

SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT: INTEGRATED MANAGEMENT OF COYOTE, RED FOX, FERAL DOG, WOLF-HYBRID, AND EXOTIC CARNIVORE PREDATION ON LIVESTOCK IN THE STATE OF WEST VIRGINIA

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

I. INTRODUCTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program prepared an environmental assessment (EA) to evaluate potential impacts to the quality of the human environment from the implementation of a management program to address predation on livestock associated with carnivores in West Virginia (USDA 2002). The EA evaluated the need for damage management and the relative effectiveness of six alternatives to meet that proposed need, while accounting for the potential environmental effects of the alternatives. WS' proposed action in the EA evaluates an integrated damage management program to fully address the need for resolving predation caused by carnivores while minimizing impacts to the human environment.

The EA analyzes the effects of WS' activities to reduce damage and predation on livestock associated with several carnivores. Carnivores addressed in the EA and this supplement includes coyotes (*Canis latrans*), red fox (*Vulpes vulpes*), feral dogs (*Canis familiaris*), wolf-hybrids (*Canis* spp.) and exotic carnivores; hereafter, collectively referred to as canids¹ (USDA 2002).

II. PURPOSE

The purpose of the EA will remain as addressed in section 1.1 of the EA (USDA 2002). This supplement examines potential environmental impacts of WS' program as it relates to: 1) conducting disease surveillance and monitoring in canid populations, 2) an increase in the number of requests for assistance to manage canid damage and threats, 3) new information that has become available from public comments, research findings, and data gathering since the issuance of the Decision/FONSI in 2002, 4) new methods that have become available, 5) analyses of WS' canid damage management activities since the 2002 Decision/FONSI was issued to ensure program activities are within the impact parameters analyzed in the EA, and 6) clearly communicate to the public the analysis of individual and cumulative impacts of the current program since 2002.

III. NEED FOR ACTION

A description of the need for action to address predation and threats of predation on livestock associated with canids is provided in section 1.2 of the EA (USDA 2002). The need for action addressed in the EA remains applicable to this supplement.

Predation on sheep, goats, and cattle can result in severe economic losses to the livestock industry in the United States. In 2004, the National Agricultural Statistics Service (NASS) estimated sheep and lamb losses from predators in the United States totaled 224,200 individuals with a value of \$18.3 million (NASS 2005). Coyotes accounted for 60.5% of those predator losses and dogs accounted for 13.3% of the reported predator losses (NASS 2005). Similarly, cattle and calf losses from predators in the United States during 2005 totaled 191,000 individuals valued at \$92.7 million (NASS 2006). Coyotes and dogs

¹The use of the term canid in this document will collectively refer to those carnivore species addressed in the EA and this document. Exotic carnivores, as analyzed in the EA, are not limited to canid species but could include any non-native carnivore that have escaped captivity or have been released and identified as causing damage or posing a threat of damage.

accounted for 51.1% and 11.5% of those predator losses, respectively. Goats and kid losses from predators in the United States totaled 155,000 individuals valued at \$15.9 million during 2004 (NASS 2005). Those livestock loss figures do not include the cost of damage prevention activities.

Based on surveys conducted in 2004, farmers and ranchers throughout the United States spent \$9.8 million on non-lethal methods to prevent predation of sheep and lambs (NASS 2005). A similar survey conducted in 2005 found that farmers and ranchers spent \$199.1 million on non-lethal methods to prevent losses of cattle and calves to predators (NASS 2006).

The NASS estimated the loss of sheep in West Virginia from predation was valued at \$266,000 in 2004 (NASS 2005) and cattle losses was estimated at \$604,000 in 2005 (NASS 2006). Surveys of West Virginia shepherds conducted by the West Virginia Cooperative Extension Service in 1995 indicated that shepherds lost an estimated 4,630 lambs and ewes to coyote predation resulting in a total economic loss of \$329,050. The survey was conducted to determine the cause of a decline in statewide sheep inventories. On a percentage basis, the years preceding the survey experienced a higher rate of decline in the sheep inventory than any other time in West Virginia agricultural history. The 1995 survey also found that 51% of the shepherds no longer raised sheep due to predation losses (McConnell 1995).

WS continues to provide both operational and technical assistance to those persons experiencing damage or threats of damage caused by canids. Table 1 shows the number of WS' technical assistance projects conducted by federal fiscal year² (FY). Technical assistance was provided through the dissemination of handouts and information regarding damage management techniques, species identification, methods demonstrations, loaning of equipment, and site visits. WS made recommendations on the appropriate methods available for use that a requestor could employ to resolve damage or reduce threats without WS' direct involvement. Technical assistance as provided by WS to resolve damage or threats associated with canids under the proposed action was discussed in the EA under Section 3.2.2.1 (USDA 2002).

The WS program in West Virginia has conducted a total of 2,077 technical assistance projects since FY 2002 that involved providing information and recommendations on resolving or preventing damage caused by canids. Nearly 97% of the requests for assistance involved damage or threats of damage to agricultural resources. Requests for technical assistance often involve canid damage or threats of damage to multiple livestock species.

Table 1 – Technical assistance requests involving canids by resource type in West Virginia.

Resource Type	Fiscal Year									TOTAL
	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Agriculture	182	139	222	261	200	167	156	181	498	2,006
Human Safety	1	9	10	0	4	0	10	1	3	38
Property	4	1	2	1	2	1	7	10	2	30
Natural Resources	0	0	0	0	0	1	0	2	0	3
TOTAL	187	149	234	262	206	169	173	194	503	2,077

WS has also conducted direct operational assistance to manage and prevent predation to livestock. Operational assistance occurs when WS is directly involved with employing methods to resolve or alleviate damage that is occurring, to prevent damage from occurring, and/or to reduce threats of predation associated with those canid species addressed in the EA. WS' direct operational assistance was discussed in section 3.2.2.2 of the EA (USDA 2002). As directed by the selected alternative, WS continued to apply multiple methods as part of an integrated damage management program. WS' direct

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

assistance involved continuing to provide operational methods to prevent predation. As part of an integrated management program, that included the employment of non-lethal methods, WS also employed lethal methods to take canids.

Proposed Supplement to the EA

WS continues to receive requests for assistance to manage damage and threats to livestock associated with canids. Since FY 2002, WS has responded to requests for assistance to manage canid damage to property, agricultural resources, natural resources, and human safety. Prior to and during the development of the EA, WS was providing direct operational assistance to those livestock producers requesting assistance in approximately ten counties. In FY 2007, the number of counties requesting assistance increased from ten to 20 counties. In FY 2008, WS was requested to provide assistance for canid damage management to livestock in all 55 counties of the State. This has led to an increase in requests for assistance (see Table 1) in areas where WS has not provided damage management assistance previously. Since the development of the EA, the inventory of meat goats, a class of livestock vulnerable to coyote depredation, in West Virginia has increased annually. In 2002, the number of meat goats in the State was estimated at 14,326 head compared to 24,459 head of meat goats in 2007 (USDA 2009).

A survey conducted by the NASS in 2000, estimated 700 calves were killed by coyotes in West Virginia (NASS 2001). A similar survey conducted by NASS in 2005 estimated the number of calves lost to coyotes at 1,300 (NASS 2006) which is an increase of nearly 86% compared to the estimated number of calves lost due to coyotes in 2000. The NASS survey conducted in 2000 indicated that nearly 78% of the calves lost to predators occurred from depredation by coyotes (NASS 2001). In 2005, the NASS found that nearly 87% of the calves lost due to predators occurred from coyotes (NASS 2005).

An increase in the number of counties in which WS has been requested to provide damage management activities has resulted in an increase in the number of producer requests for assistance. This supplement to the EA will evaluate the increase in requests for assistance, primarily regarding damage and damage threats to livestock associated with coyotes. Based on activities conducted during the development of the EA, the EA evaluated an annual take of up to 500 coyotes by WS. Since FY 2004, the annual take of coyotes by WS in West Virginia has exceeded 400, ranging from 400 coyotes to 818 coyotes. The expanded program service area and the number of sheep, goat, and cattle operations requesting assistance make it likely that WS would be requested to lethally remove coyotes that would exceed the annual take of up to 500 coyotes as analyzed under the proposed action in the EA. Therefore, this supplement will evaluate the proposed action as it relates to an increase in coyote damage management activities, which could include an annual take of up to 1,900 coyotes as part of the integrated damage management approach as described in the proposed action.

The supplement to the EA also evaluates additional methods available to resolve canid damage that have become available since the completion of the EA. Trap monitors, Forward Looking Infrared (FLIR), and night vision equipment have become available and could be used or recommended as part of an integrated damage management strategy to alleviate canid damage by WS. The use of those methods as part of an integrated approach to resolving damage and threats associated with canids are also analyzed in this supplement to the EA. A description of the wildlife damage management methods that could be used or recommended by WS is provided in Appendix B of the EA (USDA 2002) and in Appendix J of WS' programmatic FEIS (USDA 1997).

Trap monitors are devices that send a radio signal to a receiver if a set trap is disturbed and alerts field personnel that an animal may be captured. Trap monitors can be attached directly to the trap or attached to a string or wire and then placed away from the trap in a tree or shrub. When the monitor is hung above the ground, it can be detected from several miles away, depending on the terrain in the area. There are

many benefits to using trap monitors, such as saving considerable time when checking traps, decreasing fuel usage, prioritizing trap checks, and decreasing the need for human presence in the area. Trap monitors could be used under the proposed supplement where appropriate.

Night vision and FLIR equipment could be used in combination with shooting to remove coyotes at night. WS' personnel most often use this technology by watching sheep at night which are being depredated upon by coyote(s) and shooting the coyote(s) when they approach. This approach is highly selective as it targets coyotes in the act of depredating or in close proximity to the sheep. FLIR and night vision equipment could be used under the proposed supplement where appropriate.

In addition, a review of threatened and endangered (T&E) species listed by the USFWS showed that additional listings of T&E species in West Virginia have occurred since the completion of the EA in 2002. This supplement analyzes any potential impacts canid damage management activities may pose to T&E species.

WS would continue to employ methods in an integrated approach to effectively reduce threats and damages associated with coyotes as described under the proposed action in the EA. The increased use of methods to address an increasing number of requests for assistance will be further evaluated in this proposed supplement to the EA.

IV. OBJECTIVES

The EA identified five objectives for canid damage management conducted by WS (see section 1.3 of the EA). Those objectives include: (1) to respond to 100% of the requests for assistance with the appropriate action (technical assistance or direct control) as determined by WS' personnel applying the WS Decision Model (Slate et al. 1992, USDA 1997, USDA 2002), (2) to reduce canid predation on livestock and poultry to the greatest extent possible on properties where WS' assistance is requested, (3) to minimize the lethal take of non-target species, (4) to encourage livestock producers to adopt non-lethal control methods, and (5) to provide predator management workshops to livestock producers and agency personnel.

Those five objectives have been met since the implementation of the proposed action in the following ways: (1) WS has responded to 100% of the requests for assistance since FY 2002, WS has provided technical assistance to an average of 2,398 individuals per year and has provided direct operation assistance to an average of 150 farms per year; (2) WS has maintained livestock depredations between 1.12 to 3.13 head of livestock per farm since FY 2002; (3) through the use of the WS Decision Model to determine appropriate methods and application of methods, the ratio of WS' take of non-targets to targets has been 1:5 since FY 2002; (4) through workshops and personal/phone consultations, WS has encouraged livestock producers to incorporate non-lethal methods to reduce livestock predation, and (5) WS continues to provide workshops to those persons requesting assistance with managing damage or threats of damage associated with canids.

V. RELATIONSHIP OF THIS DOCUMENT TO OTHER ENVIRONMENTAL DOCUMENTS

WS' Programmatic Environmental Impact Statement

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. Pertinent information available in the FEIS has been incorporated by reference into the EA and this supplement to the EA.

VI. DECISIONS TO BE MADE

Based on the scope of the EA and this supplement to the EA, the decisions to be made are: (1) should WS continue to provide assistance to livestock producers experiencing predation or threats of predation, (2) should WS conduct disease surveillance and monitoring in the canid populations when requested by the WVDNR and/or other entities, (3) should WS continue to implement an integrated damage management strategy, including technical assistance and direct operational assistance to meet the need for canid damage management, (4) if not, should WS attempt to implement one of the alternatives to an integrated damage management strategy as described in the EA, and (5) would continuing the proposed action result in adverse impacts to the environment requiring the preparation of an EIS based on activities conducted since the completion of the EA and/or based on new information available.

VII. RELATIONSHIP OF AGENCIES

Based on agency relationships, MOUs, and legislative authorities, WS was the lead agency for the EA, and therefore, responsible for the scope, content, and decisions made. The West Virginia Division of Natural Resources (WVDNR) is responsible for managing wildlife in West Virginia, including the establishment and enforcement of regulated hunting and trapping seasons. WS' activities to reduce and/or prevent damage would be coordinated with the WVDNR to ensure WS' actions are incorporated into population objectives established for wildlife populations.

The WVDNR and the West Virginia Department of Agriculture (WVDA) were involved in the scoping and development of the EA to ensure an interdisciplinary approach in compliance with the National Environmental Policy Act (NEPA). As part of the scoping process, the WVDNR and the WVDA would be involved with the development of this supplement to the EA.

VIII. SCOPE OF ANALYSIS

The EA and this supplement evaluate canid damage management activities in West Virginia. The scope of analysis remains valid as addressed in the EA for those activities to manage damage and threats to livestock associated with canids. This supplement will analyze additional activities as a result of an expanded service area, an increase in the number of coyotes removed by WS annually, new listings of T&E species, and additional methodologies. The supplement to the EA will provide additional analyses and information related to activities conducted under the proposed action.

Actions Analyzed

The EA and this supplement discuss the issues associated with conducting wildlife damage management 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 situation, taking action, evaluating, and monitoring results of the actions taken (USDA 1997, USDA 2002). The published article provides more detail on the processes used in WS' Decision Model. WS' programmatic FEIS provides more detail and examples of how the model is used (USDA 1997). WS' personnel use the Decision Model to develop the most appropriate strategy to reduce damage and to determine potential environmental effects from damage management actions (Slate et al. 1992, USDA 1997, USDA 2002).

The methods available for use or recommendation under each of the alternatives evaluated are provided in the EA. The alternatives addressed in the EA also discuss how methods would be employed to manage

damage and threats associated with canids in the State. Therefore, the actions evaluated are the use of those methods available under the alternatives and the employment of those methods by WS to manage or prevent damage and threats associated with canids.

Native American Lands and Tribes

WS does not have any Memorandum of Understanding (MOU) or signed cooperative service agreements with any Native American tribe in West Virginia. Currently, no Native American tribal properties are designated in West Virginia. If this would change, WS could enter into an agreement for wildlife damage management on tribal property and the EA would be reviewed and supplemented, if appropriate, to ensure compliance with the NEPA.

Period for which the EA is Valid

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

Site Specificity

This supplement to the EA analyzes the potential impacts of WS' canid damage management activities and addresses activities on all lands within West Virginia under MOU, cooperative service agreement, and in cooperation with the appropriate public land management agencies. The EA and this supplement also address the potential impacts of damage management activities on areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide assistance when requested, within the constraints of available funding and workforce, it is conceivable that additional damage management efforts could occur at additional locations within the State. Thus, the EA and this supplement anticipate that potential expansion and will analyze the impacts of such efforts as part of the alternatives. Because livestock production occurs throughout West Virginia and canids are or could be found in every county, it is conceivable that WS' direct control activities could occur anywhere in the State.

Planning for the management of canid damage must be viewed as being conceptually similar to other agencies whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, and insurance companies. Although some of the sites where damage will occur can be predicted, all specific locations or times where such damage will occur in any given year cannot be predicted. The threshold triggering an entity to request assistance from WS to manage damage associated with canids is often unique to the individual; therefore, predicting where and when such a request for assistance would be received by WS is difficult.

The EA and this supplement emphasize major issues as they relate to specific areas whenever possible; however, many issues apply wherever canid damage and resulting management occurs and are treated as such. The standard WS Decision Model (Slate et al. 1992, USDA 1997, USDA 2002) would be the site-specific procedure for individual actions conducted by WS in the State (see Chapter 3 of the EA for a description of the Decision Model and its application). Additional information on the Decision Model is

available in WS' programmatic FEIS (USDA 1997). Decisions made using the model would be in accordance with WS' directives and 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 the analysis area. In this way, WS meets the intent of the NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with the NEPA and still be able to accomplish its mission. This supplement adds to the analysis in the 2002 EA and Decision/FONSI and all information and analyses in the EA remains valid unless otherwise noted.

Public Involvement

The EA was made available to the public for review and comment by a legal notice published in 19 newspapers in West Virginia. The EA was also mailed directly to agencies, organizations, and individuals with probable interest in the proposed program. Public review and comment occurred during a 30-day comment period. One comment letter was received from the WVDNR supporting the proposed action. The comment letter received during the public involvement process was reviewed for substantive issues and alternatives which were considered in developing the Decision.

After consideration of the analysis contained in the EA and review of the one comment letter received, a Decision and Finding of No Significant Impact (FONSI) for the EA was issued on May 15, 2002. The Decision and FONSI selected the proposed action alternative which implemented an integrated damage management program using multiple methods to adequately address the need to manage damage and predation associated with carnivores.

This supplement to the EA along with the EA and the 2002 Decision/FONSI will be made available for public review and comment prior to the issuance of a Decision through the publication of a legal notice announcing a minimum of a 30-day comment period. The legal notice will be published in the *Charleston Daily Mail* and posted on the APHIS website located at http://www.aphis.usda.gov/wildlife_damage/nepa.shtml according to WS' public notification requirements (see 72 FR 13237-13238). 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 prior to the issuance of a Decision.

IX. AUTHORITY AND COMPLIANCE

WS' activities to reduce threats associated with canids in West Virginia are regulated by federal, state, and local laws and regulations. WS' authority and compliance with relevant laws and regulations is discussed in detail in section 1.8 of the EA (USDA 2002), along with the authorities of other federal, state, and local entities. WS' authorities and those of federal, state, and local entities for the supplemental activities will remain as addressed in the EA, including compliance with all federal, state, and local laws and regulations. WS would continue to coordinate activities to alleviate or prevent canid damage with the WVDNR to ensure WS' activities are considered as part of the management objectives for those species established by the WVDNR. Compliance with laws and regulations not directly addressed in the EA will be discussed in this supplement.

United States Environmental Protection Agency (EPA)

The EPA is responsible for implementing and enforcing the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) which regulates the registration and use of pesticides, including pesticides

available for use to lethally take mammals.

National Historic Preservation Act (NHPA) of 1966, as amended

The NHPA and its implementing regulations (36 CFR §800) require federal agencies to initiate the section 106 process if an agency determines that the agency's actions are undertakings as defined in Sec. 800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects on historic properties. If the undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties were present, the agency official has no further obligations under section 106. None of the canid damage management methods described in this EA that might be used operationally by WS causes major ground disturbance, any physical destruction or damage to property, any alterations of property, wildlife habitat, or landscapes, nor involves the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, the site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

Noise-making methods, such as firearms, that are used at or in close proximity to historic or cultural sites for the purposes of hazing or removing nuisance wildlife have the potential for audible effects on the use and enjoyment of historic property. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage problem, which means such use, would be to the benefit of the historic property. A built-in mitigating factor for this issue is that virtually all the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by the Section 106 of the NHPA would be conducted as necessary in those types of situations.

Environmental Justice - Executive Order 12898

Executive Order 12898, entitled "*Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*" promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Environmental justice is a priority within APHIS and WS. Executive Order 12898 requires federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies and activities on minorities and persons or populations of low income. APHIS implements Executive Order 12898 principally through its compliance with the NEPA. All WS' activities are evaluated for their impact on the human environment and compliance with Executive Order 12898. WS' personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minorities and persons or populations of low income.

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 canid 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 this proposed action.

Invasive Species - Executive Order 13112

Executive Order 13112 establishes guidance to federal agencies to prevent the introduction of invasive species, provide for the control of invasive species, and to minimize the economic, ecological, and human health impacts that invasive species cause. The Order states that each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law: 1) reduce invasion of exotic species and the associated damages, 2) monitor invasive species populations and provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control and promote public education of invasive species.

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.

X. AFFECTED ENVIRONMENT

The proposed action and the supplement to the proposed action could be conducted on private, federal, state, tribal, and municipal lands in West Virginia where WS' assistance has been requested by a landowner or manager to reduce and/or prevent damage to livestock. The affected environment includes, but is not necessarily limited to, areas in and around agricultural areas, livestock facilities, and rural areas wherever canids are found to be causing damage to resources or posing threats to livestock and human safety. Predator damage management may be conducted when requested by a landowner or manager and only on properties where a cooperative service agreement or other comparable document has been signed by WS and the cooperating entity.

WS has reviewed the affected environment during evaluations of program activities under the proposed action through annual monitoring reports. The affected environment has not changed since the implementation of the proposed action and continues to be as addressed in the EA (USDA 2002).

XI. ISSUES ANALYZED IN DETAIL

Issues are concerns raised regarding potential environmental problems that might occur from a proposed action. Such issues must be considered in the NEPA decision-making process. Issues relating to the reduction of wildlife damage were raised during the scoping process for WS' programmatic FEIS (USDA 1997) and were considered in the preparation of the EA. Issues related to managing damage and threats associated with canids were developed by WS in consultation with the WVDNR and the WVDA.

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 address those issues are discussed in Chapter 3 of the EA (USDA 2002) and are listed in the following section. Potential impacts of Alternatives 1, 2, 3, 4, and 6 on the human environment related to the issues analyzed in detail have not changed from those

described in the EA and thus do not require additional analyses in this supplement. Chapter 4 of the EA contains a detailed discussion and comparison of the identified alternatives and the issues analyzed in detail (USDA 2002). The issues were identified as important to the scope of the analysis in the EA (40 CFR 1508.25). Alternative 5 (proposed action/no action), as described in the EA, addresses requests for canid damage management using an integrated damage management approach by WS to reduce damage to agricultural resources. 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 proposed supplement to the EA as related to Alternative 5 (proposed action/no action):

Issue 1 - Effects on target (coyote and red fox) species populations

The issue of the effects on target species arises from the use of non-lethal and lethal methods to address predation and damage threats to livestock. Non-lethal methods are employed to exclude, harass, and/or disperse wildlife from areas where threats or damages are occurring. Lethal methods are often employed to reinforce non-lethal methods and to remove wildlife species that have been identified as causing damage or posing a threat of predation. Both non-lethal and lethal methods have the potential to impact coyote and red fox populations. The EA evaluated those potential impacts and found that when WS' activities are conducted within the scope analyzed in the EA, those activities would not adversely impact those species' populations in West Virginia (USDA 2002). WS' directives and SOPs are designed to reduce the effects on coyote and red fox populations and are discussed in section 3.4 of the EA (USDA 2002).

Under WS' current coyote and red fox damage management program, WS incorporates non-lethal and lethal methods in an integrated approach in which all or a combination of methods may be employed to resolve a request for assistance. WS recommends both non-lethal and lethal methods to interested individuals, as governed by federal, state, and local laws and regulations. Non-lethal methods can disperse or otherwise make an area unattractive to coyotes or red fox that are causing damage; thereby, reducing the presence of coyotes or red fox at the site and potentially the immediate area around the site where non-lethal methods are employed. Non-lethal methods would be given priority when addressing requests for assistance (see WS Directive 2.101). However, non-lethal methods would not necessarily be employed to resolve every request for assistance if deemed appropriate by WS' personnel using the Decision Model or by cooperating entities based on previous use of non-lethal methods. For example, if a cooperator requesting assistance, has already attempted to disperse coyotes and/or fox using non-lethal harassment methods, WS would not necessarily employ those methods again during direct operational assistance since those methods have already been proven to be ineffective in that particular situation.

Non-lethal methods are not employed over large geographical areas or applied at such intensity that essential resources (*e.g.*, denning locations, food sources) would be unavailable for extended durations or over a wide geographical scope that long-term adverse affects would occur to those species' populations. Non-lethal methods are most often applied by the livestock owner. Agricultural producers in the United States spent \$199.1 million in 2005 on non-lethal methods to prevent damages to livestock associated with predators, primarily guard dogs, exclusion fencing, frequent checking, and culling (NASS 2006).

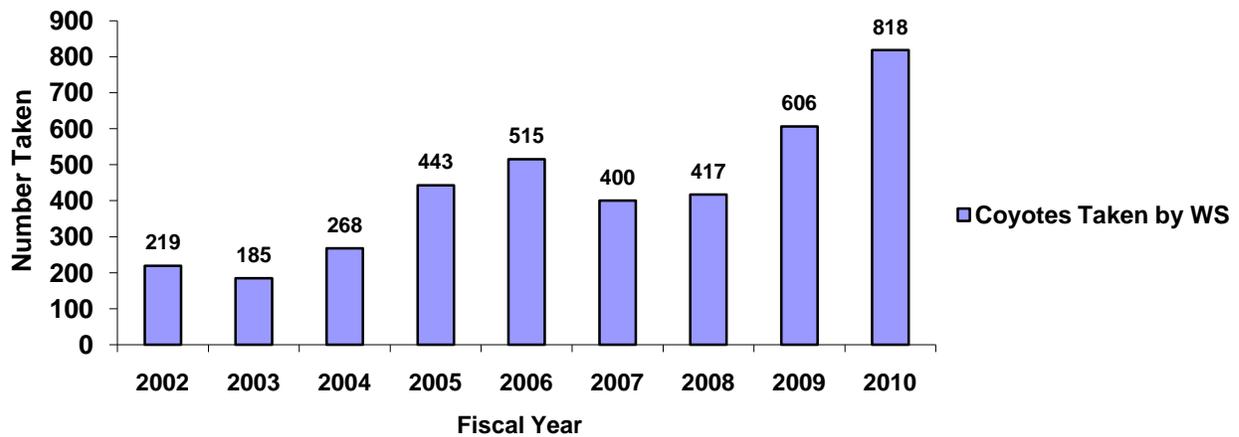
Lethal methods would be employed to remove coyotes or red fox responsible for causing damage or posing a threat to livestock. The use of lethal methods would therefore result in local reductions of coyotes or red fox in the area where damage or threats were occurring. The number of coyotes or red fox removed from the population under the proposed action would be dependent on the number of requests for assistance received, the number of coyotes or red fox involved with the associated damage or threat, and the efficacy of methods employed.

Summary of WS' Coyote and Red Fox Damage Management Activities in West Virginia

WS continued to provide both technical and operational assistance to those persons requesting assistance with managing damage and threats associated with canids. Damages reported by cooperators and verified by WS occurred primarily from coyotes killing livestock. WS has verified and received reports of predation on cattle, sheep, and goats since FY 2002.

Figure 1 and Figure 2 provide information on the number of coyotes and red fox taken by WS from FY 2002 to FY 2010 to manage predation on livestock. There was an increasing trend in the number of coyotes taken by WS from FY 2002 through FY 2006. The average annual take of coyotes from FY 2002 to FY 2004 was 224 compared to an average take of 533 coyotes from FY 2005 to FY 2010. This increasing trend correlates with the increase in the commercial harvests of coyotes during the same time period (see Figure 3). The highest level of coyote take by WS occurred in FY 2010 when 818 coyotes were lethally taken to alleviate damage or threats to livestock.

Figure 1 - Number of Coyotes Taken by WS from FY 2002 to FY 2010



From FY 2002 to FY 2010, WS has lethally taken a total of 158 red fox in response to livestock depredation, ranging from 2 to 66 fox annually. The highest level of red fox take by WS occurred in FY 2010. Red fox are minor predators of lambs and kid goats with the number of requests for assistance received from year to year varying.

Figure 2 - Number of Red Fox Taken by WS from FY 2002 to FY 2010

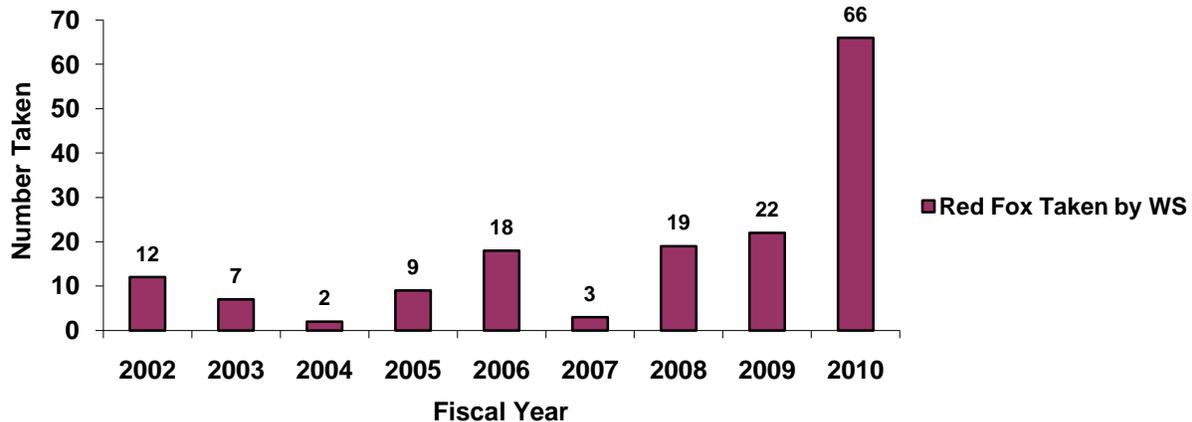


Table 2 shows WS' lethal take of coyotes by method to alleviate damage and threats to livestock since FY 2002. The use of the M-44 sodium cyanide ejector has accounted for 72% of the coyotes lethally taken by WS in West Virginia, followed by snares (19%) and foothold traps (6%). Livestock Protection Collars (LPC) have accounted for 2% and shooting for 2% of the coyotes lethally taken. Appendix B of the EA provides a complete discussion of the methods and the application of those methods to resolve damage and threats to livestock associated with canids (USDA 2002). In addition, those methods are also discussed in WS' programmatic FEIS (USDA 1997). All methods employed by WS from FY 2002 through FY 2010 were discussed in Appendix B of the EA. While conducting canid damage management activities, WS continued to abide by those SOPs discussed in the EA, including the use restrictions for the application of M-44 sodium cyanide ejectors (USDA 2002).

Table 2 – WS' lethal take of coyotes by method in West Virginia from FY 2002 through FY 2010

Method	Fiscal Year									TOTAL
	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Firearm	1	4	0	5	3	1	8	12	42	76
Snare[†]	55	42	44	117	120	66	71	112	98	725
Foothold Trap[†]	34	24	29	43	30	18	14	7	15	214
Gas Cartridge	0	0	0	0	1	0	0	0	0	1
M-44	119	106	181	256	347	309	318	474	662	2,772
LPC	10	9	14	22	14	6	6	1	1	83
TOTAL	219	185	268	443	515	400	417	606	818	3,871

[†] Coyotes live-captured using those methods were subsequently euthanized in accordance with WS Directive 2.505.

Similar to the take of coyotes, the take of red fox by WS to alleviate damage and threats to livestock has occurred primarily through the use of the M-44 sodium cyanide ejector (see Table 3). Fifty-eight percent of the red fox taken by WS to alleviate damage or threats has occurred from the use of M-44 ejectors. Foothold traps accounted for over 18% of the lethal take and 22% by snares. Two percent of targeted red fox were lethally taken using a firearm.

Table 3 – WS' lethal take of red fox by method in West Virginia from FY 2002 through FY 2010

Method	Fiscal Year									TOTAL
	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Firearm	1	0	0	0	0	0	0	0	3	4
Snare	0	0	1	2	4	1	3	5	18	34
Foothold Trap	3	0	0	2	11	0	1	3	8	28
M-44	8	7	1	5	3	2	15	14	37	92
TOTAL	12	7	2	9	18	3	19	22	66	158

Coyote and Red Fox Population Impact Analysis from WS' Activities: FY 2002 through FY 2010

Lethal methods are employed by WS to take an individual or a group of coyotes or fox responsible for causing damage. The use of lethal methods would therefore result in localized reductions of those species in the area where damage or threats were occurring. The number of coyotes or fox removed from the population using lethal methods under the proposed action is dependent on the number of requests for assistance received, the number of coyotes or fox involved with the associated damage or threat, and the efficacy of methods employed.

WS' lethal take of coyotes and red fox did not exceed the estimated level analyzed in the EA during all years except FY 2006, FY 2009, and FY 2010. The EA evaluated an annual lethal take level of up to 500 coyotes and 100 red fox which was based on the number of requests received prior to the development of

the EA and based on anticipation of an increase in the number of requests received annually. WS' take of coyotes exceeded the level analyzed in the EA by 15 coyotes in FY2006, by 106 coyotes in FY 2009, and 318 in FY 2010. WS annually monitors activities conducted pursuant to the proposed action. Based on the analysis in the FY 2006 monitoring report, the take of 515 coyotes did not adversely affect coyote populations based on the information available. Similarly, WS' take of coyotes in FY 2009 did not adversely affect coyote populations. However, since WS' take has exceeded the take level analyzed in the EA, WS is preparing this supplement to further analyze an increase in the annual take of coyotes to evaluate potential cumulative impacts.

Coyotes are considered a harvestable species in the State and can be hunted year round with no limit on the number of coyotes that can be taken. Coyotes can also be harvested during annual trapping seasons in the State with no daily take limit or season limit. Similarly, red fox can be harvested during a regulated hunting and trapping season with no limit on the number of fox that can be harvested during the season. Red fox can also be lethally taken when causing damage through a permit issued by the WVDNR (see WVC §20-2-15b). The number of coyote pelts sold to West Virginia fur dealers from 2002 through 2010 is provided in Figure 3. The number of red fox pelts sold to fur dealers from 2002 through 2010 is presented in Figure 4.

Figure 3 - Coyote Pelts Sold to Fur Dealers in West Virginia From 2002 through 2010

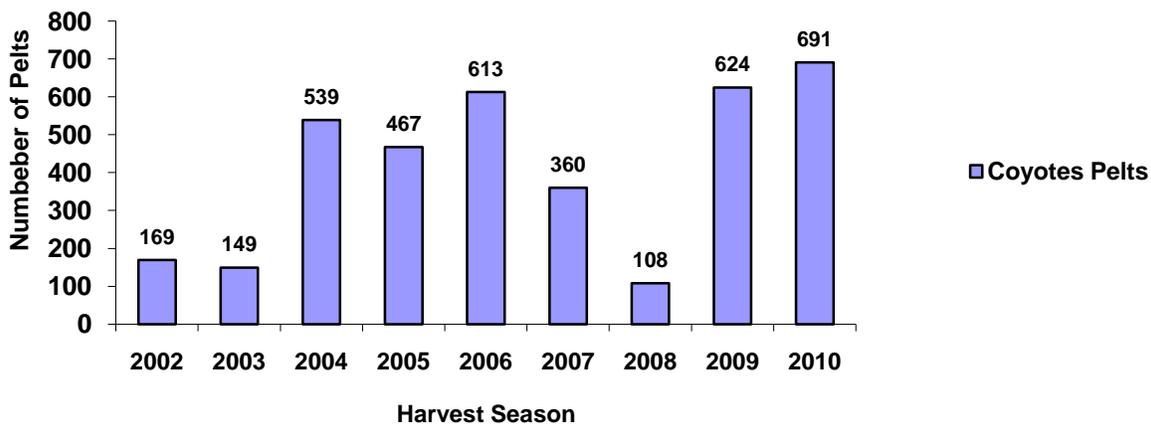


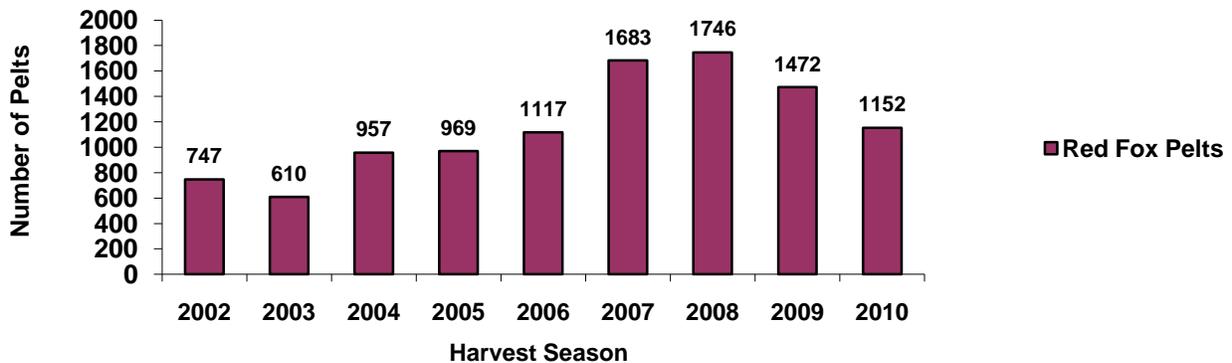
Figure 3 and Figure 4 represent only those coyote and red fox pelts sold to fur dealers in West Virginia. The harvest of coyotes and red fox is likely higher since pelts could be sold to out-of-state fur dealers and not all coyotes or red fox harvested are sold to fur dealers. Also, the number of pelts sold is likely more reflective of pelt prices than of population trends. Take of coyotes and red fox by other entities to prevent depredation on livestock is also unknown. Therefore, the take of coyotes and red fox is higher than is represented by the sale of pelts to West Virginia fur dealers.

No definitive estimates are available for coyote and red fox populations in West Virginia. Observations of coyotes and red fox by West Virginia bow hunters have remained relatively level since 2004 (Warner et al. 2009). Coyote and red fox populations in West Virginia are considered stable (R. Rogers, WVDNR, pers. comm. 2011).

Since FY 2002, WS' take of coyotes to alleviate damage has averaged 430 coyotes per year. Since 2002, at least 3,720 coyotes have been harvested based on the number of pelts sold in the State which is an

average of 413 coyote pelts sold annually. Although coyote densities vary considerably between habitat types and vary based on numerous environmental variables, Knowlton (1972) estimated an average population density was likely 0.5 to 1.0 coyote/mi² over the entire range of the coyote in the United States. Exact coyote population densities in West Virginia are unknown. Using a coyote population density of 0.5 to 1.0 coyote/mi² and the total area of West Virginia of 24,230 mi² (United States Census Bureau 2011), a statewide coyote population could be estimated at 12,115 to 24,230 coyotes. If the population density was half of the lowest estimated population density determined by Knowlton (1972), the statewide coyote population would be estimated at 6,057 coyotes based on 0.25 coyotes/mi². Population modeling information provided in the EA and WS' programmatic FEIS suggests that a viable coyote population can withstand an annual removal of 70% of their population without causing a decline in the population (Connolly and Longhurst 1975, Connolly 1995, USDA 1997, USDA 2002).

Figure 4 - Red Fox Pelts Sold to Fur Dealers in West Virginia From 2002 through 2010



Using a statewide coyote population estimated at 6,057 coyotes, the average annual take of coyotes (which represents the minimum take) of 843 coyotes would represent 13.9% of the estimated statewide population. The highest level of take by WS of coyotes occurred in FY 2010 and the highest level of coyote pelts sold in the State also occurred in 2010. This combined take of coyotes would represent 24.9% of a coyote population estimated at 6,057. In 2009, the combined take would represent 20.3% of a statewide population estimated at 6,057 coyotes. Based on the best available information for coyote populations in the State, there appears to be no indication that WS' activities conducted from FY 2002 through FY 2010 caused a decline in statewide coyote populations. All take of coyotes by WS is reported to the WVDNR annually to ensure WS' take is considered as part of the management objectives for coyotes. Based upon the harvest and take information from all known sources provided previously and with coyote populations capable of recovering from a high annual harvest (~ 70%), WS' limited take of coyotes in West Virginia is having a minimal impact on local and statewide coyote populations.

The EA evaluated an annual take of up to 100 red fox as part of an integrated approach to resolving requests for assistance. WS' take of red fox to alleviate damage has averaged 18 fox annually since FY 2002. In addition to target take, red fox have also been taken unintentionally during activities to alleviate damage associated with coyotes. Since FY 2002, WS has lethally taken 159 red fox unintentionally during coyote damage management activities, which is an average of 18 fox annually. WS' combined take of fox (target and non-target take) has been 317 red fox since FY 2002. WS' annual combined take of red fox has averaged 35 fox which is below the take of 100 red fox analyzed in the EA.

Since 2003, the number of fox pelts sold to fur dealers in the State has increased annually through 2008 and population trend data for fox indicates a stable population. As shown in Figure 4, at least 10,453 red

fox have been harvested since 2002 which is an average of at least 1,161 red fox harvested annually. WS' average combined take of 35 red fox since FY 2002 would represent 3.0% of the average 1,162 red fox pelts sold annually since 2002. WS' take of red fox could be considered as a low magnitude of take when compared to the number of red fox pelts sold annually in the State.

Therefore, WS' total combined take of 317 red fox since FY 2002 has not had cumulative adverse effects on statewide populations. WS' take did not adversely affect the ability of those persons interested to harvest red fox during the regulated season based on the low magnitude of take. Based on current information, WS' continued take of red fox to alleviate damage to livestock when conducted with the parameters analyzed in the EA would continue to have no adverse effect on red fox populations.

WS' damage management activities were site specific, and although local populations of coyotes and red fox were reduced, there were no probable adverse impacts on statewide populations from WS' activities.

Coyote Population Impact Analysis from the Proposed Supplement to the EA

The EA evaluated an annual take of no more than 500 coyotes based on the number of requests received prior to the development of the EA and a reasonable anticipation of an increase in the number of requests received annually. Since FY 2002, the number of counties where livestock producers could be provided assistance with managing damage associated with canids, based on available funding, has increased. In FY 2002 when the EA was developed, livestock producers in 10 counties within the State could receive assistance from WS when assistance was requested. The number of counties where assistance could be provided increased from 10 to 20 in FY 2007 and to all 55 counties in FY 2008. During this period, the inventory of meat goats in West Virginia had also increased. Based the expanded program service area to areas where WS has not provided coyote damage management services in the past, and the increasing number of goats, WS reasonably anticipates the number of requests for assistance received will increase. In addition, WS' use of methods to resolve damage is also likely to increase and will be analyzed further in following sections of this supplement.

Under the proposed action as addressed in the EA, WS employs methods in an integrated approach that is adapted to each request for assistance based on WS' Decision model (USDA 1997, USDA 2002). If the number of requests received by WS to manage damage by coyotes increases and if deemed appropriate through the use of WS' Decision Model, the number of coyotes lethally taken to resolve those requests for assistance is also likely to increase and exceed the take of 500 coyotes analyzed in the EA. Given the reasonable anticipation of an increase in the number of requests for assistance and the associated increase in the use of methods to resolve those requests up to 1,900 coyotes may be lethally taken to resolve requests for assistance under this supplement to the EA.

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. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage. WS' take is monitored by comparing numbers of animals killed with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of native species populations (USDA 1997).

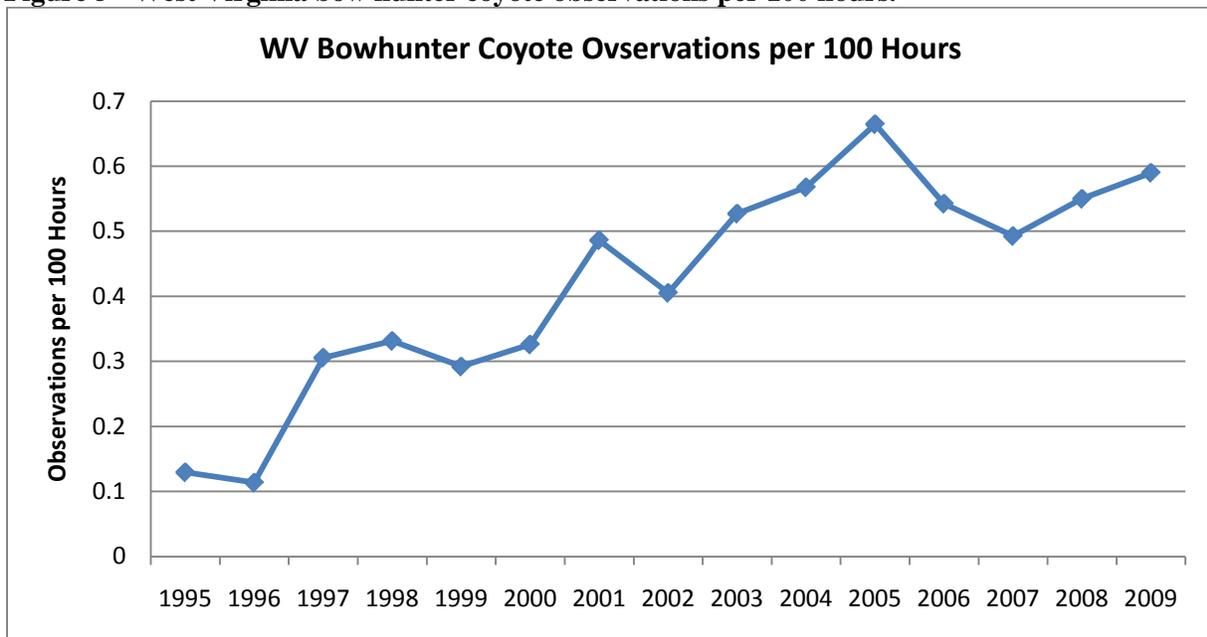
A reliable estimate of actual coyote numbers is currently unknown. Because determinations of absolute coyote densities are frequently unknown (Knowlton 1972), many researchers have estimated coyote

populations using various methods (Clark, 1972, Knowlton 1972, Camenzind 1978, USDI 1979, Pyrah 1984). The cost to accurately determine absolute coyote densities over large areas is prohibitive (Connolly 1992) and would not appear to be warranted given the coyote's overall relative abundance. The presence of unusual food concentrations and the assistance provided to a breeding pair by non-breeding coyotes at the den can influence coyote densities and complicate efforts to estimate abundance (Danner and Smith 1980). Coyote densities are lowest in late winter prior to whelping, highest immediately after whelping, followed by a continued decline to the next whelping season (Parker 1995).

Predator abundance indices suggest that densities of coyotes in North America increase from north to south (Knowlton and Stoddart 1985, Parker 1995). Coyote densities range from 0.2/mi² when populations are low (pre-whelping) to 3.6 coyotes/mi² when populations are high (post-whelping) (USDI 1979, Knowlton 1972). Knowlton (1972) concluded that coyote densities may approach a high of 5 to 6 coyotes/mi² under extremely favorable conditions with densities of 0.5 to 1.0/mi² possible throughout much of their range. Such an estimate is speculative but represents some of the best available information for estimating coyote populations. As presented in the previous section, such densities would suggest a statewide coyote population of 12,115 to 24,230 coyotes. To provide for a reasonable margin of error the impact analysis for this document will use a population density half of the lowest estimated population density determined by Knowlton (1972). Using half of the lowest estimated population (0.25 coyotes/mi²) the statewide coyote population would be estimated at 6,057 coyotes.

The WVDNR, as the agency with management responsibility for wildlife in West Virginia, has classified the coyote as a wildlife species (WVC §20-2-5, Section 8) with few restrictions on sport harvest, depredation harvest, or season of take. Even though there is no season or restriction of harvest, coyote sightings from hunter surveys have shown an overall general increasing trend since the mid-1990s (see Figure 5).

Figure 5 - West Virginia bow hunter coyote observations per 100 hours.



The unique resilience of the coyote, its ability to adapt, and its perseverance under adverse conditions is commonly recognized among biologists and land managers. Despite intensive historical damage management efforts in livestock production areas and despite sport hunting and trapping for fur, coyotes continue to thrive and expand their range, occurring widely across North and Central America (Miller

1995). Connolly and Longhurst (1975) determined that, “...if 75% of the coyotes are killed each year, the population would be exterminated in slightly over 50 years.” However, Connolly and Longhurst (1975) go on to explain that their “...model suggests that coyotes, through compensatory reproduction, can withstand an annual population mortality of 70%” and that coyote populations would regain pre-control densities (through recruitment, reproduction, and migration) by the end of the fifth year after control was terminated even though 75% mortality had occurred for 20 years. In addition, other researchers (Windberg and Knowlton 1988) recognized that immigration, (not considered in the Connolly and Longhurst (1975) model) can result in rapid occupancy of vacant territories, which helps to explain why coyotes have thrived in spite of intensive damage management activities (Connolly 1978).

A statewide coyote population based on available information could be estimated to range from 12,115 to 24,230 coyotes with a population estimate of 6,057 coyotes representing a worst case scenario. If the coyote population remains stable or increases annually, WS’ take of up to 1,900 coyotes to alleviate damage or threats to livestock would range from 7.8% to 15.7% of the estimated population and 31.4% of the worst case scenario. The highest number of coyote pelts sold to West Virginia fur dealers occurred in 2010 when 691 pelts were sold. The take of coyotes beyond that reported sold to fur buyers is unknown. The cumulative take of coyotes by WS and other known entities would represent 10.7% to 21.4% of the estimated population and 42.8% of the population under the worst case scenario. There is no indication that the combined take by sportsman and WS has or would reach a magnitude that would cause a decline in the coyote population. The number of coyotes observed by bow hunters has remained at steady despite take by WS and by other entities which indicate previous harvest levels have not caused a decline the coyote population.

Coyote populations can withstand a harvest of up to 70% of the population annually (Connolly and Longhurst 1975). The proposed take of up to 1,900 coyotes by WS and the take of coyotes by other entities are not likely to adversely affect coyote populations. Thus, cumulative take appears to be beneath the level that would begin to cause a decline in the coyote population. The WVDNR has concurred with WS’ finding that coyote damage management activities would not adversely affect statewide coyote populations (R. Rogers, WVDNR, pers. comm. 2011).

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

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

Issue 2 - Effects on dogs, wolf-hybrids, and exotic carnivores

Similar to Issue 1, the effects on dogs, wolf-hybrids, and exotic carnivores arises from the use of non-lethal and lethal methods to address the need for reducing damage and threats associated with those species. The use of non-lethal methods can disperse target wildlife from areas where applied resulting in the absence of the target wildlife from the area or fewer individuals present at the location. Non-lethal methods are generally considered as not adversely affecting the populations of target species since individuals or groups of individuals are dispersed to other areas. Lethal methods result in the removal of individuals or groups of individuals identified as causing damage in the area where damage has occurred or the threat of damage is occurring. Therefore, lethal methods can result in localized population reductions, primarily in the area where damage or threats are occurring.

Summary of WS' Feral Dog, Wolf-hybrid, and Exotic Carnivore Damage Management Activities

WS continues to receive requests for assistance to manage damage or threats to livestock in which feral dogs have been identified as the cause of the damage or threat of damage. Since FY 2002, 19 feral dogs have been lethally taken by WS to resolve and prevent further predation on livestock. WS employed foothold traps to live-capture and euthanize two dogs with 17 feral dogs lethally taken using M-44 ejectors. In addition, eight feral dogs have been unintentionally taken during canid damage management activities. No requests for assistance were received by WS to resolve damage or threats of damage caused by wolf-hybrids or exotic carnivores. Therefore, no intentional take of those species occurred by WS.

Feral Dog Population Impact Analysis from WS' Activities from FY 2002 through FY 2010

Feral dog populations are currently unknown. Since FY 2002, a total of 19 feral dogs have been lethally taken by WS as targets and eight as non-targets which is an average take of three feral dogs annually. Feral dogs are a non-native species in West Virginia that often competes with native wildlife for food resources. Any take could be considered as benefiting native wildlife species (Cromer 1967, Perry 1970, Plyant 1977). WS' take of feral dogs occurred within the impact parameters analyzed in the EA. Program activities and their potential impacts on dogs, wolf-hybrids, and exotic carnivores have not changed from those analyzed in the EA. The effects on this issue are expected to remain insignificant.

Analysis of the Proposed Supplement to the EA

An increase in activities and the availability of additional methods should not involve additional adverse effects on the populations of feral dogs, wolf-hybrids, and exotic carnivores. Methods available since the completion of the EA are components that are not the primary methods being employed but are only used to aid in the use of other methods. The use patterns of those methods are not such that would result in additional adverse effects on feral dogs, wolf-hybrids, or exotic carnivores. The potential for an increase in the number of feral dogs unintentionally taken due to the increase of activities to resolve coyote damage will be addressed under Issue 3 below.

Issue 3 - Effects on non-target wildlife populations, including threatened and endangered (T&E) species

The issue of non-target species effects, including effects on T&E species arises from the use of non-lethal and lethal methods identified in the alternatives. The use of non-lethal and lethal methods has the potential to inadvertently disperse, capture, or kill non-target wildlife. WS' SOPs are designed to reduce the effects of damage management activities on non-target species' populations. 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. 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 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.

The lethal take of non-targets from using those methods described in the EA is limited. Any potential non-targets live-captured using non-lethal methods would be handled in such a manner as to ensure the survivability of the animal when released. The use of firearms is selective for target species since animals are identified prior to application; therefore, no adverse impacts are anticipated from the use of this method. The use of chemical methods, when used according to label directions, poses minimal hazards to non-target wildlife (USDA 1997). The SOPs discussed in the EA are intended to minimize non-target take during canid damage management activities.

While every precaution is taken to safeguard against taking non-targets during operational use of methods for resolving damage and reducing threats caused by wildlife, the use of such methods can result in the incidental take of unintended species. Those occurrences are minimal and should not affect the overall populations of any species. WS' take of non-target species during activities to reduce damage or threats to agricultural resources caused by canids is expected to continue to be extremely low. WS would continue to monitor annually the take of non-target species to ensure program activities or methodologies used in damage management activities do not adversely impact non-targets.

The EA concluded that WS' damage management activities would have no adverse effects on other wildlife species (non-target), including T&E species when those activities were conducted within the scope analyzed in the EA. Methods used by WS are essentially selective for target species when applied appropriately. In addition, WS adheres to those SOPs discussed in the EA to minimize the potential for non-target take.

Summary of WS' Unintentional Take of Non-targets during Canid Damage Management Activities

Table 4 shows the number of non-targets unintentionally taken during canid damage management activities by WS. Thirteen species have been taken unintentionally during WS' canid damage management activities since FY 2002. Feral dogs and red fox were unintentionally taken but are also considered target species in the EA that are likely to cause damage to agricultural resources. Other non-targets taken by WS during canid damage management include gray fox (*Urocyon cinereoargenteus*), black bear (*Ursus americanus*), bobcat (*Lynx rufus*), raccoon (*Procyon lotor*), white-tailed deer (*Odocoileus virginianus*), opossum (*Didelphis virginianus*), striped skunk (*Mephitis mephitis*), wild turkey (*Meleagris gallopavo*), turkey vulture (*Cathartes aura*), woodchuck (*Marmota monax*), and common raven (*Corvus corax*).

WS' take of feral dogs and red fox as non-targets is expected to have no significant impacts on the viability of those species' populations since the combined take (take as targets and take as non-target) of those species are within the level of take analyzed in the EA. The cumulative take of feral dogs and red fox was discussed previously under Issue 1 and Issue 2.

Raccoons were the primary non-target species taken during canid damage management activities conducted by WS. Since FY 2002, WS has unintentionally taken 305 raccoons which is an average of 34 raccoons annually. As shown in Table 5, raccoons were primarily taken unintentionally with M-44 ejectors that are placed for the lethal take of coyotes. Activities also resulted in the unintentional take of 159 red fox and 197 gray fox between FY 2002 and FY 2010. The unintentional take of red fox has averaged nearly 18 fox per year from FY 2002 through FY 2010 while the unintentional take of gray fox has average 22 fox per year.

The current population of raccoons is unknown. Based on surveys, the WVDNR currently estimates the raccoon population to be stable (R. Rogers, WVDNR, pers. comm. 2011). Raccoons are considered

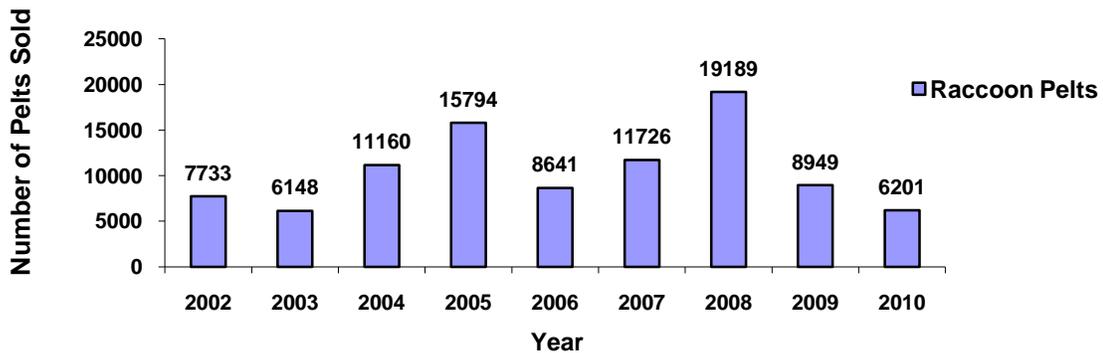
furbearers with regulated hunting and trapping seasons. An unlimited number of raccoons can be harvested during the duration of the hunting and trapping season (WVDNR 2009). The number of raccoon pelts sold to fur dealers in the State is shown in Figure 6. The number of pelts sold is likely more an indication of pelt prices than an indication of population trends. In addition, not all raccoon pelts harvested annually are likely sold to dealers in the State, and the annual harvest level of raccoons is likely higher. The number of pelts sold, however, provides an indication of the number of raccoons harvested.

Table 4 – WS’ unintentional take of non-targets during canid damage management activities

Species	Fiscal Year									TOTAL
	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Feral Dog	1	0	0	0	0	0	1	2	2	6
Red Fox	6	2	13	31	9	6	17	36	39	159
Gray Fox	22	14	21	25	7	6	13	48	41	197
Black Bear	1	0	0	3	1	0	2	0	2	9
Bobcat	2	3	1	8	1	0	1	2	0	18
Raccoon	24	16	27	33	16	12	55	45	77	305
White-tailed Deer	0	0	0	9	0	0	9	5	2	25
Opossum	12	0	1	6	2	1	15	6	5	48
Striped Skunk	1	0	0	2	0	1	3	7	2	16
Wild Turkey	0	0	0	0	0	0	8	3	0	11
Turkey Vulture	0	0	0	0	0	0	3	1	0	4
Woodchuck	0	0	1	0	2	0	2	6	0	11
Common Raven	0	0	1	0	0	0	1	0	0	2

The highest level of unintentional raccoon take occurred in FY 2010 when 77 raccoons were taken. When compared to the number of raccoon pelts sold in the State during 2010, WS’ take of 77 raccoons represents 1.2% of the number of raccoon pelts sold. The fewest number of pelts sold from 2002 through 2010 occurred in 2003 with 6,148 pelts sold. In FY 2003, 16 raccoons were unintentionally taken by WS which represented 0.3% of the raccoon pelts sold. Based on current information, the magnitude of WS’ unintentional take of raccoons during canid damage management activities could be considered low when compared to the number of raccoon pelts sold which likely under-represents the actual number of raccoons harvested. Therefore, the magnitude of raccoon take on the statewide population from WS’ unintentional take of raccoons is even lower. When WS’ non-target take of raccoons is compared to the annual harvest of raccoons by West Virginia hunters and trappers, WS’ take impact is of low magnitude.

Figure 6 - The annual number of raccoons pelts sold to fur dealers in West Virginia, 2002 - 2010



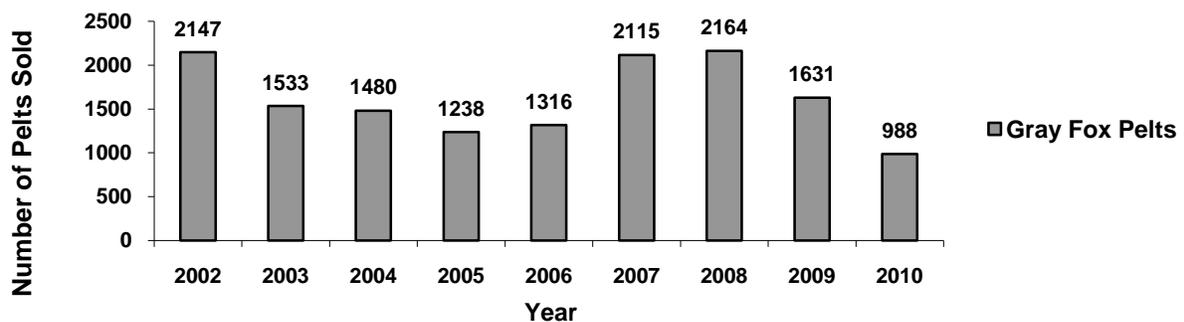
Since FY 2002, the average annual non-target take of gray fox by WS during canid damage management activities has been 22 gray fox. Non-target take occurred primarily during the use of M-44 ejectors. Gray fox can be found statewide where suitable habitat exists. The population of gray fox is currently unknown. Similar to other furbearing species, an unlimited number of gray fox can be harvested during regulated hunting and trapping seasons. The number of gray fox pelts sold to fur dealers in the State is shown in Figure 7.

Table 5 – WS’ unintentional take of non-targets by method in West Virginia, FY 2002 – FY 2010

Species	Method			TOTAL
	M-44	Snare	Foothold	
Feral Dog	4	2	0	6
Red Fox	137	14	8	159
Gray Fox	183	9	5	197
Black Bear	4	4	0	8
Bobcat	4	9	5	18
Raccoon	178	81	46	305
White-tailed Deer	1	24	0	25
Opossum	24	9	15	48
Striped Skunk	1	7	8	16
Wild Turkey	0	11	0	11
Turkey Vulture	1	1	2	4
Woodchuck	1	7	3	11
Common raven	1	1	0	2

The fewest number of gray fox pelts sold to fur dealers occurred in 2010 (see Figure 7). In FY 2010, a total of 41 gray fox were unintentionally taken by WS which represents 4.1% of the pelts sold. WS’ highest level of non-target take of gray fox occurred in FY 2009 when 48 fox were taken. WS’ take of gray fox in FY 2009 represents 2.9% of the number of pelts sold. Based on the limited take occurring by WS, the magnitude of WS’ non-target take should be considered low when compared to the number of pelts sold. WS’ non-target take did not limit the ability of those interested in hunting or trapping gray fox during the regulated hunting and trapping seasons. The potential impacts associated with the unintentional take of red fox were addressed previously under Issue 1 since red fox are also lethally taken as target species by WS to alleviate predation and threats of predation.

Figure 7 - The annual number of Gray fox pelts sold to fur dealers in West Virginia, 2002 - 2010



WS has also unintentionally lethally taken black bears, bobcats, and white-tailed deer during canid

damage management activities. Bobcats and white-tailed deer were primarily taken in snares set to alleviate coyote damage while black bears were primarily taken with M-44 ejectors. Bear and white-tailed deer are considered harvestable species during regulated hunting seasons while bobcats can be taken during hunting and trappings seasons. Since FY 2002, an average of one black bear, two bobcats, and three white-tailed deer have been unintentionally taken by WS during canid damage management. Based on the limited take occurring of those species on an annual basis, WS' take of those species has not adversely affected populations of those species. Similarly, WS' take has not limited the ability to harvest those species during the regulated hunting and trapping seasons.

Based on current information, WS' unintentional take of non-targets from FY 2002 through FY 2010 during canid damage management activities has not adversely affected populations of those species. The magnitude of WS' non-target take when compared to the harvest of those species is low, and WS' activities have not limited the ability to harvest those species during regulated hunting and trapping seasons.

Threatened & Endangered (T&E) Species: A review of T&E species listed by the USFWS showed that additional listings have occurred in West Virginia since the completion of the EA in 2002. Those species listed since the completion of the EA include the ring pink (pearlymussel) (*Obovaria retusa*), Madison Cave isopod (*Antrolana lira*), American burying beetle (*Nicrophorus americanus*), and gray wolf (*Canis lupis*). Of those species listed since the completion of the EA, only the Madison Cave isopod is listed as currently occurring in West Virginia. For those species not currently listed as occurring in West Virginia, WS' activities to manage damage associated with canid damage management would have no effect on those species based on their absence in the State.

The Madison Cave isopod is a subterranean freshwater crustacean found only in Virginia and West Virginia where it can be found in underground lakes and deep karst aquifers (USFWS 1996, West Virginia Wildlife 2005). When initially discovered in 1958, populations of the isopod were only known to occur in the Shenandoah Valley of Virginia. Populations were more recently discovered at two sites in Jefferson County, West Virginia (West Virginia Wildlife 2005). Current threats to isopods are groundwater contamination and development in areas where populations are known to occur. Although the EA discusses habitat modification such as fencing to resolve canid damage or threats or the clearing of rock piles, brush, or trash piles near lambing or calving pastures to reduce available cover for predators, those activities do not cause major ground disturbances that would result in lost habitat, sedimentation, or allow for an increase in the amount of contaminants leaching into underground aquifers. Therefore, the recommendation or use of habitat modification to alleviate damage caused by canids would have no effect on the Madison Cave isopod.

Of additional concern is the potential for chemicals to leach into ground water when used to alleviate damage or reduce threats associated with canid damage management. WS' use or recommendation of the use of chemical methods described in the EA are applied to target specific canids identified as responsible for causing damage or posing a threat and are not widely broadcasted over large geographical areas. Chemical methods used to alleviate damage or reduce threats associated with canids that were addressed in the EA that by their use patterns could result in leaching include M-44 sodium cyanide devices, Compound 1080 used in livestock protection collars, and gas cartridges which produces carbon monoxide when ignited. Those chemical methods are registered for use pursuant to the FIFRA with the EPA.

The EPA (1994) concluded that the encapsulated use of sodium cyanide in M-44 ejectors would pose minimal risks to the environment based on the use pattern and the degradation pattern of sodium cyanide. Sodium cyanide readily reacts with moisture and atmospheric carbon dioxide to produce hydrogen cyanide gas. If a spill occurs or when the ejector is fired, the reaction of the sodium cyanide with moisture and carbon dioxide produces hydrogen cyanide gas which would diffuse into the atmosphere and

be diluted into the air (EPA 1994). Reactions with soil components convert sodium cyanide to carbon dioxide and ammonia or other nitrogen containing compounds (EPA 1994). Microorganisms are also known to decompose cyanide in soils by producing carbon dioxide and ammonia as end-products. Therefore, the EPA (1994) determined that groundwater contamination by cyanide from M-44 ejectors was not anticipated.

Based on available data, the EPA (1995) found that the modes of dissipation for Compound 1080 (sodium fluoroacetate) in the environment were leaching and metabolism through biological mediated processes. Limited data is available on the potential for sodium fluoroacetate to leach through the soil column. Using the solubility of Compound 1080 in water to determine the potential for mobility in soil, the EPA (1995) concluded that undegraded fluoroacetate may tend to leach in soil. The absorption of fluoroacetate by organic matter, clay particles, and plants likely reduces the potential for leaching (EPA 1995). Despite the potential for sodium fluoroacetate to leach to groundwater, no detections of the compound occurred in groundwater from 1971 to 1991 (EPA 1995) when the use of sodium fluoroacetate was much higher based on registered products available compared to the use of the compound today (labeled for use in LPCs only). However, if leaching occurs, toxicity studies of Compound 1080 have classified the compound as practically non-toxic to freshwater invertebrates (EPA 1995).

Large gas cartridges contain sodium nitrate which when ignited produces carbon monoxide gas. Sodium nitrate is a naturally occurring substance (EPA 1991). When used as a den fumigant, the carbon monoxide gas produced from igniting the sodium nitrate dissipates into the atmosphere and is diluted into the air (EPA 1991). Some dissipation of carbon monoxide gas into the soil also likely occurs. Given the use patterns of gas cartridges, the likelihood of leaching of sodium nitrate or carbon monoxide into ground water is minimal.

When used according to label instructions M-44 ejectors, LPCs, and large gas cartridges would pose no risk to groundwater and therefore, would have no effect on the Madison Cave isopod based on currently available information.

Analysis of the Proposed Supplement to the EA on Non-target Effects

Non-target take can occur during canid damage management activities. SOPs discussed in the EA are intended to minimize non-target take. Those SOPs would continue to be followed by WS when conducting canid damage management activities under the supplement to the EA. The supplement to the EA evaluates the need to address an increasing number of requests for assistance to address damage or threats associated with coyotes.

The increased take of coyotes proposed in the supplement to the EA would be expected to also increase the number of associated non-targets taken on an annual basis. From FY 2002 through FY 2010, WS unintentionally removed one non-target per five target coyote, red fox, or feral dogs taken. The most frequent non-targets unintentionally taken were gray fox, red fox, and raccoons. The ratio of non-target fox to targeted coyotes/red fox was one fox unintentionally taken as a non-target for each 11.3 coyotes/red fox taken as a target. One raccoon was unintentionally taken for each 13.2 coyotes/red fox taken as a target. If up to 1,900 coyotes are taken annually by WS under the supplement, an anticipated 79 red fox and 97 gray fox would be unintentionally taken.

On average, 1,161 red fox pelts have been sold annually since 2002 which is considered the minimal annual harvest of red fox. Based on the average number of red fox pelts sold since 2002, WS' anticipated annual unintentional take of 79 red fox would represent 6.8% of the estimated number of red fox pelts sold annually. When the take of an anticipated 79 non-target red fox is combined with the average number of red fox taken as targets, WS' combined take would represent 8.4% of the average number of

red fox pelts sold. The current population of red fox is unknown. However, observations of red fox by West Virginia bow hunters have remained relatively stable (Warner et al. 2009). If take of non-targets occur as anticipated based on previous activities, WS' take of red fox under the proposed supplement to the EA could be considered low when compared to the number of red fox pelts sold. When compared to the take of red fox by other entities to alleviate damage when permitted by the WVDNR and the total take of red fox during the regulated hunting and trapping seasons, WS' take would be of low magnitude.

Similar to red fox, gray fox can also be harvested during regulated hunting and trapping seasons. Since 2002, the average number of gray fox pelts sold annually has been 1,624 pelts, which is considered the minimum annual harvest since not all pelts reach the market. Based on previous activities, those activities conducted by WS to alleviate an increasing number of requests for assistance to manage coyote damage could also increase the number of gray fox that are unintentionally taken. Using information from WS' activities conducted since FY 2002, an estimated 97 gray fox could be lethally taken unintentionally during coyote damage management activities discussed in this supplement. If 97 gray fox were taken by WS annually, WS' take would represent 6.0% of the average number of gray fox pelts sold. Since the number of pelts sold is considered the minimum number of gray fox harvested annually, WS' take is likely a much smaller percentage of the statewide harvest. Therefore, the magnitude of WS' unintentional take of gray fox under the supplement to the EA could be considered low based on activities conducted by WS previously.

Under the supplement to the EA, the number of raccoons taken as non-targets could increase to approximately 150 raccoons annually based on the previous non-target take. An average of 10,616 raccoon pelts have been sold since 2002 which would be considered the minimum number of raccoons harvested annually. If WS' non-target take of raccoons increased to an average of 150 raccoons annually, WS take would represent 1.4% of the average raccoon pelts sold since 2002. Between 2002 and 2009, the fewest raccoon pelts sold occurred in 2003 when 6,148 pelts reached the market which is considered the minimum number of raccoons harvested. The non-target take of 150 raccoons annually would represent 2.4% of the raccoon pelts sold. Based on the number of pelts sold annually, WS' estimated non-target take of raccoons under the proposed supplement could be considered low.

Take of other wildlife would also be expected under the supplement to the EA but would likely be similar to the take levels that have occurred from FY 2002 through FY 2010. Take of other wildlife species is expected to be extremely low to non-existent. All non-target take would be evaluated annually to insure non-target take does not reach a level that would cause adverse effects to non-target species. All non-target take is reported to the WVDNR to ensure WS' take is considered as part of the management objectives. Since the actual non-target take that would occur cannot be predicted, the non-target take for red and gray fox and raccoons anticipated from activities proposed in the supplement to the EA are considered estimates based on previous activities conducted by WS. Those non-target take estimates are used to provide analysis of the expected non-target take if activities were conducted under the supplement. Therefore, WS' actual take of non-targets under the proposed supplement could be lower or higher than those estimates discussed. However, the take of non-targets under the proposed supplement is not expected to reach a magnitude that would cause adverse effects to those non-target populations likely to be taken during activities.

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

Effects on Non-targets from the Use of those Methods Addressed in the Supplement to the EA

Night vision and FLIR equipment and trap monitoring devices have become available since the completion of the EA which allow night hunting and trapping for coyotes to be carried out more effectively and to improve target specificity.

Night vision and FLIR equipment are most often used in association with the use of firearms. Night vision and FLIR equipment allow for the identification of target species during night-time hunting activities which reduces the risks to non-targets and reduces human safety risks. Since night vision and FLIR equipment only aid in the identification of wildlife and are not actual methods of take, the use of visual aids would not contribute to the take of non-targets. Therefore, the use of night vision and FLIR equipment would not adversely affect non-targets.

Trap monitoring devices indicate when a trap has been activated. These devices allow personnel to prioritize trap checks and decrease the amount of time captured non-targets would be restrained. By reducing the restraint time, pain and stress can be minimized and non-targets are more likely to be released unharmed. Trap monitoring devices would be employed where applicable to facilitate monitoring in remote locations to ensure any captured wildlife, target or non-target, is removed promptly. The use of night vision equipment, FLIR devices, and trap monitors would have no effect on T&E species listed in the West Virginia, including their designated critical habitats.

Issue 4 - Effects on human health and safety

Based on the analyses in the EA and WS' programmatic FEIS, when WS' activities are conducted according to WS' directives and SOPs, according to federal, state, and local laws, and to label requirements, those activities pose minimal risks to human safety (USDA 1997, USDA 2002). The EA concluded that the effects of WS' canid damage management program on this issue would be insignificant. WS' implementation of program activities since the completion of the EA has not resulted in any adverse impacts to human health and safety. WS would continue to employ methods using SOPs and WS' program directives to prevent any adverse impacts to human safety. As discussed in the EA and WS' programmatic FEIS, methods available to alleviate damage and threats associated with canids are not likely to cause any human safety issues.

Analysis of the Proposed Supplement to the EA

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

Management activities conducted by WS have not resulted in any injuries or illness to any members of the public or to WS' personnel. Program activities and their potential impacts on human health and safety

have not changed from those analyzed in the EA. The possible increase in the number of depredation control projects addressed in the supplement to the EA would not increase risks associated with those activities nor employ additional methods that would increase the risks to human safety. Impacts of the program on this issue are expected to remain insignificant.

Issue 5 - Humaneness of control methods used by WS

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.

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.

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, which are applied as humanely as possible. Methods used in canid damage management activities in West 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 manage damage and threats caused by canids from FY 2002 through FY 2010 have not changed from those analyzed in the EA.

Analysis of the Proposed Supplement to the EA

The issue of humaneness from those proposed activities in the supplement would remain as addressed in the EA since the methods available for use under the proposed supplement are the same as those methods addressed in Appendix B the EA. The potential increase in activities by WS to address damages and threats to human safety and property proposed in the supplement would not result in humaneness issues outside of those addressed in the EA for the methods available for use. The proposed use of trap monitoring devices would likely result in methods being used more humanely since monitoring devices allow traps to be checked remotely thus reducing travel time. By allowing traps to be monitored remotely, traps can be checked more effectively and efficiently which allows those animals live-captured to be addressed more timely which minimizes the amount of time the animal is restrained. Therefore, the use of trap monitoring devices proposed under the supplement would likely result in traps being used more humanely. Additionally, the use of FLIR and night vision equipment may improve the perceived

humanness of coyote and red fox removal as shooting is generally considered to involve less stress to the animal than trapping or the use of toxicants.

Issue 6 - Effects on the aesthetic values of target and non-target species

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

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

The use of lethal methods would result in temporary declines in local populations resulting from the removal of target canid species to resolve requests for assistance. WS' goal is to respond to requests for assistance and to manage those canids responsible for the resulting damage. Therefore, the ability to view and enjoy canids in West Virginia would still remain if a reasonable effort is made to locate canids outside the area in which damage management activities occurred.

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 canids. The WS program only conducts activities at the request of the affected property owner or resource manager. Upon receiving a request for assistance, WS addresses issues/concerns and explanations are given for the reasons why a particular method or group of methods would be the most effective in reducing damage for the specific situation. Methods employed to reduce or resolve damage is agreed upon by the cooperator according to a cooperative service agreement.

The number of canids lethally removed by WS in West Virginia since completion of the EA had minimal impacts on canid species. Therefore, WS' activities did not limit the opportunity to view or enjoy canids. Native canids remain common and abundant and available for viewing by persons with that interest. There are no known populations of non-native canids or exotic carnivores in West Virginia, except for feral dogs.

Analysis of the Proposed Supplement to the EA

Program activities and methods and their potential impacts on aesthetics have not changed from those analyzed in the EA. The effects on aesthetics from an increase in the number of canids removed or the use of additional methods to remove them, as described in the supplement to the EA, would not further increase any effects on aesthetics. An increase in take of coyotes may occur under the supplement to the EA but would not significantly affect target canid populations. Therefore, the analysis in the EA remains appropriate for the proposed supplement. Native canids addressed in the EA are common and abundant in West Virginia and can be reasonably viewed outside of the damage area if efforts are made. Impacts of the proposed action and the supplement on aesthetics are expected to remain insignificant.

XII. ISSUES NOT CONSIDERED IN DETAIL

In addition to the identified major issues considered in detail, five additional issues were considered but were not analyzed in detail with rationale provide in the EA in Section 2.4 of 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.

XIII. ALTERNATIVES ANALYZED IN DETAIL

The alternatives considered and evaluated using the identified issues are described and discussed in detail in Chapter 3 of the EA (USDA 2002). In addition, the EA contains a detailed description and discussion of the alternatives and the effects of the alternatives on 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 six potential alternatives that were developed to address the issues identified above. Alternatives analyzed in detail include:

- Alternative 1 - Technical Assistance Only
- Alternative 2 - Non-lethal Control Only
- Alternative 3 - Non-lethal Control before Lethal Control
- Alternative 4 - Lethal Control Only
- Alternative 5 - Integrated Wildlife Damage Management (Proposed Action/No Action)
- Alternative 6 - No Federal WS Predator Damage Management in West Virginia

XIV. ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Seven additional alternatives were considered but not analyzed in detail in Section 3.3 of the EA. WS has reviewed the alternatives not analyzed in detail in the EA and has determined that the analyses provided in the EA have not changed and are still appropriate.

XV. STANDARD OPERATING PROCEDURES

The current WS program in West Virginia uses many SOPs. SOPs are discussed in Chapter 3 of the EA (USDA 2002) and Chapter 5 of WS' programmatic FEIS (USDA 1997). The SOPs discussed in the EA remain appropriate for WS' canid damage management activities conducted in the State.

XVI. CUMULATIVE IMPACTS

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

WS would be the primary federal program with damage management responsibilities; however, other entities may conduct similar activities as permitted by the WVDNR. Through ongoing coordination with the WVDNR, 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.

Cumulative Impacts on Coyote and Red Fox Populations

Evaluation of WS' activities relative to coyote and red fox populations indicated that program activities would likely have no cumulative adverse effects on populations in West 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 wildlife
- Human-induced mortality through private damage management activities
- Human-induced mortality through fur harvest
- Human and naturally induced alterations of wildlife habitat
- Annual and perennial cycles in population densities

All those factors play a role in the dynamics of coyote and red fox 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 1997). This process allows WS to take into consideration other influences in the environment, such as those listed above, in order to avoid cumulative adverse impacts on target species.

No cumulative adverse impacts on coyote and red fox populations are expected from WS' actions based on the following considerations:

Historical outcomes of WS' programs on wildlife

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

With management authority over coyotes and fox in West Virginia, the WVDNR can adjust take levels, including the take of WS, to ensure population objectives for coyotes and fox are achieved. Consultation and reporting of take by WS would ensure the WVDNR considers any activities conducted by WS. Currently, the WVDNR allows coyotes to be taken at any time with no limit on the number of coyotes that can be taken. A regulated harvest season is in place for red fox, but the WVDNR does not limit the number of red fox that can be harvested during the harvest period. The WVDNR concurred with WS' analysis that WS' activities would not adversely impact coyote and red fox populations (USDA 2002, P. Johansen, WVDNR, pers. comm. 2009).

Since the completion of the EA, coyote populations in West Virginia are thought to have remained at least stable which provides some indication that WS' activities are not cumulatively impacting populations. Since FY 2002, 3,871 coyotes have been taken by WS for the protection of livestock in West Virginia. Since 2002, hunters and trappers have removed at least 3,720 coyotes during hunting and trapping season as reported by fur dealers which underestimates the actual take by hunters and trappers because many coyote pelts are sold to out-of-state fur dealers or not sold at all and are not represented in those data. In addition, many coyotes may have been shot or trapped by livestock producers to alleviate predation and the fur pelts never harvested. Therefore, the actual harvest of coyotes is much higher than the data

presented here. Since FY 2002, 158 red fox have been taken by WS for the protection of livestock. WS' limited annual take of red fox has averaged 1.5% of the number of red fox reported sold to fur dealers in West Virginia since 2002 indicating WS' activities are only a small portion of the total take occurring.

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

SOPs built into WS' program

SOPs are designed to reduce the potential negative effects of WS' actions on 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 ensured through monitoring, in accordance with the WS Decision Model (Slate et al. 1992, USDA 1997, USDA 2002).

Cumulative Impact Potential on Dogs, Wolf-hybrids, and Exotic Carnivores

Feral dogs, wolf-hybrids, and exotic carnivores are not native to West Virginia and often occur due to abandonment by their owner or by escaping from captivity. Feral wildlife often have negative impacts on native fauna either from competition, predation, or through the transmission of diseases (Cromer 1967, Perry 1970, Plyant 1977). Though depredation of livestock by feral canids and exotic carnivores occurs infrequently, it has been documented to occur (USDA 2002). There are currently no known populations of wolf-hybrids or exotic carnivores in West Virginia.

Feral dog populations are established in West Virginia but the current population and status is unknown. Since FY 2002, 25 feral dogs were captured by WS. WS' take of feral dogs has averaged 2.8 dog per year since FY 2002. Though an increase in the capture of feral dogs may occur under the proposed supplement, take is not likely to result in cumulative impacts to feral dog populations. Feral dogs are a non-native species and could be considered to be negatively impacting native fauna. Therefore, any reduction in feral dog populations could be viewed as benefitting native fauna.

Cumulative Impact Potential from Chemical Components

The use of pesticides as a lethal population management component may have the greatest potential for cumulative impacts on the environment. Potential impacts relate to the deposit of chemical residues in the physical environment causing environmental toxicosis.

The LPC containing sodium fluoroacetate (Compound 1080), the M-44 device containing sodium cyanide, and the large gas cartridge which produces carbon monoxide when ignited are the only chemicals registered for use in West Virginia to protect livestock from predation by canids. The amount of sodium cyanide and Compound 1080 used by WS in West Virginia between FY 2002 and FY 2010 is summarized in Table 6. WS has used relatively small amounts of these chemicals annually. When exposed to the environment, sodium cyanide quickly reacts with moisture and diffuses to the atmosphere

and is diluted in the air. Reactions with soil components (including microorganisms) would convert cyanide to carbon dioxide and ammonia or other nitrogen containing compounds. The potential for any cumulative impacts from sodium cyanide are very low (EPA 1994). The environmental fate of Compound 1080 is not well documented; however, the EPA, in its registration of the pesticide, has not required additional studies because of the limited amount of Compound 1080 that is used annually in livestock protection. WS uses an average of 3.6 grams of Compound 1080 annually in West Virginia. WS' programmatic FEIS concluded through a risk assessment that the likelihood of significant cumulative impacts resulting from WS' chemical use is small (USDA 1997).

Table 6 – Grams of Sodium Cyanide and Compound 1080 used by WS in West Virginia, FY 2002 – FY 2010.

Chemical (grams)	Fiscal Year									TOTAL (grams)
	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Sodium Cyanide	1,033.0	480.2	643.1	752.7	706.2	618.9	1,154.3	1,533.6	1,810.0	8,732.0
Compound 1080	3.6	3.9	4.2	7.2	6.0	2.1	2.4	2.1	0.9	32.4

No known non-targets were taken from the use of the LPC. The collars were employed according to EPA labeling and by WS' personnel who are certified to use the pesticide. Based on the limited application period and the safety inherent with the use of pesticides according to EPA labeling, WS' use of the LPC and the M-44 device has had no cumulative adverse effects. WS does not expect that any increase in the use of LPCs and M-44s from activities proposed in the supplement would cause cumulative adverse effects.

Cumulative Impact Potential to Non-targets, including T&E Species

From FY 2002 through FY 2010, WS' activities to reduce predation on livestock in West Virginia resulted in the unintentional take of feral dogs, red fox, gray fox, black bears, bobcats, raccoons, white-tailed deer, opossum, striped skunks, wild turkeys, turkey vultures, woodchucks, and common ravens (see Table 4). There is a risk of non-target species being taken whenever lethal control methods are employed to stop livestock predation. The WVDA registered the M-44, the LPC, and the large gas cartridge for use by WS' personnel only as a means of preventing adverse environmental affects. The use restrictions that accompany those pesticides are designed to prevent risks to the public and minimize the take of non-target animals while targeting those predators causing damage. The WVDNR has authorized WS' personnel to address predation complaints with all legal methods throughout the entire year. From FY 2002 to FY 2010, WS has taken an average of 90 non-target animals each year on farms that are experiencing livestock predation (see Table 4). WS removes approximately five depredating coyotes for each non-target animal that is taken.

In contrast to adverse impacts on non-target animals from direct take, some species may actually benefit from WS' methods. Coyotes, dogs, and red foxes are opportunistic predators and may feed on many bird and mammal species. Some examples include: coyotes killing fawn and adult white-tailed deer which some people enjoy watching, photographing, and hunting. Red fox eat eggs and fledglings of quail (*Colinus virginianus*), wild turkey, and ruffed grouse (*Bonasa umbellus*) which some people enjoy viewing, feeding, or hunting. In contrast, others may argue that coyotes prey on deer which may help reduce the number of deer-vehicle collisions and crop damage in an area.

No T&E species were taken by WS during activities to reduce livestock predation by canids. A review of the current listed species in West Virginia indicates WS' activities would have no cumulative impacts on the viability of those species' populations. WS' use of methods in limited situations to target specific canids would have no cumulative impacts on T&E species.

Cumulative impacts to non-target and T&E species are likewise not likely to occur from any increased activities proposed under the supplement to the EA. WS' use of methods and techniques, including the use of SOPs, limit the unintentional take of non-targets during the use of methods. Take of non-targets under the proposed supplement to the EA is not likely to significantly increase to levels where declines in populations would occur. WS would annually monitor non-target take during program activities to ensure the unintentional take of non-targets does not negatively impact populations.

Cumulative Impact Potential to Human Health and Safety

No adverse impacts to human safety were observed or reported to WS from the implementation of the proposed action in the EA. Methods available for use by WS are employed according to SOPs discussed in the EA to ensure human safety is not threatened by the use of methods to protect livestock from predation by canids.

Cumulative impacts from the proposed supplement to the EA are likewise likely to have no adverse effect on human health and safety. Though some increased use of methods may occur under the proposed supplement to the EA, those methods are still not likely to adversely affect human safety. Methods would continue to be employed according to SOPs and WS' Directives to ensure human safety issues are considered as part of the decision-making process for the use of those methods. The cumulative impacts to human safety from implementation of the proposed action and the supplement to the EA would not have cumulative impacts on human safety.

Humaneness of Control Methods used by WS

Those methods employed by WS to reduce or prevent predation on livestock by canids in West Virginia are addressed in Appendix B of the EA (USDA 2002) and further described in WS' programmatic FEIS (USDA 1997). WS continues to employ those methods as humanely as possible to minimize suffering and distress. WS' SOPs are further discussed in section 3.4 in the EA (USDA 2002).

WS continues to seek new methods and ways to improve current technology to improve the humaneness of methods used to manage damage caused by mammals. 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 methods.

As discussed in the supplement, the use of trap monitors would likely allow traps to be used more humanely by allowing traps to be checked more effectively and efficiently. Thus, wildlife can be addressed in a timelier manner which lessens the amount of time the animal is restrained by the trap. Therefore, trap monitors would likely enhance the humane use of methods. The use of FLIR and night vision equipment to remove coyotes depredating or adjacent to sheep would increase the selectivity of direct control management activities by targeting coyotes most likely to kill livestock and reducing the take of non-target species.

Effects on the Aesthetic Values of Target and Non-target Species

Those persons who enjoy viewing wildlife may experience a temporary reduction in being able to view wildlife at some sites where WS' program activities are implemented. However, other individuals of the same species would likely continue to be present in the affected area, and would also likely be available for viewing and enjoyment at adjacent locations.

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, especially predators and exotic or feral species. Continued increases in numbers of individuals or the continued presence of an overabundant species may lead to further degradation of some people's enjoyment of any wildlife. WS' actions could positively affect the aesthetic enjoyment of wildlife for those people that are being adversely affected by the target species identified in this EA. WS' activities are not expected to have any cumulative adverse affects on this element of the human environment.

XVII. 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 2002. Under the proposed action, activities to alleviate predation by canids using an integrated approach employing both non-lethal and lethal methods would not have significant impacts on wildlife populations in West Virginia. WS continues to coordinate activities with federal, state, 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.

XVIII. LITERATURE CITED

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