SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT: REDUCING MAMMAL DAMAGE THROUGH AN INTEGRATED WILDLIFE DAMAGE MANAGEMENT PROGRAM IN THE STATE OF NEW JERSEY

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I. INTRODUCTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program prepared an environmental assessment (EA) to evaluate potential impacts to the quality of the human environment from the implementation of a management program to address damage to property, agricultural resources, natural resources, and threats to human safety caused by mammals in New Jersey (USDA 2004). The EA evaluated the need for damage management and the relative effectiveness of four alternatives to meet that proposed need, while accounting for the potential environmental effects of those activities. WS' proposed action in the EA evaluates an integrated damage management program in the State to fully address the need for resolving damage caused by mammals while minimizing impacts to the human environment.

The EA analyzes the effects of WS' activities to reduce damage and threats associated with several mammal species. Mammal species addressed in the EA include white-tailed deer (*Odocoileus virginianus*), woodchuck (*Marmota monax*), raccoon (*Procyon lotor*), opossum (*Didelphus marsupialis*), muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), porcupine (*Erethizon dorsatum*), gray squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), domestic/feral dog (*Canis familiaris*), Norway rat (*Rattus norvegicus*), roof rat (*Rattus rattus*), feral cat (*Felis* spp.), Eastern mole (*Scalopus aquaticus*), star-nosed mole (*Condylura cristata*), short-tailed shrew (*Blarina brevicauda*), house mouse (*Mus musculus*), deer mouse (*Peromyscus maniculatus*), white-footed mouse (*Peromyscus leucopus*), woodland jumping mouse (*Napaeozapus insignis*), meadow jumping mouse (*Zapus hudsonius*), meadow vole (*Microtus pennsylvanicus*), pine vole (*Mictrotus pinetorum*), and red-backed mouse (*Clethrionomys gapperi*).

In addition to those mammals addressed in the EA, this supplement to the EA will also address damage and threats of damage associated with feral swine (*Sus scrofa*), Eastern cottontail rabbits (*Sylvilagus floridanus*), nutria (*Myocaster coypus*), masked shrews (*Sorex cinereus*), Tuckahoe masked shrews (*Sorex cinereus nigriculus*), water shrews (*Sorex palustris*), smokey shrews (*Sorex fumeus*), long-tailed shrews (*Sorex fumeus*), and least shrews (*Crytotis parva*).

II. AUTHORITY AND COMPLIANCE

WS' activities to reduce damage and threats associated with wildlife are regulated by federal, state, and local laws and regulations. The authority of WS and other agencies along with the compliance with relevant laws and regulations are discussed in detail in Section 1.1 of the EA (USDA 2004). WS' activities are also conducted consistent with relevant Executive Orders which were also discussed in Section 1.1 of the EA (USDA 2004). Compliance with laws and regulations not directly addressed in the EA will be discussed in this supplement.

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

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

III. SCOPE AND PURPOSE

The purpose of the EA will remain as addressed in section 1.2 of the EA (USDA 2004). This supplement to the EA examines potential environmental impacts of WS' program as it relates to: 1) conducting disease surveillance and monitoring in mammal populations, particularly monitoring for the presence of feral swine diseases (*e.g.*, swine brucellosis, pseudorabies, classical swine fever), plague, tularemia, raccoon roundworm, canine heartworm, tick-borne diseases (*e.g.*, Lyme disease, babesiosis), and white nose syndrome in bats, 2) an increase in the number of requests for assistance to manage mammal damage and threats in New Jersey, 3) new issues and data that have become available from public comments, research findings, and data gathering since the issuance of the Decision/Finding of No Significant Impact (FONSI) in 2004, and 4) analyses of WS' mammal damage management activities in New Jersey since the 2004 Decision/FONSI was issued to ensure program activities are within the impact parameters analyzed in the EA.

IV. NEED FOR ACTION

The need for action to manage damage and threats associated with mammals in New Jersey arises from requests for assistance[1] received by WS to reduce and prevent damage associated with mammals from occurring to four major categories: agricultural resources, natural resources, property, and threats to human safety. WS has identified those mammal species most likely to be responsible for causing damage to those four categories in the State based on previous requests for assistance. Table 1 lists WS' technical assistance projects involving mammal damage or threats of mammal damage to those four major resource types in New Jersey from the federal fiscal year[2] (FY) 2004 through FY 2010. Technical assistance is provided by WS to those persons requesting assistance with resolving damage or the threat of damage by providing information and recommendations on mammal damage management activities that can be conducted by the requestor without WS' direct involvement in managing or preventing the damage. The technical assistance projects conducted by WS are representative of the damage and threats that are caused by mammals in New Jersey. WS' technical assistance activities are discussed further in Chapter 3 of the EA (USDA 2004).

WS has conducted 174 technical assistance projects involving mammal damage to agricultural resources, natural resources, property, and human safety since FY 2004 in New Jersey. In addition to technical

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

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

assistance, WS also provided direct operational assistance in which WS was directly involved with managing damage associated with mammals in the State. Activities associated with WS providing direct operational assistance are also discussed in Chapter 3 of the EA (USDA 2004).

A description of the need for action to address damage and threats associated with mammals in New Jersey is provided in section 1.3 of the EA (USDA 2004). The need for action addressed in the EA remains applicable to this supplement to the EA. This supplement to the EA will evaluate an increase in the number of requests for assistance.

Table 1 – Number of technical assistance* requests received by WS in New Jersey involving mammal species, FY 2004 – FY 2010

	Fiscal Year							
Resource Type	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**
Property	2	2	0	0	18	50	14	**86**
Agriculture	0	0	0	1	3	1	3	**8**
Natural Resources	0	0	0	0	2	9	13	**24**
Human Safety	2	0	0	0	25	15	14	**56**
TOTAL	**4**	**2**	**0**	**1**	**48**	**75**	**44**	**174**

*Data presented in the table were taken from NJ WS Annual Program Reports and represent the number of technical assistance projects conducted by the NJ WS program. Data does not represent operational assistance projects conducted during the time period covered.

Over 49% of the technical assistance projects involving mammals conducted by WS in New Jersey from FY 2004 through FY 2010 involved damage or the threat of damage to property. Damage to property associated with mammal species can occur in a variety of ways and is often dependent on the behavior of the species involved. Many requests for assistance received by WS are associated with the threats mammals can pose to aircraft from strikes or that act as attractants to other wildlife species that pose threats of aircraft strikes. Threats to human safety associated with mammals accounted for over 32% of the technical assistance projects conducted by WS from FY 2004 through FY 2010. Human safety threats occur primarily from the threat of disease transmission associated with mammals.

During requests for assistance received by WS, cooperators often report or WS verifies through site visits, damage associated with various species of mammals in the State. Since FY 2004, damage has been reported to WS or WS has verified over $22,383 in damages caused by mammals in the State (see Table 2). Damages have been reported or verified as occurring primarily to property and agricultural resources. Approximately $7,233 in damage to property has been reported to or verified by WS in the State since FY 2004 with $15,150 in damages to agricultural resources. No monetary damages have been reported to WS associated with mammal damage to natural resources or to human safety.

Table 2 – Monetary damage by resource caused by mammals in New Jersey, FY 2004 – FY 2010

	Fiscal Year							
Resource Type	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**
Property	0	$4,033	0	0	0	$3,200	0	**$7,233**
Agriculture	0	0	0	$15,000	0	$150	0	**$15,150**
Natural Resources	0	0	0	0	0	0	0	**0**
Human Safety	0	0	0	0	0	0	0	**0**
TOTAL	**0**	**$4,033**	**0**	**$15,000**	**0**	**$3,350**	**0**	**$22,383**

Table 2 only reflects damage that has been reported to or verified by WS based on requests received for assistance. Assigned monetary damage to natural resources can be difficult especially when factoring in the lost aesthetic value when natural resources are damaged by mammals. Similarly, placing a monetary

value on threats to human safety can be difficult. The monetary damage reported in Table 2 reflects damage that has occurred and that has been reported to or verified by WS, but is not reflective of all mammal damage occurring in the State since not all mammal damage or threats are reported to WS.

The civil and military aviation communities have acknowledged that the threat to human health and safety from aircraft collisions with wildlife is increasing (Dolbeer 2000, MacKinnon et al. 2001). Collisions between aircraft and wildlife are a concern throughout the world because wildlife strikes threaten passenger safety (Thorpe 1996), result in lost revenue, and repairs to aircraft can be costly (Linnell et al. 1996, Robinson 1996). Aircraft collisions with wildlife can also erode public confidence in the air transport industry as a whole (Conover et al. 1995).

White-tailed deer are a commonly encountered problem at airfields in New Jersey, threatening the safe operation of aircraft at those facilities. Collisions between deer and aircraft can cause major damage to the aircraft, and potentially cause injury and loss of human life. Serious consequences are also possible if pilots lose control of the aircraft while attempting to avert a collision with deer. From 1990 through 2008, there were 782 reported deer-aircraft strikes to civil aircraft in the United States resulting in 206,175 hours in aircraft down time and nearly $30 million in reported repair costs (Dolbeer et al. 2009).

Other mammal species can also pose threats to aircraft or act as attractants for other wildlife species that then pose a threat to aviation safety. Of reported strikes, coyotes were involved with 34% of the strikes involving terrestrial mammals which are the second highest percentage for mammals behind only deer. A total of 33 species of terrestrial mammals have been identified in the strike record in the United States along with eight species of bats (Dolbeer et al. 2009). Most requests for assistance received by WS to manage damage associated with wildlife at airports involves threats to property since wildlife strikes can cause damage to aircraft. Between species of carnivores and species of Artiodactyls (*i.e.*, hooved, even-toed mammals), nearly $39 million in damages to aircraft have occurred from 1990 through 2008 in the United States (Dolbeer et al. 2009).

Proposed Supplement to the EA

Several aspects of WS' mammal damage management activities have experienced an increase in the number of requests for assistance received. Areas of WS' mammal damage management activities experiencing an increase in requests for assistance include disease surveillance and monitoring, along with increases in requests to reduce risks associated with human safety, protection of property, and reducing or preventing agricultural damage. The increase in WS' mammal damage management program analyzed in this supplement to the EA would allow WS to adequately address requests as needs are identified, as requested by cooperators experiencing threats to human safety and/or damage due to mammals, and as funding permits. In addition, new methods to manage damage have become available since the EA was developed which will be analyzed in this supplement to the EA.

As part of the increase in requests for assistance, WS reasonably anticipates an increase in the number of wildlife requested to be lethally removed as part of an integrated damage management strategy to reducing threats to aircraft and human safety. WS also anticipates an increase in non-lethal harassment and dispersal as part of the increasing requests for assistance.

Those mammal species addressed in the EA were identified based on requests for assistance received by WS prior to the development of the EA. WS continues to receive requests for assistance to manage damage and threats of damage caused by mammals in New Jersey. Since FY 2004, WS has responded to requests for assistance to manage damage to property, agricultural resources, natural resources, and threats to human safety associated with mammals. WS is also being requested to participate in disease surveillance and monitoring programs to detect and evaluate risks associated with mammalian diseases.

This supplement to the EA will evaluate the issues associated with an increase in the number of requests for assistance received by WS in New Jersey to address damage and threats associated with an increasing number of mammals and mammal species. This supplement evaluates WS' activities to address an increasing number of requests for assistance to manage damage caused by shrews, muskrats, and Norway rats in the State. In addition, this supplement will evaluate the take of feral swine, Eastern cottontail rabbits, nutria, masked shrews, Tuckahoe masked shrews, water shrews, smokey shrews, long-tailed shrews, and least shrews which were not addressed in the EA.

Disease Surveillance and Monitoring

Public awareness and health risks associated with zoonoses (*i.e*., diseases of animals that can be transmitted to humans) have increased in recent years. Several zoonotic diseases associated with mammals were addressed in section 1.3.1 of the EA (USDA 2004). Those zoonotic diseases remain a concern and continue to pose threats to human safety where people encounter mammals. Since the completion of the EA, WS has received requests to assist with reducing damage and threats associated with several mammal species in the State. As part of the activities conducted to alleviate damage or threats of damage associated with those mammal species, WS also receives requests for assistance with conducting disease monitoring and surveillance activities as part of those activities. Most disease sampling occurs ancillary to other wildlife damage management activities (*i.e*., disease sampling occurs after wildlife have been captured or lethally taken for other purposes). For example, WS may sample deer harvested during the annual hunting season for Chronic Wasting Disease (CWD) or may collect ticks from raccoons that were lethally taken to alleviate damage occurring to property. Although CWD has not been identified in cervid populations in New Jersey, WS could be requested to conduct surveillance activities in the State for CWD, such as taking lymph node samples from deer culled from captive deer herds in the State when requested by the New Jersey Division of Fish and Wildlife (NJDFW). As part of monitoring activities associated with white nose syndrome in bats, WS has also worked with property owners that find dead bats to submit those bats for testing.

WS could be requested to conduct disease surveillance activities involving those mammal species addressed in the EA. In addition, WS could receive requests for assistance to conduct disease sampling and surveillance in populations of those mammals that were not addressed in the EA but are being addressed in this supplement to the EA, primarily feral swine.

Feral swine are potential reservoirs for at least 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. In addition, feral swine can pose risks to domestic livestock through the potential transmission of diseases between feral swine populations and domestic livestock where interactions may occur.

In addition to activities being requested to monitor diseases in feral swine populations in the State, the WS program in New Jersey is increasingly being requested to sample for diseases in other mammalian species. WS has been requested to conduct disease surveillance and monitoring activities for plague, tularemia, and roundworms in raccoons and other mammals. WS has also been requested to collect samples for canine heartworm in coyotes. Ticks have also been collected from mammals addressed during wildlife damage management activities for tick-borne disease testing, such as Lyme disease and babesiosis. In those cases, sampling occurred from mammals that were being addressed to alleviate damage or the threat of damage and disease sampling was not the reason those animals were addressed.

Addressing Increasing Requests for Assistance Received by WS in New Jersey

The need for an increase in damage management activities associated with muskrats, shrews, and Norway rats in the State is based on an increase in the number of requests received to manage damage caused by

those species. As part of the requests for assistance, WS reasonably anticipates an increase in the number of mammals requested to be lethally removed as part of an integrated damage management strategy to reducing damage and threats. WS also anticipates an increase in non-lethal harassment and dispersal of those mammal species addressed in this supplement as part of the increasing requests for assistance.

To assist with communicating to the public the individual and cumulative impacts associated with managing increasing damage and threats associated with shrews, muskrats, and Norway rats in New Jersey, those activities are being further analyzed and addressed in this supplement to the EA. Information regarding the need for action to manage damage associated with those species will be further evaluated by species in this supplement to the EA.

In addition to those species addressed in the EA, the WS program in New Jersey has received requests for assistance to manage damage and threats of damage associated with feral swine, cottontail rabbits, nutria, and shrews which were not specifically addressed in the EA.

Agricultural damage and threats caused by feral swine in New Jersey occurs to crops, livestock, and other agricultural resources. Damage occurs from direct consumption of agricultural crops and from trampling, rooting, and/or wallowing that are common activities of feral swine. Rooting is a common activity of feral swine during their search for food where they overturn sod and soil in the search for food (Stevens 1996). Feral swine also wallow in water and mud to regulate body temperature and to ward off skin parasites.

Feral swine can cause damage to a variety of agricultural crops through direct consumption of the crop but also from trampling, rooting, and wallowing (Beach 1993). Damage and threats to livestock associated with feral swine result from predation on livestock and the risks associated with disease transfer from feral swine to domestic livestock. Feral swine can also cause damage to other agricultural resources. For example, feral swine can cause damage to pastures and land used for hay by rooting and wallowing, can cause damage to ponds and water sources for livestock, and can cause damage from the consumption of livestock feed. Feral swine feeding activities in agricultural crops can also lead to increased erosion from the removal of vegetation that leaves the soil bare along with the overturning of soil caused by rooting.

In addition to crop damage, feral swine damage pastures, land used for hay, and sod farms from rooting and wallowing activities (Beach 1993). Rooting activities can also lead to increased erosion and soil loss. Wallowing and rooting activities in livestock watering areas can lead to a degradation in water quality, by increasing turbidity, by causing algal blooms, by depleting dissolved oxygen, and increasing erosion (Beach 1993). Since feral swine often travel in family groups, damages from rooting and wallowing can be extensive often encompassing several acres.

Additional risks associated with feral swine include the potential for disease transmission from feral swine to domestic livestock, especially to domestic swine. Feral swine are potential reservoirs for several diseases that are known to be transmissible between feral swine and domestic livestock (Wood and Barrett 1979, Corn et al. 1986, Beach 1993). Corn et al. (1986) found feral swine tested in Texas were positive for pseudorabies, brucellosis, and leptospirosis. A study in Oklahoma found samples from feral swine tested positive for antibodies of porcine parvovirus, swine influenza, and porcine reproductive and respiratory syndrome virus (Saliki et al. 1998). Cholera, trichinosis, and African swine fever are additional diseases that can be transmitted between livestock and feral swine. Disease transmission is likely to occur where domestic livestock and feral swine have a common interface, such as at water sources and livestock feeding areas.

Although several diseases known to be carried by swine are also transmissible to other livestock, the primary concern is the potential transmission of diseases from feral swine to domestic swine. Pseudorabies is a viral disease associated with an extremely contagious herpes virus that can have negative impacts on reproduction in domestic swine. Brucellosis is a bacterial disease that can also have negative impacts on reproduction of swine. Many of the other diseases associated with feral swine also negatively affect the health and marketability of domestic swine that can lead to economic losses to the livestock producer.

The United States is one of the world's largest producers of pork and is the second largest exporter of pork. Pork production in the United States accounts for about 10% of the total world supply. The retail value of pork sold to consumers exceeds $30 billion annually. In addition, the pork industry supports more than 600,000 jobs. An economic analysis estimated that the annual cost of pseudorabies to pork producers in the United States at more than $30 million annually in lost production as well as testing and vaccination costs (USDA 2008). The WS program in New Jersey conducts disease surveillance in the feral swine population as part of the National Wildlife Disease Surveillance Program. Since the testing of feral swine began in the State, no feral swine in New Jersey have tested positive for swine brucellosis or pseudorabies.

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 can cause economic losses that can negatively impact the statewide swine industry.

In addition to the potential for disease transmission, feral swine are known to predate on livestock. Feral swine are known to kill calves, kids, lambs, and poultry (Stevens 1996). Predation occurs primarily on young livestock, but feral swine can also kill weakened or injured livestock. Predation of livestock likely does not occur with regular frequency. However, if feral swine populations continue to increase, WS could be requested to address localized predation associated with feral swine.

Overall, feral swine damages to agricultural resources in New Jersey are not well documented. Since feral swine are documented 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 WS to manage damage and threats.

Natural resources may be described as those assets belonging to the public and often managed and held in trust by government agencies for citizens. Such resources may be plants or animals, including threatened and endangered species, historic properties, or habitats in general. Examples of natural resources are historic structures and places; parks and recreation areas; natural areas, including unique habitats or topographic features; threatened and endangered plants or animals; and any plant or animal populations which have been identified by the public as a natural resource.

Feral swine compete with over 100 species of native wildlife for important and limited natural food supplies. Native animals in direct competition with feral swine for quality food include high profile species such as deer, wild turkey, quail, and black bear. Some species including quail, turkey, endangered sea turtles, and shorebirds are at risk of predation by nest destruction and the consuming of eggs. Feral swine cause damage to natural flora and fauna on private lands along with designated natural areas such as parks and wildlife management areas. Those sites suffer erosion and local loss of critical ground plants and roots as well as destruction of seedlings as a result of their feeding and other activity (Barrett and Birmingham 1994). Many state and federal natural resource managers are now in the process of

controlling swine numbers because of their known impact to endangered plants and animals (Thompson 1977).

Feral swine are known to feed on many smaller animals (some threatened or endangered), disrupt ecosystems via rooting, and feeding on rare and endangered plants. Many experts in the fields of botany and herpetology have observed declines in some rare species of plants, reptiles, amphibians, and soil invertebrates (Singer et al. 1982) in areas inhabited by feral swine. It has been well documented that feral swine disturb large areas of vegetation and soils through rooting, and it is documented that swine inhabiting coastal, upland, and wetland ecosystems are uprooting, damaging, and feeding on rare native species of plants and animals (Means 1999). It has been documented that swine can disrupt natural vegetative communities, eliminate rare plants and animals, alter species composition within a forest including both canopy and low growing species (Lipscomb 1989, Frost 1993), increase water turbidity in streams and wetlands (reducing water quality and impacting native fishes), and increase soil erosion and alter nutrient cycling (Singer et al. 1982, DeBenedetti 1986). For example, 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 several Louisiana watersheds. Additionally, some species of freshwater mussels and aquatic insects have been negatively impacted by feral swine (Kaller and Kelso 2006).

Feral swine can damage landscaping, golf courses, roads, drainage ditches and cause erosion by feeding in these areas. Feral swine dig or root in the ground with their nose in search of desired roots, grubs, earthworms, and other food sources. Feral swine can damage landscaping, golf courses, roads, drainage ditches and cause erosion by feeding in these areas. The rooting and digging activity of feral swine turns sod and grass over which often leaves the area bare of vegetation and susceptible to erosion. Feral swine also pose a threat to property from being struck by motor vehicles and aircraft.

Feral swine can pose a threat to human safety from disease transmission, from aggressive behavior, and from being struck by vehicles and aircraft. Feral swine are potential reservoirs for at least 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. Brucellosis, salmonellosis, toxoplasmosis, trichinosis, tuberculosis, and tularemia are some of the common diseases that can be carried by feral swine that are also known to infect humans (Stevens 1996, Hubalek 2002, Seward et al. 2004). Actual transmission of diseases from feral swine to humans is rare (Amass 1998).

In addition to threats from disease transmission, feral swine can pose risks from aggressive behavior and from being struck by motor vehicles and aircraft. Feral swine can be very aggressive toward people, especially when threatened. Collisions with motor vehicles and aircraft can also threaten human safety if the operator loses control of the vehicle or if the damage to aircraft is severe.

In many circumstances, assistance with a wildlife conflict is requested because of a perceived risk to human health or safety associated with wild animals living near humans or acting abnormally in human-inhabited areas. Under the proposed action, WS could assist in resolving these types of requests. In the majority of cases in which human health concerns are a major reason for requesting assistance with feral swine damage, there may have been no actual cases of transmission of disease to humans to prompt the request. Thus, it is the potential of disease transmission that is the primary reason for requesting and conducting management activities. 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 due to high populations of feral swine in urban and suburban areas or from companion animals coming in contact with 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 the West Nile virus may be

transmitted by biting flies or mosquitoes and are typically more of a threat during the time of year that these insects are more 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.

- Exposure to the bacterium, *Brucella suis*, which causes swine brucellosis. Swine are considered the natural host for *B. suis* which can be harbored without signs of illness. Humans may contract the disease by handling, dressing, or eating undercooked meat.

- 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.

Feral swine commonly feed in road-side ditches and cross busy streets and highways. With some animals weighing as much as five hundred or more pounds, physical injuries to humans can occur when vehicles collide with, or try to avoid hitting these animals. Feral swine may pose an aviation threat (to aircraft and human safety) when they are found in aircraft operating areas on airports. At least one crash in Florida was caused by feral swine on a runway. In Louisiana, at least four civilian and military airports have reported problems with free-ranging feral swine and have taken action to remove them.

In addition to feral swine, the WS program in New Jersey has begun to receive requests for assistance associated with damage and threats of damage associated with nutria. Nutria are a non-native species in the United States which were introduced from South America. Nutria primarily inhabit brackish or freshwater marshes, but are also found in swamps, rivers, ponds, and lakes. They live in dense vegetation, in abandoned burrows, or in burrows they dig along stream banks or shorelines (Wade and Ramsey 1986). Nutria are almost entirely herbivorous and eat animal material (mostly insects) incidentally. Freshwater mussels and crustaceans are occasionally eaten in some parts of their range.

The digging and feeding behavior of nutria can be destructive to marsh ecosystems. Nutria forage directly on the vegetative root mat, leaving the marsh pitted with digging sites and fragmented with deeply cut swimming canals. The denuding of marsh vegetation can accelerate erosion associated with tidal currents and wave action. The loss of vegetation can also facilitate salt water intrusion into marsh interiors. Nutria also cause damage by eating lawn grasses found adjacent to aquatic habitats. Nutria are opportunistic feeders and eat approximately 25% of their body weight daily (LeBlanc 1994).

Burrowing activities of nutria can severely damage levees, dikes, earthen dams, and other structures. Burrowing is the most commonly reported damage caused by nutria. Additionally, nutria burrows can weaken flood control levees that protect low-lying areas. In some cases, tunneling in levees is so extensive that water will flow unobstructed from one side to the other, necessitating their complete reconstruction.

Nutria can also burrow into the styrofoam floatation under boat docks and wharves, causing these structures to lean and sink. Nutria burrow under buildings, which may lead to uneven settling or failure of the foundations. Burrows can weaken road beds, steam banks, dams, and dikes, which may collapse when the soil is saturated by rain or high water or when subjected to heavy objects on the surface (such as vehicles, farm machinery, or grazing livestock). Rain and wave action can wash out and enlarge collapsed burrows and compound the damage.

Nutria depredation on crops has also been documented (LeBlanc 1994). Crops that have been damaged include corn, milo (grain sorghum), sugar and table beets, alfalfa, wheat, barley, oats, peanuts, various melons, and a variety of vegetables from home gardens and truck farms.

Nutria girdle fruit, nut, and shade trees and ornamental shrubs. They also dig up lawns and golf courses when feeding on the tender roots and shoots of sod grasses. Gnawing damage to wooden structures is also common.

Cottontail rabbits and shrews can cause damage in the State, primarily associated with consumption of landscaping vegetation, garden plants, gnawing on trees, and burrowing activities. However, most requests for assistance received by WS are associated with those species at airports where they act as attractants for other wildlife species that can pose a threat to aviation safety. Raptors and other carnivores can be attracted to airports with high densities of rabbits and shrews which pose a strike risk on airports.

Additional Methods Available to Manage Mammal Damage

The supplement to the EA evaluates additional methods to resolve mammal damage that have become available since the completion of the EA. Since the completion of the EA, reproductive inhibitors, trap monitors, Forward Looking Infrared (FLIR) devices, and night vision equipment have become available and could be used or recommended as part of an integrated damage management strategy to alleviate mammal damage by WS. The use of those methods as part of an integrated approach to resolving damage and threats associated with mammals are also analyzed in this supplement to the EA. A description of the wildlife damage management methods available during the development of the EA that could be used or recommended by WS is provided in Appendix B of the EA (USDA 2004) and in Appendix J of WS' programmatic Final Environmental Impact Statement (FEIS) (USDA 1997). Those methods that have become available since the EA was developed are addressed below.

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

Night vision and FLIR equipment aid in locating wildlife at night when wildlife may be more active. Night vision and FLIR equipment could be used during wildlife surveys and in combination with shooting to remove wildlife at night. WS' personnel most often use this technology to target mammals in the act of causing damage or likely responsible for causing damage. The use of those methods allows WS to conduct activities at night when human activities are minimal; thereby, reducing risks to human safety.

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

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

product must also be registered with the state and approved for use by the appropriate state agency responsible for managing wildlife. In New Jersey, GonaCon™ has been registered for the management of the white-tailed deer population by the New Jersey Department of Environmental Protection, Pesticide Control Program. The product can only be used by WS, the NJDFW, and persons under their direct supervision. In addition, the Game Code (N.J.A.C. 7:25-5) of New Jersey specifically requires that "[f]*ertility control methodologies, including contraception, contragestation and sterilization materials and procedures, may be used by the cooperator and/or its agents who have been issued the Special Permit to Inhibit Wildlife Reproduction approved by the Council and issued by the* [NJDFW]..." (see N.J.A.C. 7:25-5.32(d)(5)). The "*Special Permit to Inhibit Wildlife Reproduction*" and the procedures for issuing the permit are further described at N.J.A.C. 7:25-5.37(a).

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

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

Threatened and Endangered Species Consideration

Since the completion of the EA, additional species have been listed as threatened or endangered in the State. As part of the supplement to the EA, WS will evaluate mammal damage management activities under the proposed action alternative as described in the EA and as proposed in the supplement to the EA to ensure activities are not likely to jeopardize the continued existence of any threatened and endangered species listed by the United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the NJDFW. Further evaluation of threatened and endangered species will occur under Issue 2 below.

As stated previously, the proposed supplement will evaluate potential impacts related to the increased need for the reduction of damage and threats associated with mammals in the State. Methods available to WS under each of the alternatives are evaluated and discussed in detail in Appendix B of the EA (USDA 2004) and also in WS' programmatic FEIS (USDA 1997). This supplement will also evaluate additional

methods that could be used by WS under the alternatives. The increased use of methods to address an increasing number of requests for assistance will also be evaluated in this supplement to the EA.

V. RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

Information from the following documents has been incorporated by reference into the EA and this proposed supplement to the EA. Additional documents are addressed in Section 1.4 of the EA (USDA 2004).

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

Environmental Assessment and Finding of No Significant Impact – Oral Vaccination to Control Specific Rabies Virus Variants in Raccoons, Gray Fox, and Coyotes in the United States: An EA was developed to analyze the potential for environmental effects of WS' involvement in the funding of and participation in Oral Rabies Vaccination programs to eliminate or stop the spread of raccoon rabies in a number of eastern states (including New Jersey) and gray fox and coyote rabies in Texas (USDA 2001). The EA has been supplemented with additional information and analyses. Pertinent information from the EA and supplements has been incorporated by reference into this document.

Environmental Assessment and Finding of No Significant Impact – Oral Vaccination to Control Specific Rabies Virus Variants in Raccoons on National Forest System Lands in the United States: An EA was developed to analyze the environmental effects of WS' involvement in the funding of and participation in Oral Rabies Vaccination programs to eliminate or stop the spread of raccoon rabies on Forest Service lands in a number of eastern states (including New Jersey) (USDA 2005). Pertinent information from the EA and supplements has been incorporated by reference into this document.

VI. DECISIONS TO BE MADE

Based on agency relationships, Memorandums of Understanding (MOUs), and legislative authorities, WS was the lead agency for the EA, and therefore, responsible for the scope, content, and decisions made. The NJDFW is responsible for managing wildlife in the State of New Jersey, including the establishment and enforcement of regulated hunting and trapping seasons in the State. WS' activities to reduce and/or prevent mammal damage in the State would be coordinated with the NJDFW which ensures WS' actions are incorporated into population objectives established for wildlife populations in the State.

Based on the scope of the EA and this supplement to the EA, the decisions to be made are: 1) should WS continue to conduct wildlife damage management to alleviate damage and threats to property and human safety in the State, 2) should WS conduct disease surveillance and monitoring in the wildlife population when requested by the NJDFW and other agencies, 3) should WS continue to implement an integrated wildlife damage management strategy, including technical assistance and direct operational assistance, to meet the need for mammal damage management in the State, 4) if not, should WS attempt to implement one of the alternatives to an integrated damage management strategy as described in the EA, and 5) would continuing the proposed action alternative under this supplement result in adverse impacts to the environment requiring the preparation of an Environmental Impact Statement (EIS) based on activities conducted since the completion of the EA and/or based on new information available.

VII. SCOPE OF ANALYSIS

The EA and this supplement to the EA evaluate mammal damage management activities in New Jersey to reduce damage and threats to human safety in the State. The scope of analysis remains valid as addressed in the EA unless otherwise discussed in this supplement.

Actions Analyzed

The EA and this supplement evaluate the need for mammal damage management to reduce damage to agricultural resources, natural resources, property, and threats to human safety within the State of New Jersey wherever such management is requested by a cooperator. The EA and this supplement discuss the issues associated with conducting mammal damage management in the State to meet the need for action and evaluate different alternatives to meet that need while addressing those issues.

WS uses a decision model based on a publication by Slate et al. (1992) which involves evaluating each request for assistance, taking action, evaluating the action, and monitoring results of the actions taken. Slate et al. (1992) provides more detail on the processes used in WS' Decision Model. WS' programmatic FEIS (USDA 1997) also provides more detail and examples of how the model is used. WS' personnel use the Decision Model to develop the most appropriate strategy to reduce damage and to determine potential environmental effects from damage management actions (Slate et al. 1992, USDA 1997, USDA 2004).

Native American Lands and Tribes

Currently, WS does not have MOUs or signed cooperative service agreements with any Native American tribes in New Jersey. If WS enters into an agreement with a tribe for wildlife damage management on tribal property, the EA would be reviewed and supplemented, if appropriate, to ensure compliance with the National Environmental Policy Act (NEPA).

Period for which the EA is Valid

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

Site Specificity

The EA and this supplement analyze the potential impacts of mammal damage management and address activities on those properties currently under a MOU or cooperative service agreement with WS where activities have been and currently are being conducted. The EA and this supplement also address the impacts of mammal damage management where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional mammal damage management efforts could occur at additional locations in the State. Thus, the EA and this supplement anticipate the potential expansion and analyze the impacts of such efforts as part of the program.

Planning for the management of wildlife damage must be viewed as being conceptually similar to federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they would occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, and insurance companies. Although some of the sites where wildlife damage would occur can be predicted, all specific locations or times where such damage would occur in any given year cannot be predicted. This EA emphasizes major issues as they relate to specific areas whenever possible; however, many issues apply wherever mammal damage and the resulting management occur, and are treated as such. The standard WS Decision Model (Slate et al. 1992, USDA 1997, USDA 2004) would be the site-specific procedure for individual actions conducted by WS in New Jersey.

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

Public Involvement

The EA was made available to the public for a 31-day comment period by a legal notice in *The Gloucester County Times, The Press of Atlantic City, The Star Ledger, Courier Post,* and *Today's Sunbeam* on April 22, 2004 and April 23, 2004. A letter of availability for the EA was also mailed directly to agencies, organizations, and individuals with probable interest in the proposed program. A total of eight comment documents were received from the public during the public involvement process. Comments from the public involvement process were reviewed for substantive issues and alternatives which were considered in developing the Decision for the EA. Based upon those comments, several minor editorial changes were incorporated into the EA. Those minor changes enhanced the understanding of the proposed program, but did not change the analysis provided in the EA. Responses to specific comments were included in Appendix A of the Decision for the EA.

After consideration of the analysis contained in the EA and review of public comments, a Decision and FONSI for the EA was issued on May 28, 2004. The Decision and FONSI selected the proposed action alternative which implemented an integrated damage management program in New Jersey using multiple methods to adequately address the need to manage damage caused by mammals.

This supplement to the EA, along with the EA and the 2004 Decision/FONSI, will be made available for public review and comment through the publication of a legal notice announcing a minimum of a 30-day comment period. The legal notice will be published at a minimum in *The Times of Trenton* and posted on the APHIS website located at http://www.aphis.usda.gov/wildlife_damage/nepa.shtml according to WS' public notification requirements (72 FR 13237-13238). A notice of availability for this supplement to the EA will also be directly mailed to agencies, organizations, and individuals with probable interest in the proposed program. Comments received during the public involvement process will be fully considered for new substantive issues and alternatives.

VIII. AFFECTED ENVIRONMENT

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

analysis area. The EA and this supplement analyze the potential impacts of mammal damage management and address activities in New Jersey that are currently under a MOU or cooperative service agreement with WS where activities have been and currently are being conducted. The EA and this supplement also address the impacts of mammal damage management in the State where additional agreements may be signed in the future.

More specific locations could include areas in and around commercial, industrial, public, and private buildings, facilities and properties and at other sites where mammals may burrow, feed, or otherwise occur. Examples of areas where mammal damage management activities could be conducted are, but are not necessarily limited to: agricultural fields, vineyards, orchards, farmyards, dairies, ranches, livestock operations, aquaculture facilities, fish hatcheries, grain mills, grain handling areas, railroad yards, waste handling facilities, industrial sites, natural areas, government properties and facilities, private properties, corporate properties, schools, hospitals, parks, woodlots, recreation areas, communally-owned homeowner/property owner association properties, wildlife refuges, wildlife management areas, coastal and tidal beaches, ponds, rivers, and inlets, military bases, and airports.

Airports

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

Federal Property

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

Similar to mammals found on airport properties, mammals confined inside a perimeter fence at federal facilities originate from free-ranging populations and thus, are not considered a unique population.

Commonwealth Property

Activities could be conducted on properties owned and/or managed by the State when requested, such as parks, forestland, historical sites, natural areas, scenic areas, conservations areas, and campgrounds.

Mammal damage management activities could be requested to occur on state highway right-of-ways and interstate highway right-of ways.

Municipal Property

Activities under the alternatives could be conducted on city, county, town, or other local governmental properties when requested by those entities. Those areas could include, but would not be limited to city parks, landfills, woodlots, cemeteries, greenways, treatment facilities, utilities areas, and recreational areas. Similar to other areas, mammals can cause damage to natural resources, agricultural resources, property, and threaten human safety in those areas. Areas could also include properties in urban and suburban areas of the State.

Private Property

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

Disease Surveillance and Monitoring Activities

Upon receiving a request for assistance, mammal damage management activities could be conducted on private, federal, state, county, and municipal lands in the State for the purposes of studying, containing, and curtailing disease outbreaks in mammal populations. Areas of the proposed action where disease sampling could occur would include, but would not limited to, state, county, municipal and federal natural resource areas, park lands, and historic sites; state and interstate highways and roads; railroads and their right-of-ways; property in or adjacent to subdivisions, businesses, and industrial parks; timberlands, croplands, and pastures; public and private properties in rural/urban/suburban areas where mammals are a threat to human safety through vehicle collisions and the spread of disease. The area of the proposed action would also include airports and military airbases where mammals are a threat to human safety and to property; areas where mammals negatively impact wildlife, including threatened and endangered species; and public property where mammals are negatively impacting historic structures, cultural landscapes and natural resources. Activities are only conducted by WS when requested and only on those properties where a MOU, cooperative service agreement, or other comparable document has been signed between WS and the entity requesting WS' assistance.

IX. ISSUES ANALYZED IN DETAIL

Issues are concerns raised regarding potential environmental problems that might occur from a proposed action. Such issues must be considered in the NEPA decision-making process. Issues relating to the reduction of wildlife damage were raised during the scoping process for WS' programmatic FEIS (USDA 1997) and were considered in the preparation of the EA. Issues related to managing damage and threats associated with mammals in New Jersey were developed by WS in consultation with the NJDFW. The EA was also made available for public review and comment to identify additional issues.

The major issues are discussed in detail in Chapter 2 of the EA (USDA 2004). Alternatives identified during the development of the EA to address those issues are discussed in Chapter 3 of the EA (USDA 2004). The following issues were identified during the scoping process for the EA:

- Issue 1 - Effects on target mammal species

- Issue 2 - Effects on other wildlife species, including threatened and endangered species
- Issue 3 - Effects on human health and safety
- Issue 4 - Impacts to stakeholders, including aesthetics
- Issue 5 - Humaneness and animal welfare concerns of methods used

X. ISSUES ADDRESSED BUT NOT ANALYZED IN DETAIL

In addition to the identified major issues considered in detail, four issues were considered in section 2.3 of the EA, but were not analyzed in detail with the rationale provided in the EA (USDA 2004). WS has reviewed the issues not considered in detail as described in the EA and has determined that the analyses provided in the EA are still appropriate regarding those issues.

XI. ALTERNATIVES ANALYZED IN DETAIL

The alternatives considered and evaluated using the identified issues are described and discussed in detail in Chapter 3 of the EA (USDA 2004). In addition, the EA contains a detailed description and discussion of the alternatives and the effects of the alternatives on the issues identified (USDA 2004). Appendix B of the EA provides a description of the methods that could be used or recommended by WS under each of the alternatives. The EA describes four alternatives that were developed to address the issues identified above. Alternatives analyzed in detail include:

Alternative 1 - Technical Assistance Only
Alternative 2 - Integrated Mammal Damage Management Program (Proposed Action/No Action)
Alternative 3 - Non-lethal Mammal Damage Management Only By WS
Alternative 4 - No federal WS Mammal Damage Management

XII. ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Three additional alternatives were considered, but were not analyzed in detail in the EA. Alternatives considered but not analyzed in detail are discussed in Section 3.3 of the EA (USDA 2004). WS has reviewed the alternatives not analyzed in detail in the EA and has determined that the analyses provided in the EA have not changed and are still appropriate.

XIII. STANDARD OPERATING PROCEDURES

The current WS program uses many Standard Operating Procedures (SOPs) which are discussed in Chapter 3 (see Section 3.4) of the EA (USDA 2004) and Chapter 5 of WS' programmatic FEIS (USDA 1997). The SOPs discussed in the EA remain appropriate for WS' wildlife damage management activities conducted in the State.

XIV. ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

The major issues are discussed in detail in Chapter 2 of the EA (USDA 2004). Alternatives developed and identified during the development of the EA to meet the need for action and to address those issues are discussed in Chapter 3 of the EA (USDA 2004). Potential impacts of Alternative 1, Alternative 3, and Alternative 4 on the human environment related to the major issues have not changed from those described and analyzed in the EA and thus do not require additional analyses in this supplement. Chapter 4 of the EA contains a detailed discussion and comparison of the identified alternatives and the major issues (USDA 2004). The issues were identified as important to the scope of the analysis in the EA (40 CFR 1508.25). Alternative 2 (proposed action/no action), as described in the EA, addresses requests for

mammal damage management in the State using an integrated damage management approach by WS. The following is an analysis of potential impacts for each of the major issues analyzed in the EA since the completion of the EA and this supplement to the EA as related to Alternative 2 (proposed action/no action alternative):

Issue 1 - Effects on Target Mammal Species

A common issue when addressing damage caused by wildlife are the potential impacts of management actions on the population of target species. Methods used to resolve damage can involve altering the behavior of target species and may require the use of lethal methods when appropriate. Under the proposed action alternative, WS provides technical and direct damage assistance using methods described in Appendix B of the EA in an integrated approach in which all or a combination of methods may be employed to resolve a request for assistance (USDA 2004).

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

Non-lethal methods are generally regarded as having minimal impacts on overall populations of wildlife since those species are unharmed and the actual number of individuals of a population is not reduced. WS' previous and continued use of non-lethal methods would have no adverse impacts on target mammal populations in the State. The only non-lethal method currently available that if used could result in population reductions is GonaCon™ which is registered with the EPA to manage local deer populations. The use of a reproductive inhibitor could reduce local deer populations through attrition (*i.e.*, deer that die are not replaced through reproductive output leading to a decline in the overall number of deer). The potential for the reproductive inhibitor to reduce deer populations will be further discussed below.

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

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

WS has provided direct damage management and technical assistance in response to requests for assistance in New Jersey since the completion of the EA. Descriptions and application of direct damage management and technical assistance projects are discussed in detail in section 3.2 of the EA (USDA 2004). All mammal damage management activities conducted by WS were pursuant to relevant federal, State, and local laws and regulations. Integrated damage management activities conducted under the selected alternative in the EA from FY 2004 through FY 2010 are discussed below by year.

Mammal Damage Management Conducted in New Jersey by WS during FY 2004

WS continued to implement and employ an integrated damage management approach to reducing threats and damage caused by mammals in FY 2004 through the recommendation and use of multiple methods. Technical assistance provides those persons seeking assistance with information on damage identification, species identification, available methods, and how to employ available methods to resolve or prevent damage. Operational assistance involves the direct application of methods and techniques by WS to alleviate damage caused by mammals when a request for such assistance is received. WS conducted four technical assistance projects in FY 2004 involving mammal species through the recommendation of methods to resolve damage and threats without WS' direct involvement (see Table 3). Requests for assistance involved damage and threats to property and human health and safety. Technical assistance projects involved damage or threats of damage caused by beaver, striped skunks, woodchucks, and Eastern gray squirrels.

Table 3 – WS' technical assistance projects conducted during FY 2004

Species	Resource[a]				Total
	A	N	P	H	
Beaver	0	0	1	0	**1**
Striped Skunk	0	0	1	0	**1**
Woodchuck	0	0	0	1	**1**
Eastern Gray Squirrel	0	0	0	1	**1**

[a]A=Agricultural Resources, N=Natural Resources, P=Property, H=Human Safety

In addition to technical assistance, WS conducted direct operational assistance in New Jersey in which WS was directly involved with resolving damage associated with mammal species. During FY 2004, WS provided direct operational assistance during six projects involving mammals in the State. Those projects were conducted to reduce threats of damage associated with mammals occurring at airports and to reduce predation threats that mammals can pose to nesting threatened and endangered species.

The number of mammals lethally taken during direct operational assistance provided by WS in FY 2004 to alleviate damage or threats of damage is shown in Table 4. WS primarily employed cage traps to live-capture mammals during operational assistance conducted in FY 2004. Those target mammal species live-captured in cage traps by WS during direct operational assistance were subsequently euthanized. Euthanasia occurred in accordance with WS Directive 2.505. A total of 21 opossum were live-captured

and euthanized during FY 2004 to alleviate damage in the State, primarily to reduce threats of predation on nesting shorebirds.

Cable restraints (snares) were also employed by WS to alleviate damage associated with coyotes in the State during FY 2004, primarily to reduce threats of predation on nesting shorebirds. In addition, four feral cats were live-captured in cage traps during FY 2004 to alleviate damage or threats of damage and were released unharmed to a local animal shelter for care and to determine the adoptability of the cats. After release of the feral cats to the animal shelter, the care and disposition of the feral cats were the responsibility of the shelter.

Table 4 – WS' take and live-capture of mammal species in New Jersey by method during FY 2004

Species	Method			TOTAL
	Cage Trap (lethal)†	Cage Trap (non-lethal)‡	Cable Restraint	
Coyote	0	0	2	**2**
Opossum	21	0	0	**21**
Raccoon	6	0	0	**6**
Striped Skunk	1	0	0	**1**
Norway Rat	8	0	0	**8**
Feral Cat	0	4	0	**4**

†Mammals were live-captured using the described methods and subsequently euthanized in accordance with WS Directive 2.505.
‡Mammals were either freed onsite, translocated, or brought to a local animal shelter.

Those methods employed by WS in FY 2004 to alleviate damage or threats of damage were addressed in Appendix B of the EA (USDA 2004). Carcasses of target wildlife lethally removed by WS were disposed of in accordance with WS Directive 2.515.

Mammal Damage Management Conducted in New Jersey by WS during FY 2005

WS continued to implement and employ an integrated damage management approach to reducing threats and damage caused by mammals in FY 2005 through the recommendation and use of multiple methods. WS conducted two technical assistance projects in FY 2005 involving muskrats through the recommendation of methods to resolve damage and threats without WS' direct involvement. The requests for assistance associated with muskrats involved damage and threats to property. Muskrats often burrow into embankment used to impound water. Muskrat burrows can allow water to seep into embankments which can weaken the structures through erosion.

Similar to those operational assistance projects conducted in FY 2004, requests for direct operational assistance in FY 2005 involved mainly threats at airports and predation of shorebird nests. During direct operational assistance projects conducted in FY 2005, WS employed firearms to lethally take one coyote and cage traps to live-capture opossum, raccoons, Norway rats, striped skunks, and feral cats (see Table 5).

Similar to FY 2004, the primary method employed by WS to alleviate damage or threats of damage was cage traps. Target mammal species live-captured in cage traps were subsequently euthanized in accordance with WS Directive 2.505 to alleviate damage or threats of damage, unless otherwise indicated in Table 5 below. Feral cats live-captured using cage traps were subsequently released to a local animal shelter for care and to determine the adoptability of the cats. After release of the feral cats to the animal shelter, the care and disposition of the feral cats were the responsibility of the shelter.

Table 5 – WS' take and live-capture of mammal species in New Jersey by method during FY 2005

Species	Method			Total
	Firearm	Cage Trap (lethal)†	Cage Trap (non-lethal)‡	
Coyote	1	0	0	**1**
Opossum	0	17	11	**28**
Raccoon	0	13	26	**39**
Norway Rat	0	4	3	**7**
Striped Skunk	0	0	2	**2**
Feral Cat	0	0	5	**5**

†Mammals were live-captured using the described methods and subsequently euthanized in accordance with WS Directive 2.505.
‡Mammals were either freed onsite, translocated, or brought to a local animal shelter.

Those methods employed by WS in FY 2005 to alleviate damage or threats of damage were addressed in the EA in Appendix B (USDA 2004). Carcasses of target wildlife lethally removed by WS were disposed of in accordance with WS Directive 2.515.

Mammal Damage Management Conducted in New Jersey by WS during FY 2006

WS' activities continued in FY 2006 with the use of an integrated approach to managing mammal damage and threats. WS did not receive requests for technical assistance involving mammals during FY 2006. Thus, WS provided only direct operational management during FY 2006.

During FY 2006, WS provided direct management assistance involving at least nine species of mammals (see Table 6). Similar to previous years, requests for assistance were primarily received to alleviate damage or threats of damage occurring at airports and to reduce threats of nesting shorebird predation. The number of mammal species addressed in FY 2006 increased compared to the number addressed by WS in FY 2005. In FY 2006, the number of airports requesting assistance with managing threats associated with wildlife strikes increased which lead to WS addressing more species of mammals and addressing an increasing number of individuals of each species.

Table 6 - WS' take of mammal species in New Jersey by method during FY 2006

Species	Method				TOTAL
	Firearm	Cage Trap†	Snap Trap	Snare	
Coyote	6	0	0	3	**9**
Red Fox	1	0	0	3	**4**
White-tailed Deer	1	0	0	0	**1**
Raccoon	0	5	0	0	**5**
Deer Mice	0	0	19	0	**19**
Field Mice	0	0	6	0	**6**
Voles	0	0	9	0	**9**
Shrews	0	0	15	0	**15**
Norway Rat	0	2	0	0	**2**

†Mammals were live-captured using the described methods and subsequently euthanized in accordance with WS Directive 2.505.

Deer mice, field mice, voles, and shrews were lethally taken using snap traps as part of wildlife hazard assessments conducted at airports in the State to evaluate rodent densities on airport properties. Rodents can act as attractants for raptors and predatory mammal species which can pose threats to aircraft.

Those methods employed by WS in FY 2006 to alleviate damage or threats of damage were addressed in the EA in Appendix B (USDA 2004). Carcasses of target wildlife lethally removed by WS were disposed of in accordance with WS Directive 2.515.

Mammal Damage Management Conducted in New Jersey by WS during FY 2007

WS' mammal damage management activities in FY 2007 were similar to the implementation of the proposed action alternative in previous years. WS continued to provide both technical assistance and direct operational assistance to requestors. WS conducted a total of one technical assistance project in FY 2007 involving red fox damage to livestock, while requests for direct operational assistance by WS involved at least nine species of mammals (see Table 7).

As with requests received previously, most requests in FY 2007 involved damage or threats of damage occurring at airports in the State along with activities conducted to reduce threats of predation on the eggs and nestlings of threatened and endangered species. WS employed firearms, cage traps, snap traps, and cable restraints (snares) to alleviate damage or threats of damage as requested by the cooperator seeking assistance. Target species live-captured in cage traps were subsequently euthanized in accordance with WS Directive 2.505. In addition to the five red fox lethally taken during FY 2007, WS employed gas cartridges to fumigate two red fox dens at the request of a cooperator to alleviate damage or threats of damage. Similar to FY 2006, mice and voles were lethally taken as part of sampling activities to determine prey densities at airports where those species can act as attractants for other predatory species that pose aircraft strike risks.

Table 7 - WS' take of mammal species in New Jersey during FY 2007 by method

Species	Method				TOTAL
	Firearm	Cage Trap†	Snap Trap	Snare	
Coyote	2	0	0	1	**3**
Red Fox	1	0	0	4	**5**
Opossum	0	13	0	0	**13**
Striped Skunk	1	0	0	0	**1**
Cottontail Rabbit	1	0	0	0	**1**
Deer Mice	0	0	7	0	**7**
Voles	0	0	3	0	**3**
Norway Rat	0	4	7	0	**11**
Raccoon	3	8	0	2	**13**

†Mammals were live-captured using the described methods and subsequently euthanized in accordance with WS Directive 2.505.

Those methods employed by WS in FY 2007 to alleviate damage or threats of damage were addressed in Appendix B of the EA (USDA 2004). Carcasses of target wildlife lethally removed by WS were disposed of in accordance with WS Directive 2.515.

Mammal Damage Management Conducted in New Jersey by WS during FY 2008

During FY 2008, WS continued to provide technical assistance and direct operational damage management to those persons requesting assistance with managing damage caused by mammals. WS continued to receive requests for assistance with several mammal species in New Jersey. WS received requests for technical assistance involving at least 14 species of mammals in FY 2008 while requests for direct operational assistance by WS involved at least seven species of mammals. Requests for technical assistance received by WS during FY 2008 are shown in Table 8 by resource category.

A total of 48 technical assistance projects were conducted by WS in New Jersey during FY 2008. Most requests for assistance involved damage or threats of damage associated with white-tailed deer and feral swine. Overall, most requests for assistance were associated with threats to human safety representing over 52% of the requests received by WS during FY 2008. Nearly 38% of the requests received involved damage or threats of damage to property, primarily associated with feral swine.

WS also employed lethal methods to take mammals during FY 2008 at the request of cooperators to reduce damage or threats of damage. The methods employed by WS to take mammals to alleviate damage or threats of damage are shown in Table 9. Most mammals lethally taken were live-captured in cage traps and subsequently euthanized in accordance with WS Directive 2.505. Similar to previous years, most requests for direct operational assistance were associated with threats occurring at airports in the State and to reduce predation on threatened and endangered species.

Table 8 – Technical assistance projects conducted by WS during FY 2008

	Resource[a]						Resource				
Species	**A**	**N**	**P**	**H**	**Total**	**Species**	**A**	**N**	**P**	**H**	**Total**
Beaver	0	0	2	0	**2**	**Striped Skunk**	0	0	2	1	**3**
Black Bear	0	0	1	1	**2**	**Eastern Gray Squirrel**	0	0	0	1	**1**
Coyote	0	0	2	3	**5**	**Woodchuck**	0	0	2	2	**4**
White-tailed Deer[†]	3	0	0	8	**11**	**Cottontail Rabbit**	0	0	0	1	**1**
Feral Swine	0	2	8	0	**10**	**Norway Rat**	0	0	0	1	**1**
Chipmunk	0	0	0	2	**2**	**Feral Cat**	0	0	1	2	**3**
Raccoon	0	0	0	2	**2**	**Bats (all)**	0	0	0	1	**1**
						TOTAL	**3**	**2**	**18**	**25**	**48**

[a]A=agricultural resources, N=Natural Resources, P=Property, H=Human Safety

[†]WS conducted eight technical assistance projects involving free-ranging deer and three projects involving captive deer

Cage traps and cable restrains (snares) were the methods most frequently used by WS to alleviate damage or threats of damage. The highest level of take during FY 2008 occurred during activities to alleviate damage associated with red fox and opossum. WS also employed gas cartridges to fumigate four red fox dens and 83 woodchuck burrow entrances during FY 2008 at the request of a cooperator seeking to alleviate damage associated with those mammal species.

Table 9 – WS' take of mammals by species in New Jersey during FY 2008 by method

Species	**Method**				**TOTAL**
	Firearm	**Cage Trap**[†]	**Corral Trap**[†]	**Snare**	
Coyote	1	0	0	3	**4**
Red Fox	1	0	0	35	**36**
Feral Swine	0	3	5	0	**8**
Opossum	0	16	0	0	**16**
Raccoon	0	5	0	6	**11**
Norway Rat	0	1	0	0	**1**
Woodchuck	0	4	0	0	**4**

[†]Mammals were live-captured using the described methods and subsequently euthanized in accordance with WS Directive 2.505.

Those methods employed by WS in FY 2008 to alleviate damage or threats of damage were addressed in the EA in Appendix B (USDA 2004) and all carcasses were disposed of in accordance with WS Directive 2.515.

Mammal Damage Management Conducted in New Jersey by WS during FY 2009

During FY 2009, WS continued to receive and respond to requests for assistance to manage damage associated with mammals in the State. To address those requests for assistance, WS continued to provide both technical assistance and operational assistance. Those persons requesting assistance reported to WS or WS verified damage associated with mammals totaling $3,350 in FY 2009. Similar to previous years, monetary damages associated with mammals that were reported to WS or were verified by WS occurred primarily to property and human health and safety during FY 2009.

WS conducted 75 technical assistance projects in New Jersey involving requests to alleviate damage and threats associated with mammals during FY 2009 which was an increase of over 56% compared to the number conducted in FY 2008 (see Table 10). WS conducted a total of 23 technical assistance projects involving white-tailed deer during FY 2009 with 20 technical assistance projects involving free-ranging deer and three projects involving captive white-tailed deer. Requests for technical assistance involving deer were primarily associated with damage to property and threats to human safety. However, WS also conducted four projects involving damage or the threat of damage to natural resources associated with deer. Threats to natural resources associated with deer are most often associated with areas where deer densities are extremely high, usually above carrying capacity, where deer over browse native vegetation with can reduce the aesthetic value of natural resources. Technical assistance projects involving beaver were the second highest number of projects conducted in FY 2009 with 16 projects, primarily associated with beaver damage to property. Overall, nearly 67% of the technical assistance requests received by WS involved damage or threats of damage to property caused by mammal species.

Table 10 – Technical assistance projects conducted by WS during FY 2009

	Resource[a]						Resource				
Species	**A**	**N**	**P**	**H**	**Total**	**Species**	**A**	**N**	**P**	**H**	**Total**
Beaver	0	0	15	1	**16**	**Raccoon**	0	1	6	1	**8**
Black Bear	0	0	0	1	**1**	**Striped Skunk**	0	1	0	1	**2**
Bobcat	0	0	0	1	**1**	**Eastern Gray Squirrel**	0	0	2	1	**3**
Coyote	1	0	2	0	**3**	**Woodchuck**	0	0	5	0	**5**
White-tailed Deer	0	4	10	9	**23**	**Muskrat**	0	0	7	0	**7**
Feral Swine	0	2	0	0	**2**	**Cottontail Rabbit**	0	0	1	0	**1**
Red Fox	0	1	1	0	**2**	**Flying Squirrel**	0	0	1	0	**1**
						TOTAL	**1**	**9**	**50**	**15**	**75**

[a]A=agricultural resources, N=Natural Resources, P=Property, H=Human Safety

WS also conducted one technical assistance project associated with damage to agricultural resources caused by coyotes within the State along with nine projects involving damage or threats occurring to natural resources. WS made recommendations on methods and techniques for reducing or alleviating damage caused by 14 species of mammals during FY 2009.

In addition to technical assistance, WS continued to employ direct damage management activities during FY 2009 when requested. The number of mammals addressed by WS during FY 2009 is shown in Table 11. During FY 2009, WS was requested to lethally take 39 captive white-tailed deer using firearms to protect property and human health and safety. The majority of the other species listed in Table 11 were lethally removed to reduce threats and predation to threatened and endangered species. All take by WS to alleviate damage or threats of damage in FY 2009 occurred within those parameters evaluated within the EA (USDA 2004). In addition, damage management activities were only conducted on those properties when requested by the appropriate property owner or manager.

Table 11 - WS' take of mammal species in New Jersey during FY 2009 by method

Species	Method				TOTAL
	Firearm	Cage Trap†	Body Gripping Trap	Snare	
Beaver	0	0	3	0	**3**
Coyote	0	0	0	5	**5**
White-tailed Deer	39	0	0	0	**39**
Feral Swine	1	0	0	0	**1**
Red Fox	0	0	0	12	**12**
Muskrat	0	0	4	0	**4**
Opossum	0	9	0	0	**9**
Raccoon	0	8	0	5	**13**
Striped Skunk	0	2	0	0	**2**

†Mammals were live-captured and subsequently euthanized in accordance with WS Directive 2.505.

Those methods employed by WS in FY 2009 to alleviate damage or threats of damage were addressed in the EA in Appendix B (USDA 2004). All carcasses of mammals lethally removed by WS were disposed of in accordance with WS Directive 2.515.

Mammal Damage Management Conducted in New Jersey by WS during FY 2010

During FY 2010, WS continued to receive and respond to requests for assistance to manage damage associated with mammals in the State. To address those requests for assistance, WS continued to provide both technical assistance and operational assistance. WS conducted 44 technical assistance projects in New Jersey involving requests to alleviate damage and threats associated with mammals during FY 2010 (see Table 12). Overall, damage or threats of damage to property, natural resources, and human safety caused by mammal species each comprised nearly 32% of the technical assistance requests received by WS. WS made recommendations on methods and techniques for reducing or alleviating damage caused by 14 species of mammals during FY 2010. WS conducted seven technical assistance projects associated with damage or threats of damage associated with coyotes which were the highest number of projects conducted for any of the 14 species followed by beaver and woodchucks at six projects for each species.

Table 12 – Technical assistance projects conducted by WS during FY 2010

Species	Resource[a]				Total	Species	Resource				Total
	A	N	P	H			A	N	P	H	
Bat	0	0	0	1	**1**	**Red Fox**	0	4	0	0	**4**
Beaver	0	0	6	0	**6**	**Muskrat**	0	0	3	0	**3**
Black Bear	1	0	0	1	**2**	**Raccoon**	0	2	0	0	**2**
Coyote	1	1	1	4	**7**	**Opossum**	0	2	1	0	**3**
White-tailed Deer†	0	0	0	2	**2**	**Striped Skunk**	0	1	0	1	**2**
Feral Cat	0	3	0	0	**3**	**Eastern Gray Squirrel**	0	0	0	1	**1**
Feral Swine	0	0	1	1	**2**	**Woodchuck**	1	0	2	3	**6**
						TOTAL	**3**	**13**	**14**	**14**	**44**

[a]A=agricultural resources, N=Natural Resources, P=Property, H=Human Safety

†WS conducted one technical assistance project involving free-ranging deer and one project involving captive deer

In addition to technical assistance, WS continued to employ direct damage management activities during FY 2010 when requested. The number of mammals addressed by WS during FY 2010 is shown in Table 13. WS addressed at least 13 species of mammals during direct operational assistance to alleviate damage or threats of damage, which was the highest number of species addressed during direct operational

assistance provided between FY 2004 through FY 2010. Two of those species addressed by WS are not native to the State. Feral swine and Norway rats are non-native species in New Jersey that often compete with native wildlife species for food and habitat.

During FY 2010, WS was requested to lethally take 30 captive white-tailed deer using firearms to protect property and human health and safety. Also during FY 2010, four feral swine were lethally removed to protect property and to collect samples for disease surveillance. Similar to previous years, the majority of requests for direct operational assistance, other than those previously discussed, were associated with threats occurring at airports in the State and to reduce predation on threatened and endangered species. In addition to the six woodchucks lethally taken during FY 2010, WS employed gas cartridges to fumigate 15 woodchuck burrows at the request of a cooperator to alleviate damage or threats of damage.

Deer mice and voles were targeted at airports by WS as part of wildlife hazard assessments being conducted to determine the densities of small rodents on airport properties. Although small rodents can cause direct damage to resources, at airports those rodents often act as attractants for other wildlife that pose a strike risk to aircraft using the airport, such as raptors and predatory mammals. As part of a comprehensive wildlife hazard assessment, WS samples rodent densities on airport properties to determine and identify potential risks to aircraft associated with wildlife that could be attracted to an airport due to high densities of rodents.

Table 13 - WS' take of mammal species in New Jersey during FY 2010 by method

Species	Method						TOTAL
	Firearm	Cage Trap†	Corral Trap†	Snap Trap	Body Gripping Trap	Snare	
Coyote	0	0	0	0	0	2	**2**
White-tailed Deer	30	0	0	0	0	0	**30**
Red Fox	2	6	0	0	0	2	**10**
Feral Swine	1	0	3	0	0	0	**4**
Woodchuck	0	4	0	0	0	2	**6**
Muskrat	0	0	0	0	4	0	**4**
Opossum	1	9	0	0	0	0	**10**
Raccoon	0	13	0	0	0	1	**14**
Striped Skunk	4	1	0	0	0	0	**5**
Cottontail Rabbit	17	1	0	0	0	0	**18**
Deer Mice	0	0	0	16	0	0	**16**
Voles	0	0	0	74	0	0	**74**
Norway Rat	0	0	0	2	0	0	**2**

†Mammals were live-captured using the described method and subsequently euthanized in accordance with WS Directive 2.505.

Those methods employed by WS in FY 2010 to alleviate damage or threats of damage were addressed in the EA in Appendix B (USDA 2004). All take occurred within the parameters evaluated within the EA. All carcasses of mammals lethally removed were disposed of in accordance with WS Directive 2.515.

Population Impact Analysis from WS' activities in New Jersey from FY 2004 through FY 2010

A common concern when addressing damage associated with wildlife species are the effects on the populations of those species from methods used to manage damage. The integrated approach of managing damage associated with mammals described in the EA under the proposed action alternative uses both non-lethal and lethal methods to resolve requests for assistance. Although non-lethal methods can disperse wildlife from areas where application occurs, those individuals are generally unharmed.

Therefore, adverse effects are not often associated with the use of non-lethal methods. However, methods used to lethally take mammals can result in local reductions in those species' populations in the area where damage or threats of damage are occurring.

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

WS' cumulative take of mammals by species from FY 2004 through FY 2010 to alleviate damage or threats of damage is shown in Table 14. The take of mammal species by WS from FY 2004 through FY 2010 that were specifically addressed in the EA occurred within the impact parameters analyzed. Those mammal species lethally taken by WS are not considered to be of low density in the State. Feral swine, feral cats, and Norway rats are considered non-native species in New Jersey that can have negative effects on native wildlife species. Any reduction in those species populations could be considered as being beneficial to the natural environment. In addition to lethal take, WS also live-captured four feral cats in FY 2004 and five feral cats in FY 2005 that were released to animal shelters for care and determination of adoptability.

Table 14 – WS' lethal take of mammals by species from FY 2004 through FY 2010

Species	Fiscal year							Total
	2004	2005	2006	2007	2008	2009	2010	
Beaver	0	0	0	0	0	3	0	**3**
Coyote	2	1	9	3	4	5	2	**26**
White-tailed Deer	0	0	1	0	0	39	30	**70**
Feral Swine	0	0	0	0	8	1	4	**13**
Red Fox	0	0	4	5	36	12	10	**67**
Muskrat	0	0	0	0	0	4	4	**8**
Opossum	21	28	0	13	16	9	10	**97**
Raccoon	6	39	5	13	11	13	14	**101**
Striped Skunk	1	2	0	1	0	2	5	**11**
Norway Rat	8	7	2	11	1	0	2	**31**
Woodchuck	0	0	0	0	4	0	6	**10**
Deer Mice	0	0	19	7	0	0	16	**42**
Field Mice	0	0	6	0	0	0	0	**6**
Voles	0	0	9	3	0	0	74	**86**
Shrews	0	0	15	0	0	0	0	**15**
Eastern Cottontail Rabbit	0	0	0	1	0	0	18	**19**

Beaver, coyotes, white-tailed deer, red fox, muskrats, opossum, raccoons, striped skunks, woodchucks, and cottontail rabbits all maintain sufficient densities in the State to allow for annual harvest seasons for those species. No daily take limits or possession limits exist for trapping coyotes, red fox, raccoons, skunks, opossum, nutria, and muskrats during the open trapping seasons in the State. Woodchucks,

coyotes, and fox can be harvested during the regulated hunting season without limit. Property owners or their agents can lethally take raccoons, opossum, skunks, woodchucks, red fox, and coyotes when those mammal species are causing damage to property or agricultural resources using lawful procedures at any time in accordance with State law and local ordinances (NJDFW 2010). Feral swine and Norway rats are non-native species within the State and are afforded no protection from take. Mice, voles, and shrews are non-game species within the State with no harvest season.

Harvest data from the NJDFW are shown in Table 15. Data shown in Table 15 include those mammal species harvested during annual regulated harvest seasons in the State which could include a hunting season and/or a trapping season. The number of mammal species lethally taken in the State to alleviate damage by other entities is currently not available. However, the take of mammals to alleviate damage by other entities does not reach a magnitude where cumulative adverse effects would occur.

When WS' take in Table 14 is compared to the annual harvest levels of those mammal species in New Jersey from Table 15, WS' take represents a small percentage of the annual take of those species. WS' take could be considered of low magnitude when compared to the cumulative take of those mammal species in the State. Population estimates for those mammal species in the State are currently not available. Since WS' take has been within the parameters evaluated in the EA and if the populations of those mammals species have remained at least stable in the State, the annual take of those species that occurs within the impact parameters evaluated in the EA would remain of a low magnitude when compared to those species' population estimates provided in the EA. No additional information was available on those species populations in New Jersey; therefore, those population estimates provided in the EA remain the best available information.

Table 15 – Species harvested during the hunting and trapping seasons in New Jersey, 2004-2010†

	Harvest Season							
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**
Beaver	496	579	632	711	653	523	607	**4,201**
Coyote	59	46	85	107	90	93	69	**549**
White-tailed Deer	69,456	58,564	59,657	56,673	47,017	53,260	52,784	**397,411**
Red Fox	2,477	2,666	3,144	3,108	3,263	2,504	2,461	**19,623**
Muskrat	56,413	39,208	34,465	33,747	25,721	28,089	36,933	**254,576**
Opossum	544	621	234	813	1,199	817	722	**4,950**
Raccoon	3,994	4,629	4,041	3,741	5,870	4,921	4,902	**32,098**
Striped Skunk	219	303	366	151	160	180	168	**1,547**
Woodchuck	20,654	N/A‡	3,794	N/A	25,463	N/A	38,344	**88,255**
Rabbit	38,884	N/A	30,431	N/A	59,425	N/A	64,347	**193,087**
Squirrel	36,721	N/A	18,140	N/A	35,348	N/A	43,612	**133,821**

†Information based on harvest survey information from the NJDFW

‡N/A=Data is currently unavailable

The EA concluded that the effects of WS' damage management activities in New Jersey would not adversely impact those populations of mammal species addressed in the EA when damage management activities occurred within the scope analyzed. Analyses conducted during the annual monitoring of WS' activities in New Jersey for the management of mammal damage determined that WS' lethal take of mammals in the State was not adversely impacting populations based on the best available information on those species' populations. The permitting of those activities by the NJDFW provides additional analyses and outside review that WS' activities since FY 2004 have not negatively impacted populations of those mammals addressed in the EA.

Population Impact Analysis of the Proposed Supplement to the EA

To further analyze WS' mammal damage management activities in the State and to clearly communicate to the public the potential individual and cumulative impacts of those activities, WS has prepared this supplement to the EA. This supplement will further address WS' increased take of muskrats, shrews, and Norway rats in the State to reduce damage and threats to human safety. In addition, this supplement will evaluate the potential impacts to feral swine, cottontail rabbit, and nutria populations in the State from damage management activities.

Muskrat Population Impact Analysis

Activities associated with managing damage and threats of damage associated with muskrats in the State were specifically addressed in the EA (USDA 2004). Since the completion of the EA, WS has received an increasing number of requests for assistance with muskrats. In association with the increasing number of requests for assistance is the likelihood that those persons requesting assistance will request WS address muskrat damage manage using lethal methods. Therefore, the number of muskrats taken annually by WS to address the increasing number of requests for assistance is also likely to increase. The EA evaluated an annual take of up to 100 muskrats (USDA 2004). However, based on recent requests for assistance and in anticipation of receiving additional requests for assistance, WS could annually take up to 200 muskrats in the State to alleviate damage or threats of damage associated with those requests.

Based on the best available information on muskrat densities and wetland habitat within the State, the EA estimated the minimum population of muskrats in the State at 1.2 million muskrats (USDA 2004). Muskrats maintain sufficient densities in the State to allow for annual trapping seasons which allow an unlimited number of muskrats to be harvested in the State during the open season. As shown in Table 15, trappers within the State have harvested 254,576 muskrats between 2004 and 2010, which is an average of 36,368 muskrats harvested annually. The highest level of take between 2004 and 2010 occurred during the 2004 trapping season when 56,413 muskrats were harvested in the State. The lowest take occurred during the 2008 trapping season when 25,721 muskrats were harvested. The declining number of muskrats harvested annually in the State during the trapping season from 2004 through 2010 is likely more of a function of declining fur values rather than indicating a declining population trend. The number of individuals harvested annually for fur is often a function of the value of pelts with harvest increasing as fur prices increase and harvest declining as fur prices decline.

With a statewide population estimated at 1.2 million muskrats, an annual take of up to 200 muskrats by WS would represent 0.02% of the population if the population remains at least stable. Based on an average annual take of 36,368 muskrats in the State from 2004 through 2010, WS' take of 200 muskrats would have represented 0.6% of the average annual harvest of muskrats in the State. If WS had taken 200 muskrats in FY 2008, the take would have represented 0.8% of the muskrats harvested in the State during the 2008 trapping season. Cumulatively, the average annual take of muskrats between 2004 and 2010 would have represented 3.0% of the estimated population in the State. If WS had lethally taken 200 muskrats annually from 2004 through 2010, the additional take by WS would have represented a minor component of the overall take and would not increase the cumulative take to a level where adverse effects to the muskrat population would occur. The unlimited harvest allowed by the NJDFW during the annual trapping season provides some indication the population of muskrats in the State is not subject to overharvest during the annual trapping seasons and from damage management activities. The take of muskrats by WS would only occur during the trapping season or when a Special Wildlife Management Permit has been issued by the NJDFW outside the trapping season to take muskrats and WS' take would only occur at levels authorized in the Permit.

Feral Swine Population Impact Analysis

The current population of feral swine in the State has been estimated to be 100 hogs and populations appear to be restricted to isolated pockets in Gloucester County (S. Predl, NJDFW pers. comm. 2010).

Feral swine are a non-native species in New Jersey that are negatively impacting resources and causing extensive damage. 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. Under this supplement to the EA, activities would occur to manage damage and threats associated with feral swine in New Jersey when a request for assistance is received and a cooperative service agreement, MOU, or comparable document has been signed by a cooperating agency or agencies and the property owner or property manager.

The NJDFW has management authority of all wildlife species, including feral swine, in New Jersey. Feral swine can be harvested during the regulated white-tailed deer hunting season in Deer Management Zone (DMZ) 25 with no limit on the number of swine that can be harvested. During the 2008 season, the NJDFW estimated that 56 feral swine were harvested in the State during the regulated deer season while 20 feral swine were harvested during the 2009 deer season (S. Predl, NJDFW pers. comm. 2010). In addition to those feral swine lethally taken in the State during the regulated deer season, WS has also been requested to assist with reducing damages associated with feral swine in the State. WS employed lethal methods to take eight feral swine to alleviate damages in FY 2008, one in FY 2009, and four in FY 2010.

Since the NJDFW regulates take of feral swine, any reduction in the feral swine population in New Jersey would be at the direction of the NJDFW which views any reduction in the population of feral swine as benefiting the native environment in New Jersey. Long-term objectives of the NJDFW could include the suppression or complete removal of feral swine from New Jersey. All activities to manage feral swine in New Jersey would be conducted pursuant to Executive Order 13112 and from the direction of the NJDFW. The NJDFW has expressed the intent and desire to suppress or remove feral swine in New Jersey.

Eastern Cottontail Rabbit Population Impact Analysis

There are nine species of cottontail rabbits in North America, north of Mexico. The Eastern cottontail is the most abundant and widespread of all those species. The Eastern cottontail is approximately 37-48 cm (15-19 inches) in length and weighs 0.9 to 1.8 kg (2 to 4 lbs.). Males and females are basically the same size and color. These animals do not distribute themselves evenly across the landscape, but tend to concentrate in favorable habitats such as brushy fence rows or field edges, gullies filled with debris, brush piles, areas of dense briars invaded with Japanese honeysuckle, or landscaped backyards where food and cover are suitable. Rabbits are rarely found in dense forest or open grasslands, but fallow crop fields may provide suitable habitat. Within these habitats they spend their entire lives in an area of 10 acres or less. Occasionally they may move a mile or so from summer range to winter cover or to a new food supply. In suburban areas, rabbits are numerous and mobile enough to fill any "*empty*" habitat created when other rabbits are removed. Population densities vary with habitat quality, but 1 rabbit per 0.4 hectares (1 acre) is a reasonable average (Craven 1994). Rabbits live only 12 to 15 months, yet make the most of time available reproductively. They can raise as many as six litters per year of one to nine young (usually four to six), having a gestation period of 28 to 32 days. If no young were lost, a single pair together with their offspring could produce 350,000 rabbits in five years (National Audubon Society 2000).

No population estimates were available for cottontail rabbits in New Jersey. In 2009, there were over 4.7 million acres of land in New Jersey, with approximately 734,000 acres considered farm lands (USDA 2010*b*). Using the assumption that 25% of the agricultural and pasture lands throughout the State have

sufficient habitat to support rabbits, rabbits are only found in agricultural and pasture land habitat, home ranges of rabbits do not overlap, and rabbit densities average 1 rabbit per acre, a statewide rabbit population could be estimated at nearly 184,000 rabbits. The population of rabbits within the State is likely higher than 184,000 rabbits given that rabbits also occur in other habitats, especially urban habitats that would not be represented in the estimated population level. Therefore, 184,000 rabbits would be considered a minimum population estimate under a worst case scenario.

Rabbits can be harvested in the State during annual regulated hunting seasons. During the 2010 hunting season, the NJDFW estimated the rabbit harvest in the State at 64,347 rabbits. Studies show that even if hunters take as many as 40% of the rabbits available in autumn, the rabbit population the following year would not be adversely affected because of the tremendous reproductive potential of rabbits (Fergus 2006). For example, the Pennsylvania Game Commission (PGC) estimated that hunters usually harvest less than 30% of the available rabbits in Pennsylvania (Fergus 2006). Using a statewide population estimated at 184,000 rabbits, the take of 64,347 rabbits during the 2010 hunting season would represent nearly 35% of the estimated population under a worst case scenario. The statewide population of rabbits is likely greater than 184,000 rabbits; therefore, the number of rabbits harvested in the State is likely a smaller percentage of the actual population.

Between FY 2004 and FY 2010, WS has employed lethal methods to take 19 rabbits to alleviate damage to property and human safety at airports. Most requests for assistance associated with cottontail rabbits are associated with airports. Although strike risks directly associated with rabbits at airports are minimal, the presence of rabbits in areas of operations at an airport can act as attractants for other wildlife species that can pose risks of aircraft strikes, such as raptors and predators.

Based on the number of airports that have requested assistance from WS previously, WS could lethally take up to 200 cottontail rabbits annually in the State to alleviate damage or threats of damage. If the population of cottontail rabbits remains at least stable in the State, WS' take of up to 200 rabbits annually would represent 0.1% of the minimum statewide population under a worst case scenario. As shown in Table 15, the NJDFW estimates 193,087 rabbits were harvested during the combined hunting seasons that occurred in 2004, 2006, 2008, and 2010 which is an average of 48,272 rabbits harvested in the State annually. If WS' estimated annual take of up to 200 rabbits is included with the average annual harvest of rabbits estimated at 48,272 rabbits, the cumulative take would represent 26.3% of the minimum statewide population estimate. The highest rabbit harvest level that has occurred in the State since 2004 occurred during the 2010 hunting season when 64,347 rabbits were harvested. If WS had lethally taken 200 rabbits during this season, the cumulative take of 64,547 rabbits by WS and during the regulated harvest would have represented 35.1% of the estimated minimum population of rabbits. As was stated earlier, the PGC estimated that a harvest level up to 40% of the rabbit population would not adversely affect the overall population. Damages and threats of damages associated with rabbits most often occur in urban areas and at airports within the State where hunting is restricted or not allowed. Therefore, WS' proposed take would not adversely affect the ability to harvest rabbits during the annual regulated hunting season in the State. The take of rabbits by WS would only occur during the hunting season or with a Special Wildlife Management Permit issued by the NJDFW outside of the hunting season and take would only occur at levels permitted.

Norway Rat Population Impact Analysis

Activities associated with managing damage and threats of damage by Norway rats in the State were specifically addressed in the EA (USDA 2004). Since the completion of the EA, WS has received an increasing number of requests for assistance with managing damage or threats of damage associated with Norway rats. In association with the increasing number of requests for assistance is the likelihood that those persons requesting assistance will ask WS to address Norway rat damage using lethal methods.

Therefore, the number of rats taken annually by WS to address the increasing number of requests for assistance is also likely to increase. The EA evaluated an annual take of up to 20 Norway rats (USDA 2004). However, based on recent requests for assistance and in anticipation of receiving additional requests for assistance, WS could annually take up to 200 Norway rats in the State to alleviate damage or threats of damage associated with those requests.

Norway rats are a non-native species in New Jersey that often compete with native wildlife for resources. The statewide population of Norway rats is currently unknown. The number of rats that are lethally taken annually in the State is unknown, but given the prolific nature of rats, the take of rats by other entities to alleviate damage or threats of damage is not likely causing a population decline in the State. Any reduction in the local or statewide population could benefit the natural environment by reducing competition between the non-native rats and native rat species. 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.

Given the limited take of Norway rats proposed by WS when compared to the likely statewide population of Norway rats, the proposed take of up to 200 rats by WS is of low magnitude.

Nutria Population Impact Analysis

The nutria is a large, dark colored, semi-aquatic rodent that is native to South America. It was introduced to the United States in the late 1930s (Whitaker, Jr. and Hamilton, Jr., 1998). The nutria is somewhat similar to the native muskrat in appearance. Nutria have small eyes and ears with a tail that is long, scaly, sparsely haired, and round (National Audubon Society 2000). Nutria weigh on average about 12 pounds (Whitaker, Jr. and Hamilton, Jr., 1998).

Nutria primarily inhabit brackish or freshwater marshes, but are also found in swamps, rivers, ponds, and lakes. They live in dense vegetation, in abandoned burrows, or in burrows they dig along stream banks or shorelines (Wade and Ramsey 1986). The burrowing activity of nutria can severely damage levees, dikes, earthen dams, and other structures. Nutria feed on terrestrial or aquatic green plants, but also feed on crops adjacent to their habitat. Nutria will consume approximately 25% of their own weight in food each day (Whitaker, Jr. and Hamilton, Jr., 1998).

Nutria females begin breeding in their first year. Breeding can occur at any time during the year. In the right conditions nutria can produce up to 15 young per year (Whitaker, Jr. and Hamilton, Jr., 1998). In the wild, the life expectancy of nutria is approximately two years. Home ranges for nutria are estimated to be from 12 to 445 acres, and densities range up to 10 nutria per acre (Whitaker, Jr. and Hamilton, Jr., 1998).

The current population of nutria in the State is unknown, but appears to be sporadic based on reported sightings. No confirmed sightings of nutria have occurred in New Jersey since the mid-1980s (A. Burnett, NJDFW pers. comm. 2010). An unconfirmed report of a nutria sighting occurred on the Lower Alloways Creek at Hancock's Bridge in Salem County in 2007. Another unconfirmed sighting occurred in 2010 when a nutria was reported on the Raritan River in Middlesex County. Other sporadic reports have occurred across the State, but most reports of sightings turn out to be muskrats, river otter, or woodchucks (A. Burnett, NJDFW pers. comm. 2010). Nutria populations are known to be established in nearby States, including Maryland and Delaware.

WS has not received requests for assistance associated with nutria previously; however, nutria are known to have established populations in adjacent states. In addition, nutria are considered an introduced species within the State that can cause extensive damage to native vegetation and often competes with native

wildlife species for resources. Since WS had not specifically received requests for assistance associated with nutria, nutria were not addressed in the EA (USDA 2004). However, based on the presence of established populations in adjacent states and the sightings occurring within the State, WS could receive requests for assistance to manage damage associated with nutria.

The number of nutria addressed by WS would be dependent on the number of requests received, the number of nutria associated with causing damage or the threat of damage, and the efficacy of methods employed to resolve the damage. If populations of nutria become established in New Jersey, WS anticipates that up to 200 nutria could be lethally taken by WS annually to resolve requests for assistance. Activities would only be conducted when requested by a property owner or property manager.

Nutria can be lethally taken during the trapping season for mink and muskrats in the State. Any nutria harvested during the open trapping season must be reported to the NJDFW to monitor the status of the species within the State. The take of nutria by WS would only occur during the appropriate trapping season or after a Special Wildlife Management Permit has been issued by the NJDFW outside the trapping season and only at levels permitted. Therefore, the take of nutria by WS would only occur at the discretion of the NJDFW and at levels to ensure the take by WS and take by other entities occurs with any population objectives established in the State. The current population objective of the NJDFW for nutria is to prevent the establishment of a permanent population in the State (A. Burnett, NJDFW pers. comm. 2011). 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. WS activities would be conducted pursuant to Executive Order 13112.

Shrew Population Impact Analysis

The EA evaluated the need for damage management activities associated with the short-tailed shrew, primarily at airports in the State where shrews can act as attractants for other wildlife species that pose strike risks at those airports when densities are high. However, other species of shrews are also present in New Jersey and can act as attractants for other wildlife at airports in the State. Airports often maintain habitat conditions which are preferred by species of shrews. The ranges of shrews often overlap and multiple species can be found at a particular location. In addition to the short-tailed shrew, WS could be requested to conduct surveillance and damage management activities associated with masked shrews, Tuckahoe masked shrews, water shrews, smokey shrews, long-tailed shrews, and least shrews.

Shrews would primarily be taken during wildlife hazard assessments conducted at airports to obtain information on densities of small mammals. Higher densities of shrews and other small mammals often attract higher numbers of raptors and other predatory wildlife to airports which increase strike risks. Therefore, as part of a comprehensive wildlife hazard assessment conducted at airports to identify strike risks, small mammal surveys are often conducted using live-traps or snap traps. Based on previous assessments conducted, and in anticipation of conducting additional surveys at airports, WS could lethally take up to 200 individuals of each species of shrew addressed in this supplement.

As was stated in Chapter 4 of the EA, shrews are considered a nongame species in New Jersey and are managed by the Endangered and Nongame Species Program of the NJDFW. The take of shrews can only occur through the issuance of a Depredation Control Permit or Scientific Collecting Permit issued by the NJDFW. Although statewide populations of shrews are unknown, they are not considered to be of low density within the State and are considered common in appropriate habitat. The reproductive potential of shrew species is very high with several liters of young being produced each year. Densities of shrews

vary by habitat and species, but have been estimated to range from 2 to 70 individual shrews per acre in North America (Schmidt 1994).

WS' take of shrews would only occur after an appropriate permit has been issued for those activities and only at levels permitted. Therefore, the take of 200 individuals of each shrew species would only occur when permitted by the NJDFW. Based on the limited take proposed by WS and the permitting of the take by the NJDFW, the potential annual take of up to 200 individuals of each of the shrew species addressed in the EA and this supplement would not reach a magnitude where adverse effects to the populations of those species would occur.

Disease Surveillance and Monitoring

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

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

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

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

Surveillance in Harvested Mammals: Check stations for harvestable mammal species provide an opportunity to sample dead mammals to determine the presence of a disease, and could supplement data collected during surveillance of live mammals. Sampling of mammals harvested or taken as part of damage management activities would focus on species that are most likely to be exposed to a disease.

Under the disease sampling strategies listed above that could be implemented to detect or monitor mammalian diseases in the United States, WS' implementation of those sampling strategies would not adversely affect mammal populations in the State. Sampling strategies that could be employed involve sampling live-captured mammals that could be released on site after sampling occurs. The sampling (*e.g.*, drawing blood, hair sample, fecal sample) and the subsequent release of live-captured mammals would not result in adverse effects since those mammals are released unharmed on site. In addition, sampling of sick, dying, or harvested mammals would not result in the additive lethal take of mammals that would not

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

have already occurred in the absence of a disease sampling program. Therefore, the sampling of mammals for diseases would not adversely affect the populations of any of the mammal species addressed in the EA or this supplement to the EA and would not result in any take of mammals that would not have already occurred in the absence of disease sampling (*e.g.*, hunter harvest).

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

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

GonaCon™ is currently registered with the EPA for use to manage local deer populations and has been registered for use in New Jersey through the Pesticide Control Program under the New Jersey Department of Environmental Protection. The product can only be used by WS, the NJDFW, and persons under the direct supervision. In addition, the use of the vaccine to manage localized deer populations by WS would only occur after a special permit has been issued by the NJDFW.

GonaCon™ is currently registered for use to prevent reproduction in female deer and only in female deer that are at least one year of age. As discussed previously, GonaCon™ when injected into the body elicits an immune response which neutralizes the GnRH hormone being produced naturally by deer. The GnRH hormone in deer stimulates the production of other sexual hormones which leads to the body reaching a reproductive state. The vaccine neutralizes the GnRH hormone being produced which then prevents the production of other sexual hormones in the deer vaccinated; thereby, preventing the body of the deer from entering into a reproductive state.

The administration of the vaccination would only occur after the deer has been live-captured and properly restrained or immobilized. Vaccination would only occur by hand injection of one-milliliter of GonaCon™ by intramuscular injection into a large muscle mass using a syringe with an 18- or 19-gauge stainless steel hypodermic needle. Female deer would be vaccinated at least two to three months prior to the onset of the reproductive season. Research has shown that the breeding behavior of female deer vaccinated with GonaCon™ could be reduced for up to four years (Miller and Killian 2000).

Population management from the use of reproductive inhibitors to induce a decline in a localized deer population occurs through a reduction in the recruitment of fawns into the population by limiting reproductive output of adults. A reduction in the population occurs when the number of deer being recruited into the population cannot replace those individuals that die from other causes each year which equates to a net loss in the number of individuals in the population and a reduction in the overall population. Although not generally considered a lethal method since no direct take occurs, reproductive inhibitors can result in the reduction of a target species' population. WS' use of GonaCon™ would target a local deer population identified as causing damage or threatening human safety. Although a reduction in a local deer population would likely occur from constant use of GonaCon™, the actual reduction in the local population annually would be difficult to derive prior to the initiation of the use of the vaccine.

One of the difficulties in calculating and analyzing any actual reduction that could occur from the use of the vaccine in a targeted population prior to application of the vaccine is the variability in the response of deer to the vaccine. Previous studies on GonaCon™ as a reproductive inhibitor have shown variability in the immune response of deer to the vaccine (Miller and Killian 2000). Not all deer injected with GonaCon™ develop sufficient antibodies to neutralize the GnRH produced in the body. Those deer continue to enter into a reproductive state and produce fawns even after vaccination. The number of deer

that do not develop sufficient antibodies after the initial vaccination cannot be predicted beforehand. In one study, 88% of the deer vaccinated with GonaCon™ did not produce fawns the following reproductive season while 12% of the deer injected with GonaCon™ produced fawns (Gionfriddo et al. 2009). The year following the initial vaccination, the number of deer that were vaccinated the first year that did not produce fawns declined to 47% while the number of deer producing fawns increased to 53% (Gionfriddo et al. 2009) demonstrating the diminishing results that are likely over time if deer are not provided a booster shot periodically.

Since the effects of GonaCon™ are reversible if deer are not provided with a booster shot periodically, the reduction in a local population of deer from the use of GonaCon™ can be maintained at appropriate levels where damages or threats are resolved by increasing or decreasing the number of deer receiving booster injections. Although localized deer populations would likely be reduced from the use of GonaCon™, the extent of the reduction would be variable. For example, not all vaccinated deer are prevented from entering into a reproductive state and those deer that are initially prevented from entering into a reproductive state often become reproductively active in subsequent years as the antibody levels neutralizing the GnRH hormone diminish over time. Therefore, the actual decline in the number of deer in a localized population achieved from the use of GonaCon™ would be difficult to predict prior to the use of the reproductive inhibitor. However, since the decline would occur through attrition over time and since the ability of the inhibitor to prevent reproduction diminishes with time, the actual decline in a localized population would be gradual and could be monitored. In addition, the reduction in a local deer population could be fully reversed if deer are no longer vaccinated or provided booster shots and other conditions (*e.g.*, food, disease) are favorable for population growth.

Turner et al. (1993) noted that although contraception in white-tailed deer may be used to limit population growth, it would not reduce the number of deer in excess of the desired level in many circumstances. Turner et al. (1993) further contend that initial population reductions by various other means may be necessary to achieve management goals, and that reproduction control would be one facet of an integrated program. Although immunocontraceptive technology has been effective in laboratories, pens, and in island field applications, it has not been effective in reducing populations of free-ranging white-tailed deer over large geographical areas.

Issue 2 - Effects on Other Wildlife Species, Including Threatened and Endangered Species

The issue of non-target species effects, including effects on threatened and endangered species arises from the use of non-lethal and lethal methods identified in the alternatives. The use of non-lethal and lethal methods has the potential to inadvertently disperse, capture, or kill non-target wildlife. WS' SOPs are designed to reduce the effects of damage management activities on non-target species' populations. To reduce the risks of adverse effects to non-target wildlife, WS selects damage management methods that are as target-selective as possible or applies such methods in ways that reduces the likelihood of affecting non-target species. Before initiating management activities, WS also selects locations which are extensively used by the target species and employs baits or lures which are preferred by those species. Despite WS' best efforts to minimize non-target take during program activities, the potential for adverse effects to non-targets exists when applying both non-lethal and lethal methods to manage damage or reduce threats to safety.

While every precaution is taken to safeguard against taking non-targets during operational use of methods and techniques for resolving damage and reducing threats caused by wildlife, the use of such methods can result in the incidental take of unintended species. Those occurrences are minimal and should not affect the overall populations of any species.

Non-target Species Analysis from WS' Activities in the State from FY 2004 through FY 2010

While every precaution is taken to safeguard against taking non-targets during operational use of methods and techniques for resolving damage and reducing threats caused by wildlife, the use of such methods can result in the incidental take of unintended species. Those occurrences are minimal and should not affect the overall populations of any species. Between FY 2004 and FY 2010, eight non-target species were captured during WS' mammal damage management activities in New Jersey. One white-tailed deer was live-captured in a restraining cable set to capture coyotes during FY 2009. The deer was released on site unharmed. In addition, a common snapping turtle (*Chelydra serpentina*) was lethally taken in a body-gripping trap set to take muskrats in FY 2009. In FY 2010, one white-tailed deer was lethally taken in a restraining cable set to capture coyotes at an airport and another was captured in a cage trap set for feral swine. The deer was euthanized due to injuries from the trap. Also in FY 2010, two European starlings and one Northern mockingbird were incidentally taken in snap traps set during small mammal surveys for a wildlife hazard assessment at an airport. Lastly, one wild turkey was captured in a cage trap set for feral swine and was released on site unharmed. WS' take of non-target species during activities to reduce damage or threats to human safety caused by mammals is expected to continue to be low to non-existent. WS would continue to monitor annually the take of non-target species to ensure program activities or methodologies used in damage management activities do not adversely impact non-targets.

The EA concluded that WS' damage management activities would have no adverse effects on other wildlife species (non-target), including threatened and endangered species throughout the State when those activities were conducted within the scope analyzed in the EA. Methods used by WS are essentially selective for target species when applied appropriately. In addition, WS adheres to those SOPs discussed in the EA to minimize the potential for non-target take. As discussed previously, the primary methods used during direct operational assistance by WS from FY 2004 through FY 2010 to resolve requests for assistance were shooting with firearms, traps (*e.g.*, cage traps, snap traps, body-gripping traps, corral traps), cable restraints, and gas cartridges.

No adverse effects to non-targets were observed or reported to WS during mammal damage management activities. WS would continue to monitor annually the take of non-target species to ensure program activities or methodologies used in mammal damage management do not adversely impact non-targets. WS' activities are not likely to adversely affect the viability of any wildlife populations from damage management activities.

Non-target Species Impact Analysis under the Proposed Supplement to the EA

The supplement to the EA evaluates those activities conducted by WS pursuant to the proposed action in the EA to resolve an increasing number of requests to manage damage or threats of damage to resources associated with feral swine, muskrats, Norway rats, cottontail rabbits, shrews, and nutria. WS' response to an increasing number of requests for direct operational assistance would result in the increased use of methods to resolve those requests. The number of methods employed to resolve the increasing requests for assistance could also increase under the proposed supplement to the EA. In addition, the frequency of individual method application to resolve requests for assistance is also likely to increase.

Take of other wildlife would also be expected under the supplement to the EA, but would likely be similar to the take levels that have occurred from FY 2004 through FY 2010. Take of other wildlife species is expected to be extremely low to non-existent. All non-target take would be evaluated annually to ensure non-target take does not reach a level that would cause adverse effects to non-target species. All non-target take is reported to the NJDFW to ensure WS' take is considered as part of the management objectives. The take of non-targets under the supplement is not expected to reach a magnitude that would cause adverse effects to those non-target populations likely to be taken during activities.

Exposure of non-target wildlife to GonaCon™ would occur primarily from secondary hazards associated with wildlife consuming deer that have eaten treated bait. Since GonaCon™ is applied directly to deer through hand injection after the animal has been live-captured and restrained, the risk of directly exposing non-target wildlife to GonaCon™ while being administered to deer is not likely to occur. Several factors inherent with GonaCon™ reduce risks to non-target wildlife from direct consumption of deer injected with the vaccine (EPA 2009). The vaccine itself and the antibodies produced by the deer in response to the vaccine are both proteins which if consumed would be broken down by stomach acids and enzymes (EPA 2009, USDA 2010*a*). The EPA determined that the potential risks to non-target wildlife from the vaccine and the antibodies produced by deer in response to the vaccine "*...are not expected to exceed the Agency's concern levels*" (EPA 2009).

Threatened and Endangered Species Analysis

No threatened and endangered species were taken or adversely affected by WS' actions conducted from FY 2004 through FY 2010. A review of threatened and endangered species listed by the USFWS and the NMFS showed that additional listings of in New Jersey have occurred since the completion of the EA in 2004. Appendix A of this supplement to the EA contains the current list of threatened and endangered species listed by the USFWS and the NMFS in the State.

Analysis of the Proposed Supplement to the EA on Threatened and Endangered species

Since the completion of the EA, the Eastern prairie fringed orchid (*Platanthera leucophaea*) has been federally listed in the State. In addition, the red knot (*Calidris canutus rufa*) has been listed as a candidate species in the State. The Queen snake (*Regina septemvittata*) has been state-listed by the NJDFW since the completion of the EA. The following analyses of those species listed since the completion of the EA will be discussed in relationship to the scope of the proposed action in the EA, including those activities analyzed in the supplement to the EA.

The Eastern prairie fringed orchid is currently listed in the State, but is currently not known to occur in New Jersey. Based on the likely absence of the orchid from the State and since WS' mammal damage management activities do not cause extensive habitat destruction or modification, WS' activities to resolve damage caused by mammals in New Jersey as addressed in the proposed supplement to the EA, including the use of new methods, would have no effect on the status of the orchid.

Red knots are long distance migrants that pass through New Jersey during spring and fall migration periods. During their migrations, red knots are found primarily in marine and estuarine habitats (Harrington 2001). Based on requests for assistance received previously by WS in New Jersey, the habitat in which red knots are found, and the limited time red knots are present in the State, WS has determined that the proposed action in the EA would have no effect on red knots if listing occurs.

Queen snakes are aquatic snakes associated with swiftly flowing creeks, brooks, and streams, but they can also be found along slower moving rivers and streams along with lakes. Snakes are rarely observed far from a water source. Crayfish comprise the primary diet of the queen snake with densities of queen snakes often correlated with densities of crayfish in an area. When fully grown, the queen snake can reach lengths of 16 to 24 inches. Historically, the range of the queen snake in New Jersey was restricted to a narrow area along the Delaware River from just south of Trenton to Gloucester County, with New Jersey likely being on the outer edge of the species range. The queen snake is likely extirpated from the State (NJDFW 2007) with the last recorded sighting of the snake in the State occurring in 1977 as of October 2001 (Schwartz and Golden 2002). Based on the limited geographical range of the species in New Jersey and the likely absence of the species in the State, WS' activities conducted pursuant to the proposed

action alternative in the EA and as addressed in this supplement to the EA would have no effect on the status of the queen snake in the State.

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

Those additional methods discussed in the proposed supplement to the EA that are available to manage damage associated with mammals, that have become available since the completion of the EA, allow for methods discussed in the EA to be employed more effectively and to be more target specific.

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

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

The use of night vision equipment, FLIR devices, and trap monitors would have no effect on threatened and endangered species listed in New Jersey, including their designated critical habitats. Based on the use pattern of GonaCon™ and the information discussed previously regarding non-target threats, the use of the vaccine is expected to have no effect on any threatened and endangered species listed in the State.

Issue 3 - Effects on Human Health and Safety

Based on the analyses in the EA and WS' programmatic FEIS, when WS' activities are conducted according to WS' directives and SOPs; federal, state, and local laws; and label requirements, those activities pose minimal risks to human safety (USDA 1997, USDA 2004). The analyses in the EA also concluded that WS' activities to reduce damage and threats associated with mammals were likely to have positive impacts to human health and safety by addressing safety issues and disease transmission associated with those mammal species.

Human Safety Analysis from WS' Activities in the State from FY 2004 through FY 2010

Management activities conducted by WS from FY 2004 through FY 2010 did not result in any injuries or illness to any members of the public or to WS' personnel. No injuries or illness from WS' activities were reported to WS from FY 2004 through FY 2010. WS' program activities had a positive impact in those situations that reduced the risks of potential injury, illness, and loss of human life from injurious mammal species. The EA concluded that an integrated approach to wildlife damage management had the greatest potential of successfully reducing potential risks to human health and safety in New Jersey.

Human Safety Analysis under the Proposed Supplement to the EA

The supplement to the EA evaluates the implementation of the proposed action to address an increasing number of requests for assistance to manage damage and threats associated with feral swine, muskrats, Norway rats, cottontail rabbits, shrews, and nutria which could result in methods being employed with more frequency to resolve damage. Those methods described in the EA inherently pose minimal risks to human safety when used appropriately and in consideration of human safety. WS would continue to incorporate those SOPs described in Chapter 3 of the EA into mammal damage management activities which would minimize the risks to human safety. Based on the use patterns of the methods available, an increase in the use of those methods to address those activities described in the supplement to the EA would not increase risks to human safety. WS' employees are trained in the proper use of methods to ensure the safety of the employee and the public. No adverse effects to human safety have occurred or have been reported to occur from WS' activities conducted from FY 2004 through FY 2010. An increase in the number of methods used or an increase in the frequency that a method is used would not increase risks to human safety when consideration of human safety is part of the use pattern associated with those methods.

Risks to human safety from the use of GonaCon™ are expected to be minimal and would occur primarily to those persons injecting the deer through accidental self-injection or those persons handling syringes. To reduce the risks of accidental exposure through self-injection, the label of GonaCon™ requires the use of long sleeved shirts, long pants, gloves, socks, and shoes. In addition, injection would only occur after deer are properly restrained to minimize accidental injection during application to the deer. The label also requires that children be absent from the area during application of the vaccine as well as a warning to women that accidental self-injection could cause infertility. Women who are pregnant would not be involved with handling or injecting of the vaccine.

In addition, human exposure could occur through consumption of deer that were treated with GonaCon™. As was discussed previously, the vaccine and the antibodies produced in response to the vaccine are amino acid proteins that if consumed would be broken down by stomach acids and enzymes, posing no risks to human safety. The vaccine would only be used in localized areas where deer populations have exceeded the biological or social carrying capacity. Those areas are likely places where hunting is prohibited or restricted (*e.g.*, in urban areas); therefore, the consumption of deer is unlikely in those areas where the vaccine would be used since hunting would be prohibited or restricted. Deer injected with the vaccine must also be marked for identification which would allow for placement of warnings to people that could take and consume a treated deer. Based on the use pattern of GonaCon™ and the chemical make-up of the vaccine and the antibodies, the risks to human safety from the use of the vaccine would be extremely low and would occur primarily to the handler (EPA 2009).

Issue 4 - Impacts to Stakeholders, including Aesthetics

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

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

Impacts to Stakeholders Analysis from WS' Activities in the State from FY 2004 through FY 2010

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

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

Impacts to Stakeholders Analysis under the Proposed Supplement to the EA

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

The ability to view and enjoy the aesthetic value of mammals at a particular site would be somewhat limited if those mammals causing damage or posing threats were removed as part of an integrated approach to managing damage. However, new mammals would most likely use the site in the future, although the length of time until those mammals arrive at the damage management site is variable, depending on the site, time of year, and population densities of those mammals in the surrounding areas. The opportunity to view mammals is available if a person makes the effort to visit sites outside of the damage management area.

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

Issue 5 - Humaneness and Animal Welfare Concerns of Methods Used

As discussed in the EA, humaneness, in part, appears to be a person's perception of harm or pain inflicted

on an animal. People may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

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

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

Therefore, WS' mission is to effectively address requests for assistance using methods in the most humane way possible that minimize the stress and pain of the animal. WS' personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible.

Humaneness Analysis from WS' Activities in the State from FY 2004 through FY 2010

Methods used in mammal damage management activities in New Jersey from FY 2004 through FY 2010 and their potential impacts on humaneness and animal welfare did not change from those analyzed in the EA. All methods employed by WS from FY 2004 through FY 2010 to alleviate mammal damage were discussed in the EA (USDA 2004). WS continued to employ methods as humanely as possible to minimize distress. Live-captured mammals addressed in the EA were euthanized using methods considered appropriate for wild mammals by the American Veterinary Medical Association (AVMA). Therefore, the analyses of the humaneness of methods used by WS to manage damage and threats caused by mammals from FY 2004 through FY 2010 did not change from those analyzed in the EA.

Humaneness Analysis under the Proposed Supplement to the EA

Since those methods described in Appendix B of the EA would continue to be available under the proposed supplement to the EA, the issue of humaneness would be similar despite the increase in frequency of the use of methods. Those methods considered inhumane by certain segments of society would be considered inhumane no matter the frequency of the use of those methods. Those methods considered inhumane that were addressed in the EA would continue to be considered inhumane under the supplement to the EA. Therefore, the analyses in the EA for the humaneness of methods would not change under the supplement to the EA. WS would continue to employ methods as humanely as possible and would continue to employ euthanasia methods recommended for wild mammals by the AVMA.

The issue of humaneness from those proposed activities in the supplement would remain as addressed in the EA since the methods available for use under the proposed supplement are the same as those methods addressed in Appendix B of the EA. The potential increase in activities by WS to address damage and

threats to human safety and property proposed in the supplement would not result in humaneness issues outside of those addressed in the EA for the methods available for use. The proposed use of trap monitoring devices would likely result in methods being used more humanely since monitoring devices allow traps to be checked using a receiver that indicates whether a trap has been triggered and potentially live-captured an animal. By allowing traps to be monitored remotely, traps can be checked more effectively and efficiently which allows those animals live-captured to be addressed more timely which minimizes the amount of time the animal is restrained. Therefore, the use of trap monitoring devices proposed under the supplement would likely result in traps being used more humanely. Additionally, the use of FLIR and night vision equipment to remove mammals may improve the perceived humanness of the removal of mammals as shooting is generally considered to involve less stress to the animal than trapping or the use of toxicants.

The use of GonaCon™ to reduce local deer populations would generally be considered humane since the animal is unharmed with reproduction in treated females restored if booster vaccinations do not occur. The production of antibodies is a natural process in mammals and does not result in pain or distress in the animal. Although some stress could occur from the deer being captured and restrained, those factors would be temporary and would generally subside once released.

XV. CUMULATIVE IMPACTS

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

WS' wildlife damage management activities would be the primary federal program with damage management responsibilities; however, other private entities may conduct similar activities in New Jersey as permitted by the NJDFW as well as the Bureau of Wildlife Management within the NJDFW which conducts wildlife damage management activities within the State. Through ongoing coordination with the NJDFW, WS is aware of such activities and may provide technical assistance in such efforts. WS does not normally conduct direct damage management activities concurrently with other entities in the same area, but may conduct activities at adjacent sites within the same timeframe. The potential cumulative impacts analyzed below could occur either as a result of WS' program activities over time or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

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

Issue 1 - Effects on Target Mammal Species

Evaluation of WS' activities relative to wildlife populations indicated that program activities would likely have no cumulative adverse effects on populations in New Jersey. WS' actions would be occurring

simultaneously, over time, with other natural processes and human-generated changes that are currently taking place. Those activities include, but are not limited to:

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

All those factors play a role in the dynamics of wildlife populations. In many circumstances, requests for assistance arise when some or all of those elements have contrived to elevate target species populations or place target species at a juncture to cause damage to resources. WS' actions taken to minimize or eliminate damage are constrained as to scope, duration and intensity, for the purpose of minimizing or avoiding impacts to the environment. WS evaluates damage occurring, including other affected elements and the dynamics of the damaging species; determines appropriate strategies to minimize effects on environmental elements; applies damage management actions; and subsequently monitors and adjusts/ceases damage management actions (Slate et al. 1992, USDA 1997, USDA 2004). This process allows WS to take into consideration other influences in the environment, such as those listed above, in order to avoid cumulative adverse impacts on target species.

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

Historical Outcomes of WS' Activities to Address Mammal Damage in the State

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

Since the completion of the EA, the number of species and the total number of mammal species addressed by WS in New Jersey has increased annually which provides some indication that WS' activities are not cumulatively impacting populations. WS continues to implement an integrated program that employs primarily non-lethal dispersal and harassment methods. WS would continue to provide technical assistance to those persons requesting assistance to identify and alleviate damage.

With management authority over those mammal species addressed in the EA and this supplement to the EA in New Jersey, the NJDFW can adjust take levels, including the take by WS, to ensure population objectives for those mammal species are achieved. Consultation and reporting of take by WS would ensure the NJDFW considers any activities conducted by WS.

WS' take has been and would continue to be a small component of the overall harvest of those target mammal species which is monitored and adjusted by the NJDFW to meet management objectives for those mammal populations in the State. Target species' populations in the State continue to remain relatively stable which provides an indication that the cumulative take of those species has not reached a level where an undesirable decline in those species' populations has occurred. WS' reporting of take to the NJDFW ensures fluctuations in those species' populations across the State occurs with the knowledge of the NJDFW and is considered when setting allowable take levels for those species to meet objectives.

WS' activities are conducted on a small portion of the land area of the State and although local declines in some populations could occur from WS' activities, those activities would not reach a level where target species' populations would be adversely affected from those actions.

SOPs Built into WS' Program

SOPs are designed to reduce the potential negative effects of WS' actions on wildlife, and are tailored to respond to changes in wildlife populations which could result from unforeseen environmental changes. This would include those changes occurring from sources other than WS. Alterations in program activities are defined through SOPs and implementation is insured through monitoring, in accordance with WS' Decision Model (Slate et al. 1992, USDA 1997, USDA 2004).

Current Status of Potentially Affected Wildlife Species

Natural and human-induced mortality patterns for wildlife are expected to remain essentially unchanged in New Jersey despite WS' activities. As a result, no cumulative adverse effects are expected from repetitive damage management programs over time in the fairly static set of conditions currently affecting wildlife in the State.

Issue 2 - Effects on Other Wildlife Species, including Threatened and Endangered Species

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

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

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

The methods described in Appendix B of the EA and this supplement all have a high level of selectivity and can be employed using SOPs to ensure minimal impacts to non-targets species. Between FY 2004 and FY 2010, eight non-target species were captured during WS' mammal damage management activities in New Jersey. These eight non-target individuals included three white-tailed deer, one common snapping turtle, one Northern mockingbird, two European starlings, and one wild turkey. Of those, one deer and the wild turkey were released unharmed on site. Based on the methods available to resolve mammal damage and/or threats, WS does not anticipate the number of non-targets taken to reach a magnitude where declines in those species' populations would occur. Therefore, take of non-targets would not cumulatively impact the populations of non-target species. WS has reviewed the threatened and endangered species listed by the USFWS and the NMFS and has determined that mammal damage management activities proposed by WS in this supplement would have no effect on threatened and endangered species. WS has also determined that mammal damage management activities proposed in this supplement would have no effect on threatened and endangered species and species of concern that are listed by the NJDFW. Cumulative impacts would be minimal on non-targets from any of the alternatives discussed.

Issue 3 - Effects on Human Health and Safety

Non-Chemical Methods

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

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

Questions have arisen about the deposition of lead into the environment from ammunition used in firearms to lethally remove mammals. As described in Appendix B of the EA, the lethal removal of mammal species with firearms by WS to alleviate damage or threats would occur using a rifle or shotgun. In an ecological risk assessment of lead shot exposure in non-waterfowl birds, ingestion of lead shot was identified as the concern rather than just contact with lead shot or lead leaching from shot in the

environment (Kendall et al. 1996). Hunt et al. (2009) also found that deer killed with rifles using lead bullets may pose a risk of lead exposure to scavengers from ingestion of lead fragments in the carcass.

Take of mammal species by WS in New Jersey occurs primarily from the use of rifles. To reduce risks to human safety and property damage from bullets passing through mammal species, the use of firearms is applied in such a way (*e.g.*, caliber, bullet weight, distance) to ensure the bullet does not pass through. When using firearms, the retrieval of carcasses for proper disposal is highly likely. With risks of lead exposure occurring primarily from ingestion of shot and bullet fragments, the retrieval and proper disposal of carcasses would greatly reduce the risk of scavengers ingesting or being exposed to lead.

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

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

Since permits can be issued by the NJDFW directly to entities experiencing damage or threats of damage, WS' assistance with removing target mammal species would not be additive to the environmental status quo since those mammals removed by WS using firearms could be lethally removed by the entities receiving the depredation permit using the same method in the absence of WS' involvement. The amount of lead deposited into the environment may be lowered by WS' involvement in mammal damage management activities due to efforts by WS to ensure projectiles do no pass through, but are contained within, the deer carcass which limits the amount of lead potentially deposited into soil from projectiles passing through the carcass. The proficiency training received by WS' employees in firearm use and accuracy increases the likelihood that mammals are lethally removed in a humane manner in situations

that ensure accuracy and that misses occur infrequently which further reduces the potential for lead to be deposited in the soil from misses or from projectiles passing through carcasses. In addition, WS' involvement ensures carcasses would be retrieved and disposed of properly to limit the availability of lead in the environment and ensures carcasses are removed from the environment to prevent the ingestion of lead by scavengers. Based on current information, the risks associated with lead bullets or shot that are deposited into the environment from WS' activities due to misses, the bullet or shot passing through the carcass, or from carcasses that may be irretrievable, would be below any level that would pose any risk from exposure or significant contamination of water.

Chemical Methods

Chemical methods available for use under the proposed action are repellents, immobilizing drugs, and euthanizing drugs described in Appendix B of the EA (USDA 2004). 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 of the EA require injection of the drug directly into an animal. Injection would occur through hand injection via a syringe, by jabstick, or by a dart fired from a projector that mechanically injects the drug into the animal upon impact. Immobilizing drugs temporarily sedate an animal to minimize stress of handling and to reduce the risks to human safety. Immobilized animals may also be euthanized using a drug described in Appendix B of the EA (USDA 2004). Euthanasia drugs would only be administered after the animal has been properly restrained and immobilized and would occur through direct injection. WS' personnel are required to attend training courses and be certified in the use of immobilizing and euthanizing drugs to ensure proper care and handling occurs, to ensure the proper doses are administered, and to ensure human safety under WS Directive 2.430. WS' personnel would continue to be trained in the proper handling and administering of immobilizing and euthanasia drugs to ensure human safety.

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

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

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

Issue 4 - Impacts to Stakeholders, including Aesthetics

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

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

Population objectives are established and enforced by the NJDFW through the regulating of take during the statewide hunting season and trapping seasons along with the issuance of depredation permits after consideration of other known mortality factors. Therefore, WS has no direct impact on the status of the population of those species since all take by WS occurs at the discretion of the NJDFW. Since those persons seeking assistance could remove those species from areas where damage is occurring through depredation permits issued by the NJDFW, WS' involvement would have no effect on the aesthetic value of those species in the area where damage was occurring. When a depredation permit has been issued by the NJDFW to a property owner and/or manager that is experiencing damage caused by those target species, the removal of those species under that permit would likely occur whether WS was involved with taking those species or not.

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

Issue 5 - Humaneness and Animal Welfare Concerns of Methods Used

Those methods employed by WS to reduce or prevent damage caused by mammals are addressed in Appendix B of the EA (USDA 2004) and further described in WS' programmatic FEIS (USDA 1997). WS continued to employ those methods as humanely as possible to minimize suffering and distress. WS also continues to implement SOPs to ensure methods are employed as humanely as possible. WS' SOPs are further discussed in Chapter 3 in the EA (USDA 2004).

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

As discussed in the supplement, the use of trap monitors would likely allow traps to be used more humanely by allowing traps to be checked more effectively and efficiently. Thus, wildlife can be addressed in a timelier manner which lessens the amount of time the animal is restrained by the trap. Therefore, trap monitors would likely enhance the humane use of methods. The use of FLIR and night vision equipment to remove mammals would increase the selectivity of direct management activities by targeting those mammals most likely responsible for causing damage or posing threats.

XVI. SUMMARY OF CUMULATIVE IMPACTS

No significant cumulative environmental impacts are expected from activities considered under the supplement to the EA. Likewise, no significant cumulative impacts have been identified from the implementation of the proposed action in the EA since FY 2004. Under the proposed action alternative, the reduction of wildlife damage or threats using an integrated approach employing both non-lethal and lethal methods would not have significant impacts on wildlife populations in New Jersey or nationwide. WS continues to coordinate activities with federal, state, and local entities to ensure activities do not adversely impact wildlife populations. No risk to public safety is expected when WS' activities are conducted pursuant to the proposed action or the proposed supplement to the EA. The EA further describes and addresses cumulative impacts from the alternatives, including the proposed action.

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Appendix A
Federal Threatened and Endangered Species Listings and Occurrences for New Jersey

Notes:

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

Animal species listed in this state and that occur in this state	
Status	**Species**
E	Bat, Indiana (*Myotis sodalis*)
T	Plover, piping except Great Lakes watershed (*Charadrius melodus*)
E	Sea turtle, hawksbill (*Eretmochelys imbricata*)
E	Sea turtle, Kemp's ridley (*Lepidochelys kempii*)
E	Sea turtle, leatherback (*Dermochelys coriacea*)
T	Sea turtle, loggerhead (*Caretta caretta*)
E	Sturgeon, shortnose (*Acipenser brevirostrum*)
E	Tern, roseate northeast U.S. nesting pop. (*Sterna dougallii dougallii*)
T	Tiger beetle, northeastern beach (*Cicindela dorsalis dorsalis*)
T	Turtle, bog (=Muhlenberg) northern (*Clemmys muhlenbergii*)
E	Wedgemussel, dwarf (*Alasmidonta heterodon*)
E	Whale, finback (*Balaenoptera physalus*)
E	Whale, humpback (*Megaptera novaeangliae*)
E	Whale, North Atlantic Right (*Eubalaena glacialis*)

Animal species listed in this state that do not occur in this state	
Status	**Species**
E	Beetle, American burying (*Nicrophorus americanus*)
E	Butterfly, Mitchell's satyr (*Neonympha mitchellii mitchellii*)
E	Puma (=cougar), eastern (*Puma (=Felis) concolor couguar*)
E	Wolf, gray Lower 48 States, except MN, MT, ID, portions of eastern OR, eastern WA, north-central UT, and where EXPN. Mexico. (*Canis lupus*)

Animal listed species occurring in this state that are not listed in this state	
Status	**Species**
T	Sea turtle, green except where endangered (*Chelonia mydas*)

Summary of Plant listings

Plant species listed in this state and that occur in this state	
Status	**Species**
T	Amaranth, seabeach (*Amaranthus pumilus*)
T	Beaked-rush, Knieskern's (*Rhynchospora knieskernii*)

Plant species listed in this state and that occur in this state	
Status	**Species**
E	Chaffseed, American (*Schwalbea americana*)
T	Joint-vetch, sensitive (*Aeschynomene virginica*)
T	Pink, swamp (*Helonias bullata*)
T	Pogonia, small whorled (*Isotria medeoloides*)

Plant species listed in this state that do not occur in this state	
Status	**Species**
T	Orchid, eastern prairie fringed (*Platanthera leucophaea*)