpiper	<i>Bartramia longicauda</i>	ST
Wilson's plover	<i>Charadrius wilsonia</i>	SE
American water shrew	<i>Sorex palustris</i>	SE
Carolina northern flying squirrel	<i>Glaucomys sabrinus coloratus</i>	SE
Delmarva Peninsula fox squirrel	<i>Sciurus niger cinereus</i>	SE
Dismal Swamp southeastern shrew	<i>Sorex longirostris fisheri</i>	ST
Eastern puma (=cougar)	<i>Puma (=Felis) concolor cougar</i>	SE
Gray bat	<i>Myotis grisescens</i>	SE
Gray wolf	<i>Canis lupus</i>	SE
Indiana bat	<i>Myotis sodalis</i>	SE

Rafinesque's eastern big-eared bat	<i>Corynorhinus rafinesquii macrotis</i>	SE
Rock vole	<i>Microtus chrotorrhinus</i>	SE
Snowshoe hare	<i>Lepus americanus</i>	SE
Virginia big-eared bat	<i>Corynorhinus</i> (= <i>Plecotus</i>) <i>townsendii virginianus</i>	SE
Virginia northern flying squirrel	<i>Glaucomys sabrinus fuscus</i>	SE
Appalachian monkeyface (pearlymussel)	<i>Quadrula sparsa</i>	SE
Atlantic pigtoe	<i>Fusconaia masoni</i>	ST
Birdwing pearlymussel	<i>Conradilla caelata</i> (= <i>Lemiox rimosus</i>)	SE
Black sandshell	<i>Ligumia recta</i>	ST
Brook floater	<i>Alasmidonta varicosa</i>	SE
Cracking pearlymussel	<i>Hemistena lata</i>	SE
Cumberland bean (pearlymussel)	<i>Villosa trabalis</i>	SE
Cumberland monkeyface (pearlymussel)	<i>Quadrula intermedia</i>	SE
Cumberlandian combshell	<i>Epioblasma brevidens</i>	SE
Deertoe	<i>Truncilla truncata</i>	SE

S/A=Similarity of Appearance; SOC=Federal Species of Concern (not a legal status; list maintained by USFWS Virginia Field Office); SE=State Endangered; ST=State Threatened; SSC=State Special Concern (not a legal status).

¹ Information obtained from <http://www.dgif.virginia.gov/wildlife/virginiatescspecies.pdf>, August 6, 2012.