ENVIRONMENTAL ASSESSMENT

Feral Swine Damage Management in New York

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Executive Summary

In recent years, small populations of feral swine have been found in several counties throughout New York State. Feral swine populations may include released or escaped domestic swine or European wild boar. Although morphologically distinct, both feral swine and European wild boar are recognized as *Sus scrofa*. Feral swine they are typically black or brown and weigh an average of 130 pounds. Feral swine are not native to any part of North America and the New York State Department of Environmental Conservation (NYSDEC) considers feral swine to be an invasive species. Invasive species are non-native species that cause harm to the environment or human health (NYSDEC 2012*b*).

Feral swine cause considerable damage to the environment, agricultural crops, pastures, national wildlife refuges, state parks and are a disease threat to livestock (Pimental et al. 2005, Campbell and Long 2009, West et al. 2009, Hamrick et al. 2011). Feral swine directly compete with valuable native wildlife and decreases habitat quality. It is because of the negative impacts on native plants, native wildlife, livestock, agriculture, and humans that the NYSDEC has implemented a goal to eradicate feral swine from New York's landscape (NYSDEC 2012*a*).

This EA describes the need to manage feral swine to reduce and prevent damage associated with these animals in New York, the potential issues associated with managing damage caused by feral swine, and the environmental consequences of conducting different management alternatives. The issues and alternatives associated with feral swine damage management were initially developed by Wildlife Services in cooperation with the NYSDEC and the New York State Department of Agriculture and Markets (NYSDAM).

Conflicts and Damage

The establishment of feral swine populations in New York is a concern due to the impacts they can have on resources such as natural resources, agriculture, property, and human health and safety. Feral swine compete directly with valuable wildlife for food, destroy habitat, predate directly on wildlife species, or may pass diseases to them. They can compete for seasonal food resources such as wild fruits and nut crops, especially oak mast, which can lead to deer and Wild Turkey entering the winter with inadequate fat reserves (Beach 1993).

Direct consumption of agricultural crops, depredation of livestock, disease transmission, rooting behaviors in crop fields, hayfields and sod farms, trampling, fence damage, and wallowing are ways feral swine can damage agriculture (Beach 1993). Use of agricultural crops as a forage resource can make up to 71% of the plant material consumed by feral swine (Mayer and Brisbin 2009). There has already been documented damage to corn by feral swine in New York, with 11 acres damaged at an estimated total cost of $14,850 (Westenbroek 2011). A farm in Clinton County, New York reported losses estimated at $25,000 due to feral swine damage to corn, apples, and strawberries (Hall 2012).

Feral swine also cause property damage, they can damage landscaping, golf courses, recreational fields, parks, lawns, and drainage ditches and cause erosion by rooting in these areas. Rooting activity turns the sod and grass over and leaves the area bare of vegetation and susceptible to

erosion. Vehicular collisions are another way feral swine damage property. In New York, five feral swine vehicle collisions were reported in recent years (K. Stang, NYSDEC, personal communication, 2012).

Human health and safety can also be threatened. Feral swine are potential reservoirs for approximately 30 viral and bacterial diseases (Davidson and Nettles 1997, Samuel et al. 2001, Williams and Barker 2001) and 37 parasites (Forrester 1991) that are transmissible to humans; however, actual transmission of diseases from feral swine to humans is thought to be rare (Amass 1998). Brucellosis, salmonellosis, toxoplasmosis, trichinosis, tuberculosis, and tularemia are some of the zoonotic diseases that can be carried by feral swine (Stevens 1996, Hubalek et al. 2002, Seward et al. 2004). Feral swine feces containing E. coli were deposited on California spinach fields where swine were feeding, causing the illness of over 200 people and 3 deaths nationwide (Food and Drug Administration (FDA) 2007, Rouhe and Sytsma 2007).

Decisions to be Made

Based on agency relationships, Memorandums of Understanding (MOUs), and legislative authorities, Wildlife Services is the lead agency for this EA, and therefore, responsible for the scope, content, and decisions made. The NYSDEC is the state agency responsible for managing wildlife in the State of New York. The goal of the NYSDEC is to completely eradicate feral swine from New York's landscape and to prevent establishment of populations in the future. Wildlife Services' activities to reduce and/or prevent feral swine damage in the State would be coordinated with the NYSDEC to ensure that actions were consistent with population goals established for feral swine in the State. Extensive literature review and discussion with entities involved in the management of feral swine were used to identify potential management strategies for feral swine. When examining management strategies, factors such as effects on swine populations, non-target wildlife species, threatened and endangered species, aesthetic values of feral swine, humaneness, and safety of management methods were all considered.

Alternatives examined in this EA include an alternative in which Wildlife Services does not become involved in feral swine damage management; an alternative in which Wildlife Services provides technical assistance (advice recommendations) but does not provide operational assistance with implementing the regulations; and a third (preferred) alternative that allows Wildlife Services and the NYSDEC to continue using an integrated feral swine damage management approach to manage feral swine. Based on a thorough review of all management strategies, Alternative 3 was the selected alternative:

<u>Alternative 3 - Continuing the Current Integrated Approach to Managing Feral Swine Damage (Proposed Action/No Action)</u>

This alternative, the no action/proposed action alternative, would continue the current implementation of an adaptive integrated approach utilizing non-lethal and lethal techniques, as deemed appropriate using the Wildlife Services Decision Model, to reduce damage and threats caused by feral swine in the State.

A major goal of the feral swine management program would be to resolve and prevent feral swine damage to natural resources, agriculture, property, and human safety. To meet this goal, Wildlife Services, in cooperation with the NYSDEC, would continue to respond to requests for assistance with, at a minimum, technical assistance, or when funding was available, operational damage management. Funding could occur through federal appropriations or from cooperative funding. The adaptive approach to managing damage associated with feral swine would integrate the use of the most practical and effective methods as determined by site-specific evaluation. City/town managers, agricultural producers, property owners, and others requesting assistance would be provided information regarding the use of appropriate non-lethal and lethal techniques.

Examples of methods that may be used under this alternative include resource management, habitat modification, livestock management, cultural practices, physical exclusion, behavior modification, shooting, bay dogs and trapping with corral traps. Only those methods legally available for use by the appropriate individual would be recommend or loaned by Wildlife Services. These methods would be available for use by those persons experiencing damage or threats of damage by feral swine. Immobilizing or euthanizing drugs, cable restraints, aerial gunning, and foot snares are methods reserved for use by Wildlife Services and the NYSDEC and their permitted cooperators only.

TABLE OF CONTENTS

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.1 PURPOSE 1
1.2 NEED FOR ACTION 2
1.3 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT 177
1.4 RELATIONSHIP OF THIS DOCUMENT TO OTHER ENVIRONMENTAL DOCUMENTS 20
1.5 AUTHORITY OF FEDERAL AND STATE AGENCIES 20
1.6 COMPLIANCE WITH LAWILDLIFE SERVICES AND STATUTES 21
1.7 DECISIONS TO BE MADE 26

CHAPTER 2: AFFECTED ENVIRONMENT AND ISSUES

2.1 AFFECTED ENVIRONMENT 28
2.2 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES 30
2.3 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE 34

CHAPTER 3: ALTERNATIVES

3.1 DESCRIPTION OF THE ALTERNATIVES 46
3.2 EXAMPLES OF FERAL SWINE DAMAGE MANAGEMENT PROJECTS 54
3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE 544
3.4 STANDARD OPERATING PROCEDURES FOR DAMAGE MANAGEMENT 588
3.5 ADDITIONAL STANDARD OPERATING PROCEDURES 60

CHAPTER 4: ENVIRONEMENTAL CONSEQUENCES

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL . 64
4.2 CUMULATIVE IMPACTS BY ISSUE 92
4.3 ADDITIONAL ANALYSES OF POTENTIAL CUMULATIVE IMPACTS 978
4.4 SUMMARY OF CUMULATIVE IMPACTS 988

CHAPTER 5: PREPARERS, REVIEWERS, AND PERSONS CONSULTED

5.1 PREPARERS 999
5.2 REVIEWERS 99
5.3 PERSONS CONSULTED 99

APPENDICES

APPENDIX A: LITERATURE CITED 100
APPENDIX B: FERAL SWINE DAMAGE MANAGEMENT METHODS 115
APPENDIX C THREATENED AND ENDANGERED SPECIES IN NEW YORK 120

LIST OF ACRONYMS

ADC	Animal Damage Control
AMDUCA	Animal Medicinal Drug Use Clarification Act
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BCC	Biological Carrying Capacity
CCC	Cultural Carrying Capacity
CDC	Center for Disease Control
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CSF	Classical Swine Fever
DEA	Drug Enforcement Administration
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act of 1973
FEIS	Final Environmental Impact Statement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FSDM	Feral Swine Damage Management
FY	Federal Fiscal Year
FONSI	Finding of No Significant Impact
HGE	Human granulocytic ehrlichiosis
HME	Human monocytic ehrlichiosis
IWDM	Integrated Wildlife Damage Management
MBTA	Migratory Bird Treaty Act
MIS	Management Information Systems
MOU	Memorandums of Understanding
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NWR	National Wildlife Refuge
NWRC	National Wildlife Research Center
NYCRR	New York Codes, Rules, and Regulations
NYSDAM	New York State, Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation, Bureau of Wildlife
PRRSV	Porcine Reproductive and Respiratory Syndrome Virus
PRV	Pseudorabies Virus
ROD	Record of Decision
SIV	Swine Influenza
SOP	Standard Operating Procedures
TB	Tuberculosis
T&E	Threatened and Endangered (species)
TSR	Trap, Sterilize, and Release
USDA	United States Department of Agriculture

USFWS	U.S. Fish and Wildlife Service
VS	Veterinary Services (USDA, APHIS)
WMA	Wildlife Management Area
WS	Wildlife Services (USDA, APHIS)

CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

1.1 PURPOSE

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services program, the New York State Department of Environmental Conservation, Bureau of Wildlife (NYSDEC), and the New York State Department of Agriculture and Markets (NYSDAM) continue to receive requests for assistance to resolve or prevent damage occurring to natural resources, agriculture, property, and human safety associated with feral swine (*Sus scrofa*) in New York. Feral swine populations in the United States are composed of escaped or intentionally released domestic swine, introduced Eurasian wild boar, and hybrids of the two. They are not native to any part of North America. Feral swine do considerable damage to the environment, wildlife and their habitats, destroy crops, and are a disease threat to livestock (Pimental et al. 2005, Campbell and Long 2009, West et al. 2009, Hamrick et al. 2011). It is because of the negative impacts on native plants, native wildlife, livestock, agriculture, and humans that the NYSDEC has implemented a goal to eradicate feral swine from New York's landscape (NYSDEC 2012*a*).

Normally, individual wildlife damage management actions conducted by the Wildlife Services program could be categorically excluded from further analysis pursuant to the National Environmental Policy Act (NEPA), in accordance with APHIS implementing regulations for the NEPA (7 CFR 372.5(c), 60 FR 6000-6003). This EA is being developed to evaluate cumulatively the individual projects conducted by Wildlife Services to manage damage and threats to agricultural resources, property, natural resources, and threats to humans caused by feral swine. This EA will assist in determining if the proposed management of feral swine damage could have a significant impact on the environment for both humans and other organisms; analyze alternatives; coordinate efforts with other federal, state, and local agencies; inform the public; and comply with the NEPA. This EA analyzes the potential effects of feral swine damage management when requested, as coordinated between Wildlife Services, the NYSDEC, and the NYSDAM; further, the USFWS would evaluate whether to provide funding for feral swine damage management to protect natural resources.

The NYSDEC will use this EA as a guidance document and management plan to request funding through the Federal Aid in Wildlife Restoration Program. The Federal Aid in Wildlife Restoration Program provides funds to fish and wildlife agencies for projects to restore, conserve, manage, and enhance wild birds and mammals and their habitat (USFWS 2011). Due to the potential for feral swine to cause damage to natural resources, funds would be requested to manage feral swine in order to protect habitats and native species in New York. The NYSDEC also serves on the New York Feral Swine Task Force, which is comprised of Wildlife Services, USDA-Veterinary Services (VS), and the NYSDAM. The task force serves as a venue to share technical information and expertise between agencies.

The NYSDAM can make regulatory changes to the operation of enclosed shooting facilities that have either domestic swine, Eurasian wild boar, or hybrids of the two on their premises, as well as making regulatory changes to the importation of swine for these and other purposes in the State of New York. The NYSDAM provides consultation and information to Wildlife Services and the NYSDEC regarding the regulation and husbandry of swine in New York.

Wildlife Services, the NYSDEC, the NYSDAM, and the USFWS are preparing this EA to: 1) facilitate planning, 2) promote interagency coordination, 3) streamline program management, 4) clearly communicate to the public the analysis of individual and cumulative impacts of program activities; and 5) evaluate and determine if there are any potentially significant or cumulative effects from the proposed program. The analyses contained in this EA are based on information derived from Wildlife Services' Management Information System, published documents (see Appendix A), input from the NYSDEC, the NYSDAM, other interagency consultations, and public involvement.

The EA evaluates the need for action to manage damage associated with feral swine in the State, the potential issues associated with feral swine damage management, and the environmental consequences of conducting different alternatives to address the need for action and the identified issues. Wildlife Services initially developed the issues and alternatives associated with feral swine damage management in consultation with the NYSDEC and the NYSDAM. To assist with the identification of additional issues and alternatives to managing damage associated with feral swine in New York, the EA will be available to the public for review and comment prior to a Decision[1].

1.2 NEED FOR ACTION

Across the United States, as human populations have expanded, wildlife species have been introduced into new areas, and land has been transformed to meet human needs. Those changes often increase the potential for conflicts between wildlife and people that result in damage to resources and threats to human health and safety. One encroachment on native ecosystems is the introduction of non-native, invasive species into naïve environments. Invasive species are non-native species that cause harm to the environment or human health (NYSDEC 2012*b*). Invasive species often compete with native plants and wildlife and can threaten biodiversity. The number of non-native invasive species introduced in the history of the United States has been estimated at 50,000 species (Pimentel et al. 2005). Some introduced species benefit society, such as corn, wheat, cattle, poultry, and other food items. Nearly 98% of the food system in the United States is derived from introduced species (USBC 2001, Pimentel et al. 2005). Other introduced invasive species have caused considerable economic and environmental damage. Pimentel et al. (2005) estimated invasive species cause nearly $120 billion in environmental damages and losses in the United States annually. Of particular concern are the impacts of invasive species on threatened and endangered (T&E) species worldwide. Invasive species negatively affect nearly 42% of the species listed as T&E in the United States (Wilcove et al. 1998, Pimentel et al. 2005). Worldwide nearly 80% of wildlife populations at risk of extinction are threatened or negatively impacted by invasive species (Pimentel et al. 2005).

Some species of wildlife, including invasive species, have adapted to and thrive in human altered habitats. Those species, in particular, are often responsible for the majority of conflicts between humans and wildlife that lead to requests for assistance to reduce damage to resources and to

[1]After the development of the EA by Wildlife Services and cooperating agencies and after public involvement in identifying new issues and alternatives, Wildlife Services will issue a Decision. Based on the analyses in the EA after public involvement, a decision would be made to either publish a Notice of Intent to prepare an Environmental Impact Statement or a Finding of No Significant Impact will be noticed to the public in accordance to NEPA and the Council of Environmental Quality regulations.

lessen the threat to human safety. In New York, feral swine are an invasive species that are expanding and increasingly causing damage to a variety of resources (USDA 2010).

Both sociological and biological carrying capacities must be applied to resolving wildlife damage problems. The wildlife acceptance capacity, or cultural carrying capacity, is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations. Biological carrying capacity is the land or habitat's ability to support healthy populations of wildlife without degradation to the species' health or their environment during an extended period of time (Decker and Purdy 1988). These phenomena are especially important because they define the sensitivity of a person or community to a wildlife species. For any given damage situation, there are varying thresholds of tolerance exhibited by those people directly and indirectly affected by the species and any associated damage. This damage threshold determines the wildlife acceptance capacity. While the habitat may have a biological carrying capacity to support higher populations of wildlife, in many cases, the wildlife acceptance capacity is lower or has been met. Once the wildlife acceptance capacity is met or exceeded, people begin to implement population or damage management, including lethal methods, to alleviate damage or address threats to human health and safety.

The alleviation of damage or other problems caused by or related to the behavior of wildlife is termed wildlife damage management and is recognized as an integral component of wildlife management (The Wildlife Society 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated and the need for damage management is derived from the specific threats to resources. Those species have no intent to do harm. They utilize habitats (*e.g.*, reproduce, walk, forage) where they can find a niche. If their activities result in lost economic value of resources or threaten human safety, people characterize this as damage. When damage exceeds or threatens to exceed an economic threshold and/or pose a threat to human safety, people often seek assistance with resolving damage or reducing threats to human safety.

The need for action to manage damage and threats associated with feral swine in New York arises from requests for assistance[2] received by Wildlife Services, the NYSDEC, and the NYSDAM to reduce and prevent damage associated with swine from occurring to four major categories: natural resources, agricultural resources, property, and threats to human safety.

Feral Swine

Biology

Feral swine include domestic pigs that have escaped captivity or pet pigs that have been released; European boar (Russian boar) that have escaped from enclosed shooting facilities; or a hybrid cross between domestic pigs and European boar (NYSDEC 2012*a*). Sows (female pigs) average 110 pounds and boars (male pigs) average 300 pounds, but they can reach up to 400 pounds

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

(NYIS 2012). Feral swine can vary in both size and color, with coat color being black, brown, gray, red, tan, or cream. They can also have spots or stripes. Piglets often have stripes that disappear as they age. Feral swine can breed as early as 1 year of age and at any time of year, with a gestation of 115 days (NYIS 2012). Feral swine are capable of producing two litters per year with the average litter size of 4.2 to 7.5 piglets (Taylor et al. 1998), but up to 10 piglets can be born under ideal conditions (Coquenot et al. 1996). Females can also begin breeding 14 to 28 days after the birth of a litter, although they may not ovulate at that time and it is unlikely (but possible) that they will be bred if they are still nursing (Britt 2006). Generally, feral swine piglets are weaned by about 3 months of age and become independent, but stay within family groups called "*sounders*" (Higginbotham 2012).

Feeding Habits

Feral swine feeding activity can be characterized by three foraging techniques: browsing and grazing on items such as leaves, fronds, stems; foraging on the ground for fruits of woody species, fungi, small animals, eggs of ground nesting birds and reptiles, and vertebrate carrion; and rooting for rhizomes, tubers, bulbs, corms, invertebrate larvae, and small fossorial vertebrates (Thomson and Challies 1998).

Diet

Feral swine can eat between 3% and 5% of their total body mass daily (Bodenchuk 2008). Their digestive tract is capable of digesting plant, animal, algal, and fungal matter (Pinna et al. 2007). However, their digestive tract is poorly equipped to break down complex carbohydrates, causing them to select forage that is easily digestible and low in structural carbohydrates (Pinna et al. 2007). Plant material accounts for approximately 80% to 88% of a feral swine's diet, and seasonally, it can be as great as 100% (Mayer and Brisbin 2009). Animal material makes up approximately 10% of a pig's diet, but the frequency of occurrence in a pig's diet is often high (*e.g*., 80 to 90%) (Mayer and Brisbin 2009).

Feral Swine Populations in New York

The NYSDEC and Wildlife Services monitor feral swine populations through motion activated trail cameras, observation reports by citizens, public surveys, examination of maps and aerial photos, and actual capture of feral swine (USDA 2010). Formal abundance estimates are not available, but anecdotal reports indicate that feral swine occur in at least 21 counties in New York with confirmed breeding in five counties (Swift et. al 2012). The NYSDEC found the population might total up to several hundred animals as of 2011 (Swift et al. 2012). Feral swine populations are difficult to estimate because of their secretive behavior and their ability to reproduce rapidly.

Feral swine populations can expand rapidly, as much as 3-fold in just a few years (Chavarria 2006). Management efforts by the NYSDEC and Wildlife Services have resulted in the removal of 143 feral swine between 2008 and 2012 in a 4-county area of central New York. Feral swine have high population growth rates; high survival rates; young breeding age; and large litter sizes (Chavarria 2006). Based on previously published survival and mortality rates, an estimate of the

size of the feral swine population stemming from those 143 feral swine can be determined if those swine had not been lethally removed by the two agencies (Adkins and Harveston 2007, Hayes et al. 2009). Presuming a 50:50 sex ratio in the population and an average litter size of 6 piglets per year with an 80% survival rate for piglets, those 143 feral swine removed previously and their offspring could have produced over 10,000 swine in a 4-county area of central New York in six years (see Figure 1).

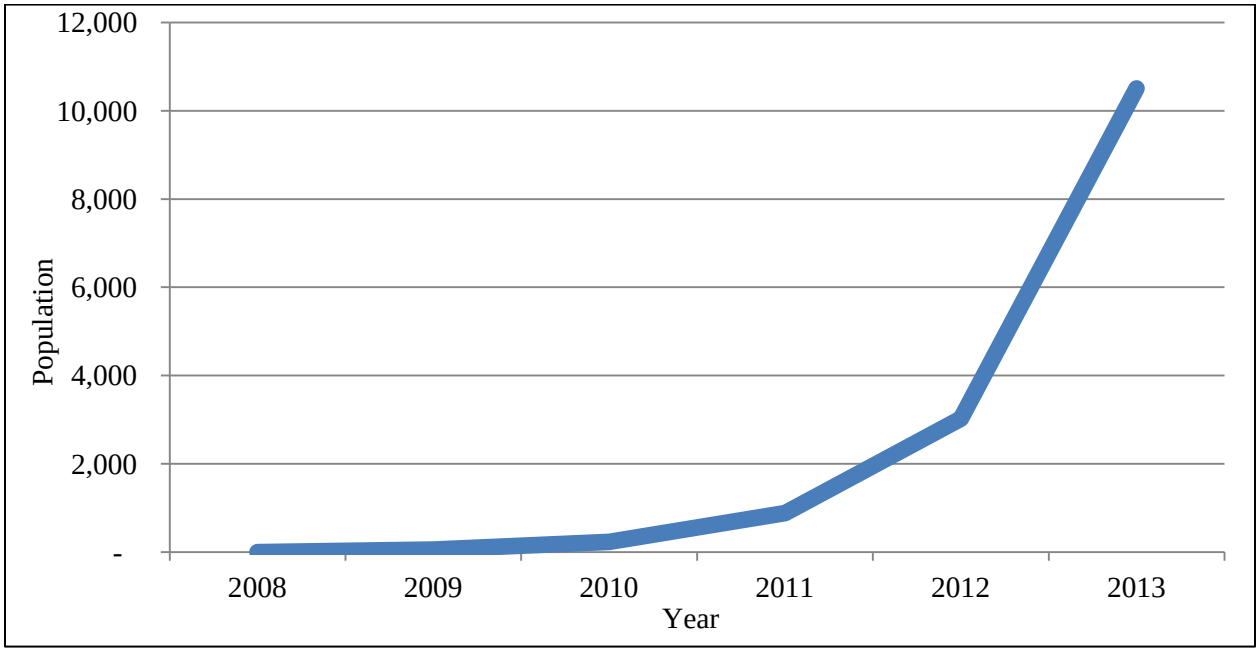

Figure 1. Estimated number of feral swine that could have been produced in New York in the absence of management. Assumes an 80% survival rate (Adkins and Harveston 2007, Hayes et al. 2009), a litter of 6 piglets per year, 50:50 sex ratio, and a total of 143 feral swine removed from the landscape during culling operations between 2008 to 2012.

Wildlife Services and the NYSDEC have also examined population models developed by other states that manage feral swine. Timmons et al. (2012) was able to model growth rates of the feral swine population in Texas using demographic parameters gathered from feral swine in the southeastern United States. Timmons et al. (2012) estimated an average annual growth rate of 21% for feral swine populations in Texas. With an average harvest of 28% of the population occurring annually in Texas, Timmons et al. (2012) expected the statewide population to double every five years. If annual harvest rates reached 41% of the statewide population, Timmons et al. (2012) the population would continue to increase at a rate of 12% per year. The model determined that a harvest of 66% of the population was needed to hold the population stable (Timmons et al. 2012).

Feral swine have become endemic in several states in the United States, and are beginning to appear in new geographic locations (McKnight 1964, Mayer 2009). States that have successfully prevented feral swine populations from becoming established have done so by reacting swiftly while populations were still low, such as Kansas and Oregon (Rouhe and Sytsma 2007, Biles 2011). The success of these states is attributed to legislation that halted the release or escapes of domestic swine and facilitated the removal of feral swine from public and private land (Rouhe

and Sytsma 2007). States that have made it illegal to hunt feral swine (Kansas) or made it illegal to keep Russian Boar (Wisconsin) have had some of the greatest population reductions (Spratt 2010, Durban 2011). Kansas wildlife biologists credit much of their success to preventing hunting of feral swine populations (Spratt 2010).

Economic Impact of Feral Swine

Damage to agriculture by established populations of feral swine can amount to millions; in Texas, feral swine account for $52 million in agriculture damage annually, with additional annual expenditures of $7 million to repair damage or control feral swine (Higginbotham et al. 2008). In Texas, feral swine populations spread from 109 counties in 1982 to 214 counties by 2004 (Campbell and Corn 2008). A total 47,407 feral swine were removed at a cost of $933,633 in Texas between March 2009 and February 2010 in order to alleviate damage in areas of high populations (Higginbotham et al. 2010). Feral swine in Georgia were responsible for $57 million dollars in damage to agriculture and $24 million in damages to non-crop resources (Mengak 2012).

The threat European boar and European boar hybrids pose to agriculture, the environment and human health and safety if they escape their enclosures may not entirely justify the economic revenue of keeping these animals for recreational shooting purposes or consumption (Michigan Commission of Agriculture 2007). The threat to state agriculture and natural resources has been well established (Seward et al 2004, Campbell and Long 2009, Higginbotham et al. 2010). New York is ranked fourth in milk production nationally, and includes 5,700 dairy farms and secondary industries from milk production that include cottage cheese and yogurt, as well as an industry of grain production to feed livestock (NYSDAM 2011). In 2011, dairy farming and supporting industries presented a total impact of $8.9 billion to New York's economy (Dairy Today 2012).

In New York, the European boar enclosed shooting facility business may generate revenue estimated between $200,000 and $1.6 million based on the number of hunts each of the 14 enclosed shooting facilities may provide and the prices paid for those hunts[3]. Since the enclosed shooting facility's industry is lightly regulated, the actual number of hunts or swine killed is unknown. Russian boars that escape from these facilities may undermine efforts to maintain brucellosis and pseudorabies free livestock herds due to the potential of feral swine to carry disease (Seward et al. 2004, Pederson et al. 2012). Between 2008 and 2012, feral swine have accounted for an estimated $470,100 in damage and management efforts combined (J. Gansowski, Wildlife Services, personal communication, 2012).

NEED TO MANAGE DAMAGE AND THREATS TO NATURAL RESOURCES CAUSED BY FERAL SWINE

Natural resources belong to the public and are often managed and held in trust by government agencies for citizens. Historic structures and places; parks and recreation areas; natural areas,

[3] Revenue information obtained based on the average cost of advertised prices posted on the internet for 14 enclosed shooting facilities offering 25 to 200 Russian or European Boar hunts per year in New York.

including unique habitats or topographic features; threatened and endangered plants or wildlife; and plant or animal populations are examples of natural resources.

Native Wildlife

Competition for Resources

Feral swine compete with over 100 species of native wildlife for important and limited natural food supplies; and will consume animal material year round, including earthworms, arachnids, crustaceans, insects, gastropods, fish, amphibians, reptiles, birds, and mammals (Mayer and Brisbin 2009). They compete for acorns (*Quercus* spp.) and hickory nuts (*Carya* spp.) with native wildlife during years of poor mast production (Campbell and Long 2009). Rooting behavior of feral swine is responsible for the near extirpation of northern short-tailed shrews (*Blarina brevicuada*), and southern red-backed voles (*Clethrionomys gapperi*) from intensely rooted areas in the Great Smokey Mountains due to the removal of leaf litter crucial for survival (Singer et al. 1984). Feral swine will often search out and excavate food caches used by small mammals, potentially affecting their ability to survive (Campbell and Long 2009).

Mast crops such as beech nut (*Fagus* spp.), acorns, and hickory nuts are an important food source for deer, turkey, black bear, and squirrels (Knee 2011). Each adult feral swine can consume up to 1,300 pounds of mast per year (Knee 2011). Consumption of hard mast by feral swine in forests also reduces the potential for forest regeneration, further affecting the food chain necessary to maintain species diversity and stable populations (Campbell and Long 2009).

Predation on native wildlife

Feral swine cause direct mortality through predation on native wildlife species. Feral swine are known to feed on many smaller animals (some threatened or endangered), and will consume voles, shrews, turtles, amphibians, and shrub or ground nesting birds (Campbell and Long 2009). Many species including quail, turkey, endangered sea turtles, and shorebirds are at risk of predation by nest destruction and the consumption of eggs (Campbell and Long 2009). In New York, feral swine have been documented rooting out and consuming the eggs of New York State threatened Blanding's Turtle (D. Morgan, Wildlife Services, personal communication, 2010). In New Zealand, feral swine have been implicated in local extinctions of endangered Hutton's Shearwater (*Puffinus huttoni*) (Campbell and Long 2009). Campbell and Long (2009) found that of the 40 studies they reviewed, 86% listed vertebrates consumed by feral swine. In New York, feral swine have the potential to affect deer, consume fawns, compete with wildlife for food, consume ground nesting birds and reptiles, and destroy wildlife habitats. In New York, there is particular concern that feral hogs may affect important game species if they become established, such as:

- **Northern Bobwhite** (*Colinus virginianus*): A study conducted in northern Texas found that feral swine consumed 23.5% and 11.5 % of simulated quail nests in each of the study areas. Researchers concluded feral swine nest predation could be a contributing factor in Northern Bobwhite Quail population declines in many areas (Timmons et al. 2012).

- **Eastern Wild Turkey** (*Meleagris gallopavo silvestris*): Feral swine were found to be a common nest predator to re-introduced Eastern Wild Turkeys in a 10,782-acre Texas wildlife management area. Researchers removed 68 swine during the first year of the study in 1998 when the turkey nesting success rate was 0% (Timmons et al. 2012). The following year, 313 feral swine were removed and 25% of the turkey nests were successful; research indicated that feral swine were a contributing factor to turkey nest depredation in the wildlife management area (Timmons et al. 2012). Feral Swine have also been documented preying on turkey poults (Wood and Lynn 1977).

- **Ruffed Grouse** (*Bonasa umbellus*): Ruffed Grouse populations in New York have declined by more than 75% since the 1960s, or about -4.7% per year (NYSDEC 2012*c*). Loss of early successional forest habitat and predation of nests are both conditions that have contributed to this decline. Predation rates of 11 to 75% by feral swine on ground nesting birds has affected Bobwhite Quail (Tolleson et al. 1993, Rolllins 1999), and Eastern Wild Turkey (Timmons et al. 2012), and would be expected to negatively affect Ruffed Grouse.

- **American Woodcock** (*Scolopax mino*): American Woodcock are considered a popular game bird in New York but loss of upland and wetland habitat, succession and forest maturation has fueled a decline in this species of about 2% per year in New York (NYSDEC 2012*d*). This species uses wetlands and associated upland habitats, conditions that are also favorable to feral swine (Nyenhuis 1991). A 20-year study on woodcock found that feral swine were one of the main causes in the decline of this species in West Germany (Nyenhuis 1991).

- **White-tailed Deer** (*Odocoileus virginianus*): In years of poor mast production, feral swine were found to negatively affect white-tailed deer populations due to competition for acorns (Wood and Roark 1980). Due to their acute sense of smell, feral swine are able to rapidly and efficiently consume fallen mast crop (Beach 1993). Feral swine also have the ability to change to other food sources when acorns are depleted, which deer are often unable to do (Beach 1993).

Native Plants

Deciduous Forest

Plant forage makes up approximately 88% of a feral swine's dietary composition and is consumed year-round (Mayer and Brisbin 2009). This high dependence on vegetation may be why feral swine can cause their greatest damage to environmentally sensitive areas (Campbell and Long 2009). Feral swine can reduce recruitment of saplings, increase the spread of invasive plants, prevent forest regeneration, reduce seedlings and seedling survival, and eliminate understory (Campbell and Long 2009). In one study, the rooting behavior by feral swine in beech forest understory was found to be so severe that recovery was unlikely to occur (Bratton 1975). Wildlife Services in New Hampshire found that feral swine outfitted with radio collars traveled up to four miles during the winter to feed on beech nuts, which were located through rooting behavior (T. Musante, USDA Wildlife Services, personal communication, 2012). Where

feral swine reduced herbaceous and belowground vegetation, recovery time was expected to take more than three years (Howe et al. 1981). Feral swine can reduce the amount of vegetative ground cover and leaf litter, reducing the critical microclimatic conditions necessary for seedling establishment and growth in forests (Chavarria et al. 2006).

Terrestrial Plant Communities

In terrestrial plant communities, disturbance can threaten native communities by promoting the spread of invasive, exotic plant species (Tierney and Cushman 2006). Following disturbance by feeding activities by feral swine, one study found the percent cover of native perennial grasses recovered at a consistently slower rate than exotic grasses (Tierney and Cushman 2006). Tierney and Cushman (2006) also found that removing or reducing the size of feral pig populations can be an effective technique for restoring native perennial grasses.

Wetland Vegetation

Habitat damage by feral swine can be most pronounced in wet environments (Engeman et al. 2007). Wet soils may make it easier for feral swine to obtain the foods they favor, such as the roots, tubers, and bulbs that are characteristic of many wetland plants. Choquenot et al. (1996) found that there appeared to be a strong correlation between soil moisture and rooting damage. Aquatic macrophytes are a key component of habitat in wetlands, providing both an important food resource and structural complexity to associated biota (Thomaz et al. 2008). Macrophytes are an aquatic plant that grows in or near water and are emergent, submergent, or floating. The destruction of wetland vegetation by feral swine was also found to alter production and respiration regimes causing anoxic (*i.e.*, depleted of dissolved oxygen) conditions (Doupe et al. 2010). Lower dissolved oxygen levels can cause chronic sub-lethal effects for the associated plant and animal life.

Water Bodies

Feral swine can affect lakes, ponds, streams and wetlands, rooting and wallowing activities near water sources may increase water turbidity in streams and wetlands, and increase soil erosion and alter nutrient cycling (Singer et al. 1984, DeBenedetti 1986). Increases in water turbidity reduce water quality and can affect native fishes (DeBenedetti 1986). Doupe et al. (2010) found that feral swine foraging in wetland floodplains disrupted physical, chemical, and biological environments; there was a resulting increase in turbidity, destruction of aquatic macrophytes, and proliferation of bare ground and open water in areas feral swine utilized.

Feral hogs spend considerable time in aquatic habitat foraging or wallowing (Mersinger and Silvy 2007). They are known to forage both in and out of water to obtain wetland roots and bulbs and are more likely to disturb the wetland substrate and water body (Doupe et al. 2010).

Kaller and Kelso (2003) found that feral and free-ranging swine were linked to increased levels of fecal coliform and other potentially pathogenic bacteria in a watershed. Kaller et al. (2007) used DNA fingerprinting to determine that feral hogs contribute detectable *E. coli* into aquatic

ecosystems. Additionally, some species of freshwater mussels and aquatic insects were negatively affected by feral swine fecal coliform within the watershed (Kaller and Kelso 2006).

NEED TO MANAGE DAMAGE TO AGRICULTURAL RESOURCES CAUSED BY FERAL SWINE

Agricultural damage and threats caused by feral swine in New York occurs to crops, livestock, and other agricultural resources. Damage occurs from direct consumption of agricultural crops and from trampling, rooting, and/or wallowing, all common activities of feral swine.

Damage to Crops

In New York, numerous grain crops and vegetable crops are susceptible to feral swine damage, including corn, soybeans, cabbage, cucumbers, squash, pumpkins, and tomatoes. New York currently ranks second in the nation for production of pumpkins and soybeans and corn ranked highest in acres harvested in the State (NYSDAM 2011). In 2011, there were over 280,000 acres of soybeans planted in the State valued at nearly $147 million while 1,100,000 acres of corn valued at $540 million were planted (USDA 2011). Wildlife Services has documented rooting damage to apple orchards and fields of corn, oat, soybean, pumpkin, and hay during the last five years (USDA 2010). Damage to corn by feral swine occurred in Delaware County, New York, with 11 acres damaged at an estimated total cost of $14,850 (Westenbroek 2011). A farm in Clinton County, New York reported approximately $25,000 in damage to corn, apples, and strawberries due to feral swine (Hall 2012). A tree farm in Cortland County reported damage due to feral swine rubbing on the bases of trees (USDA 2010). Livestock damage has also been reported, in Tioga County where feral swine damaged fences and animal enclosures, and in Sullivan County, attacked and injured two domestic sows (USDA 2010).

Feeding activities of feral swine on agricultural crops can lead to increased erosion due to the removal of vegetation, leaving bare soil. Since feral swine often travel in family groups, damage from rooting and wallowing can be extensive and encompass several acres. Use of agricultural crops as a forage resource by feral swine may make up 71% of the plant material consumed (Mayer and Brisbin 2009). A single group of feral swine can destroy a 10-acre cornfield in less than a week (Gates 2012).

The presence of feral swine in agricultural areas of the State is likely to lead to requests for assistance to manage and prevent damage to agricultural crops. Feral swine also cause damage to pastures, land used for hay, and sod farms by their rooting and wallowing activities (Beach 1993). New York has over 3 million acres of forage hay worth an estimated $312 million (USDA 2011). Hay is an important feed crop in New York and supports many agricultural industries.

In states where feral swine have been established for several years, data documenting feral swine damage to agriculture exists. In Texas, 48 cooperators estimated damages and expenditures to manage feral swine totaled $2,228,076 on 230,017 acres they owned or controlled. In Georgia, respondents to a questionnaire developed by the Georgia Feral Hog Working Group reported an average loss to crops and/or crop related damage due to feral swine during 2011 at $12,646 per

respondent (response rate of 39.25%) (Mengak 2012). In 2011, it was estimated that feral swine caused in excess of $57 million dollars in damages to agriculture and an additional $24 million in damage to non-crop values in Georgia (Mengak 2012). In California, agricultural commissioners reported feral swine caused $1,731,920 in damages (Seward et al. 2004).

Disease Threat to Livestock

Pork production in the United States accounts for about 10% of the total world supply. The United States is one of the world's largest producers of pork and is the second largest exporter of pork. The retail value of pork sold to consumers exceeds $30 billion annually (USDA 2011). In 2011, there were approximately 91,000 domestic swine on 1,871 farms in New York providing a gross income of over $9 million (USDA 2011). Disease transmission by feral swine is likely to occur where domestic livestock and feral swine have a common interface, such as at water sources and livestock feeding areas. Transitional domestic swine raised in fenced enclosures are especially vulnerable to disease from feral swine. Although several diseases carried by swine are transmissible to other livestock, the primary concern is the potential transmission of diseases from feral swine to domestic swine. Pseudorabies virus (PRV), swine influenza virus (SIV), swine brucellosis, porcine reproductive and respiratory syndrome virus (PR RSV), and classical swine fever (Wyckoff et al. 2009) are the diseases of concern to domestic swine producers.

Brucellosis

Swine brucellosis is caused by *Brucella suis,* a bacteria that is similar to the one that causes brucellosis in cattle. Cattle that are in close contact with swine harboring the disease may become infected (USDA 2005). Swine infected by the disease can develop clinical signs or appear healthy; making laboratory tests an important diagnostic tool. Infection can move through a herd quickly. Swine brucellosis is a zoonotic bacterial infection and is transmitted by oral and venereal routes (Thorne 2001). Boars can shed bacteria in their semen, and both sexes may experience short-term or permanent sterility. Infected sows may abort or give birth to weak piglets. Infection can also cause lameness.

The Cooperative State Federal Brucellosis Eradication Program was established in 1934 (Bittner 2004). From 1934 to 2009, more than $3.5 billion was spent on the eradication of brucellosis and testing of livestock (Bittner 2004). The Brucellosis Eradication Program established Uniform Methods and Rules for states to achieve eradication. Brucellosis infected herds were quarantined and depopulated resulting in losses of entire cattle herds (Richey and Harrell 1997). A state can be designated as brucellosis-free when none of the cattle in that state is found to be infected for 12 consecutive months during an active surveillance program (USDA 2008).

From March 2009 through December 2010, brucellosis prevalence in feral swine ranged from 0.7 to 14.4% in a study examining blood samples of feral swine from 13 states, including New York (Pederson et al. 2012). Seropositive feral swine were often clustered in one area within a state (Pederson et al. 2012). As recently as July 10, 2009, USDA-Veterinary Services announced that the United States was brucellosis free in domestic cattle herds (USDA 2010). Feral swine are a reservoir for the disease, and have

the potential of transmitting it back to domestic herds (Pederson et al. 2012). It is estimated that if brucellosis eradication efforts were stopped, the costs of producing beef and milk would increase by an estimated $80 million annually in less than 10 years (USDA 2012). When brucellosis is detected in domestic cattle in a state, the state loses its brucellosis free status requiring each livestock producer to participate in a rigorous testing program that can often be an economic disadvantage (Bittner 2004) and affects the sale of cattle to other states. The potential exists for feral swine to undo over 70 years of work on eradicating this disease.

Pseudorabies Virus (PRV)

Pseudorabies is a viral disease most prevalent in swine, often causing newborn piglets to die. Older pigs can survive infection, becoming carriers of the pseudorabies virus for life. It is an alpha herpes virus and transmission usually occurs by oral or venereal contact (Wyckoff et al. 2009). Other animals infected by swine die from pseudorabies, which is also known as Aujeszky's disease and "*mad itch*." Infected cattle and sheep can first show signs of pseudorabies by scratching and biting themselves. In dogs and cats, pseudorabies can cause sudden death. The virus is not known to cause illness in humans. Domestic swine in the United States recently achieved pseudorabies-free status after a 17-year effort and the expenditure of approximately $200 to $250 million dollars (Hutton et al. 2006).

Swine Influenza Virus (SIV)

Swine Influenza Virus is a viral infection in swine that is common throughout the world. It causes a respiratory illness in pigs. Symptoms include acute respiratory disease characterized by fever, inactivity, decreased food intake, respiratory disease, coughing, sneezing, conjunctivitis, and nasal discharge (Vincent et al. 2008). SIV is a herd disease with a high rate of infection within in the herd but generally low mortality (Vincent et al. 2008). The emergence of new subtypes of SIVs (hu-H1, H3N2, H4N6, and H2N3) in North American pigs has implications for pigs and people who care for them. Newly emerging viruses are capable of epidemics at the herd level since they are antigenically distinct from previously circulating and/or currently used commercial vaccine strains, are virulent in the pig, and can infect and transmit from pig to pig (Vincent et al. 2008).

Leptospirosis

Leptospirosis is a worldwide zoonotic disease of domestic animals and wildlife. It is caused by a spirochete bacteria classified under the *Leptospira*. Infections may be asymptomatic or cause various signs, including fever, jaundice, bloody urine, renal failure, infertility, abortion, and death (Merck Veterinary Manual 2011). Abortions are the most common manifestation in pigs. After acute infection, leptospires frequently localizes in the kidneys or reproductive organs and are shed in the urine, sometimes in large numbers for months or years. Because the organisms survive in surface waters, such as swamps, streams, and rivers, for extended periods, the disease is often waterborne. The organism survives well in mud and moist, alkaline soil, such as

riverbanks; floods frequently result in an increase of disease outbreaks (Merck Veterinary Manual 2011).

Classical Swine Fever

Classical Swine Fever (CSF) is a highly contagious viral disease that affects swine. Once called hog cholera, CSF has been eradicated from many developed nations, including the United States. Depending on the strain of the virus, the virus can either be very virulent and cause high mortality in swine herds, or it can be mild with the only symptoms being poor reproductive performance and failure to thrive (Center for Food Security and Public Health (CFSPH) 2009).

Porcine Reproductive and Respiratory Syndrome Virus (PR RSV)

PRRSV was first reported in the United States in 1987 (Merck Veterinary Manual 2011). The disease causes reproductive failure during late-term gestation in sows and respiratory disease in pigs of all ages. In 2006, a new, highly pathogenic PRRS emerged, characterized by high fever (41°C–42°C), skin discoloration/reddening, high incidence of illness (50%–100%), and high proportion of deaths (20%–100%) in pigs of all ages. This new PRRS has spread throughout the swine industry in China, resulting in the culling of an estimated 20 million pigs annually during 2006–2007 in China (An Tong-Qing et al. 2011).

Feral Swine in the United States have tested positive for several of these diseases listed above. Corn et al. (1986) found 124 feral swine tested for diseases in Texas were positive for pseudorabies (36%), brucellosis (3%), and leptospirosis (33%). A study in Oklahoma that collected samples from 120 feral swine found they tested positive for antibodies of porcine parvovirus (17%), leptospirosis (44%), swine influenza (11%), and porcine reproductive and respiratory syndrome virus (2%) (Saliki et al. 1998). Cholera, trichinosis, and African swine fever are additional diseases that can be transmitted between livestock and feral swine.

Although the source of livestock disease outbreaks can be difficult to identify, a risk of transmission and the spreading of diseases to domestic swine and other livestock exists wherever feral swine and domestic livestock interact. A disease outbreak not only has negative economic implications to the individual livestock producer but also can cause economic losses that can negatively affect the statewide swine industry.

The Wildlife Services program in New York conducts disease surveillance as part of the National Wildlife Disease Surveillance Program. Through a grant provided by the Invasive Species Council of New York, Wildlife Services conducted a comprehensive disease surveillance project that has tested 89 feral swine between June 2008 and June 2012. Of those tested, 9 (10%) of the feral swine came back with positive test results for disease: four with leptospirosis, two with pseudorabies, two with swine influenza, and one with *toxoplasma gondii* (Wildlife Services, unpublished report, 2012).

Predation on Livestock

Feral swine are known to kill calves, kids (goats), lambs, and poultry (Stevens 1996). Predation occurs primarily on young livestock but feral swine can also kill weakened or injured livestock. Beach (1993) reported that losses to feral swine in Texas included lambs, adult sheep, kid goats, adult goats, calves, and exotic game species. Feral swine are potential reservoirs for several diseases that are known to be transmissible between feral swine and domestic livestock (Corn et al. 1986, Beach 1993, Wyckoff et al. 2009).

Overall, feral swine damage to agricultural resources in New York is not well documented. In states where feral swine populations have become established they have been shown to cause damage and pose threats to agricultural resources. An increase in the statewide population of feral swine could lead to an increase in the number of requests for assistance received by Wildlife Services to manage damage and threats.

NEED TO MANAGE DAMAGE TO PROPERTY ASSOCIATED WITH FERAL SWINE

Feral swine can damage landscaping, golf courses, recreational fields, parks, lawns, and drainage ditches and cause erosion by rooting in these areas. Rooting activity turns the sod and grass over and leaves the area bare of vegetation and susceptible to erosion. In New York, Wildlife Services has documented two instances of feral swine damage to lawns in Sullivan County with a damage estimate of $400 at each location (USDA 2010). Large sections of lawn can be rooted over in a single night, causing extensive damage. Feral swine dig or root in the lawn with their nose in search of roots, grubs, and earthworms. Other damage to property includes feral swine attacks on domestic dogs. In two separate reports, feral swine attacked domestic dogs in Tioga County, killing one and injuring another (USDA 2010).

Feral swine also damage property when struck by motor vehicles. In New York, there have been five feral swine vehicle collisions reported in recent years (K. Stang, NYSDEC, personal communication, 2012). Mayer and Johns (2011) collected data on 179 feral swine-vehicle collisions involving 212 feral swine while conducting research on feral swine. Their findings suggested that vehicular accidents with feral swine are costly due to their mass; and that potentially, the total annual cost of feral swine-vehicle collisions in the United States can be as high as $36 million, roughly $1,173 per vehicle (Mayer and Johns 2011).

NEED TO REDUCE THREATS TO HUMAN HEALTH AND SAFETY ASSOCIATED WITH FERAL SWINE

Assistance with feral swine can be requested due to risks to human health or safety, or when they are observed near communities. Brucellosis, salmonellosis, toxoplasmosis, trichinosis, tuberculosis, and tularemia are some of the zoonotic diseases that can be carried by feral swine (Stevens 1996, Hubalek et al. 2002, Seward et al. 2004). Feral swine were responsible for the illness of over 200 people and caused three deaths nationwide due to depositing feces containing *E. coli* on spinach leaves while foraging in California spinach fields (FDA 2007, Rouhe and Sytsma 2007). Vehicle collisions are also a human health and safety threat due to the potential

for injury or death when striking feral swine, which can weigh up to 400 pounds or more (Mayer and Johns 2011).

Disease Threat

Feral swine are potential reservoirs for approximately 30 viral and bacterial diseases (Davidson and Nettles 1997, Samuel et al. 2001, Williams and Barker 2001) and 37 parasites (Forrester 1991) that are transmissible to humans; however, actual transmission of diseases from feral swine to humans is thought to be rare (Amass 1998). It is also thought that some illnesses contracted by people from swine may be perceived as the common flu, which goes untreated, unreported, or misdiagnosed. A recent swine brucellosis incident in Iowa was discovered when a pork producer was diagnosed with Undulant fever (brucellosis) while at the hospital for treatment. He had contracted the disease from his swine (Hutton et al. 2006).

Swine also serve as major reservoirs of H1N1 and H3N2 influenza viruses, which are endemic in pig populations worldwide and are responsible for one of the most prevalent respiratory diseases in pigs (Brown 2004). The maintenance of these viruses in swine and the frequent exchange of viruses between pigs and other species are facilitated directly by swine husbandry practices. Following interspecies transmission to swine, some influenza viruses may be extremely unstable genetically, giving rise to many virus variants (Brown 2004). It is a concern of public health officials that swine will be the organism in which a reassortment of the H5N1 virus changes into one that is easily transmitted from human to human (Hutton et al. 2006).

Situations where the threat of disease associated with feral swine populations might occur include, but are not limited to:

- Exposure to the threat of leptospirosis, anthrax, dermatophilosis, rabies, or Lyme disease can occur from populations of feral swine in urban and suburban areas. Exposure can also occur from companion animals encountering infected swine or other wild, feral or domestic animals contracting the virus (*e.g.*, pets, farm animals, feral cats, skunks, fox). Some diseases such as anthrax and West Nile virus may be transmitted by biting flies or mosquitoes and are typically a threat during the time of year that these insects are prevalent. It should be noted that West Nile virus antibodies have been found in feral swine but it is not known if the virus can be transmitted from feral swine blood (Platt 2004).

- Exposure to the bacterium, *Brucella suis*, which causes swine brucellosis. Swine are considered the natural host for *B. suis* and can be harbored without signs of illness. Humans may contract the disease by handling, dressing, or eating undercooked meat. New York reports less than five cases of brucellosis per year (Centers for Disease Control (CDC) 2009). In humans, brucellosis can cause a range of symptoms that are similar to the flu and may include fever, sweats, headaches, back pains, and physical weakness. Severe infections of the central nervous systems or lining of the heart may occur. Brucellosis can also cause long-lasting or chronic symptoms that include recurrent fevers, joint pain, and fatigue (CDC 2009). Hunters would be considered at risk of contracting

brucellosis while field dressing feral swine shot in enclosed shooting facilities or in the wild.

- Exposure to the parasite *Trichenella spiralis*, which causes trichinosis in humans. Due to the life cycle of this parasite, most carnivores or omnivores are potential hosts for *T. spiralis*. Humans generally contract the disease by eating meat that is not thoroughly cooked, resulting in roughly 40 cases each year in the United States (Medline 2012). Mild cases of trichinellosis are never specifically diagnosed because they are often assumed to be the flu or other common illnesses (Medline 2012). Furthermore, many people with *Trichinella* infection do not experience any symptoms at all. If the infection is heavy, persons may have trouble coordinating movements, and have heart and breathing problems. Although rare, death can occur in severe cases. For mild to moderate infections, most symptoms go away within a few months (Medline 2012).

- Tuberculosis (TB) is a disease caused by a bacterium called *Mycobacterium tuberculosis*. The causal organism *Mycobacterium tuberculosis* is sub-classified into types based on the species of host usually affected: the human type generally referred to as *M. tuberculosis* affects people and primates, the bovine type *M. bovis*, affects cattle, badgers, and other wild herbivores and sometimes people; and the avian type, the *M. avian*/*M. intracellulare* complex, affects mainly birds. Pigs are susceptible to all three but are rarely infected by the first two (The Pig Site 2012*a*). The bacteria usually attack the lungs, but TB bacteria can attack any part of the body such as the kidney, spine, and brain. If not treated properly, TB can be fatal. TB was once the leading cause of death in the United States.

- Toxoplasmosis is a disease caused by the protozoa *Toxoplasma gondii*, which affects animals and people. The life cycle is indirect. Cats are primary hosts and the only one that sheds infective oocysts in their feces. Pigs may become infected by ingesting feed or water contaminated with cat feces, by cannibalism of other infected dead pigs, by ear and tail biting or by eating infected rodents or other uncooked meat (The Pig Site 2012*b*). The danger to human health appears to be in immunosuppressed people because it can cause lethargy and lesions that may include vision loss; or pregnant woman because it can cause miscarriage (Boden 2001).

- Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus *Leptospira*. In humans, it can cause a wide range of symptoms, some of which may be mistaken for other diseases. Some infected persons, however, may have no symptoms at all. Without treatment, Leptospirosis can lead to kidney damage, meningitis (inflammation of the membrane around the brain and spinal cord), liver failure, respiratory distress, and even death (CDC 2012). The time between a person's exposure to a contaminated source and becoming sick is 2 days to 4 weeks. Illness usually begins abruptly with fever and other symptoms. Leptospirosis may occur in two phases. After the first phase (with fever, chills, headache, muscle aches, vomiting, or diarrhea) the patient may recover for a time but become ill again. If a second phase occurs, it is more severe; the person may have kidney or liver failure or meningitis; this phase is also called Weil's disease (CDC 2012).

1.3 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

Actions Analyzed

This EA evaluates the need for feral swine damage management to reduce threats to human safety and to resolve damage to property, agricultural resources, and natural resources on federal, state, municipal, and private land within the State of New York; wherever, such management is requested by a cooperator. This EA discusses the issues associated with conducting feral swine damage management in the State to meet the need for action and evaluates different alternatives to meet that need while addressing those issues.

The methods available for use or recommendation under each of the alternatives evaluated are provided in Appendix B[4]. The alternatives and Appendix B also discuss how methods would be employed to manage damage and threats associated with feral swine in the State. Therefore, the actions evaluated in this EA are the use of those methods available under the alternatives and the employment of those methods to manage or prevent damage and threats associated with feral swine from occurring when requested by the appropriate resource owner or manager.

Native American Lands and Tribes

The Wildlife Services program in New York would only conduct damage management activities when requested by a Native American Tribe. Activities would only be conducted after a Memorandum of Understanding (MOU) or cooperative service agreement had been signed between Wildlife Services and the Tribe requesting assistance. Therefore, the Tribe would determine when Wildlife Services' assistance was required and what activities would be allowed. Because Tribal officials would be responsible for requesting assistance from Wildlife Services and determining what methods would be available to alleviate damage, no conflict with traditional cultural properties or beliefs would be anticipated. Those methods available to alleviate damage associated with feral swine on federal, State, county, municipal, and private properties under the alternatives analyzed in this EA would be available for use to alleviate damage on Tribal properties when the use of those methods had been approved for use by the Tribe requesting Wildlife Services' assistance. Therefore, the activities and methods addressed under the alternatives would include those activities that could be employed on Native American lands, when requested and when agreed upon by the Tribe and Wildlife Services.

Wildlife Services met with the St. Regis Mohawks in 2012 and they reported feral swine were observed on the Canadian portion of their Tribal lands. Technical assistance was provided to the Natural Resource Management office of the St. Regis Mohawks.

The St. Regis Mohawk Tribe reviewed the draft EA in August 2012. The St. Regis Mohawk Tribe supports management of feral swine to reduce damage (K. Jock, St. Regis Mohawk Tribe, personal communication, 2012).

[4]A complete list of chemical and non-chemical methods available for use under the identified alternatives, except the alternative with no damage management (Alternative 1), can be found in Appendix B. However, listing methods neither implies that all methods will be used by Wildlife Services to resolve requests for assistance nor does the listing of methods imply that all methods will be used to resolve every request for assistance.

Federal, State, County, City, and Private Lands

Under two of the alternatives, Wildlife Services, in cooperation with the NYSDEC, could continue to provide assistance to alleviate feral swine damage or threats on federal, state, county, municipal, and private land in New York when a request was received for such services by the appropriate resource owner or manager. In those cases where a federal agency requests assistance with managing damage caused by feral swine, the requesting agency would be responsible for analyzing those activities in accordance with the NEPA. However, this EA could cover such actions if the requesting federal agency determined the analyses and scope of this EA were appropriate for those actions and the requesting federal agency adopted this EA through their own Decision based on the analyses in this EA. Therefore, actions taken on federal lands have been analyzed in the scope of this EA.

Period for which this EA is Valid

If the analyses in this EA indicates an Environmental Impact Statement (EIS) is not warranted, this EA would remain valid until Wildlife Services and the cooperating agencies determine that new needs for action, changed conditions, or new alternatives having different environmental impacts must be analyzed. At that time, this analysis and document would be reviewed and supplemented pursuant to the NEPA. Review of the EA would be conducted to ensure that activities conducted under the selected alternative occur within the parameters evaluated in the EA. If the no involvement alternative were selected, no additional analyses would occur based on the lack of involvement by Wildlife Services. The monitoring of activities would ensure the EA remained appropriate to the scope of damage management activities conducted by Wildlife Services and the cooperating agencies in New York under the selected alternative.

Site Specificity

Feral swine can occur statewide in New York; however, there is not a good estimation of their total statewide population. Actions could be taken to reduce damage to agricultural resources, protect human health and safety, alleviate property damage, and protect native wildlife and plants, including T&E species, in New York. As mentioned previously, Wildlife Services would only conduct damage management activities when requested by the appropriate property owner or manager.

This EA analyzes the potential effects of feral swine damage management based on previous activities conducted on private and public lands in New York by the cooperating agencies. Wildlife Services could only conduct activities after a request was received and the appropriate entities have entered into a MOU, cooperative service agreement, or other comparable document with Wildlife Services. The EA also addresses the potential effects of damage management in areas where additional efforts could occur, when requested. Because the need for action would be to reduce damage and because the goals and objectives would be to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional damage management efforts could occur. Thus, this EA anticipates receiving

additional requests for assistance and analyzes the potential impacts of resolving those additional requests as part of the alternatives.

Planning for the management of feral swine damage must be viewed as being conceptually similar to the actions of other entities whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where those events would occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, and insurance companies. Although some of the locations, where feral swine damage could occur, can be predicted, not all specific locations or times where such damage would occur in any given year, can be predicted. The threshold triggering an entity to request assistance to manage damage associated with feral swine is often unique to the individual; therefore, predicting where and when such a request for assistance would be received is difficult. This EA emphasizes major issues as those issues relate to specific areas whenever possible; however, many issues apply wherever feral swine damage and the resulting management actions occurs and are treated as such.

Chapter 2 of this EA identifies and discusses issues relating to damage management in New York. The standard Wildlife Services Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by Wildlife Services in the State (see Chapter 3 for a description of the Decision Model and its application). Decisions made using the model would be in accordance with Wildlife Services' directives[5] and Standard Operating Procedures (SOPs) described in this EA as well as relevant laws and regulations.

The analyses in this EA are intended to apply to any action that may occur in any locale and at any time within New York. In this way, Wildlife Services and the cooperating agencies believe this EA meets the intent of the NEPA with regard to site-specific analysis and that this is the only practical way for Wildlife Services and the cooperating agencies to comply with the NEPA and still be able to accomplish the goals and objectives.

Summary of Public Involvement

Issues related to feral swine damage management were initially developed by Wildlife Services in cooperation with the NYSDEC, the NYSDAM, and the USFWS. Issues were defined and preliminary alternatives were identified through this interagency team. As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS' NEPA implementing regulations, this document will be noticed to the public for review and comment. The public will be noticed through legal notices published in local print media, through direct mailings to parties that have requested to be notified or have been identified to have an interest in the reduction of threats and damage associated with feral swine in the State, and by posting the EA on the APHIS website at http://www.aphis.usda.gov/wildlife_damage/nepa.shtml.

Wildlife Services and the cooperating agencies will provide for a minimum of a 30-day comment period for the public and interested parties to provide new issues, concerns, and/or alternatives.

[5]At the time of preparation, Wildlife Services' Directives could be found at the following web address: http://www.aphis.usda.gov/wildlife_damage/ws_directives.shtml.

Through the public involvement process, Wildlife Services and the cooperating agencies will clearly communicate to the public and interested parties the analyses of potential environmental impacts on the quality of the human environment. New issues or alternatives raised after publication of public notices would be fully considered to determine whether the EA should be revisited and, if appropriate, revised prior to issuance of a final Decision or publication of a notice of intent to prepare an EIS.

1.4 RELATIONSHIP OF THIS DOCUMENT TO OTHER ENVIRONMENTAL DOCUMENTS

Wildlife Services' Programmatic Final Environmental Impact Statement: Wildlife Services has developed a programmatic FEIS that addresses the need for wildlife damage management in the United States (USDA 1997). The FEIS contains detailed discussions of potential impacts to the human environment from methods that could be used by Wildlife Services to alleviate wildlife damage. In addition, the FEIS contains risk assessments of many of the methods available to manage damage caused by feral swine (USDA 1997).

1.5 AUTHORITY OF FEDERAL AND STATE AGENCIES

The authorities of Wildlife Services and the cooperating agencies, as those authorities relate to conducting wildlife damage management activities, are discussed by agency below:

Wildlife Services' Legislative Authority

The primary statutory authority for the Wildlife Services program is the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). The Wildlife Services program is the lead federal authority in managing damage to agricultural resources, natural resources, property, and threats to human safety associated with wildlife. Wildlife Services' directives define program objectives and guide Wildlife Services' activities in managing wildlife damage.

New York State Department of Environmental Conservation

The mission of the NYSDEC, as stated in Section 1-0101 of the New York State Environmental Conservation Law (ECL), is to "*conserve, improve, and protect its natural resources and environment, and control water, land and air pollution, in order to enhance the health, safety, and welfare of the people of the State and their overall economic and social wellbeing*." Among many other duties, the NYSDEC is also responsible for administering fish and wildlife laws, carrying out sound fish and wildlife management practices, conducting fish and wildlife research, and managing the State's marine and coastal resources.

New York State Department of Agriculture and Markets

The mission of New York State Department of Agriculture and Markets is to foster a competitive food and agriculture industry that benefits producers and consumers alike. The NYSDAM is charged with protecting and safeguarding New York's food supply as well as to promote a viable agricultural industry and foster agricultural stewardship. The NYSDAM can make regulatory

changes to the operation of enclosed shooting facilities that may have swine on their premises, as well as to the regulation involving the importation of swine into New York. Currently, there is an MOU, which establishes a cooperative relationship between Wildlife Services and the NYSDAM, outlines responsibilities, and sets forth annual objectives and goals of each agency.

United States Fish and Wildlife Service

The USFWS is the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife resources and their habitats. The USFWS mission is to conserve, protect, and enhance fish, wildlife, and their habitats for the continuing benefit of the American people. Responsibilities are shared with other federal, state, tribal, and local entities; however, the USFWS has specific responsibilities for the protection of T&E species under the Endangered Species Act (ESA), migratory birds, inter-jurisdictional fish, and certain marine mammals, as well as for lands and waters that the USFWS administers for the management and protection of those resources. The USFWS also manages lands under the National Wildlife Refuge System. Under 50 CFR 30.11, feral animals without ownership that have reverted to the wild from a domestic state may be taken by authorized federal or state personnel or by private persons operating under permit in accordance with applicable provisions of federal or state law or regulation on National Wildlife Refuges.

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 repellents.

1.6 COMPLIANCE WITH LAWS AND STATUTES

Several laws or regulations would authorize, regulate, or otherwise affect activities under the alternatives. Wildlife Services[6] and the cooperating agencies would comply with all applicable federal, State, and local laws and regulations. Those laws and regulations related to activities conducted to reduce feral swine damage in the State are addressed below:

National Environmental Policy Act

All federal actions are subject to the NEPA (Public Law 9-190, 42 USC 4321 et seq.). Wildlife Services follows CEQ regulations implementing the NEPA (40 CFR 1500 et seq.) along with USDA (7 CFR 1b) and APHIS Implementing Guidelines (7 CFR 372) as part of the decision-making process. Those laws, regulations, and guidelines generally outline five broad types of activities to be accomplished as part of any project: public involvement, analysis, documentation, implementation, and monitoring. The NEPA also sets forth the requirement that all major federal actions be evaluated in terms of their potential to significantly affect the quality of the human environment for the purpose of avoiding or, where possible, mitigating and minimizing adverse impacts. Federal activities affecting the physical and biological environment are regulated in part by CEQ through regulations in 40 CFR, Parts 1500-1508. In accordance

[6]Wildlife Services would comply with applicable laws and regulations in accordance with Wildlife Services Directive 2.210.

with CEQ and USDA regulations, APHIS guidelines concerning Implementation of NEPA Procedures, as published in the Federal Register (44 CFR 50381-50384), provide guidance to APHIS regarding the NEPA process.

Pursuant to the NEPA and the CEQ regulations, this EA documents the analyses resulting from federal actions, informs decision-makers, and the public of reasonable alternatives capable of avoiding or minimizing adverse impacts, and serves as a decision-aiding mechanism to ensure that the policies and goals of the NEPA are infused into federal agency actions. This EA was prepared by integrating as many of the natural and social sciences as warranted, based on the potential effects of the proposed action. The direct, indirect, and cumulative impacts of the proposed action are analyzed.

The NEPA requires federal agencies to incorporate environmental planning into federal agency actions and decision-making processes. The two primary objectives of the NEPA are: 1) agencies must have available and fully consider detailed information regarding environmental effects of federal actions and 2) agencies must make information regarding environmental effects available to interested persons and agencies before decisions are made and before actions are taken.

The NEPA provides a systemic process to determine the class of action necessary when potential environmental effects are identified. Generally, there are three classes of action: 1) Categorical Exclusions, 2) Environmental Assessments, and 3) Environmental Impact Statements.

This EA will assist Wildlife Services and the cooperating agencies in determining whether potential environmental effects caused the alternatives might be significant, requiring the preparation of an EIS. The development of this EA documents the incorporation of environmental planning into the actions and decision-making process to ensure compliance with the NEPA.

Endangered Species Act

Under the ESA, all federal agencies will seek to conserve T&E species and will utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). Wildlife Services conducts Section 7 consultations with the USFWS to use the expertise of the USFWS to ensure that "*any action authorized., funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency will use the best scientific and commercial data available*" (Sec.7 (a) (2)).

As part of the development of this EA, Wildlife Services has also consulted with the USFWS regarding T&E species in New York. Evaluation of the alternatives in regards to the ESA will occur in Chapter 4 of this EA.

New York State Endangered and Threatened Species Regulations (6 NYCRR Part 182)

This regulation outlines how NYSDEC lists T&E species and species of special concern; requirements for recovery and restoration plans; requests for determination whether a specific

action is subject to Part 182; and penalties and enforcement actions. All native species present or formerly present in New York listed as endangered or threatened by the United States Department of the Interior in the Code of Federal Regulations (50 CFR part 17) are included on New York's list of endangered or threatened species. Only species native to New York and existing in the wild within the state with some regularity during a portion of its annual life cycle are considered for listing by the department as endangered or threatened. Species that are exotic, were deliberately or accidentally introduced into New York, the United States, or North America by humans, or are vagrant or an accidental visitor will not be considered for listing. Currently extirpated species are eligible for listing by the department as endangered or threatened if the species is documented to have been native in New York, and if suitable habitat for the species remains or could be created.

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 feral swine damage management methods described in this EA that would be available under the alternatives cause 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 available for use under the alternatives 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 were planned under an alternative selected because 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 removing feral swine 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.

The New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP), State Historic Preservation Office (SHPO) has jurisdiction over cultural resources in New York. The SHPO reviewed the EA in August 2012. After review of the EA, the SHPO determined that Wildlife Services would have "*no effect upon cultural resources in or eligible for inclusion in*

the National Registers of Historic Places" (A. Bonafide, NYSOPRHP, SHPO, personal communication, 2012)

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

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

Airborne Hunting Act

The Airborne Hunting Act, passed in 1971 (Public Law 92-159), and amended in 1972 (Public Law 92-502) added to the Fish and Wildlife Act of 1956 as a new section (16 USC 742j-l) that prohibits shooting or attempting to shoot, harassing, capturing or killing any bird, fish, or other animal from aircraft except for certain specified reasons. Under exception [16 USC 742j-l, (b)(1)], State and Federal agencies are allowed to protect or aid in the protection of land, water, wildlife, livestock, domesticated animals, human life, or crops using aircraft.

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.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

The FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The EPA is responsible for implementing and enforcing the FIFRA. All chemical methods, including the use of or recommendation of repellents, would have to be registered with the EPA and the NYSDEC Bureau of Pesticides, and used or recommended in compliance with labeling procedures and requirements.

Federal Food, Drug, and Cosmetic Act (21 USC 360)

This law places administration of pharmaceutical drugs, including those used in wildlife capture and handling, under the Food and Drug Administration.

Controlled Substances Act of 1970 (21 USC 821 et seq.)

This law requires an individual or agency to have a special registration number from the federal Drug Enforcement Administration (DEA) to possess controlled substances, including those that are used in wildlife capture and handling.

Animal Medicinal Drug Use Clarification Act of 1994 (AMDUCA)

The Animal Medicinal Drug Use Clarification Act (AMDUCA) and its implementing regulations (21 CFR 530) establish several requirements for the use of animal drugs, including those used to capture and handle wildlife in damage management programs. Those requirements are: (1) a valid "*veterinarian-client-patient*" relationship, (2) well defined record keeping, (3) a withdrawal period for animals that have been administered drugs, and (4) identification of animals. A veterinarian, either on staff or on an advisory basis, would be involved in the oversight of the use of animal capture and handling drugs under any alternative where an entity could use immobilizing and euthanasia drugs. Veterinary authorities in each state have the discretion under this law to establish withdrawal times (*i.e.*, a period after a drug is administered that must lapse before an animal may be used for food) for specific drugs. Animals that might be consumed by a human within the withdrawal period must be identified.

Environmental Justice - Executive Order 12898

Executive Order 12898 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 Wildlife Services and the USFWS. 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. Activities would be evaluated for their impact on the human environment and compliance with Executive Order 12898. Wildlife Services' personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. It is not anticipated that the proposed action or the other alternatives 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 it is a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, the cooperating agencies have considered the impacts the alternatives might have on children. Activities conducted under the alternatives would use only legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, the cooperating agencies conclude 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.

Possession, Transportation, and Release of Wildlife by Authorized Persons

Under the New York Environmental Conservation Law §11-0511, "*...no person shall….possess, transport, or cause to be transported, imported or exported any live wolf, wolfdog, coyote, fox, skunk, venomous reptile or raccoon, endangered species….or other species of native or non-native live wildlife or fish where the department finds that possession, transportation, importation of such species of wildlife or fish would present a danger to the health or welfare of the people of the state, an individual resident or indigenous fish or wildlife population.*

Under the New York Environmental Conservation Law §11-0507, "*...no person shall willfully liberate within the state any wildlife except under permit from the department. The department may issue such permit in its discretion, fix the terms thereof, and revoke it at pleasure. These provisions do not apply to migratory gamebirds, importation of which is governed regulation of the department.*

1.7 DECISIONS TO BE MADE

Based on agency relationships, MOUs, and legislative authorities, Wildlife Services is the lead agency for this EA, and therefore, responsible for the scope and content of the EA. Activities conducted by Wildlife Services to reduce and/or prevent feral swine damage in the State would be coordinated with the NYSDEC, which would ensure Wildlife Services' actions were incorporated into population goals established for feral swine in the State. The NYSDEC is responsible for managing wildlife in the State of New York. The goal of the NYSDEC is to

eradicate current populations of feral swine, a species that is listed as invasive in New York, from the State's landscape and to prevent feral swine from becoming established in the State.

Based on the scope of this EA, the decisions to be made are: 1) should Wildlife Services and cooperating agencies fund and conduct feral swine damage management to alleviate damage to agriculture, property, natural resources, and threats to human safety, 2) should Wildlife Services and the cooperating agencies fund and conduct disease surveillance and monitoring in the feral swine population when requested, 3) should Wildlife Services and the cooperating agencies fund and implement an integrated wildlife damage management strategy, including technical assistance and direct operation assistance, to meet the need for feral swine damage management in New York, 4) if not, should Wildlife Services and the cooperating agencies attempt to fund and implement one of the alternatives to an integrated damage management strategy as described in the EA, and 5) would the proposed action result in significant effects to the human environment requiring the preparation of an EIS.

CHAPTER 2: AFFECTED ENVIRONMENT AND ISSUES

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues that have driven the development of standard operating procedures (SOP), and issues that will not be considered in detail, with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop SOPs. Additional descriptions of affected environments will be incorporated into the discussion of the environmental effects in Chapter 4.

2.1 AFFECTED ENVIRONMENT

Feral swine damage or threats can occur wherever feral swine occur within the State. Currently, feral swine populations in New York are located in proximity to enclosed shooting facilities suggesting that swine may have escaped from those facilities (USDA 2010). Feral swine have been located in Tioga, Cortland, Onondaga, Clinton, Sullivan, and Delaware counties, but may also occur in other areas of New York. Feral swine are capable of utilizing a variety of habitats in New York that may make their presence difficult to identify. Requests for assistance to manage damage or threats of damage could occur in any area occupied by feral swine. However, assistance with the management of feral swine damage would only be conducted by Wildlife Services when requested by a landowner or manager and only on properties where a cooperative service agreement or other comparable document had been signed between Wildlife Services and a cooperating agency, business, organization, or landowner.

The NYSDEC does not conduct wildlife damage management activities except when there is an immediate human health and safety threat; however, the NYSDEC could issue permits to allow property owners to manage damage by wildlife and provide technical assistance to resolve conflicts with wildlife. The NYSDEC does manage invasive species, such as feral swine, in order to protect New York's biodiversity.

Upon receiving a request for assistance, feral swine damage management activities could be conducted on federal, state, tribal, municipal, and private properties in New York. Areas where damage or threats of damage could occur include, but would not be limited to agricultural fields, orchards, farmyards, ranches, livestock operations, aquaculture facilities, industrial sites, natural areas, government properties and facilities, private properties, corporate properties, schools, parks, woodlots, recreation areas, communally-owned homeowner/property owner association properties, wildlife refuges, levees, dikes, and wildlife management areas. The area would also include airports and military airbases where feral swine could pose a threat to human safety and to property; areas where feral swine negatively affect wildlife, including T&E species; and public property where feral swine were negatively affecting historic structures, cultural landscapes, and natural resources.

Environmental Status Quo

As defined by the NEPA implementing regulations, the "*human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment*" (40 CFR 1508.14). Therefore, when a federal action agency analyzes its

potential impacts on the "*human environment*", it is reasonable for that agency to compare not only the effects of the federal action, but also the potential impacts that occur or will occur in the absence of the federal action. This concept is applicable to situations involving federal assistance in managing damage associated with wildlife species.

Unprotected wildlife species, such as most non-native invasive species, are not protected under state or federal law. Most state managed wildlife species are managed under state authority or law without any federal oversight or protection. In some states, with the possible exception of restrictions on methods (*e.g.*, firearms restrictions), unprotected wildlife species, and certain resident wildlife species are managed with little or no restrictions allowing them to be killed or taken by anyone at any time. Feral swine in New York are considered an invasive species and can be taken year-round where legal, day or night, by those persons holding a legal small game hunting license.

When a non-federal entity (*e.g.*, agricultural producers, counties, private companies, individuals, or any other non-federal entity) takes an action to alleviate feral swine damage or threat, the action is not subject to compliance with the NEPA due to the lack of federal involvement in the action. Under such circumstances, the environmental baseline or status quo must be viewed as an environment that includes those resources as they are managed or impacted by non-federal entities in the absence of the federal action being proposed.

Therefore, in those situations in which a non-federal entity has decided that a management action directed towards feral swine will occur and even the particular methods that would be used, Wildlife Services' involvement in the action would not affect the environmental status quo since the entity could take the action in the absence of Wildlife Services' involvement. Wildlife Services' involvement would not change the environmental status quo if the requestor had conducted the action in the absence of Wildlife Services' involvement.

A non-federal entity could lethally take feral swine on private property to alleviate damage without the need for a permit. In addition, most methods available for resolving damage associated with feral swine would be available for public use. Therefore, Wildlife Services' decision-making ability would be restricted to one of three alternatives. Wildlife Services could take the action using the specific methods as decided upon by the non-federal entity, provide technical assistance only, or take no action. If no action were taken by Wildlife Services, the non-federal entity could take the action anyway using the same methods without the need for a permit. Under those circumstances, Wildlife Services would have virtually no ability to affect the environmental status quo since the action would likely occur in the absence of Wildlife Services' direct involvement.

Therefore, based on the discussion above, it is clear that in those situations where a non-federal entity could take an action to alleviate damage or threats themselves, and has already made the decision to remove or otherwise manage feral swine to stop damage with or without Wildlife Services' assistance, Wildlife Services' participation in carrying out the action would not affect the environmental status quo. In some situations, however, certain aspects of the human environment may actually benefit more from Wildlife Services' involvement than from a decision not to assist. For example, if a cooperator believes Wildlife Services has greater

expertise to selectively remove feral swine than a non-Wildlife Services entity; Wildlife Services' management activities may have less of an impact on target and non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, Wildlife Services' involvement may provide some benefit to the human environment when compared to the environmental status quo in the absence of such involvement.

2.2 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES

Issues are concerns of the public and/or professional community raised regarding potential effects that might occur from a proposed action. Such issues must be considered in the NEPA decision-making process. Issues related to managing damage associated with feral swine in New York were developed by Wildlife Services in cooperation with the NYSDEC, the NYSDAM, and the USFWS. The EA will also be made available to the public for review and comment to identify additional issues.

The issues as those issues relate to the possible implementation of the alternatives, including the proposed action, are discussed in detail in Chapter 4. The issues analyzed in detail in the EA are the following:

Issue 1 - Effects of Damage Management Activities on Feral Swine Populations

A common issue when addressing damage caused by wildlife are the potential impacts of management actions on the populations of target species. Methods available to resolve damage or threats to human safety under the alternatives are categorized into lethal and non-lethal methods.

Non-lethal methods could disperse or otherwise make an area unattractive to target species causing damage, which reduces the presence of those species at the site, and potentially the immediate area around the site where non-lethal methods were employed. Lethal methods would be employed to remove a single feral swine or those feral swine responsible for causing damage or posing threats to human safety. The use of lethal methods would therefore result in local population reductions in the area where damage or threats were occurring. The number of feral swine removed from the population using lethal methods under the alternatives would be dependent on the number of requests for assistance received, the number of individuals involved with the associated damage or threat, and the efficacy of methods employed.

The analysis for magnitude of impact on populations from the use of lethal methods generally follows the process where magnitude is defined 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 trends, when available.

Methods available under each of the alternatives to resolve damage and reduce threats to human safety would be employed targeting a single feral swine or a group of feral swine after applying the Wildlife Services' Decision Model (Slate et al. 1992) to identify possible techniques. The

effects of damage management activities on the populations of feral swine from implementation of the alternatives addressed in detail, including the proposed action, are analyzed in Chapter 4.

Issue 2 - Effects on Non-target Wildlife Species Populations, Including T&E Species

The issue of non-target species effects, including effects on T&E species arises from the use of the 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. Methods available for use under the alternatives are described in Appendix B.

The ESA states that all federal agencies *"...shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act"* [Sec. 7(a)(1)]. Wildlife Services conducts Section 7 consultations with the USFWS to ensure compliance with the ESA and to ensure that *"any action authorized, funded or carried out by such an agency...is not likely to jeopardize the continued existence of any endangered or threatened species…Each agency shall use the best scientific and commercial data available"* [Sec. 7(a)(2)].

As part of the scoping process for this EA, Wildlife Services consulted with the USFWS pursuant to Section 7 of the ESA to facilitate interagency cooperation between Wildlife Services and the USFWS. In addition, Wildlife Services consulted with the NYSDEC regarding the potential for effects to species listed as endangered, threatened, or of special concern by the NYSDEC. The potential effects of the alternatives on this issue are further discussed in Chapter 4.

Issue 3 - Effects of Damage Management Methods on Human Health and Safety

An additional issue often raised is the potential risks to human safety associated with employing methods to manage damage caused by target species. Both chemical and non-chemical methods have the potential to have adverse effects on human safety. Wildlife Services' employees would use and recommend only those methods legally available under each of the alternatives. Still, some concerns exist regarding the safety of Wildlife Services' methods despite their legality and selectivity. As a result, this EA will analyze the potential for proposed methods to pose a risk to members of the public.

In addition to the potential risks to the public associated with methods available under the alternatives, risks to Wildlife Services' employees are also an issue. Wildlife Services' employees could potentially be exposed to damage management methods, as well as, subject to workplace accidents. Selection of methods, under the alternatives, would include consideration for public and employee safety.

Safety of Chemical Methods Employed

The issue of using chemical methods as part of managing damage associated with wildlife relates to the potential for human exposure either through direct contact with the chemical or exposure to the chemical from wildlife that have been exposed. Under the alternatives identified, the use

of chemical methods would be limited to the use of immobilizing drugs and euthanasia chemicals. Currently, no repellents or reproductive inhibitors are registered for use to prevent damage caused by feral swine. A list and description of immobilizing drugs available for use under the identified alternatives can be found in Appendix B.

The potential for drugs used in animal capture, handling, and euthanasia to cause adverse health effects in humans that hunt and consume feral swine has also been identified. There is no closed season for feral swine on private property. Feral swine can be hunted and sometimes consumed by people as food. The use of chemical methods would be regulated by the U.S. Drug Enforcement Agency (DEA), by the U.S. Food and Drug Administration (FDA), by New York laws and regulations, and directives of Wildlife Services.

Safety of Non-Chemical Methods Employed

Non-chemical methods employed to reduce damage and threats to safety caused by feral swine, if misused, could potentially be hazardous to human safety. Non-chemical methods available under the alternatives may include but are not limited to firearms, live-traps, exclusion, and cable restraints. A complete list of non-chemical methods available to alleviate damage associated with feral swine is provided in Appendix B of this EA.

Effects of Not Employing Methods to Reduce Threats to Human Safety

A concern for human safety from not employing methods or not employing the most effective methods to reduce the threats that feral swine can pose has also been identified. The risks to human safety from diseases associated with feral swine were addressed previously. The low risk of disease transmission from feral swine does not lessen the concerns of cooperators requesting assistance to reduce threats from zoonotic diseases. Increased public awareness of zoonotic events has only heightened the concern of direct or indirect exposure to zoonoses. Feral swine can also pose threats to human safety when struck by vehicles or aircraft. Not adequately addressing the threats associated with potential zoonoses could lead to an increase in incidences of injury, illness, or loss of human life. This issue will be fully evaluated in Chapter 4 in relationship to the alternatives.

Issue 4 - Effects on the Aesthetic Values of Feral Swine

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

The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The American public shares a similar bond with animals and/or wildlife in general and in modern societies, a large percentage of households has indoor or

outdoor pets. However, some people may consider individual wild animals and feral swine as "*pets*" or exhibit affection toward these animals, especially people who enjoy viewing wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to manage conflicts/problems between humans and wildlife.

Wildlife populations provide a wide range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive uses, indirect benefits derived from vicarious wildlife related experiences, and the personal enjoyment of knowing wildlife exists and contributes to the stability of natural ecosystems (Bishop 1987). Direct benefits are derived from a personal relationship with animals and may take the form of direct consumptive use (using parts of or the entire animal) or non-consumptive use (viewing the animal in nature or in a zoo, photographing) (Decker and Goff 1987).

Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Public attitudes toward wildlife vary considerably. Some people believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to protected resources. Some people directly affected by the problems caused by wildlife strongly support removal. Individuals not directly affected by the harm or damage may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Some people totally opposed to wildlife damage management want agencies to teach tolerance for damage and threats caused by wildlife, and that wildlife should never be killed. Some of the people who oppose removal of wildlife do so because of human-affectionate bonds with individual wildlife. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

The effects on the aesthetic value of feral swine from implementation of the identified alternatives, including the proposed action, are analyzed in Chapter 4.

Issue 5 - Humaneness and Animal Welfare Concerns of Methods

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate damage management for societal benefits could be compatible with animal welfare concerns, if *"…the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process."*

According to the American Veterinary Medical Association (AVMA 1987), suffering is described as a *"…highly unpleasant emotional response usually associated with pain and distress."* However, suffering *"…can occur without pain…,"* and *"…pain can occur without suffering…"* Because suffering carries with it the implication of a time frame, a case could be

made for *"…little or no suffering where death comes immediately…"* (California Department of Fish and Game 1991). Pain and physical restraint can cause stress in animals and the inability of animals to effectively deal with those stressors can lead to distress. Suffering occurs when action is not taken to alleviate conditions that cause pain or distress in animals.

Defining pain as a component in humaneness appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain and identifying the causes that elicit pain responses in humans would "*…probably be causes for pain in other animals…"* (AVMA 2007). However, pain experienced by individual animals probably ranges from little or no pain to considerable pain (California Department of Fish and Game 1991).

The AVMA states "*...euthanasia is the act of inducing humane death in an animal*" and "*... the technique should minimize distress and anxiety prior to the loss of consciousness*" (AVMA 2007). Some people would prefer AVMA accepted methods of euthanasia to be used when killing all animals, including wild animals. The AVMA states that "*For wild and feral animals, many of the recommended means of euthanasia for captive animals are not feasible. In field circumstances, wildlife biologists generally do not use the term euthanasia, but terms such as killing, collecting, or harvesting, recognizing that a distress- free death may not be possible*" (Beaver et al. 2001).

Pain and suffering, as it relates to methods available for use to manage feral swine has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since *"…neither medical nor veterinary curricula explicitly address suffering or its relief"* (California Department of Fish and Game 1991). Research suggests that some methods can cause "*stress*" (Kreeger et al. 1988). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness (Bateson 1991).

The decision-making process involves trade-offs between the above aspects of pain and humaneness. Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and 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.

The issue of humanness and animal welfare concerns will be further discussed as it relates to the methods available for use under the alternatives in Chapter 4. SOPs to alleviate pain and suffering are discussed in Chapter 3.

2.3 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

Additional issues were also identified by Wildlife Services, the USFWS, the NYSDEC, and the NYSDAM during the scoping process of this EA. Those additional issues were considered but detailed analyses will not occur for the reasons provided. The following issues were considered but were not be analyzed in detail:

Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area

A concern was raised that an EA for an area as large as the State of New York would not meet the NEPA requirements for site specificity. Wildlife damage management falls within the category of federal or other regulatory agency actions in which the exact timing or location of individual activities cannot usually be predicted well enough ahead of time to describe accurately such locations or times in an EA or an EIS. Although Wildlife Services can predict some of the possible locations or types of situations and sites where some kinds of wildlife damage could occur, the program cannot predict the specific locations or times at which affected resource owners would determine a damage problem has become intolerable to the point that they request assistance from Wildlife Services. In addition, the Wildlife Services program would not be able to prevent such damage in all areas where it might occur without resorting to destruction of wild animal populations over broad areas at a much more intensive level than would be desired by most people, including Wildlife Services and other agencies. Such broad scale population management would also be impractical or impossible to achieve within Wildlife Services' policies and professional philosophies.

Lead agencies have the discretion to determine the geographic scope of their analyses under the NEPA (Kleppe v Sierra Club, 427 U.S. 390, 414 (1976), CEQ 1508.25). Ordinarily, according to APHIS procedures implementing the NEPA, Wildlife Services' individual wildlife damage management actions could be categorically excluded (7 CFR 372.5(c)). The intent in developing this EA was to determine if the proposed action would potentially have significant individual and/or cumulative impacts on the quality of the human environment that would warrant the preparation of an EIS or a FONSI. This EA addresses impacts for managing damage and threats to human safety associated with feral swine in the State to analyze individual and cumulative impacts and to provide a thorough analysis.

In terms of considering cumulative effects, one EA analyzing impacts for the entire State would provide a more comprehensive and less redundant analysis than multiple EAs covering smaller areas. If a determination were made through this EA that the proposed action or the other alternatives might have a significant impact on the quality of the human environment, then an EIS would be prepared. Based on previous requests for assistance, the Wildlife Services program in New York would continue to conducted feral swine damage management in a very small area of the State where damage was occurring or likely to occur.

Threats to Biodiversity from Damage Management Activities

Feral swine in New York are considered a non-native species that can cause damage to a variety of resources, including causing damage to native ecosystems. Adverse effects associated with feral swine to natural resources were discussed in Chapter 1. Any reduction in feral swine populations in New York could be reasonably viewed as providing some benefit to native wildlife and native plants. Executive Order 13112 directs federal agencies whose actions may affect the status of invasive species to reduce invasion of those species and the associated damages to the extent practicable and permitted by law.

The Wildlife Services program does not attempt to eradicate any species of native wildlife in the State. Wildlife Services operates in accordance with federal and state laws and regulations enacted to ensure species viability. Methods available are employed to target individual feral swine or groups of feral swine identified as causing damage or posing a threat of damage. Given the non-native status of feral swine in New York and the associated damage that feral swine can cause to natural resources, any activities proposed that reduces the density of feral swine, or eliminate them from the landscape, will likely be beneficial to the biodiversity in the area by reducing habitat destruction, competition, and predation.

A Loss Threshold Should Be Established Before Allowing Lethal Methods

One issue identified through Wildlife Services' implementation of the NEPA processes is a concern that a threshold of loss should be established before employing lethal methods to resolve damage and that wildlife damage should be a cost of doing business. Some damage and economic loss would likely be tolerated by cooperators until the damage reaches a threshold where the damage becomes an economic burden. The appropriate level of allowed tolerance or threshold before employing lethal methods would differ among cooperators and damage situations. Establishing a threshold would be difficult or inappropriate to apply to human health and safety situations. For example, aircraft striking feral swine could cause damage to the aircraft, which can threaten passenger safety if a catastrophic failure of the aircraft occurs because of the strike. Therefore, addressing the threats of a strike prior to an actual strike occurring would be appropriate.

In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied the plaintiffs' motion for a preliminary injunction. In part, the court determined a need for wildlife damage management could be established if a forest supervisor could show that damage from wildlife was threatened (Civil No. 92-C-0052A January 20, 1993). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion such as a percentage of loss of a particular resource to justify the need for damage management actions.

Harvest of Feral Swine through Hunting

Another issue commonly identified is a concern that damage management activities conducted by Wildlife Services would affect the ability of persons to harvest feral swine during hunting seasons by reducing local populations. The goal of the NYSDEC is to eradicate feral swine from the landscape in New York (NYSDEC 2012*a*); thus, no regulated hunting seasons will be established for this species in New York. Currently, while engaged in hunting activities, people with a small game license who observe feral swine may shoot and keep feral swine at any time and in any number, although this provision may be subject to change by the NYSDEC at any time (NYSDEC 2011). The concern is that hunters are more likely to shoot at groups and disperse them from the area, creating additional pockets of feral swine.

States which allow for fee feral swine hunting or legalize feral swine hunting such as California, often see increases in feral swine populations, counteracting arguments by some that legalized hunting is an effective means of reducing feral swine populations (Zivin et al. 2000, Anderson

and Yoest 2012). Tennessee allowed hunting of feral swine in just those few counties of the state that had populations from 1950 to 1999, and observed some population growth in those counties (see Figure 2) (Anderson and Yoest 2012). When feral swine hunting was expanded to allow hunting statewide, wildlife managers began to see an increase in feral swine populations throughout the state, as well as feral swine appearing in locations where they had not previously existed (see Figure 2) (Anderson and Yoest 2012). There is no longer a statewide hunting season for feral hogs in Tennessee. The state has determined that "*Unfortunately, sport hunting is not an effective way to keep wild hog populations from spreading. In fact, it's being proven nationally that sport hunting opportunities lead to the further spread of hogs into new areas*" (Tennessee Wildlife Resources Agency 2012).

A factor thought to be facilitating the spread of feral swine in some states, such as Texas and California, is the implementation of legalized hunting; a management effort aimed at limiting feral swine populations and damage (Wolf and Bartz 2009). Fee hunting may create an incentive for landowners to establish feral swine populations in new areas (Ziven et. al 2000). This occurred in California; feral swine populations began to show up in areas where no populations were previously recorded when feral swine hunting became popular (Ziven et. al 2000). Instead, their popularity as a game animal has resulted in intentional releases of feral swine by people, expanding their populations and hampering damage management efforts (Wolf and Bartz 2009). Other states, such as Alabama, experienced similar results when legalized hunting was expanded in an effort to manage feral swine damage (Ziven et al 2000).

States with established feral swine populations have shown that the revenues from feral swine hunting and/or shooting enclosures rarely recoups the damage inflicted by feral swine to agriculture, human health and safety, and the environment (Seward et al. 2004). Enclosed shooting facilities with European boars are a source of income and jobs in New York for some people working in an alternative agriculture venues. However, other agricultural industries (*e.g.*, dairy, grain producers) dependent upon grain crops and the disease free status of their herds, could be affected if European boars and other swine escaped and became endemic to New York. Currently, 9% of the feral swine captured in New York tested positive for either leptospirosis, pseudorabies, or swine influenza (Wildlife Services, unpublished data, 2012).

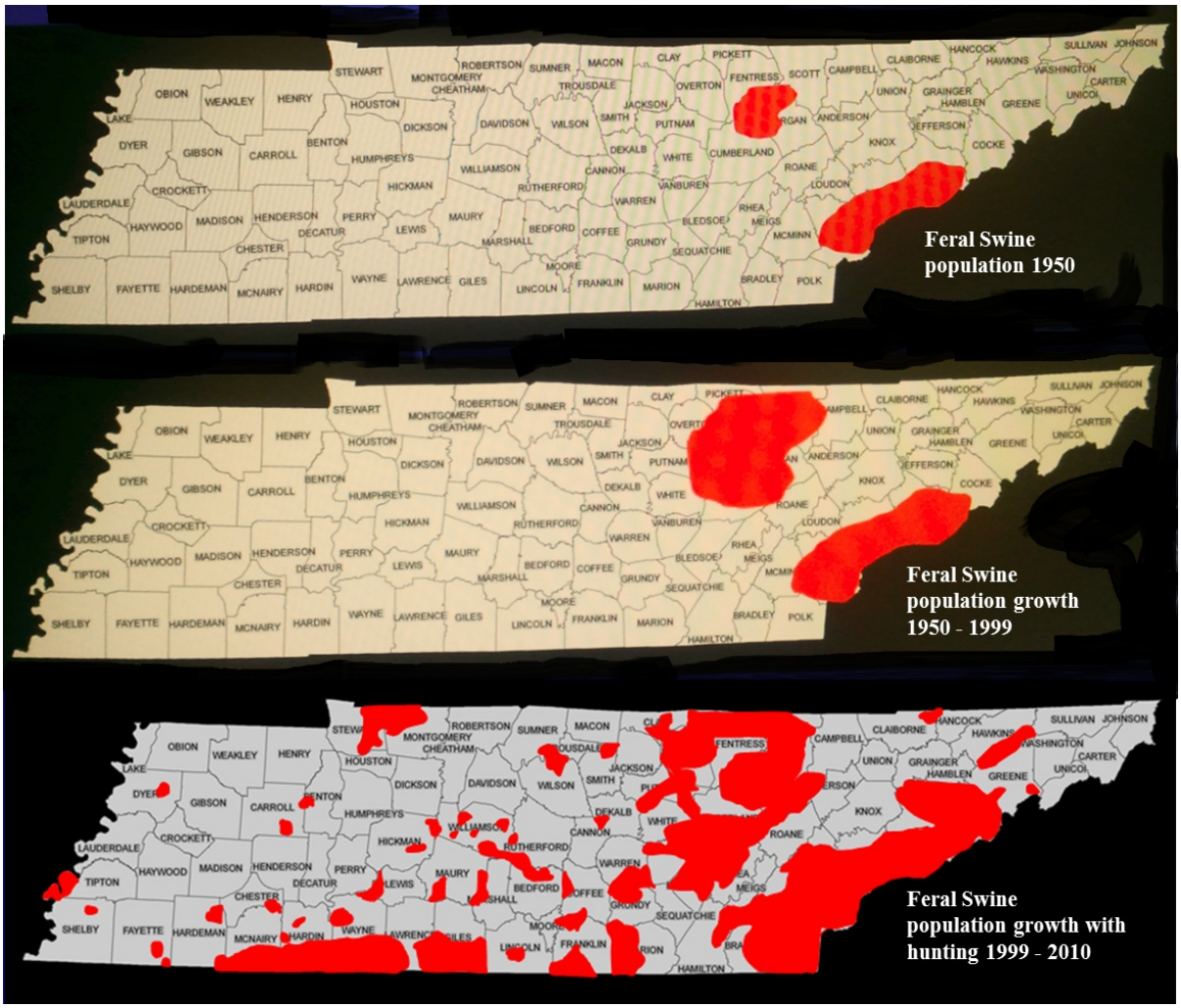

Figure 2. Population growth of Tennessee's feral swine population from 1950 – 1999 while feral swine hunting was allowed only in the counties where feral swine populations were known to exist; and then from 1999 to 2010 when feral swine hunting was allowed statewide (Anderson and Yoest 2012).

The source of feral swine in New York appears to be enclosed shooting facilities and pig sanctuaries (USDA 2010, Fitzgerald 2012, Mayer 2012). In 2007, New York had 1,527 hog and pig operations for agricultural food production with an estimated 85,741 head of hogs (NYSDAM 2011). Currently, there are 14 enclosed shooting facilities that maintain Russian boar or their hybrids; and 9 swine sanctuaries that may have Russian boars or hybrids in New York. At least 12 of the enclosed shooting facilities have advertised guided pig hunts online, with prices ranging from $350 to $900 (J. Gansowski, Wildlife Services, personal communication, 2012). To date, all of the feral swine that have been located in New York have occurred in close association with enclosed shooting facilities or sanctuaries. Swine digging out under fences appears to be the main reason for escapees (USDA 2010).

Donation of Feral Swine taken through management activities for human consumption

Under the Federal Meat Inspection Act, all swine are required to be inspected prior to entering into any establishment in which they are to be slaughtered. Inspections are carried out under the USDA Food Safety and Inspection Services (FSIS). FSIS has ruled that all swine are amenable to the Federal Meat Inspection Act and even if donated are considered to be in commerce; therefore all animals must be processed under inspection at an official establishment. This would entail examining the animal alive, at rest and in motion from both sides before passing the animal for slaughter.

Additionally, slaughter of swine in New York requires a Domestic Animal Health Permit; swine for slaughter and must be accompanied by approved health certificate and be individually identified (1 NYCRR part 63). In most instances, it is difficult to trace the origins of feral swine or determine fitness for human consumption due to the potential for feral swine to carry disease (Wyckoff et al. 2009). Transporting live feral swine to slaughter facilities also increases the potential for spreading disease to domestic swine at facilities were swine are being held prior to slaughter. Wildlife Services has determined that in order to maintain the health of swine herds in New York and to ensure that ill or diseased feral swine are not used for human consumption, feral swine will not be donated to food banks.

Feral Swine Damage Management Should Not Occur at Taxpayer Expense

An issue identified is the concern that wildlife damage management should not be provided at the expense of the taxpayer or that activities should be fee-based. Funding for feral swine damage management activities would be derived from federal appropriations and through cooperative funding. Activities conducted in the State for the management of damage and threats to human safety from feral swine would be funded through New York State, the Great Lakes Restoration Initiative and through cooperative service agreements with individual property owners or managers. A minimal federal appropriation is allotted for the maintenance of a Wildlife Services program in New York. The remainder of the Wildlife Services program would be fee-based. Technical assistance would be provided to requesters as part of the federally funded activities, but the majority of direct assistance, in which Wildlife Services' employees perform damage management activities, would be funded through cooperative service agreements between the requester and Wildlife Services.

Cost Effectiveness of Management Methods

The CEQ does not require a formal, monetized cost benefit analysis to comply with the NEPA. Consideration of this issue is not essential to making a reasoned choice among the alternatives being considered. However, the methods determined to be most effective to reduce damage and threats to human safety caused by feral swine and that prove to be the most cost effective will receive the greatest application. As part of an integrated approach, evaluation of methods will continually occur to allow for those methods that are most effective at resolving damage or threats to be employed under similar circumstance where feral swine are causing damage or pose a threat. Additionally, management operations may be constrained by cooperator funding and/or objectives and needs. The cost effectiveness of methods and the effectiveness of methods are

linked. The issue of cost effectiveness as it relates to the effectiveness of methods is discussed in the following issue.

Effectiveness of Feral Swine Damage Management Methods

The effectiveness of any damage management program could be defined in terms of losses or risks potentially reduced or prevented, how accurately practitioner's diagnosis the problem, the species responsible for the damage, and how actions are implemented to correct or mitigate risks or damages. To determine that effectiveness, Wildlife Services must be able to complete management actions expeditiously to minimize harm to non-target animals and the environment, while at the same time, using methods as humanely as possible within the limitations of current technology. The most effective approach to resolving any wildlife damage problem is to use an adaptive integrated approach, which may call for the use of several management methods simultaneously, or sequentially (Courchamp et al. 2003).

The purpose behind integrated management is to implement methods in the most effective manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment[7]. Efficacy is based on the types of methods employed, the application of the method, restrictions on the use of the method(s), the skill of the personnel using the method and, for Wildlife Services' personnel, the guidance provided by Wildlife Services Directives and policies.

The goal, as stated by the NYSDEC, is eliminate feral swine from New York's landscape (NYSDEC 2012*a*). The ability of an animal population to sustain a certain level of removal and to eventually return to pre-management levels, however, does not mean individual management actions are unsuccessful, but that periodic management may be necessary. The return of wildlife to pre-management levels also demonstrates that limited, localized damage management methods have minimal impacts on species' populations.

A common issue raised is that the use of lethal methods is ineffective because additional feral swine are likely to return to the area, which creates a financial incentive to continue the use of only lethal methods. This assumes feral swine only return to an area where damage was occurring if lethal methods are used. However, the use of non-lethal methods is also often temporary which could result in feral swine returning to an area where damage was occurring once those methods are no longer used. The common factor when employing any method is that feral swine will return if suitable conditions continue to exist at the location where damage was occurring and feral swine densities are sufficient to occupy all available habitats to the extent that damage occurs. Therefore, any reduction or prevention of damage from the use of methods addressed in Appendix B will be temporary if habitat conditions continue to exist that attract feral swine to an area where damage occurs.

Therefore, any method that disperses or removes feral swine from areas will only be temporary if habitat containing preferred habitat characteristics continues to exist. Dispersing feral swine using non-lethal methods addressed in Appendix B often requires repeated application to

[7]The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

discourage feral swine from returning to a location, which increases costs, moves feral swine to other areas where they could cause damage, and are temporary if habitat conditions at the location remain unchanged. Dispersing of feral swine could be viewed as moving a problem from one area to another, which would require addressing damage caused by those feral swine at another location. Dispersing feral swine also runs counter to the goal of the NYSDEC to eliminate the feral swine population in New York. Wildlife Services' recommendation of or use of techniques to modify existing habitat or making areas unattractive to feral swine is discussed in Appendix B. Wildlife Services' objective is to respond to request for assistance with the most effective methods and to provide for the long-term solution to the problem using Wildlife Services' Decision Model to adapt methods in an integrated approach to managing feral swine damage that is agreed upon by the cooperator.

As part of an integrated approach to managing feral swine damage, Wildlife Services would have the ability to adapt methods to damage situations to effectively reduce or prevent damage from occurring. Under the proposed integrated approach, all methods, individually or in combination, could be employed as deemed appropriate through Wildlife Services' Decision Model to address requests for assistance. Wildlife Services' objective when receiving a request for assistance under the proposed action is to reduce damage and threats to human safety or to prevent damage from occurring using an integrated approach to managing feral swine damage. Therefore, under the proposed action, Wildlife Services would employ methods adaptively to achieve that objective.

Managing damage caused by feral swine is similar to managing Canada Geese in that it can be divided into short-term redistribution approaches, long-term population, and habitat management approaches (Cooper and Keefe 1997). Short-term approaches focus on redistribution and dispersal to limit use of an area where damage or threats were occurring. Short-term redistribution approaches may include fencing, physical exclusion, pyrotechnics, propane cannons, and other adverse noise (Cooper and Keefe 1997). Population reduction by limiting survival or reproduction and removing feral swine by lethal methods, and habitat modification are considered long-term solutions (Higgenbotham et al. 2010) to managing damage caused by feral swine.

Redistribution methods are often employed to provide immediate resolution to damage occurring until long-term approaches can be implemented or have had time to reach the desired result. Dispersing wildlife often provides short-term solutions that move wildlife to other areas where damages or threats could occur (Smith et al. 1999, Gorenzel et al. 2000, Gorenzel et al. 2002). Some short-term methods may become less effective in resolving damage as a wildlife population increases, as wildlife become more acclimated to human activity, and as wildlife become habituated to harassment techniques. Non-lethal methods often require a constant presence at locations when feral swine are present and must be repeated every day until the desired results are achieved which can increase the costs associated with those activities. Long-term solutions to resolving wildlife damage often require management of the population and identifying the habitat characteristics, which attract wildlife to a particular location.

Based on the evaluation of the damage situation, the most effective methods will be employed individually or in combination based on the prior evaluations of methods or combinations of

methods in other damage management situations. Once employed, methods will be further evaluated for effectiveness based on a continuous evaluation of activities by Wildlife Services. Therefore, the effectiveness of methods is considered as part of the decision making-process under Wildlife Services' use of the Decision Model described in Chapter 3 for each damage management request based on continual evaluation of methods and results.

Feral Swine Damage Should Be Managed By Private Nuisance Wildlife Control Agents

Private nuisance wildlife control agents could be contacted to reduce feral swine damage for property owners or property managers when deemed appropriate by the resource owner. Some property owners would prefer to use a private nuisance wildlife control agent because the nuisance wildlife agent is located in closer proximity and thus could provide the service at less expense, or because they prefer to use a private business rather than a government agency. However, some property owners would prefer to enter into agreements with a government agency. Those persons seeking assistance may prefer to use Wildlife Services because of security and safety issues and reduced administrative burden. Wildlife Services further clarifies interfacing with private business and establishing cooperative projects in Wildlife Services Directive 3.101.

Effects from the Use of Lead Ammunition in Firearms

Questions have arisen about the deposition of lead into the environment from ammunition used in firearms to lethally take feral swine. As described in Appendix B, the lethal removal of feral swine with firearms by Wildlife Services to alleviate damage or threats could occur using a rifle or shotgun. In an ecological risk assessment of lead shot exposure in non-waterfowl birds, ingestion of lead shot was identified as the concern rather than just contact with lead shot or lead leaching from shot in the environment (Kendall et al. 1996).

The take of feral swine by Wildlife Services using firearms in the State would occur primarily through trapping or lethal removal with rifles. To reduce risks to human safety and property damage from bullets passing through feral swine, the use of rifles would be applied in such a way (*e.g.*, caliber, bullet weight, distance) to ensure the bullet does not pass through feral swine. Feral swine that are removed using firearms would occur within areas where retrieval of carcasses for proper disposal would be highly likely. With risks of lead exposure occurring primarily from ingestion of shot and bullet fragments, the retrieval and proper disposal of swine carcasses would greatly reduce the risk of scavengers ingesting or being exposed to lead.

However, deposition of lead into soil could occur if, during the use of a rifle or shotgun, the projectile passes through a feral swine, if misses occur, or if the feral swine carcass was not retrieved. Laidlaw et al. (2005) reported that, because of the low mobility of lead in soil, all of the lead that accumulates on the surface layer of the soil is generally retained within the top 20 cm (about 8 inches). In addition, concerns occur that lead from bullets deposited in soil from shooting activities could contaminate ground water or surface water from runoff.

Stansley et al. (1992) studied lead levels in water that was subjected directly to high concentrations of lead shot accumulation because of intensive target shooting at several shooting

ranges. Lead did not appear to "*transport*" readily in surface water when soils were neutral or slightly alkaline in pH (*i.e*., not acidic), but lead did transport more readily under slightly acidic conditions. Although Stansley et al. (1992) detected elevated lead levels in water in a stream and a marsh that were in the shot "*fall zones*" at a shooting range, the study did not find higher lead levels in a lake into which the stream drained, except for one sample collected near a parking lot. Stansley et al. (1992) believed the lead contamination near the parking lot was due to runoff from the parking lot, and not from the shooting range areas. The study also indicated that even when lead shot was highly accumulated in areas with permanent water bodies present, the lead did not necessarily cause elevated lead levels in water further downstream. Muscle samples from two species of fish collected in water bodies with high lead shot accumulations had lead levels that were well below the accepted threshold standard of safety for human consumption (Stansley et al. 1992).

Craig et al. (1999) reported that lead levels in water draining away from a shooting range with high accumulations of lead bullets in the soil around the impact areas were far below the "action level" of 15 parts per billion as defined by the EPA (*i.e.*, requiring action to treat the water to remove lead). The study found that the dissolution (*i.e*., capability of dissolving in water) of lead declines when lead oxides form on the surface areas of the spent bullets and fragments (Craig et al. 1999). Therefore, the transport of lead from bullets or shot distributed across the landscape was reduced once the bullets and shot formed crusty lead oxide deposits on their surfaces, which served to naturally reduce the potential for ground or surface water contamination (Craig et al. 1999). Those studies suggest that, given the very low amount of lead being deposited and the concentrations that would occur from Wildlife Services' activities to reduce feral swine damage using rifles or shotguns, as well as most other forms of dry land small game hunting in general, lead contamination of water from such sources would be minimal to nonexistent.

Since the take of feral swine can occur at any time with few restrictions, Wildlife Services' assistance with removing feral swine would not be additive to the environmental status quo since those feral swine removed by Wildlife Services using firearms could be lethally removed by the entities experiencing damage using the same method in the absence of Wildlife Services' involvement. The amount of lead deposited into the environment could be lowered by Wildlife Services' involvement in damage management activities due to efforts by Wildlife Services to ensure projectiles do no pass through but are contained within the carcass, which limits the amount of lead potentially deposited into soil from projectiles passing through the carcass.

The proficiency training received by Wildlife Services' employees in firearm use and accuracy would increase the likelihood that feral swine were lethally removed humanely in situations that ensure accuracy and that misses occur infrequently, which further reduces the potential for lead to be deposited in the soil from misses or from projectiles passing through carcasses. In addition, Wildlife Services' involvement ensures feral swine carcasses lethally removed using firearms would be retrieved and disposed of properly to limit the availability of lead in the environment. This ensures carcasses were removed from the environment to prevent the ingestion of lead by scavengers. Based on current information, the risks associated with lead bullets that could be deposited into the environment from Wildlife Services' activities due to misses, the bullet passing through the carcass, or from carcasses that may be irretrievable would be below any level that would pose any risk from exposure or significant contamination of water.

Potential for Feral Swine to Disperse to Other Areas Due to Management Activities

Feral swine have been reported from 21 counties across the state, and have been confirmed breeding in five of those counties in New York (Swift et al. 2012). Methods involving the pursuit, shooting, and/or harassment of feral swine could lead to the abandonment of areas traditionally used by swine in New York. If feral swine are dispersed by Wildlife Services, damages and threats could arise in those areas where feral swine dispersed. While the original complainant may see resolution to the feral swine problem when the swine are dispersed, the recipient of the feral swine may see the problem as imposed on them. Thus, overall, there is no resolution to the original feral swine problem.

Wildlife Services will evaluate the damage or threat situation to determine the appropriate method to adequately resolve the request for assistance that will not result in the likely dispersal of feral swine from those activities. All activities will be coordinated between Wildlife Services, the NYSDEC, and local entities to monitor feral swine populations in areas where dispersal may occur. The potential for dispersal when employing methods will be considered as part of the evaluation of the damage situation and will be incorporated into the decision-making process to determine which methods to employ and recommend. The use of methods that would likely result in the harassment or dispersal of feral swine (*e.g.*, shooting, propane cannons, pyrotechnics), would be used in those situations where damage, threats of damage, and/or threats to human safety require immediate resolution.

Individual feral swine may also be radio collared to locate and monitor movements of feral swine by Wildlife Services, NYSDEC, or another entity. Radio collaring would allow Wildlife Services and other entities to track movements and locations of feral swine. The tracking of feral swine in relationship to damage management activities would provide the ability to monitor movements and potential dispersal to other areas. Feral swine often form large groups that allow one individual of the group to be captured, collared, and released to return to the group. By collaring one individual, the movement and location of an entire group can be monitored. Radio telemetry will allow Wildlife Services and other entities to monitor movements and to respond as necessary to feral swine dispersal.

Coordination between cooperating agencies and local entities will ensure any dispersing feral swine are identified and addressed. The limited use of methods that disperse feral swine should further ensure they are not being displaced to other areas within New York.

A Site Specific Analysis Should be made for Every Location Where Feral Swine Damage Management Could Occur

The underlying intent for preparing an EA is to determine if a proposed action might have a significant impact on the human environment. Wildlife Services' EA development process is issue driven, meaning issues that were raised during the interdisciplinary process and through public involvement that were substantive, were used to drive the analysis and determine the significance of the environmental impacts of the proposed action and the alternatives. Therefore, the level of site specificity must be appropriate to the issues listed.

The analysis in this EA was driven by the issues raised during the scoping process during the development of the EA. In addition to the analysis contained in this EA, Wildlife Services' personnel use the Wildlife Services Decision Model (Slate et al. 1992) described in Chapter 3 as a site-specific tool to develop the most appropriate strategy at each location. The Wildlife Services Decision Model is an analytical thought process used by Wildlife Services' personnel for evaluating and responding to requests for assistance.

As discussed previously, one EA analyzing impacts for the entire State would provide a more comprehensive and less redundant analysis than multiple EAs covering smaller areas. One EA allows for a better cumulative impact analysis. If a determination were made through this EA that the alternatives developed to meet the need for action could result in a significant impact on the quality of the human environment, then an EIS would be prepared.

CHAPTER 3: ALTERNATIVES

Chapter 3 contains a discussion of the alternatives that were developed to meet the need for action discussed in Chapter 1 and to address the identified issues discussed in Chapter 2. Alternatives were developed for consideration based on the need for action and issues using the Wildlife Services Decision model (Slate et al. 1992). The alternatives will receive detailed environmental impacts analysis in Chapter 4 (Environmental Consequences). Chapter 3 also discusses alternatives considered but not analyzed in detail, with rationale. SOPs for feral swine damage management in New York are also discussed in Chapter 3.

3.1 DESCRIPTION OF THE ALTERNATIVES

The following alternatives were developed to meet the need for action and to address the identified issues associated with managing damage caused by feral swine in the State:

Alternative 1 – No Feral Swine Damage Management Conducted by Wildlife Services

This alternative would preclude all activities by Wildlife Services to reduce threats to human health and safety, and to alleviate damage to agricultural resources, property, and natural resources. Wildlife Services would not be involved with any aspect of managing damage or threats associated with feral swine in the State. All requests for assistance received by Wildlife Services to resolve damage caused by feral swine would be referred to the NYSDEC, the NYSDAM, and/or private business entities.

Despite no involvement by Wildlife Services in resolving damage and threats associated with feral swine in the State, those persons in New York experiencing damage caused by feral swine could continue to resolve damage by employing those methods legally available and permitted for use. Feral swine could continue to be lethally taken in New York to alleviate damage. In addition, feral swine could be lethally taken at any time by small game license holders in the State. All methods described in Appendix B would be available for use by those persons experiencing damage or threats except for the use of immobilizing drugs, euthanasia chemicals, aerial shooting, cable restraints, and foot snares; however, those methods could be used by NYSDEC and their cooperators.

Therefore, under this alternative, those persons experiencing damage or threats of damage could contact Wildlife Services but Wildlife Services would immediately refer the requester to the NYSDEC, NYSDAM, and/or other entities, the requester could contact other entities for information and assistance with managing damage, could take actions to alleviate damage without contacting any other entity, or could take no further action.

Alternative 2 – Feral Swine Damage Management by Wildlife Services through Technical Assistance Only

Under this alternative, Wildlife Services would provide those cooperators requesting assistance with technical assistance only. Technical assistance could provide those cooperators experiencing damage or threats with information, demonstrations, and recommendations on available and appropriate methods available. The implementation of methods and techniques to

resolve or prevent damage would be the responsibility of the requester with no direct involvement by Wildlife Services. In some cases, Wildlife Services may provide supplies or materials that are of limited availability for use by private entities (*e.g.*, propane cannons). Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to managing damage; those strategies would be based on the level of risk, need, and the practicality of their application. Wildlife Services would use the Decision Model to recommend those methods and techniques available to the requestor to manage damage and threats of damage. Those persons receiving technical assistance from Wildlife Services could implement those methods recommended by Wildlife Services, could employ other methods not recommended by Wildlife Services, could seek assistance from other entities, or take no further action.

Under a technical assistance only alternative, Wildlife Services would recommend an integrated approach similar to the proposed action alternative (see Alternative 3); however, Wildlife Services would not provide direct operational assistance under this alternative. Recommendation of methods and techniques by Wildlife Services to resolve damage would be based on information provided by the individual seeking assistance or based on site visits.

In some instances, wildlife-related information provided to the requestor by Wildlife Services results in tolerance/acceptance of the situation. In other instances, damage management options would be discussed and recommended. Only those methods legally available for use by the appropriate individual would be recommend or loaned by Wildlife Services. Similar to Alternative 1, those methods described in Appendix B would be available to those persons experiencing damage or threats associated with feral swine in the State except for the use of immobilizing drugs, euthanasia chemicals, aerial shooting, cable restraints, and foot snares. Those methods would only be available to the NYSDEC and their cooperators under this alternative.

The Wildlife Services program regularly provides technical assistance to individuals, organizations, and other federal, state, and local government agencies for managing feral swine damage. Technical assistance includes collecting information about the species involved, the extent of the damage, and previous methods that the cooperator has attempted to resolve the problem. Wildlife Services then provides information on appropriate methods that the cooperator may consider to resolve the damage themselves. Types of technical assistance projects may include a visit to the affected property, written communication, telephone conversations, or presentations to groups such as homeowner associations or civic leagues.

This alternative would place the immediate burden of operational damage management work on the resource owner, other governmental agencies, and/or other private entities. Those persons experiencing damage or are concerned with threats posed by feral swine could seek assistance from other governmental agencies, private entities, or conduct damage management on their own. Those persons experiencing damage or threats could take action using those methods legally available to resolve or prevent feral swine damage as permitted by federal, state, and local laws and regulations or those persons could take no action.

Alternative 3 - Continuing the Current Integrated Approach to Managing Feral Swine Damage (Proposed Action/No Action)

The proposed action/no action alternative would continue the current implementation of an adaptive integrated approach utilizing non-lethal and lethal techniques, when requested, as deemed appropriate using the Wildlife Services Decision Model, to reduce damage and threats caused by feral swine in the State. A major goal of the program would be to resolve and prevent feral swine damages to natural resources, agriculture, property, and human safety. To meet this goal, Wildlife Services, in coordination with the NYSDEC and the NYSDAM would continue to respond to requests for assistance with, at a minimum, technical assistance, or when funding was available, operational damage management. Funding could occur through federal appropriations or from cooperative funding.

The adaptive approach to managing damage associated with feral swine would integrate the use of the most practical and effective methods to resolve a request for damage management as determined by site-specific evaluation to reduce damage or threats to human safety for each request. City/town managers, agricultural producers, property owners, and others requesting assistance would be provided information regarding the use of appropriate non-lethal and lethal techniques. Wildlife Services would work with those persons experiencing damage in addressing those feral swine responsible for causing damage as expeditiously as possible. To be most effective, damage management activities should begin as soon as feral swine begin to cause damage. Feral swine damage that has been ongoing can be difficult to resolve using available methods since feral swine are conditioned to an area and are familiar with a particular location. Subsequently, making that area unattractive using available methods can be difficult to achieve once damage has been ongoing. Wildlife Services would work closely with those entities requesting assistance to identify situations where damage could occur and begin to implement damage management activities under this alternative as early as possible to increase the likelihood of those methods achieving the level of damage reduction requested by the cooperating entity.

Under this alternative, Wildlife Services could respond to requests for assistance by: 1) taking no action if warranted, 2) providing only technical assistance to property owners or managers on actions they could take to reduce damages caused by feral swine, or 3) providing technical assistance and direct operational assistance to a property owner or manager experiencing damage. Property owners or managers requesting assistance from Wildlife Services would be provided with information regarding the use of effective and practical non-lethal and lethal techniques. Preference would be give to non-lethal methods when practical and effective under this alternative (see Wildlife Services Directive 2.101). Property owners or managers may choose to implement Wildlife Services' recommendations on their own (*i.e.*, technical assistance), use contractual services of private businesses, use volunteer services of private organizations/individuals, use the services of Wildlife Services (*i.e.*, direct operational assistance), take the management action themselves without consulting another private entity or governmental agency, or take no further action.

Wildlife Services' Decision Model would be the implementing mechanism for a damage management program under the proposed action alternative that would be adapted to an

individual damage situation that allows for the broadest range of methods to be used to address damage or the threat of damage in the most effective, most efficient, and most environmentally conscious way available. When Wildlife Services received a request for direct operational assistance, Wildlife Services would conduct a site visit to assess the damage or threat and identify the cause of the damage. Based on the information gathered during the site visit, Wildlife Services would apply the Wildlife Services' Decision Model described by Slate et al. (1992) and Wildlife Services Directive 2.201 to determine the appropriate methods. The use of the Decision model by Wildlife Services' employees under the proposed action is further discussed below.

Non-lethal methods that would be available for use by Wildlife Services under this alternative include, but are not limited to minor habitat modifications, behavior modification methods, lure crops, visual deterrents, dogs, live capture devices, exclusionary devices, frightening devices, and immobilizing drugs (see Appendix B for a complete list and description of potential methods).

Lethal methods that would be available to Wildlife Services and the NYSDEC under this alternative include cable restraints and shooting. Wildlife Services and the NYSDEC would also have the ability to lethally remove feral swine from aircraft using a firearm. In addition, feral swine live-captured using non-lethal methods could be euthanized[8]. The lethal control of target mammals would comply with Wildlife Services Directive 2.505.

However, listing methods neither implies that all methods would be used or recommended by Wildlife Services to resolve requests for assistance nor does listing of methods imply that all methods would be used to resolve every request for assistance. The most appropriate response would often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. For example, if an entity requesting assistance had already attempted to alleviate damage using non-lethal methods, Wildlife Services would not necessarily employ those same non-lethal methods since those methods had been proven ineffective at reducing damage or threats to an acceptable level to the requester.

Non-lethal methods can disperse or otherwise make an area unattractive to feral swine causing damage; thereby, reducing the presence of feral swine at the site and potentially the immediate area around the site where non-lethal methods were employed. Non-lethal methods would be given priority when addressing requests for assistance (Wildlife Services Directive 2.101). However, non-lethal methods would not necessarily be employed to resolve every request for assistance if deemed inappropriate by Wildlife Services' personnel using the Wildlife Services Decision Model, especially when the requesting entity had used non-lethal methods previously and found those methods to be inadequate to resolving the damage or threats of damage. Non-lethal methods would be used to exclude, harass, and disperse target wildlife from areas where damage or threats were occurring. When effective, non-lethal methods would disperse feral swine from an area resulting in a reduction in the presence of feral swine at the site where those

[8]Live-captured feral swine would be euthanized using euthanasia chemicals or firearms. Euthanasia chemicals are an acceptable form of euthanasia for free-ranging wildlife (AVMA 2007). Feral swine live-captured would primarily be euthanized by gunshot, which is a method of euthanasia considered as a conditionally acceptable method of euthanasia by the AVMA for free-ranging wildlife (AVMA 2007).

methods were employed. For any management methods employed, the proper timing would be essential in effectively dispersing those feral swine causing damage. Employing methods soon after damage begins or soon after threats were identified, increases the likelihood that those damage management activities would achieve success in addressing damage. Therefore, coordination and timing of methods would be necessary to be effective in achieving expedient resolution of feral swine damage.

Under the proposed action alternative, Wildlife Services could employ only non-lethal methods when determined to be appropriate for each request for assistance to alleviate damage or reduce threats of damage using the Wildlife Services Decision Model. In many situations, the cooperating entity tries to employ non-lethal methods to resolve damage prior to contacting Wildlife Services for assistance. In those cases, the methods employed by the requester were either unsuccessful or the reduction in damage or threats had not reached a level that was tolerable by the requesting entity. In those situations, Wildlife Services could employ other non-lethal methods, attempt to apply the same non-lethal methods, or employ lethal methods. In many situations, the implementation of non-lethal methods such as exclusion-type barriers would be the responsibility of the requester, which means that, in those situations, Wildlife Services only function would be to implement lethal methods, if determined to be appropriate using the Wildlife Services Decision Model.

Lethal methods could be employed to resolve damage associated with those feral swine identified by Wildlife Services as responsible for causing damage or threats to human safety under this alternative; however, Wildlife Services would only employ lethal methods after receiving a request for the use of those methods. The use of lethal methods would result in local population reductions in the area where damage or threats were occurring since feral swine would be removed from the population. Lethal methods would often be employed to reinforce non-lethal methods and to remove feral swine that were identified as causing damage or posing a threat to human safety. The use of lethal methods would result in local reductions of feral swine in the area where damage or threats were occurring. The number of feral swine removed from the population using lethal methods under the proposed action would be dependent on the number of requests for assistance received, the number of feral swine involved with the associated damage or threat, and the efficacy of methods employed.

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

Most lethal and non-lethal methods currently available provide only short-term benefits when addressing feral swine damage. The use of those methods would be intended to reduce damage

occurring at the time those methods were employed but do not necessarily ensure feral swine would not return once those methods were discontinued. In some cases, long-term solutions involve exclusionary devices, such as fencing small areas. When addressing feral swine damage, long-term solutions generally involve modifying existing habitat or making conditions to be less attractive to feral swine. To ensure complete success, alternative sites in areas where damage was not likely to occur would often be required to achieve complete success in reducing damage and to avoid moving the problem from one area to another. Modifying a site to be less attractive to feral swine would likely result in the dispersal of those feral swine to other areas where damage could occur or could result in multiple occurrences of damage situations.

A complete list of chemical and non-chemical methods available for use under the identified alternatives can be found in Appendix B. However, listing methods neither implies that all methods would be used by Wildlife Services to resolve requests for assistance nor does the listing of methods imply that all methods would be used to resolve every request for assistance. As part of an integrated approach, Wildlife Services may provide technical assistance and direct operational assistance to people experiencing damage associated with feral swine.

Technical Assistance Recommendations

Under the proposed action, Wildlife Services could provide technical assistance to those persons requesting feral swine damage management as part of an integrated approach to managing damage. Technical assistance would occur as described in Alternative 2 of this EA.

The Wildlife Services program in New York regularly provides technical assistance to individuals, organizations, and other federal, State, and local government agencies for managing feral swine damage. Technical assistance includes collecting information about the species involved, location, the nature, and extent of the damage, and previous methods that the cooperator has attempted to resolve the problem. Wildlife Services then provides information on appropriate methods that the cooperator may consider to resolve the damage themselves. Types of technical assistance projects may include a visit to the affected property, written communication, telephone conversations, or presentations to groups such as homeowner associations or civic leagues.

Between 2008 and 2012, Wildlife Services conducted 95 technical assistance projects and made 941 site visits involving feral swine damage to agricultural resources, property, natural resources, and threats to human safety. The majority of requests for technical assistance involve feral swine damage to agricultural resources and to property.

Operational Damage Management Assistance

Operational damage management assistance would include damage management activities that were directly conducted by or supervised by personnel of Wildlife Services. Operational damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone and there was a written MOU, cooperative service agreement, comparable document between Wildlife Services and the entity requesting assistance. The initial

investigation by a Wildlife Services employee defines the nature, history, and extent of the problem; species responsible for the damage; and methods available to resolve the problem.

Educational Efforts

Education is an important element of activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, Wildlife Services provides lectures, courses, and demonstrations to producers, homeowners, State and county agents, colleges and universities, and other interested groups. Consulting agencies frequently cooperate with other entities in education and public information efforts. Additionally, technical papers have been and would continue to be presented at professional meetings and conferences so that other wildlife professionals and the public were periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

Research and Development

The National Wildlife Research Center (NWRC) provides scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. Research biologists with the NWRC work closely with wildlife managers, researchers, and others to develop and evaluate wildlife damage management techniques. For example, research biologists from the NWRC have been involved with developing and evaluating reproductive inhibitors for feral swine.

Wildlife Services' Decision Making Procedures

Wildlife Services' personnel would use a thought process for evaluating and responding to damage complaints that is depicted by the Wildlife Services Decision Model (Wildlife Services Directive 2.201) and described by Slate et al. (1992). Wildlife Services' personnel would assess the problem and then evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic, and social considerations. Following this evaluation, methods deemed to be practical for the situation would be incorporated into a damage management strategy. After this strategy was implemented, monitoring would be conducted and evaluation would continue to assess the effectiveness of the strategy. If the strategy were effective, the need for further management would be ended. In terms of the Wildlife Services Decision Model, most efforts to resolve damage or threats consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a written documented process, but a mental problem-solving process common to most, if not all, professions, including Wildlife Services.

Community Based Decision-Making

Wildlife Services could receive requests for assistance from community leaders and/or representatives. In those situations, the Wildlife Services program in New York, under this

alternative, would follow the "*co-managerial approach*" to solving wildlife damage or conflicts as described by Decker and Chase (1997). Within this management model, Wildlife Services would provide technical assistance regarding the biology and ecology of feral swine and effective, practical, and reasonable methods available to the local decision-maker(s) to reduce damage or threats. This could include non-lethal and lethal methods. Wildlife Services and other state and federal wildlife management agencies may facilitate discussions at local community meetings when resources are available. Resource owners and others directly affected by feral swine damage or conflicts in the State have direct input into the resolution of such problems. They may implement management recommendations provided by Wildlife Services or others, or may request management assistance from Wildlife Services, other wildlife management agencies, local animal control agencies, or private businesses or organizations.

Under a community based decision-making process, Wildlife Services would provide information, demonstration, and discussion on available methods to the appropriate representatives of the community for which services were requested to ensure a community-based decision was made. By involving decision makers in the process, damage management actions could be presented to allow decisions on damage management to involve those individuals that the decision-maker(s) represents. As addressed in this EA, Wildlife Services would provide technical assistance to the appropriate decision-maker(s) to allow for information on damage management activities to be presented to those persons represented by the decision-maker(s), including demonstrations and presentation by Wildlife Services at public meetings to allow for involvement of the community. Requests for assistance to manage damage caused by feral swine often originate from the decision-maker(s) based on community feedback or from concerns about damage or threats to human safety. As representatives of the community, the decision-maker(s) would be able to provide the information to local interests either through technical assistance provided by Wildlife Services or through demonstrations and presentation by Wildlife Services on damage management activities. This process would allow decisions on damage management activities to be made based on local input. The community leaders could implement management recommendations provided by Wildlife Services or others, or may request management assistance from Wildlife Services, other wildlife management agencies, local animal control agencies, or private businesses or organizations.

Community Decision-Makers

The decision-maker(s) for a local community would be elected officials or representatives of the communities. The elected officials or representatives would be popularly elected residents of the local community or appointees who oversee the interests and business of the local community. This person or persons would represent the local community's interest and make decisions for the local community or bring information back to a higher authority or the community for discussion and decision-making. Identifying the decision-maker for local business communities can be more complex because building owners may not indicate whether the business must manage wildlife damage themselves, or seek approval to manage wildlife from the property owner or manager, or from a governing Board. Wildlife Services could provide technical assistance and make recommendations for damage reduction to the local community or local business community decision-maker(s). Direct operational assistance could be provided by

Wildlife Services only if requested by the local community decision-maker, funding is provided, and if the requested direct control was compatible with Wildlife Services' recommendations.

Private Property Decision-Makers

Wildlife Services could also receive requests for assistance from private property owners. In the case of private property owners, the decision-maker is the individual that owns or manages the affected property. The decision-maker has the discretion to involve others as to what occurs or does not occur on property they own or manage. Due to privacy issues, Wildlife Services cannot disclose cooperator information to others. Therefore, in the case of an individual property owner or manager, the involvement of others and to what degree others are involved in the decision-making process would be a decision made by that individual.

Public Property Decision-Makers

The decision-maker for local, state, or federal property would be the official responsible for or authorized to manage the public land to meet interests, goals, and legal mandates for the property. Wildlife Services could provide technical assistance to this person and provide recommendations to reduce damage. Direct control could be provided by Wildlife Services if requested, when funding was provided, and the requested actions were within the recommendations made by Wildlife Services.

3.2 EXAMPLE OF FERAL SWINE DAMAGE MANAGEMENT PROJECTS

In 2010, Wildlife Services was awarded a grant by the Invasive Species Council of New York to conduct a project to manage feral swine damage. The project focused on 3 components: population reduction, disease surveillance, and border surveillance along the New York/Pennsylvania border (USDA 2010). Feral swine were removed from 3 counties in New York: Cortland, Onondaga and Tioga; 27 feral swine were captured and tested for classical swine fever, swine influenza virus, swine brucellosis, and pseudorabies.

As part of educational efforts in 2010, the Wildlife Services program conducted informational presentations on feral swine biology, disease risks, and damage management techniques to several interest groups, including the New York Farm show in Syracuse; employees of the National Resources Conservation Service in Tioga County, and at the Empire Farm Days in Seneca Falls, New York. Wildlife Services' personnel also spoke at the annual meetings of the New York State Conservation Council and the New York State Chapter of the Wild Turkey Federation.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

In addition to those alternatives analyzed in detail, several additional alternatives were identified by Wildlife Services. However, those alternatives will not receive detailed analyses for the reasons provided. Those alternatives considered but not analyzed in detail include:

Non-lethal Methods Implemented Before Lethal Methods

This alternative would require that non-lethal methods or techniques described in Appendix B be applied to all requests for assistance to reduce damage and threats to safety from feral swine in the State. If the use of non-lethal methods fails to resolve the damage situation or reduce threats at each damage situation, lethal methods would be employed to resolve the request. Non-lethal methods would be applied to every request for assistance regardless of severity or intensity of the damage or threat until deemed inadequate to resolve the request. This alternative would not prevent the use of lethal methods by other entities or by those persons experiencing feral swine damage but would only prevent the use of those methods by Wildlife Services until non-lethal methods had been employed.

Those persons experiencing damage often employ non-lethal methods to reduce damage or threats prior to contacting the NYSDEC or Wildlife Services. Verification of the methods used would be the responsibility of the NYSDEC or Wildlife Services. No standard exists to determine requester diligence in applying those methods, nor are there any standards to determine how many non-lethal applications are necessary before the initiation of lethal methods. Thus, only the presence or absence of non-lethal methods can be evaluated. The proposed action alternative (Alternative 3) and the technical assistance only alternative (Alternative 2) is similar to a non-lethal before lethal alternative because Wildlife Services would give preference to the use or recommendation of non-lethal methods (Wildlife Services Directive 2.101). Adding a non-lethal before lethal alternative and the associated analysis would not add additional information to the analyses in the EA.

Use of Lethal Methods Only

This alternative would require the use of lethal methods only to reduce threats and damage associated with feral swine. However, non-lethal methods can be effective in preventing damage in certain instances. Under Wildlife Services Directive 2.101, Wildlife Services must consider the use of non-lethal methods before lethal methods. Non-lethal methods have been effective in alleviating feral swine damage. For example, electric fencing can prevent access of feral swine to gardens. In those situations where damage could be alleviated using non-lethal methods deemed effective, those methods would be employed or recommended as determined by the decision model of Wildlife Services. Therefore, this alternative was not considered in detail.

Live Trapping and Translocation Only

Under this alternative, all requests for assistance would be addressed using live-capture methods or the recommendation of live-capture methods. Feral swine would be live-captured using corral traps, cage traps, or restraining cables. All feral swine live-captured through direct operational assistance by Wildlife Services would be translocated under this alternative. Translocation sites would be identified and approved by the NYSDEC and/or the property owner prior to live-capture and translocation. Live-capture and translocation could be conducted as part of the alternatives analyzed in detail. However, translocation of wildlife, including feral swine, could only occur under the authority of the NYSDEC. Therefore, the translocation of feral swine by Wildlife Services would only occur as directed by the NYSDEC. When requested by the

NYSDEC, Wildlife Services could translocate feral swine under any of the alternatives analyzed in detail, except for Alternative 1 in which Wildlife Services would not be involved in any aspect of feral swine damage management in the State. However, other entities could translocate feral swine despite Wildlife Services' lack of involvement. Since Wildlife Services does not have the authority to translocate feral swine in the State unless permitted by the NYSDEC, this alternative was not considered in detail. In addition, the translocation of feral swine could occur under any of the alternatives analyzed in detail by Wildlife Services or another entity.

Currently, under the New York Environmental Conservation Law §11-0511, "*...no person shall….possess, transport, or cause to be transported, imported or exported any live wolf, wolfdog, coyote, fox, skunk, venomous reptile or raccoon, endangered species….or other species of native or non-native live wildlife or fish where the department finds that possession, transportation, importation of such species of wildlife or fish would present a danger to the health or welfare of the people of the state, an individual resident or indigenous fish or wildlife population.*

Under the New York Environmental Conservation Law §11-0507, "*...no person shall willfully liberate within the state any wildlife except under permit from the department. The department may issue such permit in its discretion, fix the terms thereof and revoke it at pleasure. These provisions do not apply to migratory gamebirds, importation of which is governed regulation of the department.*

Also, the goal set forth by the NYSDEC is to completely eradicate feral swine from the landscape in New York. Consequently, Wildlife Services would not translocate any feral swine captured during direct operational assistance back into the wild.

Use of Non-lethal Methods Only

Under this alternative, Wildlife Services would be required to implement only non-lethal methods to resolve damage caused by feral swine. Non-lethal methods often have a high rate of habituation after multiple applications. To lessen habituation, non-lethal harassment and dispersal techniques require application only when feral swine are present which can lead to elevated costs from increased monitoring of vulnerable resources.

Exclusionary devices can be effective in preventing access to resources in certain circumstances. The primary exclusionary methods are fencing and other barriers. Exclusion is most effective when applied to small areas to protect high value resources. However, exclusionary methods are neither feasible nor effective for protecting human safety, agriculture, or natural resources from feral swine across large areas. The proposed action, using an integrated damage management approach, incorporates the use of non-lethal methods when addressing requests for assistance. In those instances where non-lethal methods would effectively resolve damage from feral swine those methods would be used or recommended under the proposed action. Since non-lethal methods would be available for use under the alternatives analyzed in detail, this alternative would not add to the analyses.

Reducing Damage by Managing Feral Swine Populations through the Use of Reproductive Inhibitors

Under this alternative, the only method that would be available to resolve requests for assistance by Wildlife Services would be the recommendation and the use of reproductive inhibitors to reduce or prevent reproduction in feral swine responsible for causing damage. Reproductive inhibitors are often considered for use where wildlife populations are overabundant and where traditional hunting or lethal control programs are not publicly acceptable (Muller et al. 1998). Use and effectiveness of reproductive control as a wildlife population management tool is limited by population dynamic characteristics (*e.g.*, longevity, age at onset of reproduction, population size, and biological/cultural carrying capacity), habitat and environmental factors (*e.g.*, isolation of target population, cover types, and access to target individuals), socioeconomic, and other factors.

Reproductive control for wildlife could be accomplished through either sterilization (permanent) or contraception (reversible). Sterilization could be accomplished through: 1) surgical sterilization (vasectomy, castration, and tubal ligation), 2) chemosterilization, and 3) through gene therapy. Contraception could be accomplished through: 1) hormone implantation (synthetic steroids such as progestins), 2) immunocontraception (contraceptive vaccines), and 3) oral contraception (progestin administered daily).

Reproductive inhibitors could be administered through injection or through other procedures once live-capture occurs. Those live-capture methods and immobilization chemicals discussed in Appendix B would be used to live-capture and immobilize feral swine. Once captured, the swine would be reproductively sterilized or a reproductive inhibitor would be administered. For sterilization, feral swine would have to be immobilized and sedated to perform the procedure.

Once live-captured, performing sterilization procedures during field operations on anesthetized swine would be difficult. Sanitary conditions are difficult to maintain when performing surgical procedures in field conditions. To perform operations under appropriate conditions, live-captured swine would need to be transported from the capture site to an appropriate facility, which increases the threat from handling and transporting. A mobile facility could be used but would still require additional handling and transporting of the live-captured swine to the facility. Once the surgical procedure was completed, the feral swine would have to be held to ensure recovery and transported back to the area capture occurred.

Population modeling indicates that reproductive control is more efficient than lethal control only for some rodent and small bird species with high reproductive rates and low survival rates (Dolbeer 1998). Additionally, the need to treat a sufficiently large number of target animals, multiple treatments, and population dynamics of free-ranging populations place considerable logistic and economic constraints on the adoption of reproduction control technologies as a wildlife management tool for some species.

Currently, reproductive inhibitors are not available for use to manage feral swine populations. Given the costs associated with live-capturing and performing sterilization procedures on feral swine and the lack of availability of chemical reproductive inhibitors, this alternative was not

evaluated in detail. In addition, because of the continued threat to resources created by sterilization programs and the continued threat to T&E wildlife and native wildlife in general, the use of only reproductive sterilization and/or reproductive inhibitors to lower feral swine populations to reduce damage and threats was not considered further. If a reproductive inhibitor became available and the product was proven effective in reducing localized populations, the use of the inhibitor could be evaluated under the proposed action as a method available that could be used in an integrated approach to managing damage. This EA would be reviewed and supplemented to the degree necessary to evaluate the use of the reproductive inhibitor as part of an integrated approach described under the proposed action. Currently, the only mammalian reproductive inhibitor that is registered with the EPA is Gonacon™, which is registered for use on white-tailed deer. However, Gonacon™ is not currently registered for use in the State for feral swine.

Compensation for Feral Swine Damage

The compensation alternative would require Wildlife Services to establish a system to reimburse persons impacted by feral swine damage and to seek funding for the program. Under such an alternative, Wildlife Services would continue to provide technical assistance to those persons seeking assistance with managing damage. In addition, Wildlife Services would conduct site visits to verify damage. Evaluation of this alternative indicates that a compensation only alternative had many drawbacks. Compensation would: 1) require large expenditures of money and labor to investigate and validate all damage claims, and to determine and administer appropriate compensation, 2) most likely be below full market value, 3) give little incentive to resource owners to limit damage through improved cultural or other practices and management strategies, and 4) not be practical for reducing threats to human health and safety.

Bounties

Payment of funds (bounties) for killing some feral swine causing economic losses have not been supported by State agencies, such as the NYSDEC, as well as most wildlife professionals for many years (Latham 1960, Hoagland 1993). Wildlife Services concurs with those agencies and wildlife professionals because of several inherent drawbacks and inadequacies in the payment of bounties. Bounties are often ineffective at controlling damage over a wide area, such as across the entire State. The circumstances surrounding the take of animals are typically arbitrary and completely unregulated because it is difficult or impossible to assure animals claimed for bounty were not taken from outside the area where damage was occurring or were not domestic swine. In addition, Wildlife Services does not have the authority to establish a bounty program.

3.4 STANDARD OPERATING PROCEDURES FOR DAMAGE MANAGEMENT TECHNIQUES

SOPs improve the safety, selectivity, and efficacy of activities intended to resolve wildlife damage. The Wildlife Services' program in New York uses many such SOPs. Those SOPs would be incorporated into the technical assistance only alternative and the proposed action alternative. Under the technical assistance only alternative, Wildlife Services' would recommend SOPs for those methods legally available during consultation with those persons

requesting assistance. However, implementation of SOPs would be the responsibility of those persons requesting assistance.

Some key SOPs pertinent to resolving damage include the following:

- The Wildlife Services Decision Model, which is designed to identify effective strategies and their potential impacts, would be consistently used and applied when addressing feral swine damage in New York.

- The use of non-lethal methods would be considered prior to the use of lethal methods when managing damage or making recommendations.

- Immobilizing and euthanasia drugs would be used according to the DEA, FDA, and Wildlife Services' directives and procedures.

- All controlled substances would be registered with the DEA or the FDA.

- Wildlife Services' employees would follow approved procedures outlined in the Wildlife Services' Field Manual for the Operational Use of Immobilizing and Euthanizing Drugs (Johnson et al. 2001).

- Wildlife Services' employees that use controlled substances would be trained to use each material and would be certified to use controlled substances.

- Wildlife Services' employees who use controlled substances would participate in approved continuing education to keep current of developments and maintain their certifications.

- Controlled substance use, storage, and disposal would conform to label instructions and other applicable laws and regulations, including Executive Order 12898.

- All personnel who use firearms would be trained according to Wildlife Services' Directives.

- Whenever possible, damage management would be conducted away from areas of high human activity. If this were not possible, then activities would be conducted during periods when human activity is low (*e.g.*, early morning), if possible. Where such activities would be conducted on private lands or other lands of restricted public access, the risk of hazards to the public would be even further reduced.

- Non-target animals captured in traps would be released unless it was determined that the animal would not survive and/or that the animal could not be released safely.

- Conspicuous, bilingual warning signs alerting people to the presence of traps may be placed at major access points to areas where active feral swine management operations were occurring, when appropriate. Signs would be placed when the presence of the signs

would not affect the efficacy of the management activities occurring in an area by alerting people to the presence of feral swine or the presence of equipment used for damage management purposes. The efficacy of activities could be lessened or compromised if people were alerted to the presence of activities in the area and chose to ignore the warning signs by trying to locate equipment or swine. Therefore, the presence of signs could lead to an increased risk of exposure to swine and equipment if people were alerted and chose to ignore the signs. The use of signs would be based on human activity in the area and the ability of the property owner or manager to control access to the property by the public.

- Wildlife Services would consult with the NYSDEC and the USFWS to ensure activities do not jeopardize the existence of T&E species.

- Management actions would be directed an individual swine or a localized group of swine posing a threat to human safety, causing agricultural damage, causing damage to natural resources, or causing damage to property.

- Baiting at feral swine trapping locations would only be conducted from January 1 through September 15 of each year to avoid attracting non-target wildlife, such as deer and bear to trap sites during New York state hunting seasons.

- Feral swine lethally removed through management actions would not be donated to food banks, food pantries, or shelters due to having an undocumented husbandry history and the potential for meat of feral swine to harbor diseases or bacterium harmful to human health.

- Trap monitoring devices would be employed when applicable that indicate when a trap has been activated. Trap monitoring device would allow personnel to prioritize trap checks and decrease the amount of time required to check traps, which decreases the amount of time captured swine were restrained. By reducing the amount of time feral swine were restrained, pain and stress could be minimized, which would reduce the distress of captured swine.

3.5 ADDITIONAL STANDARD OPERATING PROCEDURES SPECIFIC TO THE ISSUES

Several additional SOPs are applicable to the alternatives and the issues identified in Chapter 2 including the following:

Issue 1 - Effects of Damage Management Activities on Feral Swine Populations

- Lethal take of feral swine by Wildlife Services would be reported and monitored by Wildlife Services and the NYSDEC to evaluate population trends and the magnitude of Wildlife Services' take in the State.

- Wildlife Services would only target those individuals or groups of target species identified as causing damage or posing a threat of damage.

- The Wildlife Services' Decision Model, designed to identify the most appropriate damage management strategies and their impacts, would be used to determine feral swine damage management strategies.

- Wildlife Services would monitor feral swine damage management activities to ensure activities remained within the scope analyzed in this assessment.

Issue 2 - Effects on Non-target Wildlife Species Populations, Including T&E Species

- When conducting feral swine damage management activities via shooting, identification of the target would occur prior to application.

- As appropriate, suppressed firearms would be used to minimize noise.

- When conducting nighttime activities, potential impacts associated with spotlights would be minimized by the use of night vision equipment, infrared devices, or red filtered spotlights.

- Personnel would use lures, trap placements, and capture devices that would be strategically placed at locations likely to capture a target animal and minimize the potential of non-target animal captures.

- Any non-target animals captured in cage traps or any other restraining device would be released whenever it is possible and safe to do so.

- Live traps would be checked frequently to ensure non-target species would be released in a timely manner to ensure survival.

- Human presence at sites would be kept to the minimal time needed to accomplish the management action.

- As appropriate, capture devices would be equipped in such a manner to reduce the potential of capturing non-target animals (*e.g.*, rooter doors).

- Trap monitoring devices would be employed where applicable to facilitate monitoring of the status of traps in remote locations to ensure any captured wildlife was removed promptly to minimize pain and distress.

- Carcasses of feral swine retrieved after damage management activities would be disposed of in accordance with Wildlife Services Directive 2.515.

- Wildlife Services would continue to consult with the USFWS and the NYSDEC to evaluate activities to resolve feral swine damage and threats to ensure the protection of T&E species.

- Wildlife Services would monitor activities conducted under the selected alternative, if activities were determined to have no significant impact on the environment and an EIS was not required, to ensure those activities do not negatively impact non-target species.

Issue 3 - Effects of Damage Management Methods on Human Health and Safety

- Damage management activities would be conducted professionally and in the safest manner possible. Whenever possible, damage management activities would be conducted away from areas of high human activity. If this were not possible, then activities would be conducted during periods when human activity was low (*e.g.*, early morning), if possible. When determined necessary, signs would be placed to warn the public of any potential hazards.

- Shooting would be conducted professionally and in the safest manner possible. Shooting would be conducted during times when public activity and access to the control areas were restricted (*e.g.*, at night, in areas closed to the public). Personnel involved in shooting operations would be fully trained in the proper and safe application of this method in accordance with Wildlife Services Directive 2.615.

- Aviation safety and the operation of aircraft would adhere to standards for the use of aircraft in Wildlife Services' activities under Wildlife Services Directive 2.620.

- All pilots, crewmembers, ground crews, and aircraft maintenance personnel would adhere to the Wildlife Services Aviation Operations and Safety Manual, as amended, as well as, Title 14 CFR, and FAR, Part 43, 61, 91, 119, 133, 135, and 137.

- Personnel employing chemical methods would be properly trained and certified in the use of those chemicals. All chemicals used by Wildlife Services would be securely stored and properly monitored to ensure the safety of the public. Wildlife Services' use of chemicals and training requirements to use those chemicals are outlined in Wildlife Services Directive 2.401 and Wildlife Services Directive 2.430.

- All chemical methods used by Wildlife Services or recommended by Wildlife Services would be registered with the FDA, DEA, and the NYSDEC.

- In most cases, captured feral swine would be euthanized. In cases where feral swine would be chemically immobilized, fitted with radio telemetry equipment, and released for research or operational purposes, released animals would be identified with ear tags, PIT tags, or other similar devices that provide Wildlife Services' contact information and a warning to the public not to eat the marked animal. Wildlife Services would adhere to all established withdrawal times for feral swine when using immobilizing drugs for the capture of feral swine that are agreed upon by Wildlife Services, the NYSDEC, and veterinarian authorities.

Issue 4 - Effects on the Aesthetic Values of Feral Swine

- Management actions to reduce or prevent damage caused by feral swine would be directed toward specific individuals identified as responsible for the damage, identified as posing a threat to human safety or the environment, or identified as posing a threat of damage.

- All methods or techniques applied to resolve damage or threats to human safety would be agreed upon by entering into a cooperative service agreement, MOU, or comparable document prior to the implementation of those methods.

- Feral swine are non-native, invasive species in New York that can cause harm to native flora and fauna, including threatened and endangered species. Any reduction in those populations could be viewed as providing some benefit to the aesthetic value of a more native ecosystem.

Issue 5 - Humaneness and Animal Welfare Concerns of Methods

- Personnel would be well trained in the latest and most humane devices/methods for removing feral swine causing damage.

- Wildlife Services' personnel would attempt to euthanize captured feral swine as quickly and humanely as possible. Wildlife Services' use of euthanasia methods would follow those recommended by Wildlife Services' directives (Wildlife Services Directive 2.430, Wildlife Services Directive 2.505) and the AVMA for use on feral swine under field conditions (AVMA 2007).

- Trap monitoring devices would be employed where appropriate, which would minimize the amount of time feral swine may be confined to minimize pain and distress of live-captured swine.

- The NWRC is continually conducting research to improve the selectivity and humaneness of wildlife damage management devices used by personnel in the field.

- The use of non-lethal methods would be considered prior to the use of lethal methods when managing feral swine damage.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative to address the need for action described in Chapter 1 and the issues described in Chapter 2. This chapter analyzes the environmental consequences of each alternative as that alternative relates to the issues identified. The following resource values in the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, critical habitats (areas listed in T&E species recovery plans), visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. Those resources will not be analyzed further.

The activities proposed in the alternatives would have a negligible effect on atmospheric conditions including the global climate. Meaningful direct or indirect emissions of greenhouse gases would not occur because of any of the proposed alternatives. Those alternatives would meet the requirements of applicable laws, regulations, and Executive Orders including the Clean Air Act and Executive Order 13514.

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

This section analyzes the environmental consequences of each alternative in comparison to determine the extent of actual or potential impacts on the issues. Therefore, the proposed action/no action alternative (Alternative 3) serves as the baseline for the analysis and the comparison of expected impacts among the alternatives. The analysis also takes into consideration mandates, directives, and the procedures of Wildlife Services, the NYSDEC, and the NYSDAM.

Issue 1 - Effects of Damage Management Activities on Feral Swine Populations

A common issue is whether damage management actions would adversely affect the populations of target species, especially when lethal methods were employed. Wildlife Services maintains ongoing contact with the NYSDEC to ensure activities are within management objectives for feral swine. The current management objective of the NYSDEC is to eliminate feral swine from the landscape in New York (NYSDEC 2012*a*). Ongoing contact with the NYSDEC would assure local, state, and regional knowledge of wildlife population trends would be considered.

As discussed previously, the analysis for magnitude of impact from lethal take can 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 trend data.

Methods available to address feral swine damage or threats of damage in the State that would be available for use or recommendation under Alternative 3 (proposed action/no action alternative) and Alternative 2 (technical assistance only alternative) would either be lethal methods or non-lethal methods. Many of the methods would also be available to other entities under Alternative 1 (no involvement by Wildlife Services alternative). Only those methods legally available for use by the appropriate individual would be recommend or loaned by Wildlife Services or the NYSDEC. Immobilizing or euthanizing drugs, cable restraints, removing swine from aircraft

using firearms, and foot snares are methods that would only be available for use by Wildlife Services or the NYSDEC and their permitted cooperators. Under Alternative 2, Wildlife Services could recommend lethal and non-lethal methods as part of an integrated approach to resolving requests for assistance. Alternative 3 would address requests for assistance received by Wildlife Services through technical and/or operational assistance where an integrated approach to methods would be employed and/or recommended. Non-lethal methods that would be available under Alternative 3 include habitat modification, frightening devices, live traps, exclusionary devices, and immobilizing drugs (see Appendix B for a complete list and description of potential methods).

Non-lethal methods that would be available under all the alternatives can disperse or otherwise make an area unattractive to feral swine causing damage; thereby, reducing the presence of feral swine at the site and potentially the immediate area around the site where non-lethal methods were employed. Non-lethal methods would be given priority when addressing requests for assistance under Alternative 2 and Alternative 3 (Wildlife Services Directive 2.101). However, non-lethal methods would not necessarily be employed or recommended to resolve every request for assistance if deemed inappropriate by Wildlife Services' personnel using the Wildlife Services Decision Model. For example, if a cooperator requesting assistance had already used non-lethal methods, Wildlife Services would not likely recommend or continue to employ those particular methods since their use had already been proven ineffective in adequately resolving the damage or threat.

Many non-lethal methods would be used to exclude, harass, and disperse target wildlife from areas where damage or threats were occurring. When effective, non-lethal methods would disperse feral swine from the area resulting in a reduction in the presence of those feral swine at the site where those methods were employed. However, feral swine responsible for causing damage or threats would be dispersed to other areas with minimal effects on those species' populations. Non-lethal methods would not be employed over large geographical areas or applied at such intensity that essential resources (*e.g.*, food sources, habitat) would be unavailable for extended durations or over a wide geographical scope that long-term adverse effects would occur to a species' population. Non-lethal methods would generally be regarded as having minimal impacts on overall populations of wildlife since individuals of those species were unharmed. The use of non-lethal methods would not have adverse impacts on feral swine populations in the State under any of the alternatives.

The continued use of non-lethal methods often leads to the habituation of feral swine to those methods, which can decrease the effectiveness of those methods. For any management methods employed, the proper timing would be essential in effectively dispersing those feral swine causing damage. Employing methods soon after damage begins or soon after threats were identified, would increase the likelihood that those damage management activities would achieve success in addressing damage. Therefore, coordination and timing of methods would be necessary to be effective in achieving expedient resolution of feral swine damage.

In addition to non-lethal methods, lethal methods would also be available for use under all the alternatives by Wildlife Services and/or by other entities. Lethal methods available to address feral swine damage include live-capture followed by euthanasia, shooting, and cable restraints.

All of those methods would be available for use by Wildlife Services or for recommendation by Wildlife Services under Alternative 3. Lethal methods could be employed by Wildlife Services under Alternative 3 to resolve damage only after receiving a request for the use of those methods. Those same methods would also be available for Wildlife Services to recommend and for other entities to use under Alternative 2, except for euthanasia drugs. Under Alternative 1, those same lethal methods would continue to be available for use by other entities despite the lack of involvement by Wildlife Services in damage management activities.

When live-captured target animals were to be lethally taken under Alternative 3, take would occur pursuant to Wildlife Services Directive 2.505 and Wildlife Services Directive 2.430. Under alternative 2, Wildlife Services would recommend the use of methods to lethally take live-captured or restrained target animals in accordance with Wildlife Services Directive 2.505; however, the persons requesting assistance could euthanize live-captured feral swine as they deem appropriate. No assistance would be provided by Wildlife Services under Alternative 1; however, many of those methods available to lethally take live-captured or restrained feral swine would continue to be available for use by other entities under Alternative 1, except the availability of euthanasia chemicals would not be available to the public. Under Alternative 1, the person who live-captured the feral swine would determine the methods to lethally remove feral swine from live-capture devices.

The use of lethal methods by any entity could result in local population reductions in the area where damage or threats were occurring since feral swine would be removed from the population. Lethal methods could be employed or recommended to remove feral swine that have been identified as causing damage or posing a threat to human safety. Therefore, using lethal methods could result in local reductions of feral swine in the area where damage or threats were occurring. The number of feral swine removed from the population by Wildlife Services using lethal methods under Alternative 3 would be dependent on the number of requests for assistance received, the number of feral swine involved with the associated damage or threat, and the efficacy of methods employed. The number of feral swine removed by other entities under Alternative 1 and Alternative 2 would be unknown but would likely be similar to the take that could occur under Alternative 3.

The use of most lethal methods would be intended to reduce the number of feral swine present at a location since a reduction in the number of feral swine at a location could lead to a reduction in damage, which would be applicable whether using lethal or non-lethal methods. The intent of non-lethal methods would be to harass, exclude, or otherwise make an area unattractive to feral swine, which disperses those animals to other areas leading to a reduction in damage at the location where those feral swine were dispersed. The intent of using lethal methods would be similar to the objective trying to be achieved when using non-lethal methods, which would be to reduce the number of feral swine in the area where damage was occurring; thereby, reducing the damage occurring at that location.

Often of concern with the use of lethal methods is that feral swine that were lethally taken would only be replaced by other feral swine either during the application of those methods (*e.g.*, feral swine that relocate into the area) or by feral swine the following year (*e.g.*, increase in reproduction and survivability that could result from less competition). As stated previously,

Wildlife Services would not use lethal methods during direct operational assistance as population management tools over broad areas. Lethal methods would be employed under Alternative 3 to reduce the number of feral swine present at a location where damage was occurring by targeting those feral swine causing damage or posing threats. Since the intent of using lethal methods would be to manage those feral swine causing damage and not to manage entire populations, those methods would not be ineffective because feral swine could be replaced by other feral swine later.

Most lethal and non-lethal methods currently available provide only short-term benefits when addressing feral swine damage. Those methods would be employed to reduce damage occurring at the time those methods were employed but do not necessarily ensure feral swine would not return once those methods were discontinued. Long-term solutions to resolving feral swine damage can often be difficult to implement and can be costly. In some cases, long-term solutions involve exclusionary devices, such as fencing. When addressing feral swine damage, long-term solutions generally involve modifying existing habitat or making conditions to be less attractive to feral swine. To ensure complete success, alternative sites in areas where damage was not likely to occur would often times be required to achieve complete success in reducing damage and to avoid moving the problem from one area to another. Modifying a site to be less attractive to feral swine would likely result in the dispersal of those feral swine to other areas where damage could occur or could result in multiple occurrences of damage situations.

The alternatives discussed in Chapter 3 were developed in response to the issues identified in Chapter 2, along with meeting the need for action that was identified in Chapter 1. The issues associated with conducting the alternatives on the feral swine population are analyzed for each alternative below.

Alternative 1 – No Feral Swine Damage Management Conducted by Wildlife Services

Under this alternative, Wildlife Services would not conduct damage management activities in the State associated with feral swine. Wildlife Services would have no direct involvement with any aspect of addressing damage caused by feral swine and would provide no technical assistance. No take of feral swine by Wildlife Services would occur under this alternative. Feral swine could continue to be lethally taken to resolve damage and/or threats without a permit as allowed by state laws and regulations. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Local feral swine populations could decline, stay the same, or increase depending on actions taken by those persons experiencing feral swine damage. Some resource/property owners may take illegal, unsafe, or environmentally harmful action against local populations of feral swine out of frustration or ignorance. While Wildlife Services would provide no assistance under this alternative, other individuals or entities could conduct lethal damage management resulting in impacts similar to the proposed action. Appendix B contains a description of methods available for use by other agencies and private entities, unless otherwise noted in the Appendix, to manage damage and threats associated with feral swine.

Under this alternative, Wildlife Services would have no impact on feral swine populations in New York. Efforts by other federal, state, and local governments including private entities to reduce or prevent damage and conflicts could alternate in intensity, resulting in effects on target species populations of an unknown degree. Effects on target species under this alternative could be the same, less, or more than those of the proposed action depending on the level of effort expended by other governmental agencies and private persons. Since feral swine would still be taken under this alternative, the potential effects on the populations of feral swine in New York would be similar to Alternative 2.

Examples of methods that may be used under this alternative include resource management, habitat modification, livestock management, cultural practices, physical exclusion, behavior modification, shooting, bay dogs, and trapping with corral traps. These methods would be available to those persons experiencing damage or threats of damage by feral swine. Immobilizing drugs, euthanizing chemicals, cable restraints, the use of firearms from aircraft, and foot snares would be methods that would only be available to the NYSDEC and their permitted cooperators under this alternative.

Since feral swine would still be taken under this alternative, the potential effects on the populations of those feral swine would be similar among all the alternatives for this issue. Wildlife Services' involvement would not be additive to take that could occur since the cooperator requesting Wildlife Services' assistance could conduct feral swine damage management activities without Wildlife Services' direct involvement. Therefore, any actions to resolve damage or reduce threats associated with feral swine could occur by other entities despite Wildlife Services' lack of involvement under this alternative.

Alternative 2 – Feral Swine Damage Management by Wildlife Services through Technical Assistance Only

Feral swine populations would not be directly affected by Wildlife Services from a program implementing technical assistance only. However, persons experiencing damage or threats from feral swine could implement methods based on Wildlife Services' recommendations. Under a technical assistance only alternative, Wildlife Services would recommend and demonstrate for use both non-lethal and lethal methods legally available to resolve feral swine damage. Methods and techniques recommended would be based on Wildlife Services' Decision Model using information provided from the requestor or from a site visit. Requestors may implement Wildlife Services' recommendations, implement other actions, or take no action. However, those people requesting assistance are likely those persons that would implement damage abatement methods in the absence of Wildlife Services' recommendations.

Under a technical assistance only alternative, those persons experiencing threats or damage associated with feral swine in the State could lethally take feral swine despite Wildlife Services' lack of direct involvement in the management action. Therefore, under this alternative the number of feral swine lethally taken would likely be similar to Alternative 1.

Under this alternative, Wildlife Services would not be directly involved with damage management actions and therefore, direct operational assistance could be provided by other

entities, such as the NYSDEC, the NYSDAM, private entities, and/or other authorities. If direct operational assistance was not available from Wildlife Services or other entities, it is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal take, which could lead to real but unknown effects on other wildlife populations. People have resorted to the illegal use of chemicals and methods to resolve wildlife damage issues (White et al. 1989, USFWS 2001, Food and Drug Administration 2003).

Examples of methods that may be used under this alternative include resource management, habitat modification, livestock management, cultural practices, physical exclusion, behavior modification, shooting, bay dogs and trapping with corral traps. Only those methods legally available for use by the appropriate individual would be recommend or loaned by Wildlife Services. These methods would be available to those persons experiencing damage or threats of damage by feral swine. Immobilizing drugs, euthanasia chemicals, cable restraints, using firearms from aircraft, and foot snares would be methods reserved for use by the NYSDEC and their permitted cooperators only.

Alternative 3 - Continuing the Current Integrated Approach to Managing Feral Swine Damage (Proposed Action/No Action)

As stated previously, feral swine are currently known to occur in 21 counties of the State, with confirmed breeding in 5 counties (Swift et al. 2012). The total feral swine population in New York was estimated to be several hundred animals as of 2011 (Swift et al. 2012). In New York, feral swine are classified as a captive bred North American big game animal by the NYSDEC and currently can be shot at any time and in any number by persons possessing a small game hunting license (NYSDEC 2011). It is anticipated that feral swine populations in New York may continue to increase due to their prolific breeding behavior, adaptability, and additional swine being illegally released into the wild.

Feral swine damage may be addressed by Wildlife Services or the NYSDEC in response to requests by other federal agencies, other state agencies, or the public at any location in the State. Agricultural producers may request assistance with managing damage to standing crops or disease threats to domestic livestock. Natural resource managers may request assistance to protect natural areas, parks or recreation areas, or T&E species. Public health agencies may request assistance in reducing feral swine densities where disease threats to humans may be present. The methods that would be available under this alternative would include those methods outlined by Barrett and Birmingham (1994), West et al. (2009), and Hamrick et al. (2011) as suitable for feral swine damage management, including the use of aircraft to shoot feral swine.

Examples of methods that could be used under this alternative include resource management, habitat modification, livestock management, cultural practices, physical exclusion, behavior modification, shooting, bay dogs, and trapping with corral traps. Only those methods legally available for use by the appropriate individual would be recommend or loaned by Wildlife Services. Those methods would generally be available for use by other entities. Immobilizing drugs, euthanasia chemicals, cable restraints, shooting from aircraft, and foot snares are methods that would only be available for use by Wildlife Services and the NYSDEC and their permitted

cooperators. Appendix B contains a thorough discussion of the methods available for use in an integrated wildlife damage management approach to address requests for assistance to manage damage or reduce threats to human safety.

From FY 2008 through FY 2012, Wildlife Services removed a total of 143 feral swine to reduce damage and for disease surveillance in New York. Removal of a small number of feral swine or a single individual will sometimes reduce damage considerably where natural resources, agriculture, or property is affected (Barrett and Birmingham 1994). However, damage may increase dramatically in areas where feral swine have ample resources and opportunity to expand. As discussed in Chapter 1, feral swine populations can increase and expand rapidly. If the feral swine population increases and expands in the State, Wildlife Services and the NYSDEC anticipates receiving an increasing number of requests to address damage in the future. Based on the future need to address feral swine if populations increase and expand, Wildlife Services anticipates that up to 500 feral swine could be killed annually in New York to alleviate damage or threats of damage.

In addition, Wildlife Services may be requested by the NYSDEC and/or the NYSDAM to assist with sampling and managing the spread of diseases found in free-ranging and/or captive feral swine populations. In the case of a disease outbreak, Wildlife Services could take additional feral swine for sampling and/or to prevent further spread of diseases. If requested, Wildlife Services and the NYSDEC could also assist with sampling and removing swine from enclosed shooting facilities or other captive facilities where swine are confined inside a perimeter fence. The detection of a disease at a captive facility often raises concerns of the potential spread of diseases to free-ranging animals. The spread of diseases among swine inside these facilities is often increased due to their close contact with one another. Often, once a disease is detected in a confined population, the entire population is destroyed to ensure the containment of the disease. Any involvement with the depopulation of swine confined inside a perimeter fence by Wildlife Services would be at the request of the NYSDEC and/or the NYSDAM. As proposed in this alternative, in those cases where Wildlife Services is requested to assist with the removal of captive swine, the take would not exceed 500 for purposes of disease monitoring or surveillance. Swine confined inside perimeter fences for the purposes of non-traditional farming, including confined for hunting, are not included in statewide feral swine population estimates. However, the total take by Wildlife Services would not exceed 500 swine annually.

Damage management activities associated with feral swine would target single animals or local populations at sites where their presence was causing unacceptable damage or posing threats to agriculture, human health and safety, natural resources, or property. Feral swine are not native to North America, including New York. The goal of the NYSDEC is to eliminate current populations of feral swine in the State and to prevent feral swine from becoming established (NYSDEC 2012*a*). Therefore, any reduction in the current or future population of feral swine in the State would occur pursuant to the goals of the NYSDEC. Executive Order 13112 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, 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 on invasive species.

Any damage management activities involving lethal methods by Wildlife Services would be restricted to isolated individual sites. Some local populations may be temporarily reduced because of damage management activities aimed at reducing damage at a local site. Since feral swine are a non-native species, in those cases where feral swine are causing damage or are a nuisance and complete removal of the local population could be achieved, this could be considered as providing some benefit to the natural environment since feral swine are not considered part of the native ecosystem.

Since the NYSDEC regulates wildlife populations in the State, including feral swine, any reduction in the feral swine population in New York that might occur under this alternative would occur within the management objectives established by the NYSDEC. Current long-term objectives of the NYSDEC are to suppress or eliminate feral swine from New York. Therefore, the NYSDEC has expressed the intent and desire to suppress or remove feral swine in the State. All activities to manage feral swine in the State would be conducted pursuant to Executive Order 13112 and from the direction of the NYSDEC.

Issue 2 - Effects on Non-target Wildlife Species Populations, Including T&E Species

As discussed previously, a concern is often raised about the potential impacts to non-target species, including T&E species, from the use of methods to resolve damage caused by feral swine. The potential effects on the populations of non-target wildlife species, including T&E species, are analyzed below.

Alternative 1 – No Feral Swine Damage Management Conducted by Wildlife Services

Under this alternative, Wildlife Services would not be directly involved with feral swine damage management activities in New York. Therefore, no direct impacts to non-targets or T&E species would occur by Wildlife Services under this alternative. Feral swine could continue to be lethally removed by other entities within the State. Risks to non-targets and T&E species would continue to occur from those persons who implement damage management activities on their own or through recommendations by the other federal, state, and private entities. Although some risks occur from those persons that implement damage management in the absence of any involvement by Wildlife Services, those risks would likely be low and would be similar to those risks under the other alternatives.

The ability to reduce negative effects caused by feral swine to other wildlife species and their habitats, including T&E species, would be variable based upon the skills and abilities of the person implementing damage management actions under this alternative.

Alternative 2 – Feral Swine Damage Management by Wildlife Services through Technical Assistance Only

Under a technical assistance alternative, Wildlife Services would have no direct impact on non-target species, including T&E species. Methods recommended or provided through loaning of equipment could be employed by those persons requesting assistance. Recommendations would be based on Wildlife Services' Decision Model using information provided by the person requesting assistance or through site visits. Recommendations would include methods or techniques to minimize non-target impacts associated with the methods being recommended or loaned. Methods recommended could include non-lethal and lethal methods as deemed appropriate by Wildlife Services' Decision Model and as permitted by laws and regulations.

The potential impacts to non-targets under this alternative would be variable and based on several factors. If methods were employed, as recommended by Wildlife Services and cooperating agencies, the potential impacts to non-targets would likely be similar to the proposed action. If recommended methods and techniques were not followed or if other methods were employed that were not recommended, the potential impacts on non-target species, including T&E species would likely be higher compared to the proposed action.

The potential impacts of harassment and exclusion methods on non-target species would be similar to those described under the proposed action. Harassment and exclusion methods would be easily obtainable and simple to employ. Since identification of targets would occur when employing shooting as a method, the potential impacts to non-target species would likely be low under this alternative.

Those persons experiencing damage from feral swine could implement methods and techniques based on the recommendations of Wildlife Services. The potential for impacts would be based on the knowledge and skill of those persons implementing recommended methods. If those persons experiencing damage do not implement methods or techniques correctly, the potential impacts from providing only technical assistance could be greater than those potential impacts described in the proposed action. The incorrect implementation of methods or techniques recommended by Wildlife Services could lead to an increase in non-target take when compared to the non-target take that could occur by Wildlife Services under the proposed action alternative.

If requestors were provided technical assistance but do not implement any of the recommended actions and take no further action, the potential to take non-targets would be lower when compared to the proposed action. If those persons requesting assistance implement recommended methods appropriately and as instructed or demonstrated, the potential impacts to non-targets would be similar to the proposed action. If Wildlife Services made recommendations on the use of methods to alleviate damage but those methods were not implemented as recommended by Wildlife Services or if those methods recommended by Wildlife Services were used inappropriately, the potential for lethal take of non-targets would likely increase under a technical assistance only alternative. Therefore, the potential impacts to non-targets, including T&E species would be variable under a technical assistance only alternative.

If non-lethal methods recommended by Wildlife Services under this alternative were deemed ineffective by those persons requesting assistance, lethal methods could be employed by those persons experiencing damage. Those persons requesting assistance are those people likely to use lethal methods since a damage threshold has been met for that individual requestor that has triggered seeking assistance to reduce damage. The potential impacts on non-targets by those persons experiencing damage would be highly variable. People whose feral swine damage problems were not effectively resolved by non-lethal control methods would likely resort to other means of legal or illegal lethal control. This could result in less experienced persons implementing control methods and could lead to greater take of non-target wildlife than the proposed action. When those persons experiencing damage caused by wildlife reach a level where assistance does not adequately reduce damage or where no assistance is available, people have resorted to using chemical toxicants that are illegal for use on the intended target species. The illegal use of methods often results in loss of both target and non-target wildlife (White et al. 1989, USFWS 2001, Food and Drug Administration 2003). The use of illegal toxicants by those persons frustrated with the lack of assistance or assistance that inadequately reduces damage to an acceptable level can often result in the indiscriminate take of wildlife species.

The ability to reduce negative effects caused by feral swine to wildlife species and their habitats, including T&E species, would be variable under this alternative. The ability to reduce risks would be based upon the skills and abilities of the person implementing damage management actions. It would be expected that this alternative would have a greater chance of reducing damage than Alternative 1 since Wildlife Services would be available to provide information and advice on appropriately employing methods and reducing the risk of non-target take.

<u>Alternative 3 - Continuing the Current Integrated Approach to Managing Feral Swine Damage (Proposed Action/No Action)</u>

Potential Adverse Effects on Non-target Species

The potential for adverse effects to non-targets occurs from the employment of methods to address feral swine damage in New York. Under the proposed action, Wildlife Services could provide both technical assistance and direct operational assistance to those persons requesting assistance. The risks to non-targets from the use of non-lethal methods as part of an integrated direct operational assistance program would be similar to those risks to non-targets discussed in the other alternatives.

Personnel from Wildlife Services' would be experienced with managing wildlife damage and would be trained in the employment of methods, which would allow Wildlife Services' employees to use the Wildlife Service Decision Model to select the most appropriate methods for taking targeted animals and excluding non-target species. To reduce the likelihood of capturing non-target wildlife, Wildlife Services would employ the most selective methods for the target species, would employ the use of attractants that are as specific to target species as possible, and determine placement of methods to avoid exposure to non-targets. SOPs to prevent and reduce any potential adverse impacts on non-targets are discussed in Section 3.4 and Section 3.5 of this EA. Despite the best efforts to minimize non-target exposure to methods during program

activities, the potential for Wildlife Services to disperse or lethally take non-target exists when applying both non-lethal and lethal methods to manage damage or reduce threats to safety.

Non-lethal Methods

Non-lethal methods have the potential to cause adverse effects to non-targets primarily through exclusion, harassment, and dispersal. Any exclusionary device erected to prevent access of target species also potentially excludes species that were not the primary reason the exclusion was erected; therefore, non-target species excluded from areas may potentially be adversely affected if the area excluded was large enough. The use of auditory and visual dispersal methods used to reduce damage or threats caused by feral swine would also likely disperse non-targets in the immediate area the methods were employed. Therefore, non-targets may be permanently dispersed from an area while employing non-lethal dispersal techniques. However, like target species, Wildlife Services expects the potential affects to non-target species would be temporary with target and non-target species often returning after the cessation of dispersal methods.

Live traps (*e.g.*, cage traps, walk-in traps, corral traps) would restrain wildlife once captured. Live traps have the potential to capture non-target species. Trap placement in areas where target species were active and the use of target-specific attractants would likely minimize capture of non-targets. If traps were attended to appropriately, any non-targets captured could be released on site unharmed.

Cable restraints restrain pigs with a 12 to 14 inch diameter loop that is securely attached, via the swivel to a firm object, or to a drag. They can be placed where an animal moves through a confined area (*e.g.*, crawl holes under fences, trails through vegetation). Deer stops allow the snare cable to close to a diameter of not less than 2 ½ inches and allow deer or other animals captured by the leg to escape. Cable restraints set for feral swine would likely be set with the top of the loop 15 to 20 inches above the ground. The loop would be low to the ground making it unlikely that Wildlife Services would catch a deer or bear in a cable restraint.

Foot snares are similar to cable restraints, but are intended to capture the target animal by the foot instead of around the neck. Like cable restraints, foot snares consist of a flexible wire hoop made from aircraft cable. Foot snares would be placed along the ground; loop pointed up, on active trails and/or bait sites. The smaller loop size prevents larger animals such as black bears from accidentally becoming caught. Non-target capture could be reduced through manipulation of the site (*e.g.*, brushing in the top of the trail, placing jump sticks), and by regularly checking snares.

Non-lethal methods that use auditory and visual stimuli to reduce or prevent damage are intended to elicit fright responses in wildlife. When employing those methods to disperse or harass target species, any non-targets near those methods when employed would also likely be dispersed from the area. Similarly, any exclusionary device constructed to prevent access by target species would also exclude access to non-target species. The persistent use of non-lethal methods would likely result in the dispersal or abandonment of those areas where non-lethal methods were employed of both target and non-target species. Therefore, any use of non-lethal methods would be similar to those results on both non-target and target species. Though non-lethal methods do

not result in lethal take of non-targets, the use of non-lethal methods can restrict or prevent access of non-targets to beneficial resources. However, non-lethal methods would not be employed over large geographical areas or applied at such intensity that essential resources (*e.g.*, food sources, habitat) would be unavailable for extended durations or over a wide geographical scope that long-term adverse effects would occur to a species' population. Non-lethal methods would generally be regarded as having minimal effects on overall populations of wildlife since individuals of those species were unharmed. Overall, potential impacts to non-targets from the use of non-lethal methods would not adversely affect populations since those methods are often temporary.

Potential impacts to non-targets from the use of non-lethal methods would be similar to the use of non-lethal methods under any of the alternatives. Non-targets would generally be unharmed from the use of non-lethal methods under any of the alternatives since no lethal take would occur. Non-lethal methods would be available under all the alternatives analyzed; however, the use of immobilizing drugs would be restricted to use by veterinarians. Wildlife Services' involvement in the use of or recommendation of non-lethal methods would ensure the potential impacts to non-targets were considered under Wildlife Services' Decision Model. Non-lethal methods would not be employed over large geographical areas or applied at such intensity that essential resources (*e.g.*, food sources, habitat) would be unavailable for extended durations or over a wide geographical scope that long-term adverse effects would occur to a species' population. Non-lethal methods would generally be regarded as having minimal impacts on overall populations of wildlife since individuals of those species are unharmed. Overall, potential impacts to non-targets from the use of non-lethal methods would not adversely affect populations since those methods would often be temporary and do not result in lethal take. Potential impacts to non-targets under this alternative from the use of and/or the recommendation of non-lethal methods would likely be low.

Lethal Methods

The use of firearms would essentially be selective for target species since animals would be identified prior to application; therefore, no adverse effects would be anticipated from use of this method. Similarly, the use of euthanasia methods would not result in non-target take since identification would occur prior to euthanizing an animal.

An issue that has arisen is the potential for low-level flights associated with using firearms from aircraft could potentially disturb wildlife, including T&E species. Aerial operations would be an important method of damage management in New York when used to address damage or threats associated with feral swine in remote areas where access is limited due to terrain and habitat. Aerial operations would only occur in those areas where a cooperative service agreement allowing the use of aircraft had been signed between Wildlife Services and the cooperating landowner or manager. Aerial operations would generally be conducted with helicopters between the months of December thru April when the foliage has fallen; however, aircraft could be used at any time of year. The amount of time spent conducting aerial operations varies depending on the severity of damage, the size of the area where damage or threats were occurring, and the weather, as low-level aerial activities would be restricted to visual flight rules and would be impractical in high winds or at times when animals were not easily visible.

Aircraft play an important role in the management of various wildlife species for many agencies. Resource management agencies rely on low flying aircraft to monitor the status of many animal populations including large mammals (Lancia et al. 2000), birds of prey (Fuller and Mosher 1987), waterfowl (Bellrose 1976), and colonial waterbirds (Speich 1986). Low-level flights are also required when aircraft are used to track animal movements by radio telemetry (Gilmer et al. 1981, Samuel and Fuller 1994).

A number of studies have looked at responses of various wildlife species to aircraft overflights. The United States Department of the Interior (1995) reviewed the effects of aircraft overflights on wildlife and suggested that adverse effects could occur to certain species. Some species will frequently or at least occasionally show an adverse response to even minor overflights. In general though, it appears that the more serious potential adverse effects occur when overflights are chronic (*i.e.*, they occur daily or more often over long periods). Chronic exposures generally involve areas near commercial airports and military flight training facilities. Aerial operations conducted by Wildlife Services rarely occur in the same areas on a daily basis and little time is actually spent flying over those particular areas.

The effects on wildlife from military-type aircraft have been studied extensively (Air National Guard 1997*a*, Air National Guard 1997*b*), and were found to have no expected adverse effects on wildlife. Examples of species or species groups that have been studied with regard to the issue of aircraft-generated disturbance are as follows:

<u>Waterbirds and Waterfowl</u>**:** Low-level overflights of two to three minutes in duration by a fixed-wing airplane and a helicopter produced no "*drastic*" disturbance of tree-nesting colonial waterbirds, and, in 90% of the observations, the individual birds either showed no reaction or merely looked up (Kushlan 1979). Belanger and Bedard (1989, 1990) observed responses of Greater Snow Geese (*Chen caerulescens atlantica*) to man-induced disturbance on a sanctuary area and estimated the energetic cost of such disturbance. Belanger and Bedard (1989, 1990) observed that disturbance rates exceeding two per hour reduced goose use of the sanctuary by 50% the following day. They also observed that about 40% of the disturbances caused interruptions in feeding that would require an estimated 32% increase in nighttime feeding to compensate for the energy lost. They concluded that overflights of sanctuary areas should be strictly regulated to avoid adverse effects. Conomy et al. (1998) quantified behavioral responses of wintering American Black Ducks (*Anas rubripes*), American Wigeon (*A. americana*), gadwall (*A. strepera*), and American Green-winged Teal (*A. crecca carolinensis*) exposed to low-level military aircraft and found that only a small percentage (2%) of the birds reacted to the disturbance. They concluded that such disturbance was not adversely affecting the "*time-activity budgets*" of the species. Aerial operations conducted by Wildlife Services would not be conducted over federal, state, or other governmental property without the concurrence of the managing entity. Those flights, if requested, would be conducted to reduce threats and damages occurring to natural resources and should not result in impacts to bird species. Thus, there is little to no potential for any adverse effects on waterbirds and waterfowl.

<u>Raptors:</u> The Air National Guard (1997*a*) analyzed and summarized the effects of overflight studies conducted by numerous federal and state government agencies and private organizations.

Those studies determined that military aircraft noise initially startled raptors, but negative responses were brief and did not have an observed effect on productivity (see Ellis 1981, Fraser et al. 1985, Lamp 1989, USFS 1992 as cited in Air National Guard 1997*a*). A study conducted on the impacts of overflights to Bald Eagles (*Haliaeetus leucocephalus*) suggested that the eagles were not sensitive to this type of disturbance (Fraser et al. 1985). During the study, observations were made of more than 850 overflights of active eagle nests. Only two eagles rose out of either their incubation or brooding postures. This study also showed that perched adults were flushed only 10% of the time during aircraft overflights. Evidence also suggests that Golden Eagles (*Aquila chrysaetos*) are not highly sensitive to noise or other aircraft disturbances (Ellis 1981, Holthuijzen et al. 1990). Finally, one other study found that eagles were particularly resistant to being flushed from their nests (see Awbrey and Bowles 1990 as cited in Air National Guard 1997*a*). Therefore, there is considerable evidence that eagles would not be adversely affected by overflights during aerial operations.

Mexican Spotted Owls (*Strix occidentalis lucida*) (Delaney et al. 1999) did not flush when chain saws and helicopters were greater than 110 yards away; owls flushed to these disturbances at closer distances and were more prone to flush from chain saws than helicopters. Owls returned to their pre-disturbance behavior 10 to 15 minutes following the event and researchers observed no differences in nest or nestling success (Delaney et al. 1999), which indicates that aircraft flights did not result in adverse effects on owl reproduction or survival.

Andersen et al. (1989) conducted low-level helicopter overflights directly at 35 Red-tailed Hawk (*Buteo jamaicensis*) nests and concluded their observations supported the hypothesis that Red-tailed Hawks habituate to low level flights during the nesting period; results showed similar nesting success between hawks subjected to overflights and those that were not. White and Thurow (1985) did not evaluate the effects of aircraft overflights, but found that Ferruginous Hawks (*B. regalis*) were sensitive to certain types of ground-based human disturbance to the point that reproductive success may be adversely affected. However, military jets that flew low over the study area during training exercises did not appear to bother the hawks, nor did the hawks become alarmed when the researchers flew within 100 feet in a small fixed-wing aircraft (White and Thurow 1985). White and Sherrod (1973) suggested that disturbance of raptors by aerial surveys with helicopters may be less than that caused by approaching nests on foot. Ellis (1981) reported that five species of hawks, two falcons (*Falco spp.*), and Golden Eagles (*Aquila chrysaetos*) were "*incredibly tolerant*" of overflights by military fighter jets, and observed that, although birds frequently exhibited alarm, negative responses were brief and the overflights never limited productivity.

Grubb et al. (2010) evaluated golden eagle response to civilian and military (Apache AH-64) helicopter flights in northern Utah. Study results indicated that golden eagles were not adversely affected when exposed to flights ranging from 100 to 800 meters along, towards, and from behind occupied cliff nests. Eagle courtship, nesting, and fledging were not adversely affected, indicating that no special management restrictions were required in the study location.

The above studies indicate raptors were relatively unaffected by aircraft overflights, including those by military aircraft that produce much higher noise levels. Therefore, we conclude that aerial operations would have little or no potential to adversely affect raptors.

Passerines: Reproductive losses have been reported in one study of small territorial passerines ("*perching*" birds that included sparrows, blackbirds) after exposure to low altitude overflights (see Manci et al. 1988 as cited in Air National Guard 1997*a*), but natural mortality rates of both adults and young are high and variable for most species. The research review indicated passerine birds cannot be driven any great distance from a favored food source by a non-specific disturbance, such as military aircraft noise, which indicated quieter noise would have even less effect. Passerines avoid intermittent or unpredictable sources of disturbance more than predictable ones, but return rapidly to feed or roost once the disturbance ceases (Gladwin et al. 1988, USFS 1992). Those studies and reviews indicated there was little or no potential for aerial operations to cause adverse effects on passerine bird species.

Pronghorn (antelope) and Mule Deer: Krausman et al. (2004) found that Sonoran pronghorn (*Antilocapra americana sonoriensis*) were not adversely affected by military fighter jet training flights and other military activity on an area of frequent and intensive military flight training operations. Krausman et al. (1986) reported that only three of 70 observed responses of mule deer (*Odocoileus hemionus*) to small fixed-wing aircraft overflights at 150 to 500 feet AGL resulted in the deer changing habitats. Krausman et al. (1986) believed that the deer might have been accustomed to overflights because the study area was near an interstate highway that was followed frequently by aircraft. Krausman et al. (2004) also reported that pronghorn and mule deer do not hear noise from military aircraft as well as humans, which potentially indicates why they appeared not to be disturbed as much as previously thought.

Mountain Sheep: Krausman and Hervert (1983) reported that, of 32 observations of the response of mountain sheep to low-level flights by small fixed-wing aircraft, 60% resulted in no disturbance, 81% in no or "*slight*" disturbance, and 19% in "*great*" disturbance. Krausman and Hervert (1983) concluded that flights less than 150 feet AGL could cause mountain sheep to leave an area. When Weisenberger et al. (1996) evaluated the effects of simulated low altitude jet aircraft noise on desert mule deer (*Odocoileus hemionus crooki*) and mountain sheep (*Ovis canadensis mexicana*), they found that heart rates of the ungulates increased according to the dB levels, with lower noise levels prompting lesser increases. When they were elevated, heart rates rapidly returned to pre-disturbance levels suggesting that the animals did not perceive the noise as a threat. Responses to the simulated noise levels were found to decrease with increased exposure.

Bison: Fancy (1982) reported that only two of 59 bison (*Bison bison*) groups showed any visible reaction to small fixed-winged aircraft flying at 200-500 feet AGL. The study suggests that bison were relatively tolerant of aircraft overflights.

Domestic Animals and Small Mammals: A number of studies with laboratory animals (*e.g.*, rodents [Borg 1979]) and domestic animals (*e.g.*, sheep [Ames and Arehart 1972]) have shown that these animals can become habituated to noise. Long-term lab studies of small mammals exposed intermittently to high levels of noise demonstrate no changes in longevity. The physiological "*fight or flight*" response, while marked, does not appear to have any long-term health consequences on small mammals (Air National Guard 1997*a*). Small mammals habituate, although with difficulty, to sound levels greater than 100 dbA (USFS 1992).

Conclusion of Aircraft Overflight Impacts to Birds and Mammals

Although many of those wildlife species discussed above are not present in New York, the information was provided to demonstrate the relative tolerance most wildlife species have of overflights, even those that involve noise at high decibels such as from military aircraft. In general, the greatest potential for impacts to occur would be expected to exist when overflights are frequent such as hourly and over many days that could represent "*chronic*" exposure. Chronic exposure situations generally involve areas near commercial airports and military flight training facilities. Even then, many wildlife species become habituated to overflights that appear to naturally minimize any potential adverse effects where such flights occur on a regular basis. Therefore, it is logical to conclude that the aircraft used in aerial hunting for feral swine should have far less potential to cause any disturbance to wildlife than military aircraft because the military aircraft produce much louder noise and are flown over certain training areas many more times per year, and yet were found to have no expected adverse effects on wildlife (Air National Guard 1997*a*, Air National Guard 1997*b*).

The fact that Wildlife Services would only conduct aerial hunting on a very small percentage of the land area of the State indicates that most wildlife would not be exposed to aerial gunning overflights in the State. Further lessening the potential for any adverse impacts is that such flights would occur infrequently throughout the year.

While every precaution would be taken to safeguard against taking non-targets during operational use of methods and techniques for resolving damage and reducing threats caused by feral swine, the use of such methods could result in the incidental lethal take of unintended species. The unintentional take and capture of wildlife species during damage management activities conducted under the proposed action alternative would primarily be associated with the use of live-traps and cable restraints. Those occurrences would be infrequent and should not affect the overall populations of any species under the proposed action alternative. Wildlife Services' take of non-target species during activities to reduce damage or threats to human safety associated with feral swine in New York would be extremely low to non-existent.

No non-targets have been taken by Wildlife Services during prior feral swine damage management activities in the State. As discussed previously, the use of non-lethal methods to address damage or threats would generally be regarded as having no effect on a species' population since those individuals addressed using non-lethal methods would be unharmed and no actual reduction in the number of individuals in a species' population occurs. Similarly, the live-capture and release of non-targets would generally be regarded as having no adverse effects on a species' population since those individuals would be released unharmed and no actual reduction in the number of individuals in a population occurs. Therefore, the live-capture and subsequent releasing of non-targets during damage management activities conducted under the proposed action alternative would not result in declines in the number of individuals in a species' population.

Wildlife Services would monitor the take of non-target species to ensure program activities or methodologies used in feral swine damage management would not adversely affect non-targets.

Methods available to resolve and prevent feral swine damage or threats when employed by trained, knowledgeable personnel would be selective for target species. The potential impacts to non-targets would be similar to the other alternatives and would be considered minimal to non-existent.

T&E Species Effects

Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. SOPs to avoid T&E species effects are described in section 3.5 of this EA.

Federally Listed Species - The current list of species designated as threatened and endangered in New York, as determined by the USFWS and the National Marine Fisheries Services, was obtained and reviewed during the development of this EA. Appendix C contains the list of species currently listed in the State along with common and scientific names.

During the development of this EA, consultation with the USFWS pursuant to Section 7 of the ESA was undertaken by WS. The USFWS indicated no further coordination or consultation was necessary for activities that result in a no effect determination in Bronx, Cortland, Erie, Herkimer, Kings, Montgomery, Richmond, Jefferson, St. Lawrence, and New York Counties based on the absence of any federally listed species, under the jurisdiction of the USFWS, being present in those counties (D. Stilwell, USFWS, personal communication, 2012). For all other counties, the USFWS recommended that Wildlife Services review the county list of T&E species for each project, including the locations that listed species are known to occur, habitat characteristics, feral swine management methods, and conservation measures to avoid or minimize impacts to those species (D. Stilwell, USFWS, personal communication, 2012).

The New England Field Office of the USFWS has developed a website[9] that provides up-to-date species occurrence information and provides an outline for action agencies to assist in determining whether consultation for projects is needed under Section 7 of the ESA. WS would review the website and the online measures on a site-by-site basis to determine if any T&E species were located within the project area in order to conclude with a determination of effects. WS would also consult the New York Field Office of the USFWS as well as the website[10] created by the NYSDEC that shows the general areas where rare animal, plants, and natural communities have been documented by the New York Natural Heritage Program. If T&E species were not present in the project area, based on review of the website, WS would conclude the project would have "*no effect*" on T&E species. The no effect determination would be based on the absence of those species in the project area; therefore, no further consultation would occur with the USFWS as indicated by the website and pursuant to Section 7 of the ESA. If, after review of the procedures on the websites, WS determines T&E species may be present in a project area based on information provided on the website, WS would follow those procedures

[9]The New England Field Office website for endangered species consultation could be found at www.fws.gov/newengland/endangeredspec-consultation.htm during the development of this EA.

[10]Environmental Resource Mapper interactive mapping application for the location of rare plants, animals and significant natural communities found at www.dec.ny.gov/imsmaps/ERM/viewer.htm.

outlined on the website to conclude with a determination of effects and the need for further consultation pursuant to Section 7.

State Listed Species - Wildlife Services has consulted the List of Endangered, Threatened and Special Concern Fish and Wildlife Species in New York State. Wildlife Services has made the determination that the proposed activities may have some risk to state listed species; overall, the risk would be low and given the proposed protective measures, would not jeopardize state threatened and endangered species populations. The NYSDEC has concurred that for all actions delineated in Alternative 3 and Appendix B of this EA, Wildlife Services would not likely adversely affect State-listed species (D. Rosenblatt, NYSDEC, personal communication, 2012).

Beneficial Effects on Non-target Species

Invasive species that are introduced into naïve environments often exploit resources and often compete with native plant and wildlife species. Competition for resources between invasive and native species has been well documented (Pimentel et al. 2000, Kaller and Kelso 2006, Knee 2011). Of major concern with resource agencies are the impacts invasive species have on T&E species. Pimentel et al. (2000) estimated 400 of the 958 species listed as threatened and endangered in the United States at the time of publication were negatively impacted by invasive species, primarily from competition for resources and predation based on published reports by The Nature Conservancy (1996) and Wilcove et al. (1998). Worldwide nearly 80% of wildlife populations at risk of extinction are threatened or negatively impacted by invasive species (Pimentel et al. 2005). Thus, invasive species have been identified as the primary cause of endangerment of at least 40% of the species listed as threatened or endangered in the United States (Wilcove et al. 1998, Pimentel et al. 2000, Pimentel et al. 2005).

The adverse effects that feral swine could have on native flora and fauna are discussed in Section of 1.2 of this EA. Any reduction in the invasive feral swine populations in New York could be viewed as providing some benefit to native wildlife and habitats.

Under this alternative, Wildlife Services' would be allowed to integrate methods to achieve the most effective approach to resolve and prevent damage to native flora and fauna in New York. An integrated approach allows the greatest amount of flexibility in the use of methods to ensure employment of methods, either individually or in combination, achieves the desired level of damage or threat reduction.

Issue 3 - Effects of Damage Management Methods on Human Health and Safety

A common concern is the potential adverse effects methods available could have on human health and safety. The threats to human safety of methods available under the alternatives are evaluated below by each of the alternatives.

<u>Alternative 1 – No Feral Swine Damage Management Conducted by Wildlife Services</u>

Under the no involvement in damage management by Wildlife Services alternative, Wildlife Services would not be involved in any aspect of managing damage associated with feral swine,

including providing any technical assistance. Due to the lack of involvement in managing damage caused by feral swine, no impacts to human safety would occur directly from Wildlife Services. This alternative would not prevent those entities experiencing threats or damage from feral swine from conducting damage management activities in the absence of Wildlife Services' assistance. The direct burden of implementing permitted methods would be placed on those persons experiencing damage or require those persons to seek assistance from other entities.

Similar to the technical assistance only alternative, immobilizing drugs and euthanizing chemicals would not be available under this alternative to those persons experiencing damage or threats from feral swine. Since most methods available to resolve or prevent feral swine damage or threats would be available to anyone, the threats to human safety from the use of those methods would be similar between the alternatives. However, methods employed by those persons not experienced in the use of methods or by those persons that were not trained in their proper use, could increase threats to human safety. Overall, the methods available to the public, when applied correctly and appropriately, pose minimal risks to human safety.

Threats to human safety often occur due to interactions between people and feral swine where a concern arises from transmission of zoonotic diseases, from physical interactions that result in injuries, and/or from threats of aircraft striking feral swine. In the absence of an effective program to address human safety associated with feral swine, the risks associated with potential disease transmission and injuries would likely increase.

Under this alternative, no assistance by Wildlife Services would be provided to those persons experiencing damage or threats associated with feral swine in New York. In the absence of any assistance, those persons experiencing threats to human safety would be directly responsible for obtaining and employing the appropriate methods. Those persons employing methods could be at a higher risk of exposure to zoonotic diseases and injury since no guidance or recommendations would be made by Wildlife Services. Risks to human safety under this alternative would be greater than those risks in the other alternatives.

<u>Alternative 2 – Feral Swine Damage Management by Wildlife Services through Technical Assistance Only</u>

Under this alternative, Wildlife Services would be restricted to making recommendations of methods and the demonstration of methods only to resolve damage. Wildlife Services would only provide technical assistance to those persons requesting assistance with feral swine damage and threats. The implementation of methods would the sole responsibility of the requester. Although hazards to human safety from non-lethal methods exist, those methods would generally be regarded as safe when used by trained individuals who were experienced in their use. Risks to human safety associated with non-chemical methods such as resource management methods (*e.g.*, limited habitat modification), exclusion devices, frightening devices, and cage traps would be considered low based on their use profile for alleviating damage associated with wildlife. Although some risk of fire and bodily harm exists from the use of pyrotechnics and propane cannons, when used appropriately and in consideration of those risks, they can be used with a high degree of safety.

Under a technical assistance only alternative, the use of immobilizing drugs and euthanasia chemicals would not be available to the public. Immobilizing drugs used in capturing and handling wildlife could be administered under the direction and authority of state veterinary authorities, either directly or through procedures agreed upon between those authorities and other entities, such as the NYSDEC. Those persons capturing feral swine using live-traps or other live-capture methods would be responsible for euthanizing or handling live-captured captive animals. Since immobilizing and euthanizing drugs would be unavailable under this alternative, a gunshot would be the primary method of euthanasia recommended.

The recommendation of shooting with firearms as a method of direct lethal take could occur under this alternative. Safety issues do arise related to misusing firearms and the potential human hazards associated with firearms use when employed to reduce damage and threats. When used appropriately and with consideration for human safety, risks associated with firearms would be minimal. If firearms were employed inappropriately or without regard to human safety, serious injuries could occur. Under this alternative, recommendations of the use of firearms by Wildlife Services would include human safety considerations. Since the use of firearms to alleviate feral swine damage would be available under any of the alternatives and the use of firearms by those persons experiencing damage could occur whether Wildlife Services was consulted or contacted, the risks to human safety from the use of firearms would be similar among all the alternatives.

If non-chemical methods were employed according to recommendations and as demonstrated by Wildlife Services, the potential risks to human safety would be similar to the proposed action. If methods were employed without guidance from Wildlife Services or applied inappropriately, the risks to human safety could increase. The extent of the increased risk would be unknown and variable. Non-chemical methods inherently pose minimal risks to human safety given the design and the extent of the use of those methods. Since those non-chemical methods discussed in Appendix B would be similar across the alternatives, the risks to human safety under a technical assistance alternative would be similar to those discussed in the no involvement by Wildlife Services alternative and the proposed action.

If resource owners felt direct assistance was inadequate to resolve damage or threats to an appropriate level, the illegal use of chemicals could increase. The illegal use of chemicals to resolve wildlife damage does occur and often has impacts to other wildlife species besides the targeted species (White et al. 1989, USFWS 2001, FDA 2003). If only technical assistance was provided by WS, the extent of the illegal use of chemicals would be unknown but could increase if affected resources owners were unable to resolve damage or threats adequately with methods recommended by WS. An increase in the illegal use of chemicals could increase threats to human safety depending on the chemical used and the extent of the chemical use.

Threats to human safety under the technical assistance alternative could be resolved by those persons implementing methods recommended by Wildlife Services. The effectiveness in reducing threats would be based on the knowledge of the person to effectively implement the methods and knowledge of the behavior of the target species that would increase the likelihood of resolving the threat. The ability to resolve threats to human safety by those requesting

technical assistance would also be dependent upon the availability of methods and the effectiveness of those methods, and the ability of the requestor to acquire those methods.

Under this alternative, those persons requesting assistance would be responsible for implementing and using methods to resolve damage or threats which places the requestor at a high risk of exposure to disease and injury if not trained appropriately. The degree in which the risk is higher is unknown and is likely highly variable.

Alternative 3 - Continuing the Current Integrated Approach to Managing Feral Swine Damage (Proposed Action/No Action)

The cooperator requesting assistance would be made aware through a MOU, cooperative service agreement, or a similar document that those methods agreed upon could potentially be used on property owned or managed by the cooperator. Therefore, the cooperator would be made aware of the possible use of those methods on property they own or manage through the signing of a MOU, cooperative service agreement, or similar document, which would assist with identifying any risks to human safety associated with the use of those methods.

Under the proposed action, those methods discussed in Appendix B, could be integrated to resolve and prevent damage associated with feral swine in the State. Wildlife Services would use the Decision Model to determine the appropriate method or methods that would effectively resolve the request for assistance. Those methods would be continually evaluated for effectiveness and if necessary, additional methods could be employed. Non-lethal and lethal methods could be used under the proposed action. Wildlife Services would continue to provide technical assistance and/or direct operational assistance to those persons seeking assistance with managing damage or threats from feral swine. Risks to human safety from technical assistance conducted by Wildlife Services would be similar to those risks addressed under Alternative 2. The use of non-lethal methods as part of an integrated approach to managing damage that could be employed as part of direct operational assistance by Wildlife Services would be similar to those risks addressed in the other alternatives.

Lethal methods available under the proposed action would include the use of live-capture followed by euthanasia, cable restraints, and shooting. Those lethal methods available under the proposed action alternative would also be available under the other alternatives. None of the lethal methods available would be restricted to use by Wildlife Services only. Euthanasia chemicals would not be available to the public but those mammals live-captured could be killed using other methods.

Wildlife Services' employees who conduct activities to manage damage caused by feral swine would be knowledgeable in the use of methods, wildlife species responsible for causing damage or threats, and Wildlife Services' directives. That knowledge would be incorporated into the decision-making process inherent with the Wildlife Services' Decision Model that would be applied when addressing threats and damage caused by feral swine. When employing lethal methods, Wildlife Services' employees consider risks to human safety when employing those methods based on location and method. For example, risks to human safety from the use of methods would likely be lower in rural areas that are less densely populated. Consideration

would also be given to the location where damage management activities would be conducted based on property ownership. If locations where methods would be employed occur on private property in rural areas where access to the property is controlled and monitored, the risks to human safety from the use of methods is likely less. If damage management activities occur at parks or near other public use areas, then risks of the public encountering damage management methods and the corresponding risk to human safety increases. Activities would generally be conducted when human activity was minimal (*e.g.*, early mornings, at night) or in areas where human activities were minimal (*e.g.*, in areas closed to the public).

The use of live-capture traps and cable restraints has been identified as a potential issue. Live-capture traps available for feral swine would typically be walk-in style traps where feral swine enter but are unable to exit. Live-traps and cable restrains would typically be set in situations where human activity was minimal to ensure public safety. Those methods rarely cause serious injury and would only be triggered through direct activation of the device. Therefore, human safety concerns associated with live-traps and restraining cables used to capture wildlife, including feral swine, would require direct contact to cause bodily harm. Therefore, if left undisturbed, risks to human safety would be minimal. Signs warning of the use of those tools in the area would be posted for public view at access points to increase awareness that those devices were being used and to avoid the area, especially pet owners.

Safety issues related to the misuse of firearms and the potential human hazards associated with firearms use are issues identified when employed to reduce damage and threats. To help ensure safe use and awareness, Wildlife Services' employees who use firearms during official duties are required to attend an approved firearm safety-training course and to remain certified for firearm use must attend a safety-training course in accordance with Wildlife Services Directive 2.615. As a condition of employment, Wildlife Services' employees who carry and use firearms are subject to the Lautenberg Domestic Confiscation Law, which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence (18 USC § 922(g)(9)). A safety assessment based on site evaluations, coordination with cooperating and local agencies (if applicable), and consultation with cooperators would be conducted before firearms were deemed appropriate to alleviate or reduce damage and threats to human safety when conducting activities in the State. Wildlife Services would work closely with cooperators requesting assistance to ensure all safety issues were considered before firearms would be deemed appropriate for use. The use of all methods, including firearms, would be agreed upon with the cooperator to ensure the safe use of those methods.

The issue of using chemical methods as part of managing damage associated with wildlife relates to the potential for human exposure either through direct contact with the chemical or exposure to the chemical from wildlife that have been exposed. Under the alternatives identified, the use of chemical methods would include immobilizing drugs and euthanasia chemicals. Immobilization of live-captured feral swine would occur to minimize stress and the likelihood of injury to the individual captured and for the safety of personnel handling the swine. Immobilizing drugs would be administered according to recommended methods and doses from published sources. Under this alternative, immobilizing drugs and euthanasia chemicals would be used infrequently. Immobilizing drugs would be limited to those requests where swine would be sedated to fit radio collars and/or to collected samples and then released. The use of

immobilizing drugs would also be limited to those instances where euthanasia would occur from the use of euthanasia drugs. When euthanasia drugs were administered, immobilizing drugs would also be administered prior to the use of the euthanizing chemicals.

The use of immobilizing drugs would only be administered to feral swine that have been live-captured using other methods or administered through injection using a projectile (*e.g.*, dart gun). Immobilizing drugs used to sedate wildlife would be used to temporarily handle and transport animals to lessen the distress of the animal from the experience. Drug delivery to immobilize feral swine would be likely to occur on site with close monitoring of the animal to ensure proper care of the animal. Immobilizing drugs would be fully reversible with a full recovery of sedated animals occurring. A list and description of immobilizing drugs available for use under the identified alternatives can be found in Appendix B.

Euthanasia chemicals would be administered under similar circumstances to immobilizing drugs. Euthanasia chemicals would be administered to animals live-captured using other methods. Euthanized animals would be disposed of in accordance with Wildlife Services Directives; therefore, would not be available for harvest and consumption. If feral swine were immobilized for sampling or to be fitted with a radio collar and released, risks could occur to human safety if harvest and consumption occurred. SOPs employed by Wildlife Services to reduce risks are discussed in Chapter 3 and in Appendix B.

Drugs used in capturing, handling, and euthanizing wildlife include ketamine, a mixture of ketamine/xylazine, sodium pentobarbital, potassium chloride, and Beuthanasia-D. Meeting the requirements of the AMDUCA should prevent any adverse effects on human health with regard to this issue (see Section 1.6). SOPs that would be part of the activities conducted would include:

- All drugs used in capturing and handling wildlife would be under the direction and authority of state veterinary authorities, either directly or through procedures agreed upon between those authorities and Wildlife Services.
- As determined on a state-level basis by those veterinary authorities (as allowed by AMDUCA), wildlife hazard management programs may choose to avoid capture and handling activities that utilize immobilizing drugs within a specified number of days prior to the hunting or trapping season for the target species to avoid release of animals that may be consumed by hunters prior to the end of established withdrawal periods for the particular drugs used. Ear tagging or other marking of animals drugged and released to alert hunters that they should contact state officials before consuming the animal.

By following those procedures in accordance with the AMDUCA, wildlife management programs would avoid any adverse effects on human health with regard to this issue.

All Wildlife Services' personnel who handle and administer chemical methods would be properly trained in the use of those methods. Training and adherence to agency directives (see Wildlife Services Directive 2.430) would ensure the safety of employees applying chemical methods. Feral swine euthanized by Wildlife Services or taken using chemical methods would be disposed of in accordance with Wildlife Services Directive 2.515. All euthanasia would occur

in the absence of the public, whenever possible, which would minimize risks. SOPs are further described in Chapter 3 of this EA.

Consequences of Aerial Wildlife Operations Accidents

Aerial wildlife operations, like any other flying, may result in an accident. Wildlife Services' pilots and crewmembers would be trained and experienced to recognize the circumstances that lead to accidents and have thousands of hours of flight time. The national Wildlife Services Aviation Program has increased its emphasis on safety, including funding for additional training, the establishment of a Wildlife Services Flight Training Center and annual recurring training for all pilots. Still, accidents may occur and the environmental consequences should be evaluated.

Major Ground or Wild/Forest Fires: Although fires could result from aircraft-related accidents, no such fires have occurred from aircraft incidents previously involving government aircraft and low level flights.

Fuel Spills and Environmental Hazard from Aviation Accidents: A representative of the National Transportation Safety Board (NTSB) has stated previously that aviation fuel is extremely volatile and will evaporate within a few hours or less to the point that even its odor cannot be detected (USDA 2005). Helicopters used for aerial wildlife operations carry less fuel than fixed-wing aircraft with 30 gallons the maximum for most helicopters. In some cases, little or none of the fuel would be spilled if an accident occurs. Thus, there should be little environmental hazard from un-ignited fuel spills.

Oil and Other Fluid Spills: With the size of aircraft used by Wildlife Services, the quantities of oil (*e.g.*, 3 to 5 quarts in helicopters) capable of being spilled in any accident would be small and insignificant with respect to the potential for environmental damage. The greatest potential amount of oil that could be spilled in one accident would be about eight quarts.

Petroleum products biodegrade through volatilization and bacterial action, particularly when exposed to oxygen (EPA 2000). Thus, small quantity oil spills on surface soils can be expected to biodegrade readily. Even in subsurface contamination situations involving underground storage facilities that would generally be expected to involve larger quantities than would ever be involved in a small aircraft accident, EPA guidelines provide for "*natural attenuation*" or volatilization and biodegradation in some situations to mitigate environmental hazards (EPA 2000). Thus, even where oil spills in small aircraft accidents were not cleaned up, the oil does not persist in the environment or persists in such small quantities that no adverse effects would be expected. In addition, Wildlife Services' accidents generally would occur in remote areas away from human habitation and drinking water supplies. Thus, the risk to drinking water appears to be exceedingly low to nonexistent.

For these reasons, the risk of ground fires or fuel/oil pollution from aviation accidents could be considered low. In addition, based on the history and experience of the program in aircraft accidents, it appears the risk of significant environmental damage from such accidents is exceedingly low.

Issue 4 - Effects on the Aesthetic Values of Feral Swine

Another concern often raised is the potential impact the proposed action will have on the aesthetic value that people often regard for wildlife. The effects of the alternatives on this issue are analyzed below by alternative.

Alternative 1 – No Feral Swine Damage Management Conducted by Wildlife Services

Under the no feral swine damage management alternative, the actions of Wildlife Services would have no impact on the aesthetic value of feral swine in New York. Those persons experiencing damage or threats from feral swine would be responsible for researching, obtaining, and using all methods as permitted by the federal, state, and local regulations. The degree to which damage management activities would occur in the absence of assistance by any agency is unknown but likely lower compared to damage management activities that would occur where some level of assistance was provided. Feral swine could still be removed under this alternative by those experiencing damages or threats of damages. The potential impacts on the aesthetic values of feral swine could be similar to the proposed action if similar levels of damage management activities are conducted by those persons experiencing damage or threats. If no action is taken or if activities are not permitted by the NYSDEC, then no impact on the aesthetic value of feral swine would occur under this alternative.

Alternative 2 – Feral Swine Damage Management by Wildlife Services through Technical Assistance Only

Under this alternative, the effects on the aesthetic values of feral swine would be similar to those addressed in the proposed action. Those persons requesting assistance have often reached a damage-level that has exceeded the threshold of that individual and therefore, the social acceptance level of feral swine has reached a level where assistance is required. Based on recommendations, methods are likely to be employed by the requestor based on those recommendations that will result in the removal of those individuals of a feral swine population responsible for damage or threatening safety.

The impacts on aesthetics from a technical assistance program would only be lower than the proposed action if those individuals experiencing damage are not as diligent in employing those methods as Wildlife Services would be if conducting an operational program. If those persons experiencing damage abandoned the use of those methods, feral swine would likely remain in the area and available for viewing and enjoying for those interested in doing so.

Alternative 3 - Continuing the Current Integrated Approach to Managing Feral Swine Damage (Proposed Action/No Action)

Under the proposed action, methods would be employed that would result in the exclusion or removal of individuals or small groups of feral swine to resolve damage and threats associated with target species. In some instances where feral swine are excluded or removed, the ability of interested persons to observe and enjoy those feral swine will likely decline.

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

The use of lethal methods would result in declines in local populations from the removal of feral swine to address or prevent damage and threats. The goal of NYSDEC is to eradicate feral swine from New York. Wildlife Services responds to requests for assistance and manages feral swine responsible for damaging natural resources, agriculture, or human safety. The ability to view and enjoy feral swine will remain if interested persons visit an enclosed shooting facility or pig sanctuary.

Executive Order 13112 directs federal agencies whose actions may affect the status of invasive species to reduce invasion of those species and the associated damages to the extent practicable and permitted by law. All activities are conducted where a request for assistance has been received and only after agreement for such services has been agreed upon by the cooperator. Some loss of aesthetic value would be gained by the removal of an invasive species and the return of a more natural environment, including the return of native wildlife and plant species that may be suppressed or displaced by the presence of invasive feral swine.

Issue 5 - Humaneness and Animal Welfare Concerns of Methods

As discussed previously, a common issue often raised is concerns about the humaneness of methods available under the alternatives for resolving feral swine damage and threats. The issues of method humaneness relating to the alternatives are discussed below.

Alternative 1 – No Feral Swine Damage Management Conducted by Wildlife Services

Under this alternative, Wildlife Services would not be involved in any aspect of feral swine damage management in New York. Those persons experiencing damage or threats associated with feral swine could continue to use those methods legally available and permitted by the NYSDEC. Those methods would likely be considered inhumane by those persons who would consider methods proposed under any alternative as inhumane. The issue of humaneness would likely be directly linked to the methods legally available to the public since methods are often labeled as inhumane by segments of society no matter the entity employing those methods.

The humaneness of methods would be based on the skill and knowledge of the person employing those methods. A lack of understanding of the target species or methods used could lead to an increase in situations perceived as being inhumane to wildlife despite the method used. Despite the lack of involvement by Wildlife Services under this alternative, those methods perceived as inhumane by certain individuals and groups would still be available to the public to use to resolve damage and threats caused by feral swine. Under Alternative 1, those persons employing methods would determine the methods used to euthanize or kill feral swine.

Alternative 2 – Feral Swine Damage Management by Wildlife Services through Technical Assistance Only

The issues of humaneness of methods under this alternative would be similar to humaneness issues discussed under of the proposed action, since Wildlife Services could recommend methods that some persons may consider inhumane. Wildlife Services would not be directly involved with damage management activities under this alternative. However, the recommendation of the use of methods would likely result in the requester employing those methods. Therefore, by recommending methods and thus a requester employing those methods, the issue of humaneness would be similar to the proposed action. Under Alternative 2, Wildlife Services would recommend the use of euthanasia methods pursuant to Wildlife Services Directive 2.505. However, the person requesting assistance would determine what methods to use to euthanize or kill a live-captured animal under Alternative 2.

Wildlife Services would instruct and demonstrate the proper use and placement of methodologies to increase effectiveness in capturing feral swine and to ensure methods were used in such a way as to minimize pain and suffering. However, the efficacy of methods employed by a cooperator would be based on the skill and knowledge of the requestor in resolving the threat to safety or damage situation despite the demonstration of proper placement and use by Wildlife Services. Therefore, a lack of understanding of the behavior of feral swine or improperly identifying the damage caused by feral swine along with inadequate knowledge and skill in using methodologies to resolve the damage or threat could lead to incidents with a greater probability of being perceived as inhumane. In those situations, the pain and suffering would likely be regarded as greater than those discussed in the proposed action alternative.

Those persons requesting assistance would be directly responsible for the use and placement of methods. If monitoring or checking of those methods did not occur in a timely manner, captured wildlife could suffer and/or experience distress. The amount of time an animal was restrained under the proposed action would be shorter compared to a technical assistance alternative if those requesters implementing methods were not as diligent or timely in checking methods.

Alternative 3 - Continuing the Current Integrated Approach to Managing Feral Swine Damage (Proposed Action/No Action)

Under the proposed action, Wildlife Services would integrate methods using Wildlife Services' Decision Model as part of technical assistance and direct operational assistance. Methods available under the proposed action could include non-lethal and lethal methods integrated into direct operational assistance conducted by Wildlife Services. Under this alternative, non-lethal methods would be used by Wildlife Services, which were generally regarded as humane. Non-lethal methods would include resource management methods (*e.g.*, limited habitat modification), exclusion devices, frightening devices, cage traps, and immobilizing drugs.

As discussed previously, 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.

Some individuals believe any use of lethal methods to resolve damage associated with wildlife is inhumane because the resulting fate is the death of the animal. Others believe that certain lethal

methods can lead to a humane death. Others believe most non-lethal methods of capturing wildlife to be humane because the animal is generally unharmed and alive. Still others believe that any disruption in the behavior of wildlife is inhumane. With the multitude of attitudes on the meaning of humaneness and the varying perspectives on the most effective way to address damage and threats in a humane manner, agencies are 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 Wildlife Services would be to use methods as humanely as possible to resolve requests for assistance to reduce damage and threats to human safety. Wildlife Services would continue to evaluate methods and activities to minimize the pain and suffering of methods addressed 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 would generally be considered by most members of the public as "*humane*". Yet, without proper care, live-captured wildlife in a cage trap can be treated inhumanely if not attended to appropriately.

Therefore, the goal would be to effectively address requests for assistance using methods in the most humane way possible that minimizes the stress and pain to the animal. Overall, the use of resource management methods, harassment methods, and exclusion devices are regarded as humane when used appropriately. Although some concern arises from the use of live-capture methods, the stress of animals is likely temporary.

Although some issues of humaneness could occur from the use of live traps, foot snares, immobilizing drugs, those methods, when used appropriately and by trained personnel, would not result in the inhumane treatment of wildlife. Concerns from the use of those non-lethal methods would be from injuries to animals while those animals were restrained and from the stress of the animal while being restrained or during the application of the method. Pain and physical restraint can cause stress in animals and the inability of animals to effectively deal with those stressors can lead to distress. Suffering occurs when action is not taken to alleviate conditions that cause pain or distress in animals.

If feral swine were to be live-captured by Wildlife Services, capture devices would be checked frequently to ensure feral swine captured were addressed in a timely manner and to prevent injury. Although stress could occur from being restrained, timely attention to live-captured wildlife would alleviate suffering; therefore, stress would likely be temporary. When live-capture methods were employed, Wildlife Services would euthanize feral swine live-captured pursuant to Wildlife Services Directive 2.505.

Under the proposed action, lethal methods could also be employed to resolve requests for assistance to alleviate or prevent mammal damage and threats. Lethal methods would include shooting, cable restraints, euthanasia chemicals. In addition, target species live-captured using non-lethal methods could be euthanized by Wildlife Services. Wildlife Services' use of lethal control methods under the proposed action would follow those required by Wildlife Services' directives (see Wildlife Services Directive 2.505, Wildlife Services Directive 2.430).

Research and development by Wildlife Services' has improved the selectivity and humaneness of management techniques. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some methods were used in situations where non-lethal damage management methods are not practical or effective. Personnel from Wildlife Services and cooperating agencies would be experienced and professional in their use of management methods. Consequently, management methods would be implemented in the most humane manner possible. Many of those methods discussed in Appendix B to alleviate feral swine damage and/or threats in the State, could be used under any of the alternatives by those persons experiencing damage regardless of Wildlife Services' direct involvement. The only methods that would not be available to those persons experiencing damage associated with feral swine would be immobilizing drugs and euthanasia chemicals. Therefore, the issue of humanness associated with methods would be similar across any of the alternatives since those methods could be employed by other entities in the absence of Wildlife Services' involvement. Those persons who view a particular method as humane or inhumane would likely continue to view those methods as humane or inhumane under any of the alternatives. SOPs that would be incorporated into Wildlife Services' activities to ensure methods were used by Wildlife Services as humanely as possible are listed in Chapter 3.

4.2 CUMULATIVE IMPACTS BY ISSUE

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

Feral swine can have negative impacts to the environment (Campbell and Long 2009). They have been shown to compete with over 100 species of wildlife, impact forests, wetlands and water bodies, and depredate native species (Singer et al. 1982, Choquenot et al. 1996, Campbell and Long 2009, Mayer and Brisbin 2009). Rooting behavior in forests disrupts and loosens the soil, contributing to erosion and siltation of waterways; rooting in forest understory negatively effects herpetofauna and invertebrate communities, essentially removing their habitat (Knee 2011). They are considered by many wildlife biologists to be an undesirable component of North American wild and native ecosystems. Left unchecked, feral swine populations can double each year and will increase damage to the environment across the state.

Increases of damage to agriculture has occurred in states that have large populations of feral swine (Mayer and Brisbin 2009). Use of agricultural crops as a forage resource may make up 71% of the plant material consumed (Mayer and Brisbin 2009). Feral swine also damage pastures, land used for hay, and sod farms by their rooting and wallowing activities (Beach 1993). Most feral swine damage occurs through direct consumption, trampling, rooting, and wallowing (Beach 1993).

Any reduction in feral swine populations could be considered a providing some benefit to the natural environment. Executive Order 13112 directs Federal agencies to use their programs and

authorities to prevent the spread of or to control populations of invasive species that cause economic or environmental harm, or harm to human health.

Under Alternative 2 and Alternative 3, Wildlife Services would address damage associated with feral swine either by providing technical assistance only (Alternative 2) or by providing technical assistance and direct operational assistance (Alternative 3) in the State of New York. Wildlife Services would be the primary agency conducting feral swine damage management in the State under Alternative 2 and Alternative 3. However, other federal, state, and private entities could also be conducting feral swine damage management in New York. Take of feral swine also occurs during the regulated harvest seasons in the State.

Wildlife Services does not normally conduct direct damage management activities in the same area concurrently with other entities that are conducting feral swine damage management, but could conduct damage management activities at adjacent sites within the same period. Other federal, state, and private entities may also conduct damage management activities in the same area. The potential cumulative impacts analyzed below could occur because of Wildlife Services' damage management activities over time, or because of the aggregate effects of those activities. Through ongoing coordination and collaboration between Wildlife Services, and the NYSDEC, activities of each agency and the take of feral swine would be available. Feral swine damage management activities in New York would be monitored to evaluate and analyze activities to ensure those activities remained within the scope of analysis of this EA.

Issue 1 - Effects of Damage Management Activities on Feral Swine Populations

Evaluation of activities relative to target species indicated that program activities would likely have no cumulative adverse effects on feral swine populations in New York when targeting those feral swine responsible for damage. Wildlife Services' actions would be occurring simultaneously, over time, with other natural processes and human generated changes that are currently taking place. These activities include, but would not be limited to:

- Natural mortality of feral swine
- Mortality through vehicle strikes and aircraft strikes
- Human-induced mortality of feral swine through private damage management activities
- Human-induced mortality through state and federal management activities
- Human and naturally induced alterations of wildlife habitat
- Annual and perennial cycles in wildlife population densities

All those factors play a role in the dynamics of feral swine 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. The actions taken to minimize or eliminate damage would be constrained as to scope, duration, and intensity for the purpose of minimizing or avoiding impacts to the environment. Wildlife Services would use the Decision Model to evaluate damage occurring, including other affected elements and the dynamics of the damaging species; to determine 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). This

process allows Wildlife Services to take into consideration other influences in the environment, such as those listed above, in order to avoid cumulative adverse impacts on target species.

Issue 2 - Effects on Non-target Wildlife Species Populations, Including T&E Species

Potential effects on non-target species from conducting feral swine damage management arise from the use of non-lethal and lethal methods to alleviate or prevent those damages. The use of non-lethal methods during activities to reduce or prevent damage caused by feral swine has the potential to exclude, disperse, or capture non-target wildlife. However, the effects of non-lethal methods are often temporary and do not often involve the take (killing) of non-target wildlife species.

When using exclusion devices, both target and non-target wildlife can be prevented from accessing the resource being damaged. Since exclusion does not involve lethal take, cumulative impacts on non-target species from the use of exclusionary methods would not occur but would likely disperse those individuals to other areas. Exclusionary methods can often require constant maintenance to ensure effectiveness. Therefore, the use of exclusionary devices would be somewhat limited to small, high-value resources and not used to the extent that non-targets would be excluded from large areas that would cumulatively impact populations from the inability to access a resource, such as potential food sources.

The use of visual and auditory harassment and dispersion methods would generally be temporary with non-target species returning after the cessation of those activities. Dispersal and harassment do not involve the take (killing) of non-target species and similar to exclusionary methods would not be used to the extent or at a constant level that would prevent non-targets from accessing critical resources that would threaten survival of a population.

The use of lethal methods or those methods used to live-capture target species followed by euthanasia also have the potential to affect non-target wildlife through the take (killing) or capture of non-target species. Capture methods used would often be methods that were set to confine or restrain feral swine after being triggered. Capture methods would be employed in such a manner as to minimize the threat to non-target species by placement in those areas frequently used by target wildlife, using baits or lures that are as species specific as possible, and modification of individual methods to exclude non-targets from capture. Most methods described in Appendix B are methods that would be employed to confine or restrain feral swine that would be subsequently euthanized using humane methods. With all live-capture devices, non-target wildlife captured could be released on site if determined to be able to survive following release. SOPs are intended to ensure take of non-target wildlife is minimal during the use of methods to capture target wildlife.

The use of firearms, immobilizing drugs, and euthanasia methods would essentially be selective for target species since identification of an individual would be made prior to the application of the method. Firearms require the identification of the target before application, which essentially is selective with minimal risks to non-targets. Euthanasia methods would be applied through direct application to target feral swine. Therefore, the use of those methods would not affect non-target species.

To date there have been no non-target animals taken while performing feral swine management activities by Wildlife Services in the state of New York. Methods used or recommended by Wildlife Services' program in the State of New York would likely have no cumulative adverse effects on target and non-target wildlife populations. When methods and techniques were implemented by Wildlife Services, the potential lethal take of non-target wildlife species would be expected to be minimal to non-existent.

Issue 3 - Effects of Damage Management Methods on Human Health and Safety

Safety of Chemical Methods Employed

Chemical methods available for use under the proposed action are immobilizing drugs and euthanasia chemicals described in Appendix B. Immobilizing drugs are administered to target individuals using devices or methods that ensure the identification of the target animal. The immobilizing drugs discussed in Appendix B require injection of the drug directly into an animal. Injection would occur through hand injection through a syringe, by jabstick, or by a pneumatically propelled dart that mechanically injects the drug into the animal upon impact. Immobilizing drugs temporarily sedate an animal to minimize stress of handling and reduces the risks to human safety. Immobilized animals may also be euthanized using a euthanizing drug described in Appendix B. Euthanasia chemicals would only be administered after feral swine have been properly restrained and immobilized and would occur through direct injection through a syringe. Wildlife Services' personnel are required to attend training courses and be certified in the use of immobilizing drugs and euthanasia chemicals to ensure proper care and handling occurs, to ensure the proper dose is administered, and to ensure human safety.

Direct application of chemical methods to target species will ensure that there are no cumulative impacts to human safety. All chemical methods will be tracked and recorded to ensure proper accounting of used and unused chemicals occurs. All chemicals will be stored and transported according to FDA and DEA regulations, including the directives of Wildlife Services. The amount of chemicals used or stored by Wildlife Services and cooperating agencies will be minimal to ensure human safety. All feral swine euthanized by euthanasia drugs will be disposed of by deep burial or by incineration to ensure the safety of the public. Based on this information, the use of chemical methods as part of the proposed action by Wildlife Services and cooperating agencies will not have cumulative impacts on human safety.

Safety of Non-Chemical Methods Employed

All non-chemical methods described in Appendix B are used within a limited time frame, are not residual, and do not possess properties capable of inducing cumulative adverse impacts on human health and safety. All non-chemical methods would be used after careful consideration of the safety of those persons employing methods and to the public. All capture methods would be employed in areas where human activity was minimal and warnings signs were placed in conspicuous areas, when appropriate, to ensure the safety of the public. Capture methods also require direct contact to trigger ensuring that those methods, when left undisturbed will have no

effect on human safety. All methods would be agreed upon by the requesting entities, which would be made aware of the safety issues of those methods when entering into a MOU, cooperative service agreement, or other comparable document with Wildlife Services and cooperating agencies. SOPs would also ensure the safety of the public from those methods used to capture or take wildlife. Firearms used to alleviate or prevent damage, though hazards do exist, would be employed to ensure the safety of employees and the public. Based on the use of non-chemical methods, those methods would not cumulatively affect human safety.

Issue 4 - Effects on the Aesthetic Value of Feral Swine

The NYSDEC has management authority over wildlife species in the State. The overall objective of the NYSDEC is to eliminate current populations of feral swine in the State and to prevent the establishment of feral swine populations. The activities of Wildlife Services would result in the removal of feral swine from those areas where damage or threats are occurring. Therefore, the aesthetic value of feral swine removed in those areas where damage management activities are being conducted would be reduced. Feral swine are non-native species in New York, which can negatively affect the natural environment. For some people, the aesthetic value of a more natural environment would be gained by the removal of non-native species, including the return of native wildlife and plant species that may be suppressed or displaced by the presence of those non-native species.

Some people experience a decrease in aesthetic enjoyment of wildlife because they feel that overabundant species are objectionable and interfere with their enjoyment of wildlife in general, especially when those species are non-native to the natural environment. Continued increases in numbers of individuals or the continued presence of a non-native species may lead to further degradation of some people's enjoyment of any wildlife or the natural environment. The actions of Wildlife Services could positively affect the aesthetic enjoyment of wildlife for those people that are being adversely affected by the target species identified in this EA. Executive Order 13112 directs federal agencies whose actions may affect the status of invasive species to reduce invasion of those species and the associated damages to the extent practicable and permitted by law.

Issue 5 - Humaneness and Animal Welfare Concerns of Methods

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

As previously discussed in Chapter 2, the perception of humaneness and welfare varies among people. Generally, non-lethal methods involving habitat modification, harassment, and exclusion are considered humane methods since wildlife are displaced to other areas and are generally unharmed. Restraining methods that result in live-capture are often viewed as inhumane when wildlife are held for long periods of time that can often lead to pain, stress, and ultimately, distress of the animal. Restraining devices used for the capture of feral swine (*e.g.*, corral traps,

cage traps, and restraining cables) all require supervision of the methods, which allows for those feral swine captured to be addressed in a timely manner, which reduces the amount of time those individuals were held.

Trap monitoring devices will also be used, when appropriate, that indicate when traps have be triggered which will allow for traps in remote location to be monitored daily and any wildlife captured to be addressed quickly. By limiting the amount of time wildlife are held in restraining devices and by timely addressing those captured, pain, suffering, and distress can be minimized.

Immobilizing drugs would be used to sedate and anesthetize feral swine restrained inside a live-trap through injection either by hand, jabstick, or pneumatic dart gun. Applicators would be present on site during application, which ensures those swine were addressed in a timely manner. The effects of immobilizing drugs would be temporary with a full recovery occurring if the drug was allowed to be fully metabolized. If euthanasia occurs, feral swine captured would be euthanized while anesthetized, which renders the swine unconscious and unresponsive, which allows euthanasia to occur with no pain or suffering.

Humaneness and animal welfare concerns can also arise from the use of euthanasia methods. The guidelines for euthanasia provided by the AVMA lists barbiturates and potassium chloride in conjunction with general anesthesia as acceptable methods of euthanasia for swine (AVMA 2007). Euthanasia by gunshot is a conditionally acceptable form of euthanasia (AVMA 2007). Wildlife Services' personnel will be properly trained in the use of firearms as a euthanasia tool. Wildlife Services will utilize AVMA standards to the extent practical under field situations.

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

4.3 ADDITIONAL ANALYSES OF POTENTIAL CUMULATIVE IMPACTS

Irreversible and Irretrievable Commitments of Resources

Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Effects on Sites or Resources Protected under the National Historic Preservation Act

The actions of Wildlife Services are not undertakings that could adversely affect historic resources. New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP), State Historic Preservation Office (SHPO) has jurisdiction over cultural resources in New York. The SHPO reviewed the draft environmental assessment issued August 2012. After review of the EA, the SHPO determined that Wildlife Services would have "*No Effect upon cultural resources in or eligible for inclusion in the National Registers of Historic Places*" (J. A. Bonafide, NYSOPRHP, SHPO, personal communication, September 17, 2012).

4.4 SUMMARY OF CUMULATIVE IMPACTS

No significant cumulative environmental impacts are expected from any of the three alternatives, including the proposed action. Under the proposed action, the management of damage associated with feral swine in New York by integrating methods and techniques by Wildlife Services would not have significant impacts on the populations of feral swine. No risk to public safety is expected when activities are provided and accepted by requesting individuals in the technical assistance only alternative and the proposed action alternative since only trained and experienced personnel would conduct and recommend damage management activities. There is a slight increased risk to public safety when persons who reject assistance and recommendations in Alternative 1 and Alternative 2 and conduct their own activities. In all alternatives, however, it would not be to the point that the impacts would be significant. Although some persons will likely be opposed to feral swine damage management activities in the State, the analysis in this EA indicates that an integrated approach to the management of damage and threats caused by feral swine will not result in significant cumulative adverse impacts on the quality of the human environment.

CHAPTER 5: LIST OF PREPARERS, REVIEWERS, AND PERSONS CONSULTED

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APPENDIX A

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APPENDIX B
FERAL SWINE DAMAGE MANAGEMENT METHODS RECOMMENDED OR AUTHORIZED FOR USE BY THE NEW YORK WILDLIFE SERVICES PROGRAM

NONLETHAL METHODS

Resource Management

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

Habitat modification:

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

Livestock management:

Modifying or eliminating habitat utilized by feral swine may change feral swine behavior and reduce some feral swine-human conflicts. This could include reducing vegetative cover and forage crops used or preferred by feral swine.

Cultural practices:

Cultural methods include the application of practices which seek to minimize exposure of the protected resource to damaging animals through processes other than exclusion. They may include animal husbandry practices such as planting less susceptible crops. Strategies may also include minimizing cover where damaging wildlife might hide, manipulating the surrounding environment through barriers to deter animals from entering a protected area, or planting lure crops on fringes of protected crops.

Some feral swine which cause damage in urban environments are attracted to homes by the presence of garbage, pet food, or other food items left outside and unprotected. By removing potential food sources, feral swine can be discouraged from the area. Cultural methods would be available under all the alternatives discussed.

Physical Exclusion:

A fence can limit the entry of feral swine onto affected properties. There are several types of fences that inhibit the movement of feral swine if properly installed, including woven wire and chain link fencing. For the purpose of this EA, Wildlife Services recommends a fence constructed of heavy wire and posts.

Behavior Modification:

This refers to tactics that alter the behavior of wildlife to reduce damage. Effective behavior modification usually requires integrating two or more auditory scaring or visual scaring techniques. Currently no frightening methods are effective

LETHAL METHODS

Sharp shooting

Wildlife Services would conduct sharp shooting, with center-fire rifles, during daylight or at night using spotlights or thermal/IR night-vision equipment. Rifles may be equipped with noise suppressors, to avoid disturbance, and to facilitate success by minimizing the tendency of feral swine to flee from the sound of gunfire. Shots would be taken from elevated positions in tree stands, in the beds of trucks, or other vantage points. Elevated positions cause a downward angle of trajectory, so that any bullets that inadvertently miss or pass through targeted feral swine, will hit into the ground or into earthen embankments to minimize the risk of stray bullets presenting a safety hazard to people, pets, or property. Wildlife Services personnel would strive for head and neck shots when shooting feral swine to achieve quick, humane kills. Bait may be used to attract feral swine to safe sites for shooting and to enhance success and efficiency. All feral swine carcasses would be disposed of in accordance with applicable local, state and federal laws and regulations.

Only Wildlife Services personnel, who have completed firearms safety training, have demonstrated skill and proficiency with the firearms used for feral swine removal, and have been approved for sharp shooting by the State Director in New York will participate in sharp shooting feral swine.

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

Live Capture and Euthanasia

Some situations restrict or do not warrant standard shooting operations. In such cases it may be appropriate to remove individual feral swine by trapping and euthanizing the animals. Box traps and corral traps can be used to live capture feral swine. Feral swine that are live captured would subsequently be dispatched using a handgun, rifle, or euthanasia drug. Because New York is home to black bear, traps that will be located in areas of bear populations will be open at the top to allow any non-target capture of black bears to escape. Additionally, these traps will be monitored daily to ensure the well-being of any bears captured.

Cable Restraints

Cable Restraints are an integral tool when managing feral swine damage. A restraint consists of a flexible wire cable loop, a sliding lock device, and a heavy swivel. The cable should be either 3/32 or 1/8 inch in diameter and up to 48 inches long. Cable restraints restrain pigs with a 12 to 14 inch diameter loop that is securely attached, via the swivel to a firm object, or to a drag. The snare loop should be suspended above the ground with wire clips or small gauge metal wire. They can be placed where an animal moves through a confined area (*e.g.*, crawl holes under fences, trails through vegetation, etc.). Deer stops allow the snare cable to close to a diameter of not less than 2 ½ inches and allow deer or other animals captured by the leg to escape. Another method is to place "jump-sticks" made of larger limbs directly over the snare set. Deer will see this stick, and jump over the obstacle instead of ducking underneath into the snare. Wildlife Services in New York conducts feral swine damage management activities in habitats that are used by black bear. In order to prevent the accidental catch of black bears, snares will be used sparingly in habitats that are known to harbor this species. Additionally, in areas that can potentially harbor black bear, Wildlife Services personnel will perform a thorough search for evidence of bears (tracks, scat, etc.) prior to setting snares for feral swine management.

Foot snares

Foot snares are similar to cable restraints except that they are intended to capture the target animal by the hoof instead of around the neck. Similar to cable restraints, a foot snare consists of a flexible wire hoop made from aircraft cable. Foot snares are placed along the ground; loop pointed up, on active trails. The smaller loop size prevents larger animals such as black bears from accidentally becoming caught.

Radio telemetry

This technique involves attaching a radio-collar to a feral pig (preferably an adult female) and releasing it with the expectation that it will join up with other pigs. Once the group position is established, the feral pigs associated with the "Judas" pig are removed by either trapping or shooting. The collared pig is allowed to escape, to join up with another sounder, and the process is repeated. This technique is target specific and has minimal impact on other species. Prior to its release, the pig will be sterilized to prevent propagation of the local swine population and to minimize increased impact on the environment.

Bay dogs

Dogs that are specifically trained to track, find, and bay feral swine would be used to remove problem animals. This technique would be used after trapping and shooting operations have removed a majority of a local swine population; however, a small remnant is still causing damage or posing a human and health safety risk. Once the pig is bayed, it would be euthanized by gunshot.

Immobilizing and Euthanizing Drugs

It is also possible to live capture feral swine using chemical immobilization drugs. The following are drugs that could be used to immobilize and euthanize feral swine:

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

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

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

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

Aerial Shooting

Aerial shooting or aerial hunting (shooting from an aircraft) is a commonly used FSDM method. Aerial hunting is species specific and can be used for immediate control to reduce livestock and natural resource losses if weather, terrain, and cover conditions are favorable. Fixed-wing aircraft are most frequently used in flat and gently rolling terrain whereas helicopters, with better maneuverability, have greater utility and are safer over rugged terrain and timbered areas. In broken timber or deciduous cover, aerial hunting is more effective in winter when snow cover improves visibility and leaves have fallen. The Wildlife Services program aircraft-use policy helps ensure that aerial hunting is conducted in a safe and environmentally sound manner, in accordance with Federal and State laws. Pilots and aircraft must be certified under established Wildlife Services program procedures and only properly trained Wildlife Services employees are approved as gunners.

Aircraft overflights have created concerns of disturbing wildlife. A number of studies have looked at responses of various wildlife species to aircraft overflights. The National Park Service reviewed studies on the effects of aircraft overflights on wildlife. The report revealed that a number of studies have documented responses by certain wildlife species that suggest adverse impacts could occur. Few, if any studies, have proven that aircraft overflights cause significant adverse impacts on wildlife populations, although the report stated it is possible to draw the conclusion that impacts to populations are occurring.

It appears that some species will frequently or, at least occasionally, show adverse responses to even minor overflight occurrences. In general, it appears that the more serious potential impacts occur when overflights are frequent such as hourly and over long periods of time which represents “chronic exposure.” Chronic exposure situations generally involve areas near commercial airports and military flight training facilities. Wildlife Services aerial hunting operations occur in relatively remote areas with little time spent over any one area.

Wildlife Services has actively used fixed-wing aircraft and helicopters for aerial hunting in areas inhabited by wildlife for years. The fixed-wing aircraft used by Wildlife Services are relatively quiet whereas the helicopter is somewhat noisier. Wildlife Services conducts aerial WDM activities on areas only under cooperator agreement. Wildlife Services Predator EAs from other states where aerial hunting is used frequently have looked at the issue of aerial hunting overflights on wildlife and have found that Wildlife Services has annually flown less than 10 min./square mile on properties under agreement. Thus, wildlife would be disturbed minimally and chronic exposure situations would not occur. As a result, no known problems to date have occurred with Wildlife Services aerial hunting overflights on wildlife nor are they anticipated in the future.

APPENDIX C

THREATENED AND ENDANGERED SPECIES IN NEW YORK

FEDERALLY-LISTED SPECIES

LISTINGS AND OCCURRENCES FOR NEW YORK

ALBANY		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle *(Historic)*	*Clemmys [=Glyptemys] muhlenbergii*	T
Indiana bat (W/S)[3]	*Myotis sodalis*	E
Karner blue butterfly	*Lycaeides melissa samuelis*	E
ALLEGANY		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
BRONX[2]		
BROOME		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
CATTARAUGUS		
Bald eagle	*Haliaeetus leucocephalus*	D
Clubshell	*Pleurobema clava*	E
Rayed bean	*Villosa fabalis*	E
CAYUGA		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Indiana bat (S)	*Myotis sodalis*	E
CHAUTAUQUA		
Bald eagle	*Haliaeetus leucocephalus*	D
Clubshell	*Pleurobema clava*	E
Rayed bean	*Villosa fabalis*	E
CHEMUNG		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
CHENANGO		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
CLINTON		

Bald eagle	*Haliaeetus leucocephalus*	D
Indiana bat (S)	*Myotis sodalis*	E
COLUMBIA		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Indiana bat (S)	*Myotis sodalis*	E
New England cottontail	*Sylvilagus transitionalis*	C
CORTLAND		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
DELAWARE		
Bald eagle	*Haliaeetus leucocephalus*	D
Dwarf wedgemussel	*Alasmidonta heterodon*	E
Northern monkshood	*Aconitum noveboracense*	T
DUTCHESS		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Dwarf wedgemussel (Housatonic River Drainage)	*Alasmidonta heterodon*	E
Indiana bat (S)	*Myotis sodalis*	E
New England cottontail	*Sylvilagus transitionalis*	C
ERIE		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
ESSEX		
Indiana bat (W/S)	*Myotis sodalis*	E
FRANKLIN		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
FULTON		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
GENESEE		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle *(Historic)*	*Clemmys [=Glyptemys] muhlenbergii*	T
Eastern massasauga	*Sistrurus catenatus catenatus*	C
Eastern prairie fringed orchid *(Historic)*	*Platanthera leucophaea*	T
Houghton's goldenrod	*Solidago houghtonii*	T

GREENE		
Bald eagle	*Haliaeetus leucocephalus*	D
Indiana bat (S)	*Myotis sodalis*	E
HAMILTON		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
HERKIMER[2]		
JEFFERSON		
Bald eagle	*Haliaeetus leucocephalus*	D
Indiana bat (W/S)	*Myotis sodalis*	E
Piping plover {Designated Critical Habitat}	*Charadrius melodus*	E
KINGS[2]		
LEWIS		
Indiana bat (S)	*Myotis sodalis*	E
LIVINGSTON		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
MADISON		
American hart's-tongue fern	*Asplenium scolopendrium* var. *americana*	T
Chittenango ovate amber snail	*Novisuccinea chittenangoensis*	T
Indiana bat (S)	*Myotis sodalis*	E
MONROE		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle (Riga and Sweden Townships)	*Clemmys [=Glyptemys] muhlenbergii*	T
MONTGOMERY[2]		
NASSAU		
Piping plover[4]	*Charadrius melodus*	T
Roseate tern	*Sterna dougallii dougallii*	E
Sandplain gerardia	*Agalinis acuta*	E
Seabeach amaranth	*Amaranthus pumilus*	T
Small whorled pogonia *(Historic)*	*Isotria medeoloides*	T
NEW YORK[2]		
NIAGARA		
Bald eagle	*Haliaeetus leucocephalus*	D

Eastern prairie fringed orchid *(Historic)*	*Platanthera leucophaea*	T
ONEIDA		
Bog turtle (Camden, Florence Townships)	*Clemmys [=Glyptemys] muhlenbergii*	T
Indiana bat (S)	*Myotis sodalis*	E
ONONDAGA		
American hart's-tongue fern	*Asplenium scolopendrium* var. *americana*	T
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Eastern massasauga	*Sistrurus catenatus catenatus*	C
Eastern prairie fringed orchid *(Historic)*	*Platanthera leucophaea*	T
Indiana bat (W/S)	*Myotis sodalis*	E
Small whorled pogonia *(Historic)*	*Isotria medeoloides*	T
ONTARIO		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle (Phelps Township)	*Clemmys [=Glyptemys] muhlenbergii*	T
ORANGE		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Dwarf wedgemussel	*Alasmidonta heterodon*	E
Indiana bat (S)	*Myotis sodalis*	E
Small whorled pogonia	*Isotria medeoloides*	T
ORLEANS		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle (Clarendon Township)	*Clemmys muhlenbergii*	T
Eastern prairie fringed orchid *(Historic)*	*Platanthera leucophaea*	T
OSWEGO		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Indiana bat (S)	*Myotis sodalis*	E
Piping plover {Designated Critical Habitat}	*Charadrius melodus*	E
OTSEGO		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle *(Historic)*	*Clemmys [=Glyptemys] muhlenbergii*	T

PUTNAM		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Indiana bat (S)	*Myotis sodalis*	E
New England cottontail	*Sylvilagus transitionalis*	C
QUEENS		
Piping plover	*Charadrius melodus*	T
Roseate tern	*Sterna dougallii dougallii*	E
Seabeach amaranth	*Amaranthus pumilus*	T
RENSSELAER		
Bald eagle	*Haliaeetus leucocephalus*	D
Indiana bat (S)[3]	*Myotis sodalis*	E
RICHMOND[2]		
ROCKLAND		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys[=Glyptemys] muhlenbergii*	T
Indiana bat (S)	*Myotis sodalis*	E
Small whorled pogonia	*Isotria medeoloides (Historic)*	T
SARATOGA		
Bald eagle	*Haliaeetus leucocephalus*	D
Indiana bat (S)[3]	*Myotis sodalis*	E
Karner blue butterfly	*Lycaeides melissa samuelis*	E
SCHENECTADY		
Indiana bat (S)[3]	*Myotis sodalis*	E
Karner blue butterfly	*Lycaeides melissa samuelis*	E
SCHOHARIE		
Bald eagle	*Haliaeetus leucocephalus*	D
Indiana bat (S)[3]	*Myotis sodalis*	E
SCHUYLER		
Leedy's roseroot	*Rhodiola integrifolia* ssp. *leedyi (=Sedum integrifolium* ssp. *l.)*	T
SENECA		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Indiana bat (S)	*Myotis sodalis*	E

ST. LAWRENCE		
Bald eagle	*Haliaeetus leucocephalus*	D
Indiana bat (S)	*Myotis sodalis*	E
STEUBEN		
Bald eagle	*Haliaeetus leucocephalus*	D
Northeastern bulrush	*Scirpus ancistrochaetus*	E
SUFFOLK		
Kemp's [=Atlantic] ridley turtle[1]	*Lepidochelys kempi*	E
Green turtle[1]	*Chelonia mydas*	T
Hawksbill turtle[1]	*Eretmochelys imbricate*	E
Leatherback turtle[1]	*Dermochelys coriacea*	E
Loggerhead turtle[1]	*Caretta caretta*	T
Piping plover[4]	*Charadrius melodus*	T
Roseate tern	*Sterna dougallii dougallii*	E
Sandplain gerardia	*Agalinis acuta*	E
Seabeach amaranth	*Amaranthus pumilus*	T
Small whorled pogonia *(Historic)*	*Isotria medeoloides*	T
SULLIVAN		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Dwarf wedgemussel	*Alasmidonta heterodon*	E
Indiana bat (S)	*Myotis sodalis*	E
Northern wild monkshood	*Aconitum noveboracense*	T
TIOGA		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
TOMPKINS		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle *(Historic)*	*Clemmys [=Glyptemys] muhlenbergii*	T
ULSTER		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Indiana bat (W/S)	*Myotis sodalis*	E
Northern wild monkshood	*Aconitum noveboracense*	T
Small whorled pogonia *(Historic)*	*Isotria medeoloides*	T
WARREN		
Bog turtle *(Historic)*	*Clemmys [=Glyptemys]*	

	muhlenbergii	T
Indiana bat (W/S)	*Myotis sodalis*	E
Karner blue butterfly	*Lycaeides melissa samuelis*	E
WASHINGTON		
Indiana bat (S)	*Myotis sodalis*	E
Small whorled pogonia *(Historic)*	*Isotria medeoloides*	T
WAYNE		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Eastern prairie fringed orchid *(Historic)*	*Platanthera leucophaea*	T
Indiana bat (S)	*Myotis sodalis*	E
WESTCHESTER		
Bald eagle	*Haliaeetus leucocephalus*	D
Bog turtle	*Clemmys [=Glyptemys] muhlenbergii*	T
Indiana bat (S)	*Myotis sodalis*	E
New England cottontail	*Sylvilagus transitionalis*	C
WYOMING		
Bald eagle[2]	*Haliaeetus leucocephalus*	D
YATES		
Bald eagle	*Haliaeetus leucocephalus*	D
Leedy's roseroot	*Rhodiola integrifolia* ssp. *leedyi* *(=Sedum integrifolium* ssp. *l.)*	T

E=endangered T=threatened P=proposed C=candidate
D=delisted

W=winter S=summer - Please note that the Indiana bat may occur in additional counties but we have listed the counties with the greatest likelihood of Indiana bat presence.

[1] Except for sea turtle nesting habitat, principal responsibility for these species is vested with the National Oceanic and Atmospheric Administration Fisheries. Please visit the following website for more information http://www.nmfs.noaa.gov/pr/species/esa.htm.

[2] Except for occasional transient individuals, no Federally-listed or proposed endangered or threatened species, or candidate species under our jurisdiction are known to exist in these counties.

[3] While Indiana bats were known to winter in Albany County, we now believe they are likely extirpated or in such small numbers that it is unlikely that they would be present and impacted by any specific proposed projects in Albany, Rensselaer, Saratoga, Schenectady, and Schoharie Counties. This determination may change as we receive new information.

[4] Piping plovers are found in Suffolk and Nassau County; however, their early successional habitat is only found at the shoreline, on barrier islands, sandy beaches, and dredged material disposal islands. Please see the fact sheet at http://nyfo.fws.gov/es/PipingPloverFactSheet07.pdf for more information on suitable habitat.

List of Endangered, Threatened and Special Concern Fish & Wildlife Species of New York State

Endangered

Those endangered species which meet one or both of the criteria specified in section 182.2(g) of 6NYCRR Part 182 and which are found, have been found, or may be expected to be found in New York State include:

	Common Name	Scientific Name
Molluscs	[1]Dwarf Wedgemussel	*Alasmidonta heterodon*
	[1]Pink mucket	*Lampsilis abrupta*
	[1]Clubshell	*Pleurobema clava*
	[1]Fat pocketbook	*Potamilus capax*
	Rayed Bean	*Villosa fabalis*
	[2]Chittenango Ovate Amber Snail	*Novisuccinea chittenangoensis*
Insects	Tomah Mayfly	*Siphlonisca aerodromia*
	[1,3]American Burying Beetle	*Nicrophorus americanus*
	Hessel's Hairstreak	*Callophrys hesseli*
	[1]Karner Blue Butterfly	*Lycaeides melissa samuelis*
	Regal Fritillary	*Speyeria idalia*
	Persius Duskywing	*Erynnis persius*
	Grizzled Skipper	*Pyrgus centaureae wyandot*

	Arogos Skipper	*Atrytone arogos arogos*
	Bog Buckmoth	*Hemileuca species 1*
	Pine Pinion Moth	*Lithophane lepida lepida*
Fishes	[1]Shortnose Sturgeon	*Acipenser brevirostrum*
	[3]Silver Chub	*Macrhybopsis storeriana*
	Pugnose Shiner	*Notropis anogenus*
	Round Whitefish	*Prosopium cylindraceum*
	Bluebreast Darter	*Etheostoma camurum*
	[3]Gilt Darter	*Percina evides*
	[3]Spoonhead Sculpin	*Cottus ricei*
	Deepwater Sculpin	*Myoxocephalus thompsoni*
Amphibians	Tiger Salamander	*Ambystoma tigrinum*
	Northern Cricket Frog	*Acris crepitans*
Reptiles	Mud Turtle	*Kinosternon subrubrum*
	[2]Bog Turtle	*Clemmys muhlenbergii*
	[1]Atlantic Hawksbill Sea Turtle	*Eretmochelys imbricata*
	[1]Atlantic Ridley Sea Turtle	*Lepidochelys kempii*
	[1]Leatherback Sea Turtle	*Dermochelys coriacea*
	Queen Snake	*Regina septemvittata*
	Massasauga	*Sistrurus catenatus*
Birds	Spruce Grouse	*Falcipennis canadensis*
	[3]Golden Eagle	*Aquila chrysaetos*
	Peregrine Falcon	*Falco peregrinus*
	Black Rail	*Laterallus jamaicensis*

	[1,2,4]Piping Plover	*Charadrius melodus*
	[1,3]Eskimo Curlew	*Numenius borealis*
	[1]Roseate Tern	*Sterna dougallii dougallii*
	Black Tern	*Chlidonias niger*
	Short-eared Owl	*Asio flammeus*
	Loggerhead Shrike	*Lanius ludovicianus*
Mammals	[1]Indiana Bat	*Myotis sodalis*
	[3]Allegheny Woodrat	*Neotoma magister*
	[1]Sperm Whale	*Physeter catodon*
	[1]Sei Whale	*Balaenoptera borealis*
	[1]Blue Whale	*Balaenoptera musculus*
	[1]Finback Whale	*Balaenoptera physalus*
	[1]Humpback Whale	*Megaptera novaeangliae*
	[1]Right Whale	*Eubalaena glacialis*
	[1,3]Gray Wolf	*Canis lupus*
	[1,3]Cougar	*Felis concolor*

Threatened

Those threatened species which meet one or both of the criteria specified in section 182.2(h) of 6NYCRR Part 182 and which are found, have been found, or may be expected to be found in New York State include:

	Common Name	Scientific Name
Molluscs	Brook Floater	*Alasmidonta varicosa*
	Wavy-rayed Lampmussel	*Lampsilis fasciola*
	Green Floater	*Lasmigona subviridis*
Insects	Pine Barrens Bluet	*Enallagma recurvatum*

	Scarlet Bluet	*Enallagma pictum*
	Little Bluet	*Enallagma minisculum*
	[2,3]Northeastern Beach Tiger Beetle	*Cicindela dorsalis dorsalis*
	Frosted Elfin	*Callophrys irus*
Fishes	Lake Sturgeon	*Acipenser fulvescens*
	Mooneye	*Hiodon tergisus*
	[3]Lake Chubsucker	*Erimyzon sucetta*
	Gravel Chub	*Erimystax x-punctata*
	[3]Mud Sunfish	*Acantharchus pomotis*
	Banded Sunfish	*Enneacanthus obesus*
	Longear Sunfish	*Lepomis megalotis*
	Longhead Darter	*Percina macrocephala*
	Eastern Sand Darter	*Ammocrypta pellucida*
	Swamp Darter	*Etheostoma fusiforme*
	Spotted Darter	*Etheostoma maculatum*
Amphibians	None Listed	---
Reptiles	Blanding's Turtle	*Emydoidea blandingii*
	[2]Green Sea Turtle	*Chelonia mydas*
	[2]Loggerhead Sea Turtle	*Caretta caretta*
	Fence Lizard	*Sceloporus undulatus*
	Timber Rattlesnake	*Crotalus horridus*
Birds	Pied-billed Grebe	*Podilymbus podiceps*
	Least Bittern	*Ixobrychus exilis*
	Bald Eagle	*Haliaeetus leucocephalus*

	Northern Harrier	*Circus cyaneus*
	King Rail	*Rallus elegans*
	Upland Sandpiper	*Bartramia longicauda*
	Common Tern	*Sterna hirundo*
	Least Tern	*Sterna antillarum*
	Sedge Wren	*Cistothorus platensis*
	Henslow's Sparrow	*Ammodramus henslowii*
Mammals	[2,3]Canada Lynx	*Lynx canadensis*

Special Concern

The following are designated as species of special concern as defined in Section 182.2(i) of 6NYCRR Part 182. Species of special concern warrant attention and consideration but current information, collected by the department, does not justify listing these species as either endangered or threatened.

	Common Name	Scientific Name
Molluscs	Buffalo Pebble Snail	*Gillia altilis*
	Fringed Valvata	*Valvata lewisi*
	Mossy Valvata	*Valvata sincera*
Insects	Unnamed Dragonfly Species	*Gomphus spec. nov.*
	Southern Sprite	*Nehalennia integricollis*
	Extra Striped Snaketail	*Ophiogomphus anomalus*
	Pygmy Snaketail	*Ophiogomphus howei*
	Common Sanddragon	*Progomphus obscurus*
	Gray Petaltail	*Tachopteryx thoreyi*
	Checkered White	*Pontia protodice*
	Olympia Marble	*Euchloe olympia*
	Henry's Elfin	*Callophrys henrici*

	Tawny Crescent	*Phyciodes batesii*
	Mottled Duskywing	*Erynnis martialis*
	Barrens Buckmoth	*Hemileuca maia*
	Herodias Underwing	*Catocala herodias gerhardi*
	Jair Underwing	*Catocala jair*
	A Noctuid Moth	*Heterocampa varia*
Fishes	Mountain Brook Lamprey	*Ichthyomyzon greeleyi*
	Black Redhorse	*Moxostoma duquesnei*
	Streamline Chub	*Erymystax dissimilis*
	Redfin Shiner	*Lythrurus umbratilis*
	Ironcolor Shiner	*Notropis chalybaeus*
Amphibians	Hellbender	*Cryptobranchus alleganiensis*
	Marbled Salamander	*Ambystoma opacum*
	Jefferson Salamander	*Ambystoma jeffersonianum*
	Blue-spotted Salamander	*Ambystoma laterale*
	Longtail Salamander	*Eurycea longicauda*
	Eastern Spadefoot Toad	*Scaphiopus holbrookii*
	Southern Leopard Frog	*Rana sphenocephala utricularius*
Reptiles	Spotted Turtle	*Clemmys guttata*
	Wood Turtle	*Clemmys insculpta*
	Eastern Box Turtle	*Terrapene carolina*
	Eastern Spiny Softshell	*Apalone spinifera*
	Eastern Hognose Snake	*Heterodon platyrhinos*
	Worm Snake	*Carphophis amoenus*

Birds	Common Loon	*Gavia immer*
	American Bittern	*Botaurus lentiginosus*
	Osprey	*Pandion haliaetus*
	Sharp-shinned Hawk	*Accipiter striatus*
	Cooper's Hawk	*Accipiter cooperii*
	Northern Goshawk	*Accipiter gentilis*
	Red-shouldered Hawk	*Buteo lineatus*
	Black Skimmer	*Rynchops niger*
	Common Nighthawk	*Chordeiles minor*
	Whip-poor-will	*Caprimulgus vociferus*
	Red-headed Woodpecker	*Melanerpes erythrocephalus*
	Horned Lark	*Eremophila alpestris*
	Bicknell's Thrush	*Catharus bicknelli*
	Golden-winged Warbler	*Vermivora chrysoptera*
	Cerulean Warbler	*Dendroica cerulea*
	Yellow-breasted Chat	*Icteria virens*
	Vesper Sparrow	*Pooecetes gramineus*
	Grasshopper Sparrow	*Ammodramus savannarum*
	Seaside Sparrow	*Ammodramus maritimus*
Mammals	Small-footed Bat	*Myotis leibii*
	New England Cottontail	*Sylvilagus transitionalis*
	Harbor Porpoise	*Phocoena phocoena*

[1]Currently listed as "endangered" by the U. S. Department of the Interior.
[2]Currently listed as "threatened" by the U. S. Department of the Interior.
[3]Species is extirpated from New York State.

[4]Piping Plover is listed as federally endangered in the Great Lakes Region, and as federally threatened in the Atlantic Coastal Region.

Definitions:

Extinct - Species is no longer living or existing.

Extirpated - Species is not extinct, but no longer occurring in a wild state within New York, or no longer exhibiting patterns of use traditional for that species in New York (e.g. historical breeders no longer breeding here).

Endangered - Any native species in imminent danger of extirpation or extinction in New York State.

Threatened - Any native species likely to become an endangered species within the foreseeable future in New York State.

Special Concern - Any native species for which a welfare concern or risk of endangerment has been documented in New York State.

Authority

Environmental Conservation Law of New York, Section 11-0535 and 6 NYCRR (New York Code of Rules and Regulations) Part 182 - effective (last promulgated in state regulation) December 4, 1999.