SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT: MAMMAL DAMAGE MANAGEMENT IN FLORIDA
(FINAL)

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

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I. PURPOSE

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program prepared an environmental assessment (EA) pursuant to the National Environmental Policy Act (NEPA) that evaluates potential impacts to the quality of the human environment from the implementation of a management program to address damage caused by several mammal species in Florida (USDA 2013). Those mammal species addressed in the EA include beaver (*Castor canadensis*), black rats (*Rattus rattus*), bobcats (*Lynx rufus*), coyotes (*Canis latrans*), eastern cottontail rabbits (*Sylvilagus floridanus*), feral cats (*Felis catus*), feral dogs (*Canis familiaris*), feral swine (*Sus scrofa*), Gambian rats (*Cricetomys gambianus*), gray fox (*Urocyon cinereoargenteus*), nine-banded armadillos (*Dasypus novemcinctus*), Norway rats (*Rattus norvegicus*), raccoons (*Procyon lotor*), red fox (*Vulpes vulpes*), river otters (*Lontra canadensis*), spotted skunks (*Spilogale putorius*), striped skunks (*Mephitis mephitis*), Virginia opossum (*Didelphis virginiana*), and white-tailed deer (*Odocoileus virginianus*). The EA evaluated the need for damage management and the relative effectiveness of three alternative approaches to meet that proposed need, while accounting for the potential environmental effects of those activities. After consideration of the analysis contained in the EA and review of public comments, WS issued a Decision and Finding of No Significant Impact (FONSI) for the EA on March 28, 2013. The Decision and FONSI selected the proposed action alternative (Alternative 1), which implemented a damage management program using multiple methods to address the need to manage damage associated with target mammal species.

The purpose of the EA will remain as addressed in Section 1.1 of the EA (USDA 2013). The purpose of this supplement to the EA is to evaluate activities conducted by WS since the signing of the Decision and FONSI in 2013. In addition, the WS program in Florida has begun evaluating the use of aerial operations to address feral swine damage. Studies found that shooting feral swine from an aircraft using a pilot and gunner could rapidly reduce local populations of feral swine (Saunders and Bryant 1988, Hone 1990, Saunders 1993). The Decision and FONSI that WS issued for the EA selected the alternative that evaluated an adaptive management approach that would integrate available methods to alleviate damage (USDA 2013). However, the EA did not consider the use of aircraft as part of an integrated methods approach.

This supplement to the EA also examines the potential environmental effects of proposed activities as those activities relate to an increase in requests for assistance to manage damage associated with Virginia opossum and nine-banded armadillos. In addition, the WS program in Florida has received new requests for assistance associated with nutria (*Myocastor coypus*) and gray squirrels (*Sciurus carolinensus*). This supplement will also evaluate new data that has become available from data gathering since the issuance of the Decision and FONSI in 2013. The analyses will consider WS' activities to alleviate mammal damage in Florida since the 2013 Decision and FONSI was issued to ensure program activities remain within the impact parameters analyzed in the EA.

II. NEED FOR ACTION

Section 1.2 of the EA provides a description of the need for action to address threats and damages associated with mammals in the State (USDA 2013). The need for action to manage damage and threats associated with mammals in Florida arises from requests for assistance[1] received by WS to reduce and prevent damage from occurring to agricultural resources, natural resources, and property, along with threats to human safety.

Since federal fiscal year (FY)[2] 2012, WS has conducted 45 technical assistance projects in Florida that addressed damage and threats of damage associated with mammals (see Table 1). WS provides technical assistance by providing information and recommendations on activities that people requesting assistance could conduct themselves 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 mammals can cause in Florida. Chapter 3 of the EA further describes WS' technical assistance activities (USDA 2013). Technical assistance projects do not include projects involving direct operational assistance provided by WS in which people request WS to provide direct assistance with managing damage or threats of damage. Chapter 3 of the EA also discusses direct operational assistance that WS could provide when requested (USDA 2013).

Table 1 – Technical assistance projects conducted by WS, FY 2012 - FY 2016

Species	Projects	Species	Projects
Armadillo	2	**Bobcat**	1
Beaver	2	**Opossum**	1
Coyote	11	**Feral Swine**	11
Gray Fox	1	**River Otter**	4
Raccoon	5	**White-tailed deer**	2
Black Rat	1	**Gray Squirrel**	1
Nutria	3	**TOTAL**	**45**

During the development of the EA, the WS program in Florida based the need for action on previous requests for assistance received and identified the mammal species associated with those requests. The WS program in Florida continues to receive requests for assistance to alleviate damage or threats associated with those mammal species addressed in the EA or anticipates receiving requests for assistance associated with those species; therefore, the need for action addressed in the EA remains applicable.

However, the WS program in Florida has received increasing requests for assistance involving opossum and armadillos, primarily associated with threats and damages to natural resources. In addition, the WS program in Florida has begun receiving requests for assistance associated with nutria and gray squirrels. The WS program in Florida had not previously received requests for direct operational assistance[3] associated with nutria and gray squirrels; therefore, the WS program in Florida did not address those mammal species during the development of the EA. Based on those recent requests for assistance, WS anticipates continuing to receive requests for assistance to manage damage associated with nutria and gray squirrels in the State. The damage and threats of damage associated with nutria and gray squirrels can be similar to the damage caused by those mammal species addressed in the EA. In addition, the EA already discusses the methods that would be available to alleviate damage or threats associated with those

[1]WS only conducts damage management activities after receiving a request for assistance. Before initiating activities, WS and the cooperating entity must sign a Memorandum of Understanding, work initiation document, or another comparable document that would list all the methods the property owner or manager would allow WS to use on property they own and/or manage.

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

[3]Section 3.1 of the EA discusses direct operational assistance provided by WS.

species. Therefore, this supplement will further evaluate the potential effects associated with activities to reduce damage and threats associated with those two species. Further discussion regarding the need for action associated with alleviating damage caused by opossum, armadillos, nutria, and gray squirrels occurs for those species below.

Need for additional efforts associated with Virginia Opossum and Nine-banded Armadillos

During the development of the EA, the Virginia opossum and the nine-banded armadillo were mammal species that the WS program identified could cause damage in the State based on previous requests for assistance. Since the development of the EA, the WS program in Florida has received requests for assistance involving an increasing number of opossum and armadillos, primarily requests to alleviate predation on the eggs and nestlings of ground nesting birds. While predation is not generally a threat to a healthy animal population, it could limit the recovery of threatened or endangered species or contribute to the local extirpation of populations already depleted by other factors. Massey (1971) and Massey and Atwood (1981) found that predators can prevent federally endangered least terns (*Sterna antillarum*) from nesting or cause them to abandon previously occupied sites. In another study, mammalian predators adversely affected the nesting success of least terns on sandbars and sandpits (Kirsch 1996).

Opossum and armadillos can also predate the eggs and hatchlings of sea turtles. Besides direct predation, nest predators can also expose turtle nests to the elements and to predation by crabs, birds, and other mammals. Several species of sea turtles can nest along the beaches of the State, including loggerheads (*Caretta caretta*), green turtles (*Chelonia mydas*), leatherbacks (*Dermochelys coriacea*), and Kemp's Ridley (*Lepidochelys kempii*) sea turtles. The recovery plan for the loggerhead sea turtle lists the following recovery goal: "*Reduce the annual rate of mammalian predation to at or below 10% of nests….using ecologically sound predator control programs*". In addition, the recovery plan states, "*individual problem animals can be targeted and removed without negatively affecting the local populations of native species*" (National Marine Fisheries Service and United States Fish and Wildlife Service 2008). Several studies have documented the effectiveness of predator management in turtle nesting areas (*e.g.*, see Garmestani and Percival 2005, Engeman et al. 2010). WS could receive requests for assistance to conduct predator management at sea turtle nesting colonies in order to meet predation tolerances listed in the recovery plan for sea turtles.

Need to Address Requests for Assistance Associated with Nutria

Nutria are a large, dark colored, semi-aquatic rodent that is native to South America. As fur prices increased during the early 1900s, people in South America began establishing fur farms that raised nutria for the sale of their pelts to the fur trade. The first documented ranching attempt involving nutria in the United States occurred during 1899 in California (Bounds et al. 2003). People began establishing nutria fur farms elsewhere in the United States during the late 1930s (Whitaker, Jr. and Hamilton, Jr., 1998, Bounds et al. 2003). The establishment of nutria in the wild occurred after accidental and intentional releases prior to 1950. In some areas, people released nutria to control aquatic weeds (Wade and Ramsey 1986, Kinler et al. 1987, Bounds et al. 2003). Trappers and conservation agencies initially regarded newly established feral populations of nutria as a new fur resource and some state and federal agencies intentionally released nutria to supplement opportunities for fur trapping (Bounds et al. 2003). The species provided a means of income for hunters and trappers through the sale of meat and fur. From 1977 to 1984, people harvested approximately $7.3 million worth of nutria fur in the United States (Boutin and Birkenholz 1987, Kinler et al. 1987). Nutria can also provide a major food source for wild alligators (Valentine et al. 1972, Wolfe et al. 1987).

Nutria primarily inhabit brackish or freshwater marshes, but are also found in swamps, rivers, ponds, and lakes. Wetlands are among the most biologically productive ecosystems in the world, yet over half the

original wetlands in the United States have been lost or damaged (Mitsch and Gosselink 1993, United States Environmental Protection Agency 1995). The decline of wetlands is likely due to several factors, including human development, sea level rise, climate change, land subsidence, increased salinity, and pollution. Another factor contributing to the damage of wetland habitats is the introduction of nutria into the United States, especially in areas along the coastal United States where nutria have established populations. Pursuant to Executive Order 13112, the National Invasive Species Council has designated the nutria as meeting the definition of an invasive species. In addition, Lowe et al. (2000) ranked nutria as one of the 100 worst invasive species in the world.

A review of nutria distribution in the United States by Bounds (2000) and Carter and Leonard (2002) indicated that nutria have become established in at least 15 states, including Florida. Nutria did not evolve in wetland ecosystems of the United States; therefore, inherent biofeedback mechanisms that naturally control populations do not exist. Without natural regulation, nutria are often able to quickly exploit the native environments allowing for local populations to increase and expand quickly. Nutria are prolific breeders with breeding occurring as early as four to seven months of age and nutria are capable of breeding throughout the year. Nutria can produce up to three litters per year with litters averaging four to five young but reports of litter sizes of 13 offspring have occurred. Offspring of nutria are capable of surviving without their mother after four days of nursing. Willner et al. (1979) estimated female nutria produced 8.1 young per year in Maryland. As an example of the potential for a rapid growth rate, the population of nutria at the 10,000 acre Blackwater Unit of the Chesapeake Marshlands National Wildlife Refuge Complex in Maryland increased from less than 150 nutria in 1968 to as many as 50,000 nutria in 1998 (USDA 2014).

In Florida, established populations of nutria arose during the 1950s from range expansion and from escapes or releases from fur farms (Brown 1975, Carter and Leonard 2002). The first free-ranging nutria recorded in the State were captured in the Florida Panhandle and the Hillsborough River drainage of west central Florida (Brown 1975). Today, nutria likely occur throughout much of central Florida extending northward into the Panhandle (Bounds et al. 2003).

Nutria 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. Nutria occasionally eat freshwater mussels and crustaceans in some parts of their range. Marshes are generally wetlands frequently or continually inundated with water, characterized by emergent soft-stemmed vegetation that are adapted to saturated soil conditions. The emergent vegetation associated with marsh habitats often form thick, fibrous root mats that stabilizes the underlying soil and acts to catch soil sediments in the water.

The digging and feeding behavior of nutria can be destructive to marsh ecosystems. Nutria forage directly on the emergent vegetation and the vegetative root mat in a wetland, leaving a marsh pitted with digging sites and fragmented with deeply cut swimming canals. When nutria compromise the fibrous vegetative mat, emergent marshlands are quickly reduced to unconsolidated mudflats. The complete loss of emergent vegetation and root mats that occur from nutria are often called "*eat-outs*", where the foraging and digging behavior of nutria completely denude large areas of marsh vegetation. Those denuded areas are devoid of most plant life and essentially become mud flats, providing fewer habitats for the spawning and production of fish and shellfish, birds, and other aquatic mammals, and is the greatest direct impact of nutria (Haramis 1997, Haramis 1999, Southwick Associates 2004). The denuding of marsh vegetation can expose the soil and accelerate erosion associated with tidal currents and wave action along with a general lowering of existing elevation levels in marshlands. The loss of vegetation can also facilitate saltwater intrusion into marsh interiors. For example, in Louisiana, nutria have damaged an estimated 100,000 acres of coastal marsh (Kinler et al. 1987). Nutria are opportunistic feeders and eat approximately 25% of their body weight daily (LeBlanc 1994).

Tiner and Burke (1995) estimated that 65% of Chesapeake Bay coastal marshes have been lost since the 1700s and the effects from nutria add adverse pressures on an already fragile ecosystem. Marshes help maintain environmental quality by purifying natural waters, filtering nutrients, chemicals, organic pollutants and sediments, and producing food, which supports aquatic and terrestrial life. In addition, marsh vegetation helps minimize erosion by increasing sediment stability and reducing wave action and velocity (Southwick Associates 2004). Coastal wetlands also provide protection from storm damage to residential and commercial areas further inland and provide flood control.

Burrowing activities of nutria can severely damage levees, dikes, earthen dams, and other structures (Bounds et al. 2003). 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 those structures to lean and sink. Nutria can burrow under buildings, which may lead to uneven settling or failure of the foundations. Burrows can weaken roadbeds, railroad beds, stream banks, dams, and dikes, which may collapse when rain or high water saturate the soil or when subjected to heavy objects on the surface (*e.g.*, vehicles, farm machinery, or grazing livestock). Rain and wave action can wash out and enlarge collapsed burrows, which can intensify the damage.

Nutria depredation on crops also occurs (LeBlanc 1994). Crops that nutria have 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 can girdle fruit, nut, and shade trees and ornamental shrubs. They also can 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.

Need to Address Requests for Assistance Associated with Gray Squirrels

Gray squirrels occur throughout the State in areas with sufficient woodlands to support populations, primarily in areas with oak and hickory trees. In most urban areas, gray squirrels are the most common of the three squirrel species found in the State (FWCC 2015*a*). Gray squirrels can occur at high population densities in urban areas (Hadidian et al. 1987, Jackson 1994, FWCC 2015*a*). For example, Hadidian et al. (1987) reported the gray squirrel population density in an urban park within Washington, D.C. reached 31.3 squirrels per hectare (12.7 squirrels per acre) in 1977 and may have caused over $4,500 in damage to annual plants and trees at the park. In July 1981, the density may have reached over 50 squirrels per hectare (20 squirrels per acre) at the park (Hadidian et al. 1987).

Damage associated with gray squirrels is primarily associated with their gnawing behavior. Like other rodent species, gray squirrels have upper and lower incisors (teeth) that grow continuously. To prevent the overgrowth of the incisors, squirrels must wear down their teeth through gnawing. Squirrels often gnaw on hard surfaces (*e.g.*, plastic, wood siding, woody vegetation) to keep teeth worn to appropriate levels. Economic losses associated with squirrel damage are generally minor overall but can be locally severe, especially in areas with high squirrel densities.

This gnawing behavior can cause damage to plants, tree bark, and ornamental plants, as well as plastic items, such as electrical wiring insulation and the wood siding on houses and other buildings (Jackson 1994, FWCC 2015*a*). Squirrels can gain entry into the attic of homes or inside garages and sheds by gnawing a hole through the exterior wall. The opening into a home or other structure can create an opportunity for structural degradation by allowing water to enter between the exterior and interior walls. In addition, the opening created by the squirrels could allow other wildlife to enter into the residence or

building. Squirrels can also cause damage by gnawing on building roof and trusses. Property owners can also be concerned about the damage that could result if squirrels were able to gain entry into the interior part of homes or other structures.

Squirrels can also cause damage at nut orchards by eating nuts prematurely and by caching mature nuts and chewing on the bark of orchard trees (Jackson 1994). In addition, squirrels can interrupt electrical transmission by shorting out transformers and gnawing on wires (Jackson 1994).

III. ADDITIONAL METHODS AVAILABLE

Since the completion of the EA, WS has identified the use of aircraft, including shooting from aircraft, as a possible method that WS could use or recommend as part of an integrated damage management strategy to alleviate feral swine damage under the proposed action alternative. In addition, WS could use aircraft for monitoring and surveillance of mammal populations in the State when a request for such assistance occurs. This supplement to the EA will analyze the use of aircraft as part of an integrated approach to resolving damage and threats associated with feral swine and the use of aircraft for surveillance and monitoring. Feral swine are a non-native species in Florida that can negatively affect resources and cause 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. Lowe et al. (2000) ranked feral swine as one of the 100 worst invasive species in the world. In addition, WS could use aircraft to locate, track, monitor, or conduct surveillance of target wildlife populations in the State.

Shooting from aircraft is a commonly used damage management method for feral swine in certain circumstance and can be especially effective and efficient in removing target animals. Shooting from an aircraft would only occur in those areas where WS and the cooperating landowner or manager signed a work initiation document allowing the use of aircraft. The amount of time spent conducting aerial operations varies. Variations can occur depending on the severity of damage, the size of the area where damage or threats were occurring, the number of target animals causing damage, and the weather, as low-level aerial activities would be restricted to visual flight rules and would be impractical in high winds or at times when animals were not easily visible.

Aerial surveying is a commonly used tool for evaluating and monitoring damage and establishing population estimates and locations of various species of wildlife. Aerial surveying occurs throughout the United States to monitor and locate wildlife populations. Many entities use aerial telemetry in research projects studying the movements of various wildlife species. Biologists will frequently place radio-transmitting collars on selected individuals of a species and then monitor their movements over a specified period. Whenever possible, biologists attempt to locate the research subject using a hand-held antennae and radio receiver; however, occasionally animals will make large movements that prevent biologists from locating the animal from the ground. In those situations, WS could utilize either fixed wing aircraft or helicopters and elevation to conduct aerial telemetry and locate the specific animal wherever it has moved to.

IV. SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The EA and this supplement evaluate damage management activities associated with mammals in the State of Florida. The scope of analysis remains valid as addressed in the EA for those activities associated with managing damage and threats caused by mammals in the State (see Section 1.3 of the EA) unless otherwise discussed in this supplement to the EA.

Actions Analyzed

The EA and this supplement evaluate the need for mammal damage management to reduce damage and threats to agricultural resources, natural resources, property, and threats to human safety wherever a cooperator requests such management. 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 alternative approaches to meeting that need while addressing those issues.

WS uses a decision model based on a publication by Slate et al. (1992) that involves evaluating each threat situation, taking action, evaluating the action taken, and monitoring results of the actions taken. The published article provides more detail on the processes used in WS' Decision Model. WS' personnel use the Decision Model to develop the most appropriate strategy to reduce damage and to determine potential environmental effects from damage management actions (Slate et al. 1992; see WS Directive 2.201). Therefore, the actions evaluated in the EA and this supplement are the use or recommendation of those methods available under the alternatives and the employment or recommendation of those methods by WS to manage or prevent damage and threats associated with mammals from occurring when requested by the appropriate resource owner or manager.

Native American Lands and Tribes

The WS program in Florida would only conduct damage management activities on Native American lands when requested by a Native American Tribe. WS would only conduct activities after the requesting Tribe and WS signed a MOU, work initiation document, or a similar document, which authorized WS to conduct those activities. Therefore, the Tribe would determine when WS' assistance was required and what activities the Tribe would allow. Because Tribal officials would be responsible for requesting assistance from WS and determining what methods would be available to alleviate damage, WS does not anticipate any conflicts with traditional cultural properties or beliefs. Those methods available to alleviate damage associated with mammals on federal, state, county, municipal, and private properties under the alternatives analyzed in the EA would be available for use to alleviate damage on Tribal properties when the Tribe requesting WS' assistance had approved the use of those methods. Therefore, the activities and methods addressed under the alternatives would include those activities that WS could employ on Native American lands, when requested and when agreed upon by the Tribe and WS.

Period for which the EA is Valid

If the analyses in this supplement indicates an Environmental Impact Statement (EIS) is not warranted, the EA, as supplemented, would remain valid until WS, in consultation with the Florida Fish and Wildlife Conservation Commission (FWCC), determines that new needs for action, changed conditions, new issues, or new alternatives having different environmental impacts must be analyzed. At that time, WS would review the analysis in the EA and this supplement and WS would further supplement the EA pursuant to the NEPA or conduct another evaluation pursuant to the NEPA. WS would conduct a review of the EA and this supplement to ensure that the EA and supplement were sufficient. This process would ensure the EA was complete and still appropriate to the scope of activities conducted in the State by WS.

Site Specificity

The EA and this supplement analyze the potential impacts of mammal damage management and address activities in Florida that have occurred and are currently occurring on properties where WS and a cooperating entity have signed a MOU, work initiation document, or a similar document. The EA and this supplement also address the effects of mammal damage management in the State where WS and a requesting entity may sign additional agreements in the future. The goal of the WS program in Florida

would be to provide assistance when requested, within the constraints of available funding and workforce, and to reduce damage. Therefore, it is conceivable that additional damage management efforts could occur at additional locations in the State, including those areas associated with each of the three United States Fish and Wildlife Service (USFWS), Ecological Services work areas. Thus, the EA and this supplement to the EA anticipate those additional efforts and analyze the effects of such efforts as part of the program. Because most mammal species are present statewide and damage could occur wherever those species occur, it is conceivable that direct operational assistance provided by WS could occur anywhere in the State, when requested.

Planning for the management of damage must be viewed as being conceptually similar to the actions of other entities whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where those events would occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire departments, police departments, emergency clean-up organizations, and insurance companies. Although WS could predict some of the sites where mammal damage would occur, WS could not predict every specific location or the specific time where such damage would occur in any given year. The WS program cannot predict the specific locations or times at which affected resource owners (*i.e*., people experiencing mammal damage) would determine a damage problem had become intolerable to the point that they request assistance from WS. In addition, the WS program would not be able to prevent such damage in all areas where it might occur because WS can only conduct activities on properties where the appropriate property owner or manager has requested WS' assistance.

The EA and this supplement emphasize major issues as they relate to specific areas whenever possible; however, many issues would apply wherever mammal damage and the resulting management occurred, and the EA and this supplement treat those issues as such. The standard WS' Decision Model (Slate et al. 1992, USDA 2013) (see WS Directive 2.201) and WS Directive 2.105 would be the routine thought processes that provide the site-specific procedure for determining methods and strategies to use or recommend for individual actions conducted by WS in the State. Appropriate strategies to address mammal damage that were made using those thought processes would be in accordance with Standard Operating Procedures (SOPs) described herein or in the EA, along with applicable federal, state, and local laws and regulations, including WS' directives[4].

The analyses in this supplement would apply to any action that may occur in any locale and at any time within the analysis area. 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. This supplement adds to the analysis in the EA and the 2013 Decision. The information and analyses in the EA remain valid unless otherwise noted.

Public Involvement

WS made the EA available to the public for review and comment by a legal notice published in the *Tallahassee Democrat*. WS also mailed a letter of availability for the EA directly to agencies, organizations, and individuals with probable interest in the proposed program. WS also made a notice of availability and the EA available for public review and comment on the APHIS website. WS received no comment letters during the public involvement process for the EA.

WS will also notice this supplement to the EA to the public for review and comment. WS will notify the public through legal notices published in local print media, through direct notification of parties that have

[4]At the time of preparation, WS' Directives occurred at the following web address: http://www.aphis.usda.gov/wildlife_damage/ws_directives.shtml.

requested WS notify them, or that WS has identified as having an interest in the reduction of threats and damage associated with mammals in the State, and by posting the EA on the APHIS website.

WS will provide for a minimum of a 30-day comment period for the public and interested parties to provide new issues, concerns, and/or alternatives. Through the public involvement process, WS will clearly communicate to the public and interested parties the analyses of potential environmental effects on the quality of the human environment. WS will fully consider new issues or alternatives that commenters raise after publication of public notices prior to the issuance of a new Decision.

V. RELATIONSHIP OF THIS DOCUMENT TO OTHER ENVIRONMENTAL DOCUMENTS

The APHIS and cooperating agencies prepared a programmatic EIS to address feral swine damage management in the United States, American Samoa, Mariana Islands, United States Virgin Islands, Guam, and Puerto Rico (USDA 2015). The Record of Decision that WS issued for the EIS selected the preferred alternative in the EIS to implement a nationally coordinated program that integrates methods to address feral swine damage. In accordance with the Record of Decision, WS developed this supplement to the EA to be consistent with the EIS and the Record of Decision. Section 1.4 of the EA addresses the relationship of the EA and this supplement to additional documents (USDA 2013).

The FWCC has developed an extensive wildlife action plan that evaluates species of plants and animals within the State (FWCC 2012). The wildlife action plan "*…is a comprehensive, statewide plan for conserving the state's wildlife and vital natural resources for future generations*" (FWCC 2012). WS consulted the Florida State Wildlife Action Plan (FWCC 2012) as part of this analysis and the implementation of the alternatives discussed in the EA (USDA 2013) would be consistent with the plan.

VI. AUTHORITY AND COMPLIANCE

Federal, state, and local laws regulate the activities that WS could conduct to reduce damage associated with mammals in Florida. Appendix D in the EA discusses the authority of WS, along with the authorities of other federal, state, and local entities (USDA 2013). WS' authorities and those of federal, state, and local entities would remain as addressed in Appendix D of the EA. WS would comply with applicable federal, state, and local laws and regulations pursuant to WS Directive 2.210. Appendix D of the EA also discusses WS' compliance with relevant laws and regulations (USDA 2013). WS would also conduct activities consistent with relevant Executive Orders that the EA discussed in Appendix D (USDA 2013). WS would continue to coordinate activities to alleviate or prevent mammal damage with the FWCC[5].

In addition, this supplement to the EA will evaluate the potential use of aircraft to alleviate damage or threats of damage associated with feral swine in the State. The Airborne Hunting Act, passed in 1971 (Public Law 92-159) and amended in 1972 (Public Law 92-502), added a new section to the Fish and Wildlife Act of 1956 that prohibits shooting or attempting to shoot, harassing, capturing, or killing any bird, fish, or other animal from aircraft, except for certain specified reasons (16 USC 742j-l). Under exception [16 USC 742j-l(b)(1)], state and federal agencies are allowed to protect or aid in the protection of land, water, wildlife, livestock, domesticated animals, human life, or crops using aircraft.

VII. DECISIONS TO BE MADE

Based on agency relationships, MOUs, and legislative authorities, WS was the lead agency in developing the EA, and therefore, responsible for the scope, content, and decisions made. The FWCC is responsible

[5]The FWCC has management authority over wildlife in the State, including feral swine.

for managing wildlife in the State, including the establishment of population objectives and enforcement of regulated hunting and trapping seasons for wildlife. WS' activities to reduce and/or prevent mammal damage in the State would be coordinated with the FWCC, which ensures the FWCC would have the opportunity to incorporate the actions of WS into population objectives established for wildlife populations in the State. In addition, WS' activities associated with wildlife would only occur when authorized by the FWCC and only at authorized levels.

Based on the scope of the EA and this supplement to the EA, the WS program will make the following decisions.

- Should the WS program in Florida continue to implement the proposed action alternative (Alternative 1) to alleviate damage and threats to human safety associated with target mammal species
- If not, should the WS program in Florida attempt to implement one of the other alternatives described in the EA
- Based on information in the EA and this supplement, would continuing to implement the proposed action alternative (Alternative 1) or the implementation of the other alternatives result in effects to the human environment requiring the preparation of an EIS

VIII. AFFECTED ENVIRONMENT

Section 2.1 of the EA addresses the affected environment and remains valid as described (USDA 2013). Those mammal species addressed in the EA and this supplement to the EA occur throughout the year across the State where suitable habitat exists for foraging and shelter. Those mammal species are capable of utilizing a variety of habitats, including rural and urban areas. Because those mammal species occur throughout the State of Florida, requests for assistance to manage damage or threats of damage could occur in areas those species occupy, which includes each of the three USFWS, Ecological Services work areas. However, WS would only conduct damage management when a landowner or manager requests such assistance and only on properties where WS and the requesting entity sign a MOU, work initiation document, or another comparable document. Chapter 4 of the EA provides additional information on the affected environment (USDA 2013). Appendix B of this supplement shows the current known distribution of feral swine in the State.

Upon receiving a request for assistance from the appropriate landowner or manager, WS could conduct actions described in the alternatives on private, federal, state, tribal, and municipal lands in Florida to reduce damages and threats to agricultural resources, natural resources, property, and threats to human safety. The analyses in the EA and this supplement apply to actions that WS could take 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 effects of mammal damage management and address activities on properties in Florida that are currently under a MOU or work initiation document with WS where WS has been and is currently conducting activities. The EA and this supplement also address the potential effects of mammal damage management in the State where WS and a requesting entity may sign additional agreements in the future.

IX. ISSUES ASSOCIATED WITH MAMMAL DAMAGE MANAGEMENT ACTIVITIES

Issues are concerns regarding potential effects that might occur from an action. Agencies must consider such issues during the decision-making process of the NEPA. Initially, WS developed the issues related to managing damage associated with target mammal species in Florida in consultation with the FWCC. In addition, WS made the EA available to the public to identify additional issues. Similarly, WS will invite the public to review and comment on this supplement to the EA to identify additional issues.

Chapter 2 of the EA discusses the major issues in detail (USDA 2013). Chapter 3 of the EA addresses the alternatives developed and identified during the development of the EA to address those issues (USDA 2013). The scoping process for the EA identified the following issues:

- Issue 1 - Effects of Damage Management Activities on Target Mammal Populations
- Issue 2 - Effects on Non-target Wildlife Species Populations, Including T&E Species
- Issue 3 - Effects of Damage Management Methods on Human Health and Safety
- Issue 4 - Effects on the Socio-cultural Elements of the Human Environment
- Issue 5 - Humaneness and Animal Welfare Concerns of Methods
- Issue 6 - Effects of Mammal Damage Management Activities on the Regulated Harvest of Mammals
- Issue 7 – Effects of Beaver Dam Manipulation on the Status of Wetlands in the State

Based on those damage management activities WS conducted previously and based on those activities proposed in this supplement to the EA, the issues identified during the development of the EA remain applicable and appropriate to resolving damage and threats of damage associated with target mammal species in the State.

X. ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

In addition to the issues considered in detail, WS considered several additional issues in Section 2.3 of the EA, but WS did not consider those issues in detail. Section 2.3 of the EA also discusses the rationale for not considering those issues in detail. 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. DESCRIPTION OF THE ALTERNATIVES

Section 3.1 in the EA describes and discusses in detail the alternatives WS considered and evaluated using the identified issues (USDA 2013). In addition, the Chapter 4 in the EA contains a detailed description and discussion of the alternatives and the effects of the alternatives on the issues identified (USDA 2013). The EA also provides a description of the methods that WS could use or recommend under each of the alternatives (see Appendix B in the EA). The EA describes three alternatives that WS developed to address the issues identified previously. Alternatives analyzed in detail include:

Alternative 1 - Continue the Current Adaptive Integrated Mammal Damage Management Program (No Action/Proposed Action)
Alternative 2 – Mammal Damage Management by WS through Technical Assistance Only
Alternative 3 – No Mammal Damage Management Conducted by WS

XII. ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

WS also considered additional alternatives but WS did not analyze those alternatives in detail for the reasons provided in the EA (see Section 3.2 of the EA). WS has reviewed the alternatives not analyzed in detail in the EA and has determined that the analysis provided in the EA has not changed and is still appropriate.

XIII. STANDARD OPERATING PROCEDURES

The WS program in Florida uses many SOPs. Section 3.3 and Section 3.4 of the EA discuss the SOPs WS would incorporate into the selected alternative, when applicable (USDA 2013). The SOPs discussed in the EA remain appropriate to activities WS could conduct in the State. In addition to those SOPs discussed in Section 3.3 and Section 3.4 of the EA, the WS program would incorporate the following SOPs into activities conducted under the selected alternative when the SOPs were applicable to the alternative.

- WS' employees participating in any aspect of aerial wildlife operations would receive training in their role and responsibilities during the operations. All WS' personnel would follow the policies and directives set forth in WS' Directive 2.620; WS' Aviation Operations Manual; WS' Aviation Safety Manual and its amendments; Title 14 CFR; and Federal Aviation Regulations, Part 43, 61, 91, 119, 133, 135, and 137.

- WS would use non-lead ammunition within the constraints of availability, performance, and safety.

- The use of all traps, cable devices, and other capture devices by WS' personnel would adhere to WS Directive 2.450.

- WS' personnel would dispose of carcasses retrieved after damage management activities in accordance with WS Directive 2.515. If WS' personnel were directly involved with carcass burial (*i.e.*, WS' personnel physically or mechanically digging a hole in the ground to bury carcasses), siting decisions would occur after WS consulted with the Florida Division of Historical Resources within the Florida Department of State or the affected tribal authorities to avoid adverse effects on cultural/historic resources. If WS' personnel discovered cultural resources or artifacts during the burial of carcasses, WS would cease operations and contact the Division of Historical Resources or appropriate tribal authorities. However, WS' personnel rarely, if ever, are directly involved with the burial of carcasses in Florida.

- WS' personnel would review all projects proposed for implementation for potential to take[6] bald eagles in accordance with the provisions of the Bald and Golden Eagle Protection Act. If WS' personnel identify potential risks of take, WS would work with the USFWS on measures to reduce risks and the need for a non-purposeful take permit.

- As allowed by law, WS' personnel would provide information about food safety and the safe handling of carcasses to reduce risks to landowners that prefer to retain feral swine carcasses or other animal carcass killed on their property for personal use (see WS Directive 2.510). Therefore, providing information about food safety and the safe handling of carcasses would minimize risks to human safety by emphasizing precautions for safe handling and preparation/consumption. In addition, WS' personnel would advise landowners to avoid feeding uncooked meat or other carcass products to pets or other animals.

XIV. ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

Chapter 2 of the EA discusses the major issues WS considered in detail (USDA 2013). Chapter 3 of the

[6]The Bald and Golden Eagle Protection Act defines "*take*" as "*pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb*." Disturb is defined as any activity that can result in injury to an eagle, or cause nest abandonment or decrease in productivity by impacting breeding, feeding, or sheltering behavior.

EA discusses the alternatives that WS developed and identified during the development of the EA to meet the need for action and to address those issues (USDA 2013). Potential impacts of Alternative 2 and Alternative 3 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. The use of aircraft by WS would only occur under the proposed action alternative (Alternative 1). Under Alternative 2 (technical assistance only) and Alternative 3 (no assistance by WS), WS would not conduct any aerial operations in the State. However, surveillance of wildlife using aircraft and shooting from an aircraft to remove feral swine could occur by other entities under Alternative 2 and Alternative 3 when authorized by the FWCC. If the FWCC authorized the use of aircraft for surveillance or for shooting feral swine, the potential effects associated with the use of aircraft would be similar between the alternatives.

As discussed in Section II of this supplement to the EA, the WS program in Florida has received increasing requests for assistance associated with armadillos and opossum in the State. In addition, the WS program in Florida has begun receiving requests for assistance involving nutria and gray squirrels, which are species that WS did not address in the EA. Any activities involving the dispersal, live-capture, or removal of armadillos, opossum, nutria, and gray squirrels would only occur when the FWCC authorizes WS to conduct those activities, when required. Direct operational assistance by WS would only occur under Alternative 1; therefore, WS' activities associated with armadillos, opossum, nutria, and gray squirrels would only occur under Alternative 1. However, under Alternative 2 and Alternative 3, other entities could provide assistance or property owners/managers could alleviate damage themselves. Other entities could address those armadillos, opossum, nutria, or gray squirrels causing damage in the absence of WS' assistance; therefore, the potential effects would be similar between the alternatives.

Chapter 4 of the EA contains a detailed discussion and comparison of the identified alternatives and the major issues (USDA 2013). WS identified those issues as important to the scope of the analysis in the EA (40 CFR 1508.25). Alternative 1 (proposed action/no action), as described in the EA, addresses requests for damage management in the State using an integrated methods 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 those issues relate to Alternative 1 (proposed action/no action alternative).

Issue 1 - Effects of Damage Management Activities on Target Mammal Populations

A common issue when addressing damage caused by animals is 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 Alternative 1, WS would provide technical and direct damage assistance using methods in an integrated approach in which WS could employ all or a combination of methods to resolve a request for assistance.

Some non-lethal methods could disperse or otherwise make an area unattractive to animals causing damage or posing a threat of damage; thereby, reducing the presence of those animals at the site and potentially the immediate area around the site where non-lethal methods were employed. WS would give non-lethal methods priority when addressing requests for assistance (see WS Directive 2.101). However, WS would not necessarily employ non-lethal methods to resolve every request for assistance if deemed inappropriate by WS' personnel using the WS Decision Model. For example, if a cooperator requesting assistance had already attempted to disperse or exclude mammals using non-lethal methods, WS would not necessarily employ those methods again during direct operational assistance since those methods had already been proven ineffective in that particular situation. WS would employ non-lethal methods to exclude, harass, disperse, and capture target animals from areas where damage or threats were occurring.

When effective, non-lethal methods would disperse or relocate mammals from the area resulting in a

reduction in the presence of those species at the site where an entity employed those methods or those methods would exclude target wildlife from an area. However, employing those methods could disperse individual target animals responsible for causing damage or threats to other areas with minimal effect on the overall population of target species. Non-lethal methods would not be employed over large geographical areas or applied at such intensity that essential resources (*e.g*., shelter, food sources) would be unavailable for extended durations or over such a wide geographical scope that long-term adverse effects would occur to the populations of target mammal species. The only non-lethal method currently available that, if used, could result in population reductions is GonaCon™, which the United States Environmental Protection Agency has registered for use 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 EA addresses the potential for the reproductive inhibitor to reduce deer populations (USDA 2013). However, GonaCon™ is not currently available for use in the State.

Non-lethal methods would generally have minimal effects on overall populations of target mammal species since individual animals would be unharmed and no reduction in the actual number of individual animals in a population would occur, except when using GonaCon™ for deer. WS' previous and continued use of non-lethal methods would not adversely affect populations of target mammals in the State.

Of primary concern would be the magnitude of take on a species' population from the use of lethal methods. WS' personnel and other entities could employ lethal methods to remove an individual animal or those animals responsible for causing damage or having potential to cause damage. The use of lethal methods by WS would only occur after WS received requests for such assistance. The use of lethal methods by WS could result in local population reductions in the area where damage or threats were occurring. The number of individuals removed from a population using lethal methods under the proposed action would be dependent on the number of requests for assistance received, the number of animals involved with the associated damage or threat, and the efficacy of methods employed.

The analysis in the EA measured the number of animals lethally removed in relation to the abundance of those animals to determine the magnitude of impact to the population from the use of lethal methods. Magnitude may be determined either quantitatively or qualitatively. Determinations based on population estimates, allowable harvest levels, and actual harvest data are quantitative. Determinations based on population trends and harvest trend data, when available, are qualitative.

Population Impact Analysis from WS' Activities Conducted from FY 2012 through FY 2016

The WS program in Florida continued to respond to requests for mammal damage management between FY 2012 and FY 2016. WS responded to requests for assistance across a broad range of resources and mammal species using those non-lethal and lethal methods described in Appendix B of the EA. As described in the EA, WS' personnel continued to give preference to the use and recommendation of non-lethal methods when practical and effective using the WS Decision Model (see WS Directive 2.101). As shown in Table 2, WS' employees used numerous non-lethal methods to disperse, translocate, and release numerous target species between FY 2012 and FY 2016.

As was discussed in the EA and previously in this supplement to the EA, the use of non-lethal methods to address damage or threats would generally have no effect on a species' population. Those individuals addressed using non-lethal methods would be unharmed and no actual reduction in the number of individuals in a species' population occurs, except when using reproductive inhibitors. Similarly, the live-capture and release of target animals would generally be regarded as having no adverse effects on a species' population since those individuals would be released unharmed and no actual reduction in the

number of individuals in a population occurs. Therefore, the live-capture and subsequent releasing of target animals during damage management activities conducted under Alternative 1 would not result in declines in the number of individuals in a species' population.

Table 2 – WS' non-lethal dispersal and release of mammals, FY 2012 - FY 2016

Species	Method						Total
	Cage Trap[1]	Foothold Trap[1]	Vehicle[2]	Pyrotechnic[2]	Firearm[2]	Other[3]	
Armadillo	4	0	0	79	5	0	**88**
Bobcat	2	5	0	1	0	0	**8**
Feral Cat	86	1	2	3	0	0	**92**
Coyote	0	0	54	30	13	15	**112**
White-tailed Deer	0	0	191	25	128	38	**382**
Feral Dog	0	0	4	11	2	8	**25**
Gray Fox	0	0	3	1	1	0	**5**
Red Fox	0	0	8	1	1	0	**10**
Opossum	253	1	2	3	0	1	**260**
River Otter	1	0	2	1	0	0	**4**
Raccoon	813	0	3	6	1	1	**824**
Gambian Rat	2	0	0	0	0	0	**2**
Striped Skunk	4	0	0	0	0	0	**4**
Gray Squirrel	14	0	0	0	0	0	**14**
Feral Swine	0	0	1	5	39	0	**45**

[1]Animals were live-captured and released/translocated

[2]Animals were dispersed from area

[3]Other methods include electronic harassment devices, hand-capture, cable restraint, or hand/voice actions

WS' personnel also employed lethal methods to alleviate damage when those persons requesting assistance approved of the use of those methods. Table 3 shows WS' annual removal of mammals by species from FY 2012 through FY 2016 to alleviate damage or threats of damage. The EA and the 2013 Decision/FONSI concluded that WS' activities to manage mammal damage in Florida conducted pursuant to the scope of analyses contained in the EA would have minimal effects on local and statewide mammal populations. The annual removal of mammal species by WS from FY 2012 through FY 2016 occurred within the impact parameters analyzed in the EA, except for the number of Virginia opossum lethally removed by WS during FY 2013, FY 2014, FY 2015, and FY 2016, and for the number of armadillos lethally removed in FY 2015 and FY 2016. WS lethally removed 196 Virginia opossum during FY 2013, 273 opossum during FY 2014, 368 opossum during FY 2015, 303 opossum during FY 2016, 116 armadillo during FY 2015 and 128 armadillo during FY 2016 to alleviate damage, which exceeded the annual removal level evaluated in the EA (see Table 3).

The use of lethal methods by any entity could result in local population reductions in the area where damage or threats were occurring since those entities would remove the target animal(s) from a species' population. Therefore, the use of lethal methods could result in local reductions of target animals in the area where damage or threats were occurring. The number of target animals removed from the population annually by WS using lethal methods would be dependent on the number of requests for assistance received, the number of target animals involved with the associated damage or threat, the efficacy of methods employed, and the number the FWCC authorizes WS to remove (when required).

Population and density information specific to Florida for many of the target species is not available and is unknown. Frequently, population information is not available for a species but people can calculate conservative estimates based upon the density of a species, the statewide range of the species, the

availability of habitat, and a species use of the habitats available. To evaluate the potential impacts to a target species population and to evaluate the magnitude of the potential impacts from activities that WS could conduct under Alternative 1, the EA documented calculations of a statewide population estimate for many of the target species using available information from published literature and other sources. The analyses in the EA derived population estimates from available density data for individual species, when available. When density data was available, the analyses based the population estimates on those species occupying a certain percentage of the land area of the State. Since information on actual populations and densities was not available for most target species in Florida, the EA documented calculations of a statewide population estimate based on a species only occupying a certain percentage of the available land area to estimate a minimum population or a worst-case scenario to evaluate the magnitude of WS' potential annual lethal removal.

Table 3 – WS' lethal removal of mammals by species, FY 2012 - FY 2016

Species	WS' Estimated Removal[1]	WS' Removal by Year[2]					Population estimate[3]	% of population[4]
		2012	2013	2014	2015	2016		
Armadillo	**100**	38	50	37	118	132	**69,000**	**0.2%**
Beaver	**250**	114	119	120	69	94	**28,000**	**0.4%**
Black Rat	**2,500**	26	48	6	43	3	**N/A†**	**N/A**
Bobcat	**20**	0	2	1	4	2	**303,338**	**0.001%**
Coyote	**200**	144	129	153	141	116	**13,400**	**1.1%**
Feral Cat	**250**	58	21	8	28	10	**N/A**	**N/A**
Feral Swine	**4,000**	2,119	529	386	1,271	1,288	**500,000**	**0.4%**
Gambian Rat	**250**	12	0	0	0	0	**N/A**	**N/A**
Gray Fox	**50**	49	5	12	11	27	**42,600**	**0.1%**
Opossum	**150**	81	196	273	368	303	**34,900**	**1.1%**
Raccoon	**2,000**	600	454	440	482	498	**27,000**	**2.2%**
Red Fox	**100**	9	12	8	10	2	**35,000**	**0.03%**
River Otter	**25**	6	0	0	0	0	**5,185**	**0.1%**
Spotted Skunk	**50**	0	0	15	3	2	**76,400**	**0.02%**
Striped Skunk	**25**	0	2	2	0	1	**111,500**	**0.002%**
White-tailed Deer	**2,500**	77	76	32	67	58	**700,000**	**0.01%**

[1]WS' anticipated annual removal of target species taken from EA based on previous requests for assistance and in anticipation of additional efforts to manage damage

[2]Removal by federal fiscal year

[3]Statewide population estimate calculated in the EA using best available information for each species; represents a minimum statewide population

[4]Percentage based on WS' highest annual removal between FY 2012, FY 2013, FY 2014, FY 2015, and FY 2016

†N/A=Information is not currently available

For example, the EA estimated the statewide population of Virginia opossum based on the species occupying only 50% of the land area in the State. Virginia opossum actually occur in a variety of habitats, including urban areas, so opossum occupying only 50% of the land area of the State is unlikely. However, similar to many of the target species, the evaluation used opossum occupying only 50% of the land area to provide a minimum population estimate to evaluate potential impacts based on a worst-case scenario.

The analysis of potential impacts on each of the species populations includes the anticipated annual lethal removal by WS, which WS based on previous requests for assistance and in anticipation of additional efforts to manage damage or threats of damage in the future. The evaluation then compared the

anticipated number of animals from a species' population that WS could lethally remove annually to the calculated statewide population estimate for a species to determine the magnitude of lethal removal under a worst-case scenario.

In addition to the annual lethal removal that could occur by WS during damage management activities using lethal methods, people can harvest many of the target mammal species during annual hunting and/or trapping seasons in the State. The FWCC is responsible for establishing hunting and trapping seasons in Florida. Those species addressed in the EA that have established hunting and/or trapping seasons include beaver, bobcats, coyotes, eastern cottontails, feral swine, raccoons, river otters, striped skunks, spotted skunks, opossum, and deer. People can hunt rabbits, feral swine, raccoons, opossum, coyotes, beaver, spotted skunks, and striped skunks throughout the year using all legal rifles, shotguns, muzzleloaders, crossbows, bows, and pistols. With the exception of rabbits, people can harvest those species with no limit on the number of animals that people can harvest. People can harvest rabbits throughout the year; however, the FWCC currently imposes a daily (12 rabbits) and possession (24 rabbits) limit. People can harvest bobcats and river otters using all legal rifles, shotguns, muzzleloaders, crossbows, bows, and pistols from December 1 through March 31 with no limit on the number of animals that people can harvest during the length of the hunting season. Depending on the area of the State and the method people use to harvest deer, people can also harvest white-tailed deer during an annual hunting seasons that currently allow people to harvest up to two deer per day and possess up to four white-tailed deer during the length of the season.

The number of animals that people actually harvest annually during the hunting and trapping seasons in the State is currently not available. Table 4 shows the reported annual statewide harvest of some of the species addressed in the EA based on data from the Association of Fish and Wildlife Agencies (2017). According to the Association of Fish and Wildlife Agencies (2017), no harvest of striped skunks and spotted skunk occurred in the State from 2010 through 2014. Data from Table 4 is likely the number of pelts sold annually in the State, which is likely a minimum harvest since people do not necessarily sell pelts from every animal harvested and the pelts that people sell may be from animals harvested during previous seasons. Harvest data for 2015 and 2016 is currently not available for those species addressed in Table 4. Harvest information for the other mammal species addressed in the EA is currently not available except the annual deer harvest. During 2012, hunters harvested 136,189 deer in the State during the hunting season (Responsive Management 2012), which compares to 102,626 deer harvested during the 2014 hunting season (Responsive Management 2014). Table 4 does not include animals people may have lethally removed to alleviate damage.

In addition to annual hunting seasons, some species addressed in the EA also have annual trapping seasons. People can harvest bobcats, river otters, raccoons, opossum, coyotes, beaver, spotted skunks, and striped skunks during annual trapping seasons in the State. People can harvest raccoons, opossum, coyotes, beaver, and skunks throughout the year using legal trapping methods with no limit on the number of animals that a person can harvest. People can trap bobcats and river otters using legal trapping methods from December 1 through March 1 in the State with no limit on the number of animals that a person can harvest.

The FWCC classifies armadillos, Norway rats, black rats, and Gambian rats as non-protected mammal species; therefore, people can lethally remove those species using legal methods at any time. There is a continuous closed season for fox in the State; therefore, the FWCC prohibits the trapping or shooting of red fox and gray fox without a permit from the FWCC.

In addition to activities conducted by WS to alleviate damage in the State, other entities may also conduct activities to alleviate animal damage. Individual property owners may conduct activities on their own to alleviate damage since people can address many of the mammal species throughout the year. Property

owners may also seek assistance from private nuisance wildlife trappers to alleviate damage. The number of animals lethally removed by other entities to alleviate damage in the State is not available.

Table 4 – Species harvested during the hunting and trapping seasons in Florida, 2010-2014†

Species	Harvest Season					Total	Annual Average
	2010	2011	2012	2013	2014		
Beaver	4	0	7	2	0	**13**	**3**
Bobcat	53	54	191	256	153	**707**	**141**
Coyote	0	0	31	94	0	**125**	**25**
Opossum	11	126	93	8	0	**238**	**48**
Raccoon	444	1,110	1,200	1,360	0	**4,114**	**823**
River Otter	61	133	151	209	91	**645**	**129**

†Based on data from the National Furbearer Harvest Statistics Database (Association of Fish and Wildlife Agencies 2017)

As discussed previously, the analysis to determine the magnitude of impact from lethal removal can occur using either quantitative or qualitative measures. Quantitative determinations use population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations use population trends and harvest trend data. WS' removal that could occur to alleviate damage or threats of damage under Alternative 1 would be monitored by comparing numbers of animals killed with overall populations or trends in populations to assure the magnitude of removal was maintained below the level that would cause undesired adverse effects to the viability of native species' populations. The EA analyzed the potential impacts of implementing Alternative 1 on the populations of each species. To evaluate potential cumulative impacts, harvest data from the hunting and/or trapping seasons was also included in the effects analysis for some of the mammal species, when available. Table 5 shows the cumulative known removal for those animals with harvest information.

Table 5 – Cumulative known removal of target animals

Species	Highest Harvest[1]	WS' Highest Annual Removal[2,3]	Cumulative Annual Removal[4]	Estimated Population[5]	% of Population
Beaver	7	120	**127**	28,000	**0.5%**
Bobcat	256	4	**260**	303,338	**0.1%**
Coyote	94	153	**247**	13,400	**1.8%**
Opossum	126	368	**494**	34,900	**1.4%**
Raccoon	1,360	600	**1,960**	27,000	**7.3%**
River Otter	209	6	**215**	5,185	**4.2%**
White-tailed Deer	136,189	77	**136,266**	700,000	**19.5%**

[1]Highest annual harvest from 2010 through 2014 (see Table 4), except for white-tailed deer, which represent the highest annual harvest between 2012 and 2014.

[2]Removal by federal fiscal year

[3]Highest annual removal by WS from FY 2012 through FY 2016 (see Table 3)

[4]Cumulative annual harvest is based on the highest annual harvest during the hunting/trapping season and WS' highest annual lethal removal

[5]Statewide population estimate calculated in the EA using best available information for each species; represents a minimum statewide population

When combining WS' annual lethal removal of target species with the highest annual harvest levels of those mammal species in Florida from 2010 through 2014, the cumulative lethal removal represents a small percentage of the estimated statewide populations (see Table 5). Current population estimates for target mammal species in the State are not available. WS' annual lethal removal of target mammal species has occurred within the impact parameters evaluated in the EA, except for the annual removal of armadillos and opossum (see discussion below). If the populations of those mammal species have remained at least stable in the State, the annual removal 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 Florida; therefore, those population estimates provided in the EA remain the best available information.

The EA and the Decision/FONSI concluded that the effects of WS' damage management activities in Florida would not adversely affect 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 Florida for the management of mammal damage determined that WS' lethal removal of mammals in the State was not adversely affecting populations based on the best available information on those species' populations. The permitting of those activities by the FWCC provides additional analyses and outside review, that WS' activities since FY 2012 have not negatively affected populations of those mammals addressed in the EA.

Population Impact Analysis from WS' Activities Associated with Virginia Opossum

Based on previous requests for assistance and in anticipation of additional efforts to manage damage caused by opossum, WS anticipated that personnel could lethally remove up to 150 opossums annually in the State to address requests for assistance when implementing Alternative 1. As shown in Table 3, the number of opossum that WS' personnel lethally removed to alleviate damage in the State exceeded 150 opossums during FY 2013, FY 2014, FY 2015, and FY 2016. WS lethally removed 196 Virginia opossum during FY 2013, 273 opossum during FY 2014, 368 opossum during FY 2015, 303 opossum during FY 2016, which exceeded the annual removal level evaluated in the EA (see Table 3). Between FY 2013 and FY 2016, the WS program in Florida received requests to assist with activities to reduce nest predation on ground nesting bird species by nest predators, including opossum. The number of opossum addressed between FY 2013 and FY 2016 by the WS program to manage those nest predation risks, along with other damage management activities involving opossum, exceeded the level anticipated during the development of the EA. The WS program in Florida also lethally removed seven opossum unintentionally during activities targeting other animals in FY 2012.

In addition, WS has purposefully live-captured and released 279 opossum from FY 2012 through FY 2016 with an additional 435 opossum live-captured unintentionally during other damage management activities and released unharmed. Opossum were primarily live-captured as non-target animals during surveillance activities relating to the Oral Rabies Vaccine (ORV) program (USDA 2010). Based on recent requests for assistance received by WS and in anticipation of additional efforts, WS could lethally remove up to 500 opossum annually in the State as part of efforts to reduce or eliminate damage when implementing Alternative 1.

Opossum are common throughout Florida in appropriate habitat. Population estimates for opossum in the State are not available. Therefore, the EA derived a population estimate based on the best available information for opossum to provide an indication of the magnitude of removal proposed by WS to alleviate damage and threats of damage. As discussed in the EA, if opossum only occurred on 50% of the land area of the State and using a mean density of 10.1 opossum per square mile found by Seidensticker et al. (1987) in Virginia, the population would be approximately 271,000 opossum. Using the range of opossum densities found by Seidensticker et al. (1987) estimated at 1.3 opossum per square mile to 20.2 opossum per square mile and only 50% of the land area of the State being occupied by opossum, the statewide population would range from a low of 34,900 opossum to a high of nearly 541,600 opossum. Opossum occur in a variety of habitats so opossum occupying only 50% of the land area of the State is unlikely since opossum occur almost statewide. However, the EA evaluated opossum occupying only 50% of the land area to provide a minimum population estimate to determine the magnitude of the proposed annual removal by WS to alleviate or prevent damage.

The FWCC classifies the opossum as a furbearing species in the State that people can harvest statewide throughout the year (*i.e.*, continuous open season) using legal hunting and trapping methods with no limit on the number of opossum that people can harvest annually. The actual number of opossum harvested annually in the State is currently not available. As shown in Table 4, people harvested at least 238 opossum in the State from 2010 through 2014, which is an average minimum annual harvest of 48 opossum. The highest annual harvest of opossum from 2010 through 2014 occurred during 2011 when people harvested a minimum of 126 opossum in the State. The number of opossum that people have harvested in the State during 2015 and 2016 is not available. In addition, people other than WS can also lethally remove opossum to alleviate damage; however, the number of opossum that other entities lethally remove to alleviate damage in the State is also not available.

Based on a statewide population ranging from 34,900 opossum to 541,600 opossum, the lethal removal of up to 500 opossum annually, if WS continues to implement Alternative 1, would represent 0.1% to 1.4% of the estimated population. WS' personnel could also lethally remove opossum unintentionally during other damage management activities; however, WS does not anticipate the cumulative lethal removal of opossum by WS to exceed 500 opossum annually.

Although the total number of opossum lethally removed in the State during the annual hunting and trapping seasons and for damage management is unknown, the cumulative removal of opossum, including the proposed removal of up to 500 opossum annually by WS, would be of a low magnitude when compared to the actual statewide population. The unlimited harvest allowed by the FWCC during the harvest seasons provides an indication that population densities of opossum in the State are sufficient that overharvest is not likely to occur, including lethal removal to alleviate or prevent damage. In addition, the live-capture and subsequent release of opossum would not likely result in adverse effects to the statewide population since those animals would be released unharmed.

Population Impact Analysis from WS' Activities Associated with Nine-banded Armadillos

Based on previous requests for assistance and in anticipation of additional efforts to manage damage caused by nine-banded armadillos, WS anticipated that personnel could lethally remove up to 100 armadillos annually in the State to address requests for assistance when implementing Alternative 1. As shown in Table 3, the number of armadillos that WS' personnel lethally removed to alleviate damage in the State exceeded 100 armadillos during FY 2015 and FY 2016. In FY 2015, WS' personnel lethally removed 116 armadillos intentionally to alleviate damage with two armadillos lethally removed unintentionally during activities targeting other animals. During FY 2016, WS' personnel lethally removed 132 armadillos intentionally in the State to alleviate damage or threats of damage. In addition, WS has purposefully live-captured and released four armadillos between FY 2012 and FY 2016 with an additional 12 armadillos live-captured unintentionally during other damage management activities but released unharmed. The WS program in Florida also employed non-lethal methods to disperse 53 armadillos in FY 2015 and 31 armadillos during FY 2016.

Based on recent requests for assistance received by WS and in anticipation of additional efforts, WS could lethally remove up to 500 armadillos annually in the State as part of efforts to reduce or eliminate damage under the proposed action alternative. Nine-banded armadillos are common throughout Florida in appropriate habitat. Population estimates for armadillos in the State are not available. Therefore, the EA derived a population estimate based on the best available information for armadillos to provide an indication of the magnitude of removal proposed by WS to alleviate damage and threats of damage. Mengak (2005) reported population densities for armadillos ranged from 0.004 to 1.4 armadillos per acre with an average of 0.25 armadillos per acre. Using a population density estimated at 0.004 to 1.4 armadillos per acre, the statewide population could range from approximately 137,300 armadillos to

approximately 48 million armadillos. With an average of 0.25 armadillos per acre, the statewide population would be approximately 8.6 million armadillos.

As discussed in the EA, if armadillos only occupied 50% of the land area in the State and using the lowest density of 0.004 armadillos per acre reported by Mengak (2005), the statewide population would be approximately 69,000 armadillos. Armadillos occur in a variety of habitats in Florida and occur statewide. Therefore, armadillos occupying only 50% of the land area of the State would be unlikely. In addition, armadillos are likely to occur at a higher density in the State. However, the EA evaluated armadillos occupying only 50% of the land area and used the lowest population density to provide a minimum population estimate to determine the magnitude of the proposed annual removal by WS to alleviate or prevent damage.

Nine-banded armadillos are a non-protected mammal species in Florida and the FWCC allows people to remove nuisance armadillos at any time (FWCC 2017*a*, FWCC 2017*b*). However, the number of armadillos that other entities remove annually is unknown. Based on a statewide population of 69,000 armadillos, the lethal removal of up to 500 armadillos annually by WS, when implementing Alternative 1, would represent 0.7% of the estimated statewide population. WS' personnel could also lethally remove armadillos unintentionally while targeting other animal species; however, WS does not anticipate the cumulative lethal removal of armadillos by WS to exceed 500 armadillos annually.

Although the total number of armadillos that other entities lethally remove annually in the State to alleviate damage is unknown, the cumulative removal of armadillos, including the proposed removal of up to 500 armadillos annually by WS, would be of a low magnitude when compared to the actual statewide population. In addition, the live-capture and subsequent release of nine-banded armadillos would not likely result in adverse effects to the statewide population since those animals would be released unharmed.

Population Impact Analysis from WS' Activities Associated with Nutria

As discussed previously, the WS program in Florida had not previously received requests for direct operational assistance associated with nutria. Therefore, the WS program in Florida did not identify a need for action associated with nutria during the development of the EA. Based on recent requests for assistance associated with nutria, WS anticipates continuing to receive requests for assistance to manage damage. The WS program could use those methods addressed in Appendix B of the EA to alleviate damage associated with nutria. Therefore, this supplement to the EA will analyze the effects of damage management activities on the nutria population in the State.

The nutria is a large, dark colored, semi-aquatic rodent that is native to South America. People introduced nutria to the United States in the late 1930s (Whitaker, Jr. and Hamilton, Jr., 1998, Bounds et al. 2003). 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 (Bounds et al. 2003). On average, a nutria weighs 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 that they dig along stream banks or shorelines (Wade and Ramsey 1986, Bounds et al. 2003). 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, Bounds et al. 2003). In the wild, the life expectancy of nutria is approximately two years. Home ranges for nutria can range from 12 to 445 acres, and densities can range up to 10 nutria per acre (Whitaker, Jr. and Hamilton, Jr. 1998, Bounds et al. 2003).

Nutria are not considered a native wildlife species in Florida but the FWCC classifies nutria as a furbearing species in the State. The FWCC (2015*b*) indicates that nutria have been "…*in Florida since at least 1955 and entered the state from fur farms and from some releases for aquatic vegetation control. They have been reported over a wide area of the state at various times, but populations seem ephemeral in most areas. Current distribution in Florida is not known, although the animals are consistently reported from the Tampa Bay area, Hillsborough county*."

In response to requests for assistance, WS lethally removed one nutria during FY 2012, two nutria during FY 2014, nine nutria during FY 2015, and one nutria during FY 2016 in the State. The number of nutria addressed by WS each year 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. In response to requests for assistance, WS anticipates that personnel could lethally remove up to 500 nutria annually in the State. WS' personnel could also lethally remove nutria unintentionally during activities targeting other animal species, primarily beaver and muskrats. However, WS' personnel have not lethally removed nutria unintentionally during previous activities. Cumulatively, WS does not anticipate the intentional and unintentional lethal removal of nutria to exceed 500 individuals annually.

People can lethally remove nutria throughout the year in the State with no limit on the number people can harvest. In addition, other people could lethally remove nutria in the State to alleviate damage. The number of nutria that other people remove in the State is unknown. 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. Pursuant to Executive Order 13112, the National Invasive Species Council has designated the nutria as meeting the definition of an invasive species. Therefore, WS would conduct activities associated with nutria pursuant to Executive Order 13112. In addition, Lowe et al. (2000) ranked nutria as one of the 100 worst invasive species in the world.

Population Impact Analysis from WS' Activities Associated with Gray Squirrels

Similar to nutria, the WS program in Florida had not previously received requests for direct operational assistance associated with gray squirrels. Therefore, the WS program in Florida did not identify a need for action associated with squirrels during the development of the EA. Based on recent requests for assistance associated with gray squirrels, WS anticipates continuing to receive requests for assistance to manage damage. The WS program could use those methods addressed in Appendix B of the EA to alleviate damage associated with gray squirrels. Therefore, this supplement to the EA will analyze the effects of damage management activities on the populations of gray squirrels.

Gray squirrels occur throughout most of the eastern United States, including Florida. They inhabit mixed hardwood forests, especially those containing nut trees, such as oak and hickory. While people commonly refer to them as tree squirrels, they spend quite a bit of time on the ground foraging. Squirrels feed on a wide variety of foods and adapt quickly to unusual food sources. Typically, they feed on wild tree fruits and nuts in fall and early winter. Acorns, hickory nuts, walnuts, and Osage orange fruits are

favorite fall foods. Squirrels often cache nuts for later use. In late winter and early spring, they prefer tree buds. In summer, they eat fruits, berries, and succulent plant materials. They eat fungi, corn, and cultivated fruits when available. They may also chew bark during high population peaks, when food is scarce and may eat insects and other animal matter (Jackson 1994, Edwards et al. 2003).

Gray squirrels generally produce young in early spring and summer but may actually produce young at any time (Edwards et al. 2003). Older adults may produce two litters per year (Jackson 1994, Edwards et al. 2003). The gestation period is 42 to 45 days and two to three young comprise a litter. Young begin to explore outside the nest at about 10 to 12 weeks of age (Jackson 1994, Edwards et al. 2003). Home ranges of squirrels range from 1.2 to over 40 acres in size (Flyger and Gates 1982).

Gray squirrel populations periodically rise and fall, and during periods of high populations they may go on mass emigrations, during which time many animals die. Squirrels are vulnerable to numerous parasites and diseases such as ticks, mange mites, fleas, and internal parasites. Squirrel hunters often notice bot fly larvae, called "*wolves*" or "*warbles*", protruding from the skin of animals killed. Larvae do not impair the quality of the meat for eating. In addition to being a food source for some people, squirrels are also prey for hawks, owls, snakes, and several mammalian predators. Predation seems to have little effect on squirrel populations (Edwards et al. 2003). Typically, about half the squirrels in a population die each year and wild squirrels over four years old are rare, while captive individuals may live 10 years or more (Jackson 1994, Edwards et al. 2003).

Gray squirrel densities fluctuate based on available food sources but long-term densities tend to be stable (Gurnell 1987). Manski et al. (1981) found gray squirrel densities were typically less than 1.2 squirrels per acre in continuous areas of woodlands in North Carolina. Doebel and McGinnes (1974) found gray squirrel densities in small woodlots of less than 10 hectares in area could be as high as 16 squirrels per hectares. In urban parks, Manski et al. (1981) found gray squirrel densities can be more than 8.4 squirrels per acre. A three acre park in Washington, D.C. had a density of 50 squirrels per ha (20 per acre) (Hadidian et al. 1987).

Gray squirrels occur statewide; however, statewide population estimates for the gray squirrel are currently not available. To determine a statewide population, this analysis will use the best available information to estimate a statewide population. The land area of Florida is approximately 53,625 square miles (United States Census Bureau 2010), which is approximately 34,320,000 acres. Under a worst-case scenario, if only 25% of the land area supported squirrels, with an estimate of one gray squirrel per every 7 acres, the statewide populations could be over 1.2 million squirrels if only one squirrel occupied a home range and no home ranges overlapped. This would be a worst-case scenario since gray squirrel populations are likely to inhabit a much larger portion of the land area in the State and squirrels typically occur at much higher densities.

The FWCC classifies gray squirrels as game mammals in the State that people can harvest during annual hunting seasons that vary depending on the method used to harvest squirrels. During the development of this supplement to the EA, the limit on the number of squirrels that hunters could harvest daily was 12 squirrels and could possess up to 24 squirrels during the length of the season (FWCC 2016). The number of gray squirrels that people harvest in the State annually is currently not available.

In response to requests for assistance, WS lethally removed 19 gray squirrels during FY 2014 in the State. The number of gray squirrels addressed by WS each year would be dependent on the number of requests received, the number of squirrels associated with causing damage or the threat of damage, and the efficacy of methods employed to resolve the damage. Based on the previous request for assistance, WS anticipates that personnel could lethally remove up to 100 gray squirrels annually while responding to requests for assistance. WS' personnel could also lethally remove gray squirrels unintentionally during

activities targeting other animal species. However, WS' personnel have not lethally removed gray squirrels unintentionally during previous activities. Cumulatively, WS does not anticipate the intentional and unintentional lethal removal of squirrels to exceed 100 individuals annually.

If WS lethally removed up to 100 gray squirrels, the lethal removal would represent 0.01% of the estimated gray squirrel population in the State under a worst-case scenario. Although the number of gray squirrels that people harvest in the State annually is unknown, the cumulative removal of gray squirrels is not likely to be sufficient to cause adverse effects on the statewide population of gray squirrels.

Effects on Target Animals from the Use of Aircraft

WS is considering the use of aircraft to aid in alleviating or preventing feral swine damage. If WS continues to implement Alternative 1, aerial operations could include the use of aircraft for surveillance and monitoring, as well as, WS' employees shooting feral swine from aircraft. Surveillance and monitoring activities would use aircraft to locate feral swine or other wildlife, to determine the size of a local population, and when using radio telemetry, to locate radio collared animals.

Although the use of firearms from aircraft could rapidly reduce feral swine densities in an area (Saunders 1993, Choquenot et al. 1999, Campbell et al. 2010), WS does not anticipate the lethal removal of feral swine by WS in the State would exceed the level analyzed in the EA. The EA analyzed the lethal removal of up to 4,000 feral swine by WS annually (USDA 2013). Studies conducted in Australia found that shooting feral swine from an aircraft reduced local populations of swine by 65 to 80% and surviving feral swine could continue to cause damage and pose disease risks (Hone 1990, Saunders 1993, Saunders and Bryant 1988). Choquenot et al. (1999) found the feral swine density in an area influenced the efficiency of aerial gunning. Saunders and Bryant (1988) found feral swine "*...became attuned to the significance of a hovering helicopter and* [feral swine] *modified their behaviour* [sic] *to avoid detection.*" Dexter (1996) concluded that harassment caused by the use of aircraft in New South Wales, Australia had little effect on the movements of surviving swine since no statistically significant differences were observed in the hourly distanced moved by surviving feral swine, the home ranges of surviving feral swine, and their positions within their home ranges. Campbell et al. (2010) stated the use of aircraft to shoot feral swine "*...had only minor effects on the behavior of surviving swine...*" and the use of aircraft to remove feral swine "*...should be considered a viable tool...*" when managing disease outbreaks.

Because the number of feral swine that WS could lethally remove annually would remain as analyzed in the EA and the use of aircraft would not result in direct mortality of feral swine, the use of aircraft to lethally remove feral swine or for surveillance would not affect the population of feral swine in the State.

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

The issue of non-target species effects, including effects on threatened and endangered (T&E) species, arises from the use of non-lethal and lethal methods identified in the alternatives. The use of non-lethal and lethal methods has the potential to inadvertently disperse, capture, or kill non-target wildlife. WS has developed SOPs to reduce the effects of damage management activities on non-target species' populations (see Section 3.4 of the EA). To reduce the risks of adverse effects to non-target animals, WS would select methods that were as target-selective as possible or would apply such methods in ways that reduced the likelihood of affecting non-target species. Before initiating management activities, WS would also select locations that target species use extensively. WS would employ baits or lures that were preferred by the target mammal species. Despite WS' best efforts, the potential for WS to disperse, live-capture, or kill non-target animals would exist when applying both non-lethal and lethal methods to manage damage or reduce threats to safety.

Table 6 shows the number and species of non-target animals lethally removed by WS between FY 2012 and FY 2016 during activities targeting those mammal species addressed in the EA. In total, the WS program in Florida lethally removed seven opossum, three raccoons, and two armadillos unintentionally during activities targeting other mammal species. The cumulative removal of raccoons by WS (intentional and unintentional) from FY 2012 through FY 2016 occurred within the impact parameters evaluated in the EA. The analyses under Issue 1 associated with impacts of WS' potential activities on the population of opossum and armadillos includes the unintentional removal that could occur when implementing Alternative 1.

Table 6 - Number and species of non-targeted mammals lethally removed by method during WS' damage management operations in Florida, FY 2012 - FY 2016[a].

Species	Neck Snare	Cage Trap	TOTAL
Virginia Opossum	1	6	**7**
Raccoon	3	0	**3**
Nine-banded Armadillo	0	2	**2**

[a]Table 2 includes those non-target animals taken during mammal damage management activities and does not include those non-target animals potentially captured and released during the ORV surveillance program in Florida.

[b]Raccoons, opossum, and armadillo are also considered target species under the EA but are considered unintentional non-target animals when take occurs during mammal damage management activities conducted that are targeting other species.

WS would continue to monitor the removal of non-target species to ensure program activities or methodologies used in mammal damage management would not adversely affect non-target animals. Methods available to resolve and prevent mammal damage or threats when employed by trained, knowledgeable personnel would be selective for target species. WS would report to the FWCC any non-target animal removal to ensure the FWCC had the opportunity to consider removal by WS as part of management objectives established for those species by the FWCC. The potential for adverse effects to occur to the populations of non-target species would be similar to the other alternatives and would be minimal based on previous non-target removal.

As discussed previously, the use of non-lethal methods to address damage or threats would generally have no effect on a species' population since those individuals addressed using non-lethal methods would be unharmed and no actual reduction in the number of individuals in a species' population occurs. Similarly, the live-capture and release of non-target animals would generally have no adverse effects on a species' population since personnel would release those individuals unharmed and no actual reduction in the number of individuals in a population occurs. Therefore, the live-capture and subsequent releasing of non-target animals during damage management activities conducted when implementing Alternative 1 would not result in declines in the number of individuals in a species' population.

While WS' personnel would take precautions to safeguard against dispersing, capturing, and removing non-target animals during operational use of methods and techniques for resolving damage and reducing threats caused by mammals, the use of such methods could result in the incidental removal of unintended species. Those occurrences would be rare and should not affect the overall populations of any species when implementing Alternative 1.

Based on a review of those T&E species listed in the State during the development of the EA, WS determined that activities conducted pursuant to Alternative 1 would not likely adversely affect species listed as threatened or endangered in the State by the USFWS. As part of the development of the EA, WS consulted with the USFWS under Section 7 of the Endangered Species Act. The USFWS concurred with WS' determination that activities conducted pursuant to Alternative 1 would not likely adversely affect those species currently listed in the State (H. Rauschenberger, USFWS pers. comm. 2012).

Between FY 2012 and FY 2016, WS' activities did not result in the take of any T&E species nor did WS' activities adversely affect any T&E species. A review of T&E species listed by the USFWS and the National Marine Fisheries Service showed additional listings of T&E species in Florida have occurred since the completion of the EA in 2013 and the development of this supplement to the EA. Table 7 shows those species currently listed as threatened or endangered in Florida and those species that are candidates for listing in the State.

As part of the development of this supplement to the EA, WS re-initiated consultation with the USFWS under Section 7 of the Endangered Species Act. Based on a review of the activities conducted previously and those methods currently available, including the use of aircraft, WS determined that activities conducted under Alternative 1, as supplemented by this document, would not likely adversely affect many T&E species listed within the State (see Table 7 for a list of specific species). The USFWS concurred with WS' determination that activities conducted pursuant to Alternative 1, including the use of aircraft, would not likely adversely affect those species or their critical habitats (A. Blackford, USFWS pers. comm. 2017, A. Dziergowski, USFWS pers. comm. 2017, S. Blomquist, USFWS pers. comm. 2017). In addition, WS has made a "*no effect*" determination for several species currently listed in the State based on those methods currently available and based on current life history information for those species (see Table 7).

Table 7 – Threatened, endangered, or candidate species in Florida and WS' determination

Common Name	Scientific Name	Status[†]	Determination[‡]
ANIMALS			
Amphibians			
Frosted Flatwoods salamander	*Ambystoma cingulatum*	T	MANLAA
Loggerhead sea turtle	*Caretta caretta*	T	MANLAA
Reticulated Flatwoods salamander	*Ambystoma bishopi*	E	MANLAA
Striped newt	*Notophthalmus perstriatus*	C	MANLAA
Birds			
Audubon's crested caracara	*Polyborus plancus audubonii*	T	MANLAA
Bachman's wood warbler	*Vermivora bachmanii*	E	MANLAA
Cape Sable seaside sparrow	*Ammodramus mirabilis*	E	MANLAA
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E	MANLAA
Florida grasshopper sparrow	*Ammodramus savannarum*	E	MANLAA
Florida scrub-jay	*Aphelocoma coerulescens*	T	MANLAA
Ivory-billed woodpecker	*Campephilus principalis*	E	MANLAA
Kirtland's warbler	*Dendroica kirtlandii*	E	MANLAA
Piping plover	*Charadrius elodus*	T	MANLAA
Red-cockaded woodpecker	*Picoides borealis*	E	NE
Red knot	*Calidris canutus rufa*	T	MANLAA
Roseate tern	*Sterna dougallii dougallii*	T	MANLAA
Whooping crane	*Grus americana*	EXP	NE
Wood stork	*Mycteria americana*	T	MANLAA
Clams			
Chipola slabshell	*Elliptio chiplolaensis*	T	MANLAA
Choctaw bean	*Villosa choctawensis*	E	MANLAA
Fat threeridge	*Amblema neislerii*	E	MANLAA
Fuzzy pigtoe	*Pleurobema strodeanum*	T	MANLAA
Gulf moccasinshell	*Medionidus penicillatus*	E	MANLAA

Narrow pigtoe	*Fusconaia escambia*	T	MANLAA
Ochlockonee moccasinshell	*Medionidus simpsonianus*	E	MANLAA
Oval pigtoe	*Pleurobema pyriforme*	E	MANLAA
Purple bankclimber	*Elliptoideus sloatianus*	T	MANLAA
Round ebonyshell	*Fusconaia rotulata*	E	MANLAA
Shinyrayed pocketbook	*Lampsilis subangulata*	E	MANLAA
Southern kidneyshell	*Ptychobranchus jonesi*	E	MANLAA
Southern sandshell	*Hamiota australis*	T	MANLAA
Tapered pigtoe	*Fusconaia burkei*	T	MANLAA
Corals			
Elkhorn coral	*Acropora palmate*	T	NE
Staghorn coral	*Acropora cervicornis*	T	NE
Crustaceans			
Squirrel chimney cave shrimp	*Palaemonetes cummingi*	T	MANLAA
Fish			
Atlantic sturgeon	*Acipenser oxyrinchus desotoi*	T	NE
Okaloosa darter	*Etheostoma okalossae*	T	MANLAA
Shortnose sturgeon	*Acipenser brevirostrum*	E	NE
Smalltooth sawfish	*Pristis pectinate*	E	NE
Insects			
Bartram's hairstreak butterfly	*Strymon acis bartrami*	E	MANLAA
Florida leafwing butterfly	*Anaea troglodyte floridalis*	E	MANLAA
Highlands tiger beetle	*Cicindelidia highlandensis*	C	MANLAA
Miami blue butterfly	*Cyclargus behunebakeri*	E	MANLAA
Schaus' swallowtail butterfly	*Heraclidesa aristsodemus*	E	MANLAA
Mammals			
Anastasia Island beach mouse	*Peromyscus phasma*	E	MANLAA
Choctawhatchee beach mouse	*Peromyscus Polionotus*	E	MANLAA
Finback whale	*Balaenoptera physalus*	E	NE
Florida bonneted bat	*Eumops floridalis*	E	MANLAA
Florida panther	*Puma concolor coryi*	E	MANLAA
Florida salt marsh vole	*Microtus pensylvanicus*	E	MANLAA
Gray bat	*Myotis grisescens*	E	NE
Humpback whale	*Megaptera novaeangliae*	E	NE
Indiana bat	*Myotis sodalist*	E	NE
Key deer	*Odocoileus virginianus*	E	NE
Key Largo cotton mouse	*Peromyscus allapaticola*	E	MANLAA
Key Largo wood rat	*Neotoma floridana smalli*	E	MANLAA
Lower Keys marsh rabbit	*Sylvilagus palustris hefneri*	E	NE
North Atlantic right whale	*Eubalaena glacialis*	E	NE
Perdido Key beach mouse	*Peromyscus trissyllepsis*	E	MANLAA
Red wolf	*Canis rufus*	E	NE
Rice rat	*Oryzomys palustris natator*	E	MANLAA
Sei whale	*Balaenoptera borealis*	E	NE
Southeastern beach mouse	*Peromyscus niveiventris*	T	MANLAA
Sperm whale	*Physeter catodon*	E	NE
St. Andrew beach mouse	*Peromyscus peninsularis*	E	MANLAA

West Indian manatee	*Trichechus manatus*	E	NE
Reptiles			
American crocodile	*Crocodylus acutus*	T	NE
Atlantic saltmarsh snake	*Nerodia clarkia taeniata*	T	MANLAA
Bluetail mole skink	*Eumeces egregious lividus*	T	MANLAA
Eastern indigo snake	*Drymarchon corais couperi*	T	MANLAA
Gopher tortoise	*Gopherus polyphemus*	C	MANLAA
Green sea turtle	*Chelonia mydas*	T	MANLAA
Hawksbill sea turtle	*Eretmochelys imbricate*	E	MANLAA
Kemp's Ridley sea turtle	*Lepidochelys kempii*	E	MANLAA
Leatherback sea turtle	*Dermochelys coriacea*	E	MANLAA
Sand skink	*Neoseps reynoldsi*	T	MANLAA
Snails			
Stock Island tree snail	*Orthalicus reses*	T	MANLAA
PLANTS			
Ferns and Allies			
Florida bristle fern	*Trichomanes punctatum ssp. floridanum*	E	MANLAA
Flowering Plants			
Aboriginal prickly-apple	*Harrisia aboriginum*	E	MANLAA
American chaffseed	*Schwalbea Americana*	E	MANLAA
Apalachicola rosemary	*Conradina glabra*	E	MANLAA
Avon Park harebells	*Crotalaria avonensis*	E	MANLAA
Beach jacquemontia	*Jacquemontia reclinata*	E	MANLAA
Beautiful pawpaw	*Deeringothamnus pulchellus*	E	MANLAA
Big Pine partridge pea	*Chamaecrista lineata keyensis*	E	MANLAA
Blodgett's silverbush	*Argythamnia blodgettii*	T	MANLAA
Britton's beargrass	*Nolina brittoniana*	E	MANLAA
Brooksville bellflower	*Campanula robinsiae*	E	MANLAA
Cape Sable thoroughwort	*Chromolaena frustrate*	E	MANLAA
Carter's mustard	*Warea carteri*	E	MANLAA
Carter's small-flowered flax	*Linum carteri carteri*	E	MANLAA
Chapman rhododendron	*Rhododendron chapmanii*	E	MANLAA
Cooley's meadowrue	*Thalictrum cooleyi*	E	MANLAA
Cooley's water-willow	*Justicia cooleyi*	E	MANLAA
Crenulate lead-plant	*Amorpha crenulata*	E	MANLAA
Deltoid spurge	*Chamaesyce deltoidea*	E	MANLAA
Etonia rosemary	*Conradina etonia*	E	MANLAA
Everglades bully	*Sideroxylon reclinatum austrofloridense*	C	MANLAA
Florida bonamia	*Bonamia grandiflora*	T	MANLAA
Florida brickell-bush	*Brickellia mosieri*	E	MANLAA
Florida golden aster	*Chrysopsis floridana*	E	MANLAA
Florida pineland crabgrass	*Digitaria pauciflora*	C	MANLAA
Florida prairie-clover	*Dalea carthagenensis floridana*	C	MANLAA
Florida semaphore cactus	*Consolea corallicola*	E	MANLAA
Florida skullcap	*Scutellaria floridana*	T	MANLAA
Florida ziziphus	*Ziziphus celata*	E	MANLAA
Four-petal pawpaw	*Asimina tetramera*	E	MANLAA

Fragrant prickly-apple	*Cereus eriophorus*	E	MANLAA
Fringed campion	*Silene polypetala*	E	MANLAA
Garber's spurge	*Chamaesyce garberi*	T	MANLAA
Garrett's mint	*Dicerandra christmanii*	E	MANLAA
Gentian pinkroot	*Spigelia gentianoides*	E	MANLAA
Godfrey's butterwort	*Pinguicula ioinantha*	T	MANLAA
Harper's beauty	*Harperocallis flava*	E	MANLAA
Highlands scrub hypericum	*Hypericum cumulicola*	E	MANLAA
Johnson's seagrass	*Halophila johnsonii*	T	MANLAA
Key tree cactus	*Pilosocereus robinii*	E	MANLAA
Lakela's mint	*Dicerandra immaculate*	E	MANLAA
Lewton's polygala	*Polygala lewtonii*	E	MANLAA
Longspurred mint	*Dicerandra cornutissima*	E	MANLAA
Miccosukee gooseberry	*Ribes echinellum*	E	MANLAA
Okeechobee gourd	*Cucurbita okeechobeensis*	E	MANLAA
Papery whitlow-wort	*Paronchia chartacea*	T	MANLAA
Pigeon wings	*Clitoria fragrans*	T	MANLAA
Pineland sandmat	*Chamaesyce deltoidea pinetorum*	C	MANLAA
Pygmy fringe-tree	*Chionanthus pygmaeus*	E	MANLAA
Rugel's pawpaw	*Deeringothamnus rugelii*	E	MANLAA
Sand flax	*Linum arenicola*	E	MANLAA
Sandlace	*Polygonella myriophylla*	E	MANLAA
Scrub blazingstar	*Liatris ohlingerae*	E	MANLAA
Scrub buckwheat	*Eriogonum longifolium*	T	MANLAA
Scrub lupine	*Lupinus aridorum*	E	MANLAA
Scrub mint	*Dicerandra frutescens*	E	MANLAA
Scrub plum	*Prunus geniculate*	E	MANLAA
Short-leaved rosemary	*Conradina brrevifolia*	E	MANLAA
Small's milkpea	*Galactia smallii*	E	MANLAA
Snakeroot	*Eryngium cuneifolium*	E	MANLAA
Telephus spurge	*Euphorbia telephioides*	T	MANLAA
Tiny polygala	*Polygala smallii*	E	MANLAA
Wedge spurge	*Chamaesyce deltoidea serpyllum*	E	MANLAA
White birds-in-a-nest	*Macbridea alba*	T	MANLAA
Wide-leaf warea	*Warea amplexifolia*	E	MANLAA
Wireweed	*Polygonella basiramia*	E	MANLAA
Conifers and Cycads			
Florida torreya	*Torreya taxifolia*	E	MANLAA
Lichens			
Florida perforate cladonia	*Cladonia perforate*	E	MANLAA

†T=Threatened; E=Endangered; C=Candidate; EXP=Experimental Population;

‡NE=No effect; MANLAA=May affect, not likely to adversely affect

In addition, the USFWS and/or the National Marine Fisheries Service has designated critical habitat for several species listed as threatened or endangered within the State. Table 8 shows those species with critical habitat designated in Florida. Based on a review of WS' activities, the methods available to manage damage associated with mammals, and those locations where critical habitat is designated, WS has determined the implementation of Alternative 1, as supplemented, would have no effects on any

designated critical habitat in the State (see Table 8). The USFWS has concurred with the determinations made by WS (A. Blackford, USFWS pers. comm. 2017, A. Dziergowski, USFWS pers. comm. 2017, S. Blomquist, USFWS pers. comm. 2017).

Table 8 – Critical habitat designated by the USFWS and WS' determination

Common Name	Scientific Name	Status†	Determination‡
ANIMALS			
Amphibians			
Frosted Flatwoods salamander	*Ambystoma cingulatum*	CH	NE
Reticulated Flatwoods salamander	*Ambystoma bishopi*	CH	NE
Birds			
Cape Sable seaside sparrow	*Ammodramus mirabilis*	CH	NE
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	CH	NE
Piping plover	*Charadrius elodus*	CH	NE
Clams			
Chipola slabshell	*Elliptio chiplolaensis*	CH	NE
Choctaw bean	*Villosa choctawensis*	CH	NE
Fat threeridge	*Amblema neislerii*	CH	NE
Fuzzy pigtoe	*Pleurobema strodeanum*	CH	NE
Gulf moccasinshell	*Medionidus penicillatus*	CH	NE
Narrow pigtoe	*Fusconaia escambia*	CH	NE
Ochlockonee moccasinshell	*Medionidus simpsonianus*	CH	NE
Oval pigtoe	*Pleurobema pyriforme*	CH	NE
Purple bankclimber	*Elliptoideus sloatianus*	CH	NE
Round ebonyshell	*Fusconaia rotulata*	CH	NE
Shinyrayed pocketbook	*Lampsilis subangulata*	CH	NE
Southern kidneyshell	*Ptychobranchus jonesi*	CH	NE
Southern sandshell	*Hamiota australis*	CH	NE
Corals			
Elkhorn coral	*Acropora palmate*	CH	NE
Staghorn coral	*Acropora cervicornis*	CH	NE
Fish			
Atlantic sturgeon	*Acipenser oxyrinchus desotoi*	CH	NE
Insects			
Bartram's hairstreak butterfly	*Strymon acis bartrami*	CH	NE
Florida leafwing butterfly	*Anaea troglodyte floridalis*	PCH	NE
Mammals			
Choctawhatchee beach mouse	*Peromyscus Polionotus*	CH	NE
Perdido Key beach mouse	*Peromyscus trissyllepsis*	CH	NE
Rice rat	*Oryzomys palustris natator*	CH	NE
St. Andrew beach mouse	*Peromyscus peninsularis*	CH	NE
West Indian manatee	*Trichechus manatus*	CH	NE
Reptiles			
American crocodile	*Crocodylus acutus*	CH	NE
PLANTS			
Flowering Plants			
Cape Sable thoroughwort	*Chromolaena frustrate*	CH	NE
Carter's small-flowered flax	*Linum carteri carteri*	CH	NE

Florida brickell-bush	*Brickellia mosieri*	CH	NE
Johnson's seagrass	*Halophila johnsonii*	CH	NE

†CH=Critical Habitat

‡NE=No effect, no adverse modification

In addition, WS has reviewed the list of species listed in the State by the FWCC. Based on the use patterns of methods available, including the use of aircraft, WS has determined the activities conducted under Alternative 1, as supplemented by this document, would not adversely affect those species listed in the State by the FWCC.

Effects on Non-target animals from Additional Efforts to address Nine-banded Armadillos, Virginia Opossum, Nutria, and Gray Squirrels

Similar to activities that the WS program has conducted previously, the potential exists for WS' personnel to disperse, live-capture, or lethally remove non-target animals during activities that target armadillos, opossum, nutria, and gray squirrels. However, those risks would continue to be non-existent to minimal. Based on previous activities associated with those species and the methods available to address damage caused by those species, the unintentional dispersal, live-capture, or lethal removal of non-target animals would not increase substantially when addressing armadillos, opossum, nutria, and gray squirrels. WS' personnel would continue to implement those SOPs discussed in Chapter 3 of the EA and those SOPs discussed in this supplement to minimize risks of dispersing, live capturing, or lethally removing non-target animals. WS' personnel would continue to release non-target animals live captured when those non-target animals were unharmed and personnel could safely release those animals.

Effects on Non-target animals from the Use of Aircraft

An additional concern that WS has identified is the potential for low-level aircraft flights to disturb wildlife, including T&E species. Low-level aircraft flights would be associated with the use of firearms from aircraft and from the use of aircraft for wildlife surveillance. Aerial operations using firearms could be an important method of damage management in Florida when used to address damage or threats associated with feral swine in remote areas where access was limited due to terrain and habitat. Aerial operations using firearms would only occur in those areas where WS and the cooperating landowner or manager sign a MOU, work initiation document, or a comparable document allowing the use of aircraft and firearms. WS would typically conduct aerial operations using firearms between the months of December and April when the foliage has fallen; however, WS could utilize aircraft at any time of year. The amount of time spent conducting aerial operations using firearms would vary depending on the severity of damage and the number of feral swine causing damage. In addition, the size of the area where damage or threats were occurring and the weather would influence the amount of time spent conducting aerial operations using firearms. Low-level aerial activities would be restricted to visual flight rules and would be impractical in high winds or at times when animals were not easily visible.

Aircraft play an important role in the management of various wildlife species for many agencies. Resource management agencies rely on low flying aircraft to monitor the status of many animal populations, including large mammals (Lancia et al. 2000), birds of prey (Fuller and Mosher 1987), waterfowl (Bellrose 1976), and colonial waterbirds (Speich 1986). Low-level flights could also be required when agencies use aircraft to track animal movements by radio telemetry (Gilmer et al. 1981, Samuel and Fuller 1996).

A number of studies have looked at responses of various wildlife species to aircraft overflights. The National Park Service (1995) reviewed the effects of aircraft overflights on wildlife and suggested that adverse effects could occur to certain species in localized areas. Some species will frequently or at least

occasionally show an adverse response to even minor overflights. In general though, it appears that the more serious potential adverse effects occur when overflights are chronic (*i.e.*, they occur daily or more often over long periods). Chronic exposures generally involve areas near commercial airports and military flight training facilities. Aerial operations conducted by WS rarely occur in the same areas on a daily basis and aerial operations conducted by WS spend little time flying over those particular areas.

The effects on wildlife from military-type aircraft have been studied extensively (Air National Guard 1997), and were found to have no expected adverse effects on wildlife. The following discussion provides examples of species or species groups studied with regard to the issue of aircraft-generated disturbance.

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

Raptors: The Air National Guard (1997) analyzed and summarized the effects of overflight studies conducted by numerous federal and state government agencies and private organizations. Those studies determined that military aircraft noise initially startled raptors, but negative responses were brief and did not have an observed effect on productivity (see Ellis 1981, Fraser et al. 1985, Lamp 1989, United States Forest Service 1992 as cited in Air National Guard 1997). A study conducted on the impacts of overflights to bald eagles (*Haliaeetus leucocephalus*) suggested that the eagles were not sensitive to this type of disturbance (Fraser et al. 1985). During the study, observations were made of more than 850 overflights of active eagle nests. Only two eagles rose out of either their incubation or brooding postures. This study also showed that perched adults were flushed only 10% of the time during aircraft overflights. Evidence also suggested that golden eagles (*Aquila chrysaetos*) were not highly sensitive to noise or other aircraft disturbances (Ellis 1981, Holthuijzen et al. 1990). Finally, one other study found that eagles were particularly resistant to being flushed from their nests (see Awbrey and Bowles 1990 as cited in Air National Guard 1997). Therefore, there is considerable evidence that overflights during aerial operations would not adversely affect eagles.

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

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

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

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

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

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

Mountain Sheep: Krausman and Hervert (1983) reported that, of 32 observations of the response of mountain sheep to low-level flights by small fixed-wing aircraft, 60% resulted in no disturbance, 81% in no or "*slight*" disturbance, and 19% in "*great*" disturbance. Krausman and Hervert (1983) concluded that flights less than 150 feet AGL could cause mountain sheep to leave an area. When Weisenberger et al. (1996) evaluated the effects of simulated low altitude jet aircraft noise on desert mule deer (*Odocoileus*

hemionus crooki) and mountain sheep (*Ovis canadensis mexicana*), they found that heart rates of the ungulates increased according to the dB levels, with lower noise levels prompting lesser increases. When they were elevated, heart rates rapidly returned to pre-disturbance levels suggesting that the animals did not perceive the noise as a threat. Responses to the simulated noise levels decreased with increased exposure.

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

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

Although many of those animal species discussed above are not present in Florida, the information demonstrates the relative tolerance most wildlife species have of overflights, even those that involve noise at high decibels, such as from military aircraft. In general, the greatest potential for impacts to occur exists when overflights were frequent, such as hourly and over many days that could represent "*chronic*" exposure. Chronic exposure situations generally involve areas near commercial airports and military flight training facilities. Even then, many wildlife species habituate to aircraft overflights, which appear to minimize any potential adverse effects where such flights occur on a regular basis. Therefore, aircraft used by WS should have far less potential to cause any disturbance to wildlife than military aircraft. Military aircraft produce much louder noise and would be flown over certain training areas many more times per year, and yet, were found to have no expected adverse effects on wildlife (Air National Guard 1997).

The fact that WS would only conduct overflights on a very small percentage of the land area of the State indicates that exposure of most wildlife to overflights by WS would not occur. In addition, such flights would occur infrequently throughout a year, which would further lessen the potential for any adverse effects.

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

Based on the analyses in the EA, when WS' activities were conducted according to applicable laws, including WS' directives, and methods were used as intended, those activities pose minimal risks to human safety (USDA 2013). The analyses in the EA also concluded that WS' activities to reduce damage and threats associated with mammals could reduce risks to human health and safety by addressing safety issues and possible disease transmission.

Management activities conducted by WS between FY 2012 and FY 2016 did not result in any injuries or illnesses to any members of the public or to WS' personnel. The WS program in Florida did not receive any reports of injuries or illnesses from WS' activities conducted between FY 2012 and FY 2016. The EA concluded that an integrated approach to damage management had the greatest potential of successfully reducing potential risks to human health and safety in Florida.

Effects on Human Safety from Additional Efforts to address Nine-banded Armadillos, Virginia Opossum, Nutria, and Gray Squirrels

Addressing damage or threats of damage associated with armadillos, opossum, nutria, and gray squirrels could result in employing methods 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 and those discussed in this supplement into damage management activities, which would minimize risks to human safety. Based on the use patterns of the methods available, an incretion in the use of those methods to address those activities described in this supplement to the EA pertaining to an increase in activities would not increase risks to human safety. The training and experience of WS' employees in the proper use of methods would ensure the safety of employees and the public. No adverse effects to human safety have occurred from WS' activities conducted from FY 2012 through FY 2016. An increase in the number of methods used or an increase in the frequency that WS uses a method would not increase risks to human safety when consideration of human safety was part of the use pattern associated with those methods.

Human Safety Analysis Associated with the Use of Aircraft

Aerial wildlife operations, like any other flying, may result in an accident. WS' pilots and crewmembers would receive training and have the experience to recognize the circumstances that lead to accidents. The national WS Aviation Program has increased its emphasis on safety, including funding for additional training, the establishment of a WS Flight Training Center, and annual recurring training for all pilots. Still, accidents may occur and the WS program in Florida will evaluate environmental consequences of potential accidents.

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

Fuel Spills and Environmental Hazard from Aviation Accidents: Aviation fuel is generally extremely volatile and aviation fuel will generally evaporate within a few hours or less. The fuel capacity for aircraft used by WS varies. For fixed-winged aircraft, a 52-gallon capacity would generally be the maximum, while 91 gallons would generally be the maximum fuel capacity for helicopters. In some cases, little or none of the fuel would spill if an accident occurs. Thus, there should be little environmental hazard from unignited fuel spills.

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

Through volatilization and bacterial action, petroleum products will biodegrade especially when exposed to oxygen (United States Environmental Protection Agency 2000). Thus, small quantity oil spills on surface soils can biodegrade readily. Even in subsurface contamination situations involving underground storage facilities that would generally involve larger quantities than would ever be involved in a small aircraft accident, EPA guidelines provide for *"natural attenuation"* or volatilization and biodegradation in some situations to mitigate environmental hazards (United States Environmental Protection Agency 2000). Thus, even where people did not clean up oil spills in small aircraft accidents, the oil would not persist in the environment or would persist in such small quantities that no adverse effects would occur. In addition, WS' accidents generally would occur in remote areas away from human habitation and drinking water supplies. Thus, the risk to drinking water appears to be exceedingly low to nonexistent.

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

Issue 4 - Effects on the Socio-cultural Elements of the Human Environment

As described in the EA, WS could employ methods when requested that could 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 WS' personnel disperse or remove target animals, the ability of interested persons to observe and enjoy those animals would likely temporarily decline. Even the use of exclusionary devices could lead to the dispersal of mammals if the resource the target animals were damaging was acting as an attractant. Thus, once the attractant was removed or made unavailable, mammals would likely disperse to other areas where resources were more vulnerable making them unavailable for viewing or enjoyment.

The EA concluded the effects on socio-cultural elements would be variable depending on the damage situation, stakeholders' values towards animals, and their compassion for those persons who are experiencing damage from mammals. The WS program in Florida only conducts activities at the request of the affected property owner or resource manager and only on property owned or managed by the requester. Upon receiving a request for assistance, WS would address issues/concerns and personnel would explain the reasons why a particular method or group of methods would be the most effective in reducing damage for the specific situation. WS would only provide assistance after the requester and WS signed a work initiation document, a MOU, or another similar document. The work initiation document, MOU, or similar document would include those methods the requester agreed to allow WS' personnel to use on property they own or manage to alleviate damage or threats of damage.

Information in this supplement to the EA indicates that WS' lethal removal of mammal species has been minimal and of a low magnitude when compared to the estimated populations of those species. WS' lethal removal has not reached a magnitude that would severely limit the ability to view and enjoy mammals. WS' personnel only target those mammals identified as causing damage and only after receiving a request for such action. Therefore, the presence of target species may be lower on properties where the owner or managers requests WS remove target animals causing damage. However, people could still view animals if they made a reasonable effort 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 Florida. Therefore, WS would not conduct activities over such a large portion of the State that would greatly limit the socio-cultural value of mammals.

Effects on Socio-cultural Elements from Additional Efforts to address Nine-banded Armadillos, Virginia Opossum, Nutria, and Gray Squirrels

The activities addressed in this supplement to the EA could result in a greater number of armadillos and opossum being lethally removed or could result in an increase in the number of locations where WS' personnel lethally remove armadillos and opossum. In addition, under the proposed supplement to the EA, the WS program could address nutria and gray squirrels to alleviate damage when a person requests such assistance. WS' goal would be to respond to requests for assistance and to manage those target animals responsible for the resulting damage. Therefore, the ability to view and enjoy armadillos, opossum, nutria, and gray squirrels would remain if entities made a reasonable effort to locate those species outside the area in which damage management activities occurred.

The ability to view and enjoy the aesthetic value of armadillos, opossum, nutria, and gray squirrels at a particular site would be somewhat limited if WS' personnel dispersed or removed target animals 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 arrived would be variable, depending on the site, time of year, and population densities of those mammals in the surrounding areas.

As shown under Issue 1, the magnitude of WS' proposed removal of armadillos, opossum, nutria, and gray squirrels under the supplement to the EA would be low if removal occurred at the levels proposed. WS' proposed activities addressed in this supplement would not cause the populations of those species to decline over a large geographical area. WS' activities would be limited to site specific locations where damage has occurred or was likely to occur. Therefore, even with the proposed increased removal of armadillos and opossum under the supplement and the removal of nutria and gray squirrels, those species' populations would remain high in the State and people could enjoy the aesthetic value of those species if people made a reasonable attempt to locate those species outside of the damage management area.

Effects on the Aesthetic Values of Mammals Associated with the Use of Aircraft

The use of aircraft to remove feral swine could result in temporary declines in local feral swine populations resulting from the removal. WS' goal would be to respond to requests for assistance and to address those feral swine responsible for the resulting damage. Therefore, the ability to view and enjoy feral swine in Florida would remain if people made a reasonable effort to locate feral swine outside the area in which damage management activities occurred.

The ability to view and enjoy the aesthetic value of feral swine at a particular site would be somewhat limited if those swine causing damage or posing threats were removed as part of an integrated approach to managing damage. As was discussed in the EA, the magnitude of WS' proposed removal of feral swine, including the removal of swine using aircraft under the supplement to the EA, could be low if removal levels occurred at the levels proposed. WS' proposed activities addressed in the supplement would not result in declines of feral swine populations over a large geographical area, but would be limited to site-specific locations where feral swine damage has occurred or is likely to occur. Therefore, even with the proposed removal of feral swine addressed in the EA, feral swine populations would remain high in the State and people could enjoy the aesthetic value of swine if those persons made a reasonable attempt to locate feral swine outside of the damage management area.

Issue 5 - Humaneness and Animal Welfare Concerns of Methods

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

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

Some people and groups of people have stereotyped methods as "*humane*" or "*inhumane*". However, many "*humane*" methods can be inhumane if not used appropriately. For example, most members of the public would likely consider a cage trap as "*humane*" since an animal is alive when captured. Yet, without proper care, inhumane situations can occur when people do not attend to live-captured animals appropriately.

If target animals were to be live-captured by WS, personnel would check capture devices in accordance with State laws and regulations to ensure personnel addressed animals captured in a timely manner and to prevent injury. Although stress could occur from being restrained, timely attention to live-captured animals would alleviate suffering; therefore, stress would likely be temporary. When personnel employ live-capture methods and translocation was not appropriate or available, WS would euthanize target animals live-captured pursuant to WS Directive 2.505. WS' personnel could also employ lethal methods to resolve requests for assistance to alleviate or prevent damage and threats. Lethal methods would include shooting, euthanasia chemicals, body-grip traps, rodenticides, and cable restraints. WS' use of lethal control methods when implementing Alternative 1 would follow WS' directives (see WS Directive 2.430, WS Directive 2.505).

Therefore, WS' mission would be to address requests for assistance using methods in the most humane way possible that minimizes the stress and pain of the animal. WS' personnel would be experienced and professional in their use of management methods. When employing methods to resolve damage to resources or threats to human safety, WS' personnel would apply methods as humanely as possible. Methods used in damage management activities in Florida since the completion of the EA and their potential impacts on humaneness and animal welfare have not changed from those analyzed in the EA. No changes in methods were identified that would alter the analysis contained in the EA on the issue of method humaneness or animal welfare. Therefore, the analyses of the humaneness and animal welfare of methods used by WS to manage damage and threats caused by mammals have not changed from those analyzed in the EA.

Methods used in damage management activities in Florida from FY 2012 through FY 2016 and their potential impacts on humaneness and animal welfare have not changed from those analyzed in the EA. The EA discusses all of the methods employed by WS from FY 2012 through FY 2016 to alleviate damage (USDA 2013), except the use of aircraft. WS continued to employ methods as humanely as possible to minimize distress. Live-captured target animals were euthanized using methods considered appropriate for wild mammals by the American Veterinary Medical Association (AVMA). Therefore, the analyses of the humaneness and animal welfare concerns of methods used by WS to manage damage and threats caused by mammals from FY 2012 through FY 2016 has not changed from those analyzed in the EA.

Effects on Humaneness and Animal Welfare from Additional Efforts to address Nine-banded Armadillos, Virginia Opossum, Nutria, and Gray Squirrels

The EA discusses those methods that would be available to manage damage associated with armadillos, opossum, nutria, and gray squirrels. The WS program in Florida is not considering any additional methods for use to manage damage associated with armadillos, opossum, nutria, and gray squirrels. Therefore, the EA already discusses and analyzes the humaneness and animal welfare concerns of those methods and remains appropriate to the methods available.

Humaneness and Animal Welfare Analysis Associated with the Use of Aircraft

As noted previously, aircraft can play an important role in the management of various wildlife species.

Resource management agencies rely on low flying aircraft to monitor the status of many animal populations and to track animal movements by radio telemetry. Similarly, WS could use aircraft to monitor and track feral swine or other mammal species in the State if WS continues to implement Alternative 1, as supplemented. Dexter (1996) and Campbell et al. (2010) concluded the use of aircraft had little effect on the movements and behavior of feral swine. In addition, aerial overflights appear to have minimal effects on other animal species, especially when those flights occur infrequently and are of limited duration. Most activities associated with WS' use of low-flying aircraft would occur between December and April when visibility would be highest due to the lack of foliage and limited vegetation, which is not generally the reproductive seasons for many animal species present in the State. Low-flying aircraft would not be employed over large geographical areas or applied at such intensity that essential resources (*e.g*., shelter, food sources) would be unavailable for extended durations or over such a wide geographical scope that long-term adverse effects would occur to the populations of animals.

Of primary concern would be the humaneness and animal welfare of using firearms to shoot feral swine from aircraft. The EA addresses the use of firearms as a method (USDA 2013). Therefore, the EA addresses the issue of humaneness and animal welfare associated with the use of a firearm. All personnel who use firearms would receive training in their proper use according to WS' Directives (*e.g*., see WS Directive 2.615), including guidance provided to WS' personnel on the lethal removal of animals (see WS Directive 2.505). The AVMA has stated previously "[c]*onditions found in the field, although more challenging than those that are controlled, do not in any way reduce or minimize the ethical obligation of the responsible individual to reduce pain and distress to the greatest extent possible during the taking of an animal's life*" (AVMA 2007). Similar recommendations occur in the current guidelines on euthanasia produced by the AVMA (AVMA 2013). Therefore, the goal of WS would be to address requests for assistance using effective methods, including shooting from an aircraft, in the most humane way possible that minimizes the stress and pain to the animal.

Issue 6 - Effects of Mammal Damage Management Activities on the Regulated Harvest of Mammals

The populations of several of the mammal species addressed in the EA and this supplement to the EA are sufficient to allow for annual harvest seasons that typically occur during the fall. The FWCC establishes hunting and trapping seasons in the State. Those species addressed in the EA that have established hunting and/or trapping seasons include beaver, bobcats, coyotes, eastern cottontails, feral swine, raccoons, river otters, striped skunks, spotted skunks, opossum, and white-tailed deer. The EA concluded that the effects of WS' activities on this issue would be insignificant. WS' activities are coordinated with the FWCC to ensure WS' annual removal of harvestable species does not exceed a level where a decline in those species' populations would occur due to cumulative impacts from harvest, damage management activities, and other sources of mortality. WS' limited removal of mammals in Florida is not occurring at a magnitude that would adversely affect the ability of those persons interested to harvest those species in the State. Program activities and their potential impacts on statewide populations of harvestable species have not changed from those analyzed in the EA.

Effects on the Ability to Harvest Animals from Additional Efforts to address Nine-banded Armadillos, Virginia Opossum, Nutria, and Gray Squirrels

As discussed previously, the FWCC has classified the opossum and nutria as furbearing species in the State that people can harvest each year in the State. The FWCC classifies gray squirrels as game animals that people can also harvest each year in the State. People can harvest opossum and nutria on private property statewide throughout the year (*i.e*., continuous open season) using legal hunting and trapping methods with no limit on the number of opossum and nutria that people can harvest annually. During the development of this supplement to the EA, the limit on the number of squirrels that hunters could harvest daily was 12 squirrels and could possess up to 24 squirrels during the length of the season (FWCC 2016).

Nine-banded armadillos are a non-protected mammal species in Florida and the FWCC allows people to remove nuisance armadillos at any time.

The FWCC establishes hunting and trapping seasons in the State for wildlife. With oversight of activities to alleviate damage associated with wildlife, the FWCC maintains the ability to regulate removal by WS to meet management objectives for wildlife in the State. Therefore, the FWCC would have the opportunity to consider the cumulative removal of wildlife as part of their objectives for wildlife populations in the State. WS' annual removal of armadillos, opossum, nutria, and gray squirrels would be of a low magnitude when compared to the total known removal of those species and the populations of those species. Therefore, the proposed activities associated with opossum, nutria, and gray squirrels would not limit the ability of people to harvest those species in the State.

Effects of Using Aircraft on the Regulated Harvest of Mammals

Because the number of feral swine that WS could lethally remove annually would remain as analyzed in the EA and the use of aircraft would not result in direct mortality of feral swine, the use of aircraft to lethally remove feral swine or for surveillance would not affect the population of feral swine in the State. Therefore, the analysis in the EA regarding this issue remains appropriate and applicable.

Issue 7 – Effects of Beaver Dam Manipulation on the Status of Wetlands in the State

WS' personnel could remove or breach beaver dams in Florida by hand to return streams, channels, dikes, culverts, and irrigation canals to their original channel. WS' personnel would remove or breach dams in accordance with provisions of the Clean Water Act and Florida laws. Between FY 2012 and FY 2016, WS' personnel did not remove or breach beaver dams in the State. Therefore, WS' activities did not result in negative effects to wetlands. Program activities and their potential impacts on wetlands have not changed from those analyzed in the EA.

Additional efforts by the WS program to address damage caused by armadillos and opossum, and activities to address damage caused by nutria and gray squirrels would have no effects on beaver dams or the status of wetlands in the State. Similarly, the use of aircraft to remove feral swine by shooting and the use of aircraft for monitoring and surveillance activities would have no effect on beaver dams and the status of wetlands in the State from the removal of beaver or beaver dams.

XV. CUMULATIVE IMPACTS OF ALTERNATIVE 1 BY ISSUE

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

WS would be the primary federal agency with damage management responsibilities; however, other entities may conduct similar activities in the State. 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 because of WS' program activities over time or because 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 associated with the implantation of Alternative 1. The following resource values in the State were not expected to be significantly impacted by any of the alternatives analyzed in the EA: soils, geology, minerals, water

quality/quantity, flood plains, wetlands, critical habitats (areas designated for T&E species), visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. Similarly, the WS program in Florida does not expect the activities proposed in this supplement to the EA to affect significantly those same resources based on the analyses WS conducted. Therefore, no further analysis of those resources will occur. The continued implementation of Alternative 1, including the activities proposed in this supplement to the EA, would have a negligible effect on atmospheric conditions, including the global climate. Meaningful direct or indirect emissions of greenhouse gases would not occur from the continued implementation of Alternative 1, as supplemented. The continued implementation of Alternative 1, including those activities proposed in this supplement, would meet the requirements of applicable laws, regulations, and Executive Orders including the Clean Air Act and Executive Order 13514.

Issue 1 - Effects of Damage Management Activities on Target Mammal Populations

Evaluation of WS' activities relative to mammal populations in the State indicated that program activities would have no cumulative adverse effects on populations in Florida. 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 mammals
- Mortality of mammals from vehicle collisions and aircraft strikes
- Human-induced mortality of mammals through private damage management activities
- Human-induced harvest mortality during a continuously open harvest season
- Human-induced harvest mortality during annual hunting and trapping seasons
- Human and naturally induced alterations of wildlife habitat
- Annual and perennial cycles in population densities

All of those factors play a role in the dynamics of mammal populations. In many circumstances, requests for assistance arise when some or all of those elements have contrived to elevate mammal populations at a juncture to cause damage to resources. WS would only provide assistance after receiving a request to manage damage or threats. Therefore, if WS provided direct operational assistance, WS would provide assistance on a small percentage of the land area of Florida. In addition, WS would only target those mammals identified as causing damage or posing a threat. WS would not attempt to suppress wildlife populations across broad geographical areas at such intensity levels for prolonged durations that significant ecological effects would occur. The goal of WS would be to manage damage caused by specific individuals of a species not to manage animal populations. The management of wildlife populations in the State is the responsibility of the FWCC and activities associated with many of the mammal species addressed in the EA require authorization from the FWCC. Therefore, those factors would constrain the scope, duration, and intensity of WS' actions when implementing the alternatives.

WS would evaluate damage occurring, including other affected elements and the dynamics of the damaging species; determine appropriate strategies to minimize effects on environmental elements; would apply damage management actions; and would subsequently monitor and adjust/cease damage management actions (Slate et al. 1992, USDA 2013). This process would allow 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. The WS program does not expect any cumulative effects on mammal populations to occur from the implementation of Alternative 1 based on the following considerations:

Historical outcomes of WS' activities to address mammal damage in the State

The analyses contained in the EA and this supplement to the EA has not identified cumulative adverse

effects because of program activities implemented over time. WS continues to implement an integrated damage management program that adapts to the damage situation and the behavior of mammals. WS would only target mammals that were causing damage or posing a threat of damage after receiving a request for assistance. All program activities would be coordinated with appropriate federal, state, and local entities to ensure WS' activities would not adversely affect the populations of any native wildlife species.

With management authority over many of the mammal species addressed in the EA, the FWCC could adjust allowed removal levels, including the removal of WS, to ensure the achievement of population objectives for mammals in the State. Consultation and reporting of activities by WS would ensure the FWCC had the opportunity to consider any activities conducted by WS.

WS' lethal removal has been and would continue to be of low magnitude when compared to estimated population levels in the State. The WS program in Florida would conduct activities on a small portion of the land area of the State and although localized declines of mammal populations could occur from WS' activities, those activities would not reach a level that would adversely affect mammal populations.

In addition, nutria, feral swine, feral cats, and feral dogs are non-native species in the State that often compete with native wildlife. Therefore, any reduction in the local or statewide population could provide some benefits to native wildlife and plant communities.

SOPs built into WS' program

The WS program has designed SOPs to reduce the potential negative effects of WS' actions on mammal populations, and WS has tailored the SOPs to respond to changes in populations, which could result from unforeseen environmental changes. This would include those changes occurring from sources other than WS. The monitoring of program activities ensures the continued implementation of SOPs in accordance with WS' Decision Model (Slate et al. 1992, USDA 2013).

WS would continue to monitor activities, in context of the issues analyzed in detail, to determine if the need for action and the associated impacts remain with the parameters established and analyzed in the EA. Pursuant to SOPs discussed in Section 3.3 and Section 3.4 of the EA, WS would continue to coordinate activities to reduce and/or prevent mammal damage in the State with the FWCC. The mission of the FWCC is "*managing fish and wildlife resources for their long-term well-being and the benefit of people*" (FWCC 2017*c*). Therefore, coordinating activities would ensure the FWCC had the opportunity to incorporate any activities WS conducts into objectives established for wildlife populations in the State. Through monitoring, WS can evaluate and adjust activities as changes occur over time.

WS' monitoring would also include reviewing the list of species the USFWS and the National Marine Fisheries Service considers as threatened or endangered within the State pursuant to the Endangered Species Act. As appropriate, WS would consult with the USFWS and/or the National Marine Fisheries Service pursuant to Section 7 of the Endangered Species Act to ensure the activities conducted by WS would not jeopardize the continued existence of threatened or endangered species or result in adverse modification to areas designated as critical habitat for a species within the State. Through the review of species listed as threatened or endangered and the consultation process with the USFWS and/or the National Marine Fisheries Service, the WS program in Florida can evaluate and adjust activities conducted pursuant to any alternative approach selected to meet the need for action. Accordingly, WS could supplement this analysis or conduct a separate evaluation pursuant to the NEPA based on the review and consultation process. In this way, any actions conducted by WS would be responsive to ongoing changes and the associated cumulative impacts of actions conducted in Florida in accordance with the NEPA.

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

Potential effects on non-target species from conducting damage management activities arise from the use of non-lethal and lethal methods to alleviate or prevent those damages. The use of non-lethal methods during activities to reduce or prevent damage caused by target mammal species has the potential to exclude, disperse, or capture non-target animals. However, the effects of non-lethal methods would often be temporary and often do not involve the take (killing) of non-target wildlife species. Exclusion devices can prevent both target and non-target animals from accessing the resource being damaged. Since exclusion does not involve lethal take, cumulative effects on non-target species from the use of exclusionary methods would not occur but would likely disperse those individuals to other areas. Exclusionary methods can often require constant maintenance to ensure effectiveness. Therefore, the use of exclusionary devices would be somewhat limited to small, high-value resources. WS' personnel would not use those methods to the extent that those methods would exclude non-target animals from large areas that would cumulatively affect populations from the inability to access a resource, such as potential food sources. The use of visual and auditory harassment and dispersion methods would generally be temporary with non-target species 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, WS' personnel would not use those methods to the extent or at a constant level that would prevent non-target animals 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 affect non-target wildlife through the removal (killing) or capture of non-target species. Capture methods used would often be methods that would be set to confine or restrain target animals after the animal triggered the device. WS' personnel would employ capture methods 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 were as species specific as possible, and modification of individual methods to exclude non-target animals from capture. Most methods described in the EA are methods that people can employ to confine or restrain animals that would be subsequently euthanized using humane methods since the FWCC generally does not allow people to translocate animals. With all live-capture devices, WS' personnel could release non-target animals captured on site if personnel determine the non-target animal would survive following release. The intent of implementing SOPs is to ensure take of non-target animals would be minimal during the use of methods to capture target animals.

The use of firearms, immobilizing drugs, and euthanasia chemicals would essentially be selective for target species since WS' personnel would identify the species of animal prior to the application of the method. Firearms require the identification of the target before application, which essentially is selective with minimal risks to non-target animals. WS' personnel would use immobilizing drugs and euthanasia chemicals through direct application to target wildlife. Therefore, the use of those methods would not affect non-target species.

The methods described in the EA all have a high level of selectivity and could be employed using SOPs to ensure minimal impacts to non-target species. Based on the methods available to resolve damage and/or threats, WS does not anticipate the number of non-target animals taken to reach a magnitude where declines in those species' populations would occur. Therefore, take under Alternative 1 of non-target animals would not cumulatively affect non-target species. As part of the development of this supplement to the EA, WS re-initiated consultation with the USFWS under Section 7 of the Endangered Species Act. Based on a review of the activities conducted previously and those methods currently available, including the use of aircraft, WS determined that activities conducted under the proposed action, as supplemented by this document, would not likely adversely affect many T&E species listed within the State. The

USFWS concurred with WS' determination that activities conducted pursuant to the proposed action, including the use of aircraft, would not likely adversely affect those species or their critical habitats (A. Blackford, USFWS pers. comm. 2017, A. Dziergowski, USFWS pers. comm. 2017, S. Blomquist, USFWS pers. comm. 2017). Cumulative impacts would be minimal on non-target animals from any of the alternatives discussed.

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

Safety of Non-Chemical Methods

All non-chemical methods described in the EA and this supplement to the EA would be used within a limited period, would not be residual, and do not possess properties capable of inducing cumulative adverse effects on human health and safety. WS' personnel would only use non-chemical methods after careful consideration of the safety of those people employing methods and to the public. Activities would generally be conducted when human activity was minimal (*e.g*., early mornings, at night) or in areas where human activities was minimal (*e.g*., in areas closed to the public), whenever possible. All capture methods would be employed in areas where human activity was minimal and warnings signs would be placed in conspicuous areas, when appropriate, to ensure the safety of the public. Capture methods also require direct contact to trigger ensuring that those methods, when left undisturbed, would have no effect on human safety. Before conducting activities, the entity requesting assistance and WS must sign a work initiation document, a MOU, and/or another similar document, which would list all the methods the entity requesting assistance agrees to allow on the property they own or manage. WS' personnel would make the requesting entity aware of the safety issues associated with methods when signing a work initiation document, a MOU, and/or another comparable document. SOPs would also ensure the safety of the public from those methods used to capture or take wildlife. Although hazards due exist, WS' personnel would consider the safety of employees and the public when determining if firearms would be an appropriate method for use to manage the damage or threat of damage associated with a request for assistance.

The WS program in Florida has received no reports or documented any adverse effects to human safety from previous activities conducted in the State to manage damage or threats of damage associated with mammals. Personnel employing non-chemical methods would continue to receive training 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 affect human safety.

Safety of Chemical Methods

Chemical methods available for use under the proposed action would be repellents, immobilizing drugs and euthanizing chemicals described in the EA. WS' personnel would administer immobilizing drugs to target individuals using devices or methods that ensure the identification of the target animal. The immobilizing drugs discussed in 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. WS may also euthanize immobilized animals using a euthanizing chemical described in the EA. WS' personnel would administer euthanasia chemicals after a target animal was properly restrained and immobilized and would occur through direct injection. WS' personnel would be required to attend training courses and receive certification in the use of immobilizing drugs and euthanizing chemicals to ensure proper care and handling occurs, to ensure the personnel administer proper doses, and to ensure human safety under WS Directive 2.430. WS' personnel would continue to receive training in the proper handling and administering of immobilizing drugs and euthanasia chemicals to ensure human safety.

Direct application of chemical methods to target species would ensure that there were no cumulative effects to human safety. The WS program in Florida would track and record the use of all chemical methods to ensure proper accounting of used and unused chemicals occurs. All chemicals would be stored and transported according to regulations, including the directives of WS. The amount of chemicals used or stored by WS and cooperating agencies would be minimal to ensure human safety.

The United States Environmental Protection Agency must approve the use of repellents available to disperse mammals from areas of application according to the Federal Insecticide, Fungicide, and 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 applying repellents according to label requirements, WS expects no adverse effects to human safety would occur.

The WS program in Florida has not received any reports or identified any adverse effects from the use of chemical methods during previous activities conducted by WS. When WS' personnel apply chemical methods as intended and when personnel follow safety guidelines, the WS program in Florida expects no adverse effects to human safety would occur. 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 implementation of Alternative 1 by WS would not have cumulative impacts on human safety.

Issue 4 - Effects on the Socio-cultural Elements of the Human Environment

The activities of WS could result in the removal of those target mammal species from those areas where damage or threats were occurring. Therefore, the socio-cultural elements associated with those mammals in those areas where WS' personnel conduct damage management activities could be lower. However, for some people, the aesthetic value of a more natural environment may occur by reducing densities of those species, including the return of native wildlife and plant species that high densities of those animals were suppressing or displacing.

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 those mammal species adversely affect.

The FWCC establishes and enforces population objectives for wildlife species through the regulating of take after consideration of other known mortality factors. Therefore, WS would have no direct impact on the status of the population of most wildlife species since all take by WS would occur at the discretion of the FWCC. Since those persons seeking assistance could remove those species from areas where damage was occurring through authorizations issued by the FWCC, WS' involvement would have no effect on the aesthetic value of those species in the area where damage was occurring. When the FWCC has authorized 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 WS program in Florida does not expect the activities the program conducts would 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 when authorized by the FWCC, which is the agency responsible for

regulating wildlife species in the State.

Issue 5 - Humaneness and Animal Welfare Concerns of Methods

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

For those methods not requiring direct supervision during employment (*e.g.,* live traps), WS' personnel would check and monitor those methods in accordance with state law to ensure personnel addressed any animals confined or restrained in a timely manner to minimize distress of the animal. WS' personnel would immobilize live-captured mammals to minimize the stress of handling if WS' personnel did not euthanize those animals on site. WS' personnel would apply all euthanasia methods used for live-captured target mammal species according to WS Directive 2.505. Shooting would occur in limited situations and personnel would receive training in the proper use of firearms to minimize pain and suffering of animals taken by this method.

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

Issue 6 - Effects of Mammal Damage Management Activities on the Regulated Harvest of Mammals

The EA concluded that the effects of WS' activities on this issue would be insignificant. WS' activities are coordinated with the FWCC to ensure WS' annual take of harvestable species does not exceed a level where a decline in those species' populations would occur due to cumulative impacts from harvest, damage management activities, and other sources of mortality. WS' limited take of mammals in Florida would not be occurring at a magnitude that would adversely affect the ability of those persons interested to harvest those species in the State. Program activities and their potential impacts on statewide populations of harvestable species have not changed from those analyzed in the EA.

Issue 7 – Effects of Beaver Dam Manipulation on the Status of Wetlands in the State

WS' personnel could breach or remove beaver dams in Florida using hand tools with the purpose of returning streams, dikes, culverts, and irrigation canals to their original channel. Personnel would remove beaver dams in accordance with provisions of the Clean Water Act. As described in the EA, WS often receives requests for assistance soon after the initiation of damage caused by beaver. Therefore, in nearly all cases, dams that WS' personnel could breech or remove occurred from recent beaver activity and the water impoundments associated with the dam would not have developed into wetlands subject to regulations under the Clean Water Act. Since beaver dams removed by WS are recently occurring and have not established wetland characteristics, WS' damage management activities associated with beaver would not negatively affect the statewide status of wetlands. Between FY 2012 and FY 2016, WS' personnel did not breach or remove any beaver dams in the State; therefore, activities had no effect on the status of wetlands in the State.

Program activities and their potential impacts on wetlands have not changed from those analyzed in the

EA. Since the implementation of the proposed action addressed in the EA and the Decision, the WS program in Florida has not implemented any new methods. In addition, no regulations or differing circumstances from those addressed in the EA have occurred. The EA concluded that WS' beaver dam removal/breaching activities should have minimal impact on wetlands.

XVI. RESPONSES TO COMMENTS

WS made the EA available to the public for review and comment through notices published in local media and through direct notification of interested parties. WS made the EA available to the public for review and comment by a legal notice published in the *Tallahassee Democrat* newspaper from April 10, 2017 through April 12, 2017. WS also made the EA available to the public for review and comment on the APHIS website on April 14, 2017 and on the regulations.gov website beginning on March 29, 2017. WS also sent a notice of availability directly to agencies, organizations, and individuals with probable interest in managing mammal damage in the State. The public involvement process ended on May 12, 2017. During the public comment period, WS received four comment responses on the draft supplement to the EA. Section XVI summarizes the comments received and provides WS' response to the comments.

Comment – Why is the United States Environmental Protection Agency involved; the United States Environmental Protection Agency is duplicitous and is not needed; do away with the United States Environmental Protection Agency

Response: The United States Environmental Protection Agency was not involved with the preparation of the supplement to the EA nor was the United States Environmental Protection Agency a cooperating agency during the development of the EA. Eliminating the United States Environmental Protection Agency and/or the need for the United States Environmental Protection Agency is outside the scope of the EA and the supplement to the EA.

Comment – Commenter does not support any involvement by WS

Response: WS developed alternatives to meet the need for action and to address the identified issues associated with managing damage caused by mammals in Florida. The EA analyzed a no involvement by the WS program alternative (Alternative 3)(see Section 3.1 of the EA). Under Alternative 3, the WS program would not provide assistance with any aspect of managing mammal damage in the State. Section 4.1 of the EA analyzes the environmental consequences of each of the alternatives in comparison to determine the extent of actual or potential impacts on the issues, including the no involvement by WS alternative. Potential impacts of Alternative 3 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.

Comment - Commenter does not support any of the proposal; against the use of aircraft

Response: One of the purposes for preparing this supplement to the EA was to evaluate the use of aerial operations by WS to address feral swine damage. Studies show that shooting feral swine from an aircraft using a pilot and gunner could rapidly reduce local populations of feral swine (Saunders and Bryant 1988, Hone 1990, Saunders 1993). The Decision and FONSI that WS issued for the EA selected the alternative that evaluated an adaptive management approach that would integrate available methods to alleviate damage (USDA 2013). However, the EA did not consider the use of aircraft as part of an integrated methods approach. Based on consideration of this supplement to the EA and the EA, the WS program will issue a decision.

Comment – Animals are part of the ecological scheme put on earth

Response: Maintaining viable populations of native species is a concern of the public and of biologists within the state and federal land and wildlife management agencies, including WS. Native wildlife play a vital role in a healthy ecosystem; therefore, a common issue when addressing damage caused by wildlife is the potential impacts of the management actions on the populations of target animal species. WS does not attempt to eradicate or suppress any species of native wildlife. WS operates in accordance with federal and state laws and regulations enacted to ensure species viability. WS would only use available methods to target individual animals or groups of animals identified as causing damage or posing a threat of damage. Any reduction of a local population or group of animals is frequently temporary because immigration from adjacent areas or reproduction replaces the animals removed. WS would only provide assistance under the appropriate alternatives after receiving a request to manage damage or threats of damage. In addition, WS would only provide assistance on a small percentage of the total land area of Florida. Further, WS would only target those animals identified as causing damage or posing a threat. WS would not attempt to suppress native wildlife populations across broad geographical areas at such intensity levels for prolonged durations that significant ecological effects would occur. The goal of WS would not be to reduce native animal populations but to manage damage or threats associated with specific individuals of a species.

Comment – People are the problem; there are too many people; there is massive illegal immigration

Response: The WS program in Florida does not have the statutory authority to regulate human behavior, human population growth, and illegal immigration. Therefore, managing the behavior of people is outside the scope of the EA.

Comment – Massive loss of habitat and climate change are the issue

Response: The impact of habitat loss and climate change on wildlife is of increasing concern to land managers, biologists, and members of the public. WS recognizes that habitat loss and climate change is an ongoing concern and may result in changes in species range and abundance. Over time, the combination of these two factors is likely to lead to changes in the scope and nature of human-wildlife conflicts in the State. Because habitat loss and climate change are ongoing processes, the EA developed a dynamic system, including SOPs, and built in measures that allow agencies to monitor for and adjust to impacts of ongoing changes in the affected environment.

If WS continues to implement Alternative 1, WS would monitor activities, in context of the issues analyzed in detail, to determine if the need for action and the associated impacts remain with the parameters established and analyzed in the EA. This supplement to the EA was prepared as part of that monitoring process. Pursuant to SOPs discussed in Section 3.3 and Section 3.4 of the EA, WS would continue to coordinate activities to reduce and/or prevent mammal damage in the State with the FWCC. The mission of the FWCC is "*managing fish and wildlife resources for their long-term well-being and the benefit of people*" (FWCC 2017*c*). Therefore, coordinating activities would ensure the FWCC had the opportunity to incorporate any activities WS' conducts into population objectives established for wildlife populations in the State. Through monitoring, WS and the FWCC can evaluate and adjust activities as changes occur over time.

WS' monitoring would also include reviewing the list of species the USFWS considers as threatened or endangered within the State pursuant to the ESA. As appropriate, WS would consult with the USFWS and/or the National Marine Fisheries pursuant to Section 7 of the ESA to ensure the activities conducted by WS would not jeopardize the continued existence of threatened or endangered species or result in adverse modification to areas designated as critical habitat for a species within the State. Through the review of species listed as threatened or endangered and the consultation process with the USFWS and/or

the National Marine Fisheries Service, the WS program in Florida can evaluate and adjust activities conducted pursuant to any alternative approach selected to meet the need for action. Accordingly, WS could supplement this analysis or conduct a separate evaluation pursuant to the NEPA based on the review and consultation process. In this way, any actions conducted by WS would be responsive to ongoing habitat loss and climate change. Thus, through the monitoring process, WS can evaluate the associated cumulative impacts of actions conducted in Florida in accordance with the NEPA.

Comment – Airplanes pollute the air and use lead in the gasoline; do not use leaded gasoline in vehicles

Response: Under the alternative approaches intended to meet the need for action, the WS program in Florida could potentially produce criteria pollutants (*i.e.*, pollutants for which maximum allowable emission levels and concentrations are enforced by state agencies). Those activities could include working in the office, travel from office to field locations, travel at field locations (vehicles or ATV), and from aircraft activities. During evaluations of the national program to manage feral swine, the WS program reviewed greenhouse gas emissions for the entire national WS program (USDA 2015). The analysis estimated effects of vehicle, aircraft, office, and ATV use by WS for FY 2013 and included the potential new vehicle purchases that could be associated with a national program to manage damaged caused by feral swine. The review concluded that the range of Carbon Dioxide Equivalents (includes CO_2, NO_x CO, and SO_x) for the entire national WS program would be below the reference point of 25,000 metric tons per year recommended by CEQ for actions requiring detailed review of impacts on greenhouse gas emissions. The activities that WS could conduct under the alternative approaches discussed in Chapter 3 of the EA would have negligible cumulative effects on atmospheric conditions, including the global climate.

The proposed activities described in the supplement to the EA involving the use of aircraft to manage damage caused by feral swine would primarily involve the use of helicopters. However, WS could use airplanes occasionally for surveillance (*e.g.*, conducting wildlife counts) and radio telemetry activities in Florida. Currently, the two principal types of fuel used in aviation today are aviation gasoline (commonly referred to as avgas) and jet fuel. According to the Federal Aviation Administration, aviation gasoline is the only transportation fuel that still contains a lead additive (Federal Aviation Administration 2017). Jet fuel does not contain a lead additive. The helicopters that WS could use to manage damage associated with feral swine in Florida use jet fuel, which does not contain lead. However, the airplanes that WS could use occasionally for surveillance and radio telemetry activities use aviation gasoline, which does contain lead. The Federal Aviation Administration (2017) stated, "[Aviation gasoline] *emissions have become the largest contributor to the relatively low levels of lead emissions produced in* [the United States]."

In consultation with the Federal Aviation Administration, the United States Environmental Protection Agency has the authority to regulate aircraft emissions under the Clean Air Act, including lead emissions from the use of aviation gasoline. When the United States Environmental Protection Agency sets standards for aircraft emissions, the Clean Air Act specifies that the United States Environmental Protection Agency and the Federal Aviation Administration must consider the time needed to develop required technology, consider cost, and must not adversely affect aircraft safety or noise (Federal Aviation Administration 2017).

In 2006, an environmental advocacy organization petitioned the United States Environmental Protection Agency to find that lead emissions from airplanes using aviation gasoline containing lead additives contribute to lead air pollution that may endanger public health or welfare. The same environmental advocacy organization petitioned the United States Environmental Protection Agency again in 2014 and urged the United States Environmental Protection Agency to make an endangerment finding regarding

lead emissions from aviation gasoline. Despite the petitions, the United States Environmental Protection Agency continues to indicate that more data and findings are need to make a judgment on whether lead emissions from aviation gasoline are a danger to public health. Pursuant to Section 231 of the Clean Air Act, the United States Environmental Protection Agency is currently conducting proceedings regarding whether lead emissions from piston-engine general aviation aircraft that use aviation gasoline cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare. In addition, the Federal Aviation Administration is supporting research of alternative fuels to replace aviation gasoline that contain lead additives. The Federal Aviation Administration anticipates issuing final test reports on alternative fuels to replace aviation gasoline that contain lead additives by the end of 2018 (Federal Aviation Administration 2017).

As discussed previously, the WS program in Florida infrequently uses airplanes for surveillance and radio telemetry. Activities associated with the removal of feral swine to alleviate damage would involve the use of helicopters, which do not use fuel containing lead additives. Based on the limited use of airplanes by WS in Florida that may use aviation gasoline containing lead, the emission of lead by airplanes used by WS in Florida would be very low. The Federal Aviation Administration is committed to developing an alternative fuel or fuels for use in airplanes and the United States Environmental Protection Agency continues to proceed with investigations regarding whether lead emissions from airplanes using aviation gasoline cause or contribute to air pollution that may endanger the public.

Comment – No taxpayer funds to kill animals

Response: WS considered a similar issue during the development of the EA but WS did not analyze the issue in detail for the reasons provided in Section 2.3 of the EA. It is the policy of WS to use available public funds to assist people equally based on the need for action, not on their ability to pay for assistance.

Comment – Support for non-lethal management only

Response: WS considered a non-lethal management only alternative in the EA; however, WS did not consider the alternative in detail for those reasons provided in Section 3.2 of the EA.

Comment – Animals have a right to their own lives; we need to live humanely with all animals

Response: WS understands the philosophy that some people have that society should extend the rights of people to animals. As stated throughout the EA and the supplement to the EA, WS would only provide assistance after receiving a request for such assistance and would only employ those methods that the requesters agree with. Therefore, those people requesting assistance from WS may prefer and request that WS use lethal methods to remove those animals causing damage or posing a threat of damage. In addition, the standard WS Decision Model (Slate et al. 1992; see WS Directive 2.201) would be the site-specific procedure for individual actions that WS could conduct in the State (see Chapter 3 of the EA for a description of the Decision Model and its application). Decisions made using the model would be in accordance with SOPs described in the EA, this supplement to the EA, and WS' directives, as well as relevant laws and regulations. Using the Decision Model and based on site visits or reported information, WS would consider several factors before selecting or recommending methods and techniques. However, WS would give preference to non-lethal methods when formulating a management strategy using the WS Decision Model pursuant to WS Directive 2.101. When the person requesting assistance determined the death of animal was necessary, the goal of WS would be to use methods in the most humane way possible that minimizes the stress and pain to the animal.

Comment – Swine are edible and should be used to feed the hungry

Response: WS considered the ability to donate feral swine for human consumption during the development of the EA (see Section 2.3 of the EA). The APHIS also prepared an EIS to address feral swine damage management in the United States, American Samoa, Mariana Islands, United States Virgin Islands, Guam, and Puerto Rico, which further discusses the donation of feral swine for human consumption (USDA 2015). For those reasons discussed in Section 2.3 of the EA and the EIS, the WS program in Florida would not donate feral swine to food banks or other charitable organizations.

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APPENDIX A
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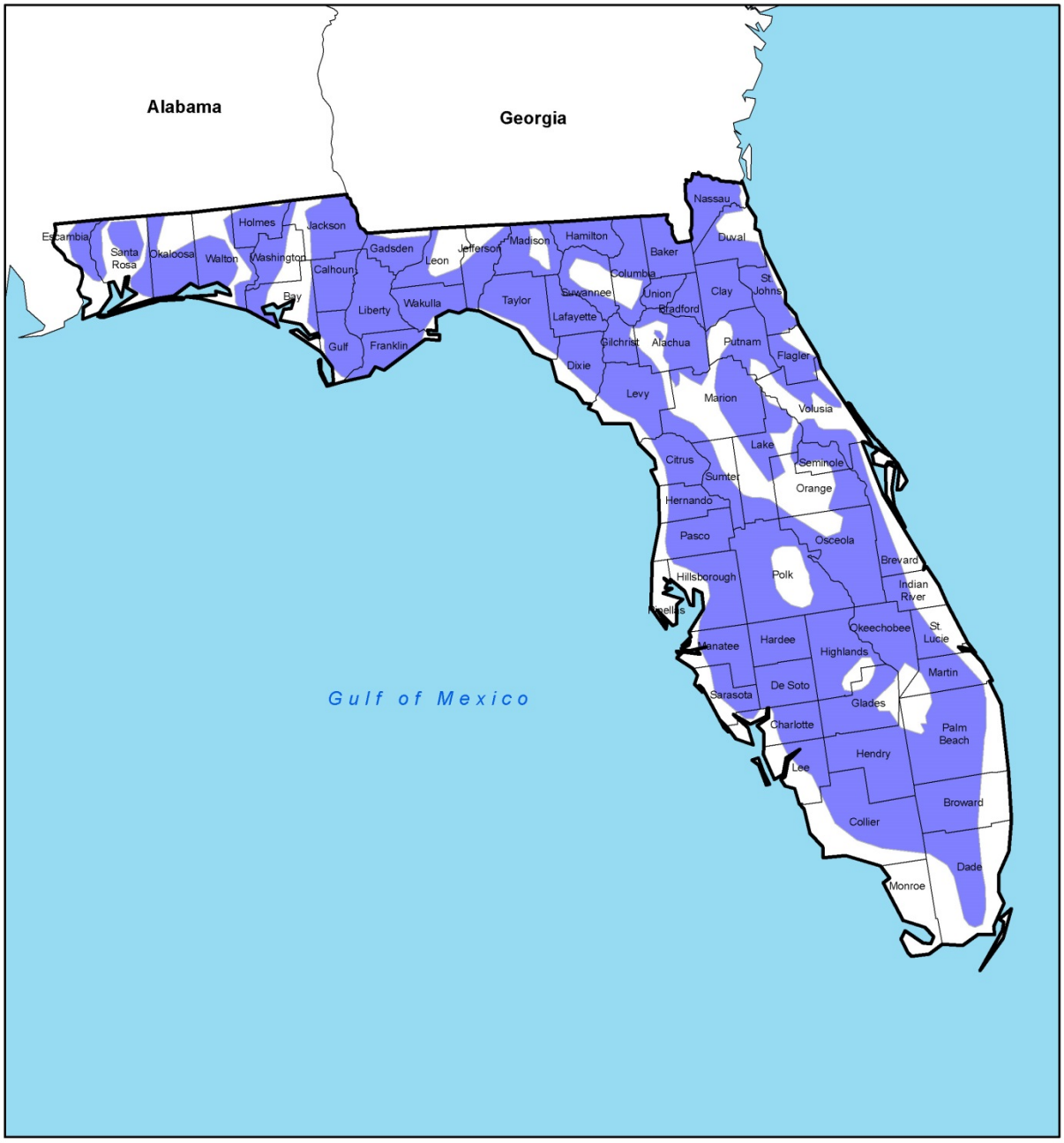
APPENDIX B
CURRENT DISTRIBUTION OF FERAL SWINE IN FLORIDA, 2014



Feral/Wild Swine Populations 2014
Florida

This feral swine distribution map was prepared from data independently compiled by state, federal, and territorial fish and wildlife management agencies, agriculture agencies, and universities of the United States in cooperation with the Southeastern Cooperative Wildlife Disease Study, College of Veterinary Medicine, University of Georgia. Support for this project was through Cooperative Agreement Numbers 07-9113-0863CA, 08 to12-9113-1156CA and 13 to14-9100-1407CA, Veterinary Services, Animal and Plant Health Inspection Service, U.S. Department of Agriculture.

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SOUTHEASTERN COOPERATIVE WILDLIFE DISEASE STUDY