U.S. Fish & Wildlife Service

DRAFT ENVIRONMENTAL ASSESSMENT

FERAL SWINE DAMAGE MANAGEMENT PLAN

THEODORE ROOSEVELT NATIONAL WILDLIFE REFUGE COMPLEX

Washington, Issaquena, Sharkey, Humphreys, Yazoo, Holmes, and Leflore Counties, Mississippi

Southeast Region

DRAFT ENVIRONMENTAL ASSESSMENT

for

Feral Swine Damage Management Plan

Theodore Roosevelt National Wildlife Refuge Complex

U.S. Department of the Interior

Fish and Wildlife Service

Southeast Region

January, 2015

Submitted by: _____ Date:_____

Mike Rich, Project Leader, Theodore Roosevelt NWR Complex

Concur: _____ Date:_____

Ricky Ingram, Area Supervisor, Southeast Region

Approved by: _____ Date:_____

David Viker, Regional Chief, Southeast Region

Prepared by:
U.S. Department of the Interior
Fish and Wildlife Service
Yazoo City, Mississippi

ENVIRONMENTAL ASSESSMENT

Chapter 1 Background 1
Introduction 1
Action 2
Purpose and Need for Action 2
Purpose 2
Need 3
Decision Framework 3
Chapter 2 Affected Environment 4
Chapter 3 Alternatives Including the Proposed Action 4
Formulation of Alternatives 4
Description of Alternatives 4
No-Action Alternative 4
Proposed Alternative 5
Alternatives Considered but not Analyzed in Detail 5
Chapter 4 Environmental Consequences 7
Effects Common to Both Alternatives 7
Environmental Justice 7
Climate Change 8
Human Health and Safety 8
Refuge Physical Environment 8
Cultural Resources 8
Habitats 8
Effects on Wildlife 9
Humaneness of Control Methods 12
Summary of Effects 12
Climate Change 12
Human Health and Safety 12
Refuge Physical Environment 13
Cultural Resources 13
Habitats 13
Effects on Wildlife 13

Humaneness of Control Measures 14
Cumulative Impacts Analysis 14
Environmental Justice 14
Climate Change 14
Human Health and Safety 15
Refuge Physical Environment, Cultural Resources, and Habitats 15
Effects on Wildlife 15
Humaneness of Control Measures 15
Chapter 5 Consultation and Coordination 17
Literature Cited 18

CHAPTER 1 BACKGROUND

INTRODUCTION

The U.S. Fish and Wildlife Service (Service) is a Federal bureau operated within the Department of the Interior (DOI). The Service manages 556 national wildlife refuges totaling over 150 million acres. The Service is responsible for protecting threatened and endangered species, migratory birds, anadromous and interjurisdictional fish, and certain marine mammals. The Service maintains a national network of lands and waters consisting of national wildlife refuges, other managed lands, and wetland management districts, to manage and protect these resources.

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. The Mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

The Theodore Roosevelt National Wildlife Refuge Complex consists of 7 National Wildlife Refuges. The overriding purpose for the Complex is: “providing for the habitat needs of migratory birds, with an emphasis on waterfowl” (U.S. Fish and Wildlife Service, 2006). Each refuge has a purpose given in establishing legislation or Executive Order. These purposes are listed in the Complex CCP (U.S. Fish and Wildlife Service, 2006) and the Draft CCP for Theodore Roosevelt and Holt Collier NWRs, which will be available in 2015.

The following laws, regulations, and Executive Orders relate to the management of feral animals on Federal lands:

1. The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, permits the uses of refuges provided that the proposed use is compatible with the primary purpose for which a refuge was established.
2. The Refuge Recreation Act of 1962, as amended, authorizes public hunting on refuges where the hunting program is compatible with the other major purposes for which the area was established.
3. The Fish and Wildlife Act of 1956, as amended, authorizes development, advancement, management, conservation, and protection of fish and wildlife resources.
4. Executive Order 12996, “Management and General Public Use of the National Wildlife Refuge System” recognizes compatible wildlife-dependent recreational activities involving hunting, among others, as priority general public uses of the National Wildlife Refuge System.
5. Title 50 CFR, Section 31.2 lists hunting as a method of surplus wildlife population control.
6. Title 50 CFR, Part 31, Section 14: (a) Animal species which are surplus or detrimental to the management program of a wildlife area may be taken in accordance with federal and state laws and regulations by federal or state personnel or by permit issued to private individuals. (b) Animal species which damage or destroy federal property within a wildlife refuge area may be taken or destroyed by federal personnel.

7. Title 50 CFR, Part 30, Section 11 (a) states that feral animals, including horses, burros, cattle, swine, sheep, goats, reindeer, dogs, and cats, without ownership that have reverted to the wild from a domestic state may be taken by authorized federal or state personnel or by private persons operating under permit in accordance with applicable provisions of federal or state law or regulation.
8. Executive Order 13112 (Federal Register/ Vol. 64 No. 25 / Monday, Feb. 8, 1999/Presidential Documents 6183) states in Sec. 2. Federal Agency Duties. that we should; (I) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (ii) monitor invasive species populations accurately and reliably; (iii) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (iv) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species.
9. Title 50 CFR 32.1 states that the opening of a wildlife refuge area to hunting will be dependent upon the provisions of law applicable to the area and upon a determination by the Secretary of the Interior that the opening of the area to hunting of migratory game birds, upland game, or big game will be compatible with the principles of sound wildlife management and will otherwise be in the public interest.
10. Title 50 CFR 32.2 provides provisions which apply to each person while engaged in public hunting on a wildlife refuge.

ACTION

The Service is preparing a Draft Feral Swine Damage Management Plan as a step-down plan from the Complex CCP (U.S. Fish and Wildlife Service, 2006) and the Draft CCP for Theodore Roosevelt and Holt Collier NWRs, which will be available in 2015. Control of feral swine by baiting, ground-based shooting, and trapping has been previously analyzed in the EA produced for the 2006 CCP (U.S. Fish and Wildlife Service, 2005). The Service is proposing to add aerial gunning to the list of methods available to it for controlling feral swine on TRNWRC. This EA is to analyze the impacts to the human environment of implementing a feral swine damage management plan on Theodore Roosevelt National Wildlife Refuge Complex.

PURPOSE AND NEED FOR ACTION

PURPOSE

The purpose of the proposed Feral Swine Damage Management Plan is to identify goals and objectives and evaluate and prescribe strategies for mitigating the threats posed by feral swine (*Sus scrofa*), and reducing or eliminating the damage that feral swine do, to refuge resources on TRNWRC lands. The purpose of adding aerial gunning to the list of available methods for feral swine control is to enable the refuge complex to use this method in conjunction with other methods already in place at the refuge complex. The Service believes this addition will greatly enhance its ability to control feral swine populations and reduce the amount of damage caused by these animals.

NEED

The action is needed because feral swine pose an unacceptable and growing threat to refuge resources, the accomplishment of refuge purposes, and the health and safety of the public. The Service believes that developing and implementing a plan which includes aerial gunning as a component of an integrated management approach is the best way to address the problems that feral swine cause on the TRNWRC.

DECISION FRAMEWORK

Based on the analyses in this Environmental Assessment, the Service will select the alternative that best serves the purposes for which the refuges within the TRNWRC were established and supports the mission of the NWRS, and determine if the selected alternative is a major Federal action which significantly negatively affects the quality of the human environment, thus requiring the preparation of an Environmental Impact Statement. The Service identified issues, concerns, and needs through discussions with the public, organizations, agency managers, conservation partners, Tribes, local, state, and federal government agencies, and others. The Service identified priority issues, developed a range of alternatives, evaluated the possible consequences of implementing each of the alternatives, and selected the proposed alternative as the proposed action. The draft plan was developed for implementation based on this recommendation.

CHAPTER 2 AFFECTED ENVIRONMENT

For a description of the affected environment, see relevant portions of the 2006 CCP for Theodore Roosevelt National Wildlife Refuge Complex (U.S. Fish and Wildlife Service, 2006) which is incorporated into this Environmental Assessment by Reference. A Draft Comprehensive Conservation Plan for Theodore Roosevelt and Holt Collier National Wildlife Refuges, is being prepared, and will be available in 2015. The 2006 CCP can be accessed at: http://www.fws.gov/southeast/planning/PDFdocuments/Theo%20Roosevelt%20NWR%20Complex%20CCP/TRfinalCCP/TRFinalCCPformatted.pdf

CHAPTER 3 ALTERNATIVES INCLUDING THE PROPOSED ACTION

FORMULATION OF ALTERNATIVES

Alternatives are different approaches or combinations of management actions designed to fulfill the Purpose and Need and help the refuge complex achieve its purposes. The National Environmental Policy Act requires that a range of alternatives be considered including the No Action alternative. Through internal scoping and intergovernmental consultation, the Service has identified two alternatives, including the No Action alternative, which constitute the full range of reasonable alternatives for this action.

DESCRIPTION OF ALTERNATIVES

Goal 2 in the 2006 CCP (U.S. Fish and Wildlife Service, 2006) is to “control and manage invasive, pest, and nuisance species.” Both alternatives described here would be expected to achieve that goal. The alternatives represent two approaches to achieving this goal.

NO-ACTION ALTERNATIVE

This alternative reflects current management. The refuge complex currently uses the following methods of feral swine control in an integrated management approach to reduce feral swine populations and the damage they cause. For a more complete description of each method, please see the descriptions in Chapter V of the Draft Feral Swine Damage Management Plan, companion to this document.

Opportunistic Take by the Public

Big game hunters may currently take feral swine as an incidental species with any legal weapon during TRNWRC big game seasons. Because of concerns about creating incentives for illegal release of swine on refuges, the refuge complex does not allow special hunts for feral swine.

Trapping

Baited traps, including corral-type and cage-type, are currently used on TRNWRC refuges by refuge personnel and contractors to trap feral swine, which are then euthanized on site. Non-target animals are released on site.

Ground-based shooting

Shooting is used on TRNWRC refuges as part of an integrated management program. Feral swine may be shot by refuge personnel on an incidental basis, or during focused operations

which may include baiting and the use of blinds during daylight or nighttime hours, with artificial light.

Fencing

The refuge may use fencing to protect high-value areas, e.g. impoundments planted to agronomic crops, from feral swine. Fence may be installed by Service personnel or by farm cooperators.

PROPOSED ALTERNATIVE

This alternative would be the same as the No-Action Alternative with the addition of aerial gunning as a component of the integrated management approach for managing feral swine damage which also includes opportunistic take by the public, trapping, and ground-based shooting (discussed above).

Aerial Gunning

Aerial gunning would be conducted by trained wildlife personnel employed by or under contract to the Service or USDA APHIS Wildlife Services. All feral swine control by non-Service personnel would be conducted under a Special Use Permit. Aerial operations would be conducted in compliance with the Department of the Interior Aerial Capture, Eradication, and Tagging of Animals (ACETA) Handbook (U.S. Department of the Interior, n.d.). Aerial gunning operations would be 100% selective for feral swine.
For a more detailed description of aerial gunning, see the description in Chapter V of the Draft Feral Swine Damage Management Plan, companion to this document.

ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

The following alternative was considered because of known concerns about animal welfare among the public and advocacy groups. However, the Service determined during internal scoping that major aspects of the alternative are currently infeasible. We therefore did not analyze its effects on the human environment.

Non-lethal-only Control of Feral Swine

Non-lethal control of feral swine has been proposed for use where lethal methods are not feasible or to supplement lethal control methods. Methods include the use of fertility control, construction and maintenance of fencing, the use of repellents, the application of diversionary feeding, and translocation of animals (Massei et al., 2011). The Service has determined that none of these methods is currently feasible for control of feral swine populations on TRNWRC.

Fertility Control

This method consists of treating sows to cause long-term (1-5 year) infertility. Because of the cost, slow results, and uncertain efficacy, this method is currently applicable only to small-scale situations and/or to aid in the prevention of wildlife diseases (Massei et al., 2011; Killian et al., 2007).

Large-scale Fencing

Fences have been used successfully in small-scale settings and to protect high-value resources such as agronomic crop fields. However, construction and maintenance of large-scale swine-

proof fencing for TRNWRC lands would be cost-prohibitive. Even if fences were to be used, feral swine inside the fence would have to be removed and either euthanized or translocated.

Repellents

No repellents are currently labeled for use on swine in the United States. This method is therefore not available.

Diversionary Feeding

This method can be used for short-term diversion of feral swine to protect a resource such as a crop field (Massei et al., 2011). However, long-term diversionary feeding amounts to supplemental feeding, which has been shown to support swine populations (Geisser & Reyer, 2005) and is counter-productive in an integrated control strategy. Diversionary feeding also poses potential problems because feeding sites also may act as baiting stations where deer or other wildlife could be illegally hunted.

Translocation

This method involves the capture by trapping and removal of feral swine to a location where they will not impact the resources of interest. This method is infeasible because translocation and subsequent release of feral swine is illegal in Mississippi. Even were it to become legal, serious issues with the spread of wildlife diseases and feral swine themselves would preclude the use of this method.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter outlines the foreseeable environmental consequences of implementing the two alternatives described in Chapter 3 above in order to provide information necessary to make an informed decision when selecting an alternative to address the purpose and need described above in Chapter 1.

EFFECTS COMMON TO BOTH ALTERNATIVES

Because the proposed alternative differs from the no-action alternative by adding one control method only, most of the environmental effects are common to both alternatives. These effects have been analyzed in the following Environmental Assessments, the relevant portions of which are incorporated into this Environmental Assessment by reference.

- Environmental Assessment 2012 Nuisance Animal Plan on North Louisiana Refuges Complex (U.S. Fish and Wildlife Service, 2012)
- Feral Hog Management Environmental Assessment for Southwest Louisiana National Wildlife Refuge Complex (U.S. Fish and Wildlife Service, 2010)
- Environmental Assessment Mammal Damage Management in Mississippi (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2012)
- Environmental Assessment Reducing Feral Hog Damage through an Integrated Wildlife Damage Management Program in the State of Georgia (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2005)
- Environmental Assessment Feral Swine Damage and Disease Management in Louisiana (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2014)

Results of those analyses which are relevant to the alternatives in this Environmental Assessment will be summarized and cited below.

ENVIRONMENTAL JUSTICE

Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” was signed by President Clinton on February 11, 1994, to focus federal attention on the environmental and human health conditions of minority and low-income populations, with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income communities with access to public information and opportunities for participation in matters relating to human health or the environment.

Neither of the management alternatives described in this environmental assessment will disproportionately place any adverse environmental, economic, social, or health impacts on minority and low-income populations. Implementation of the action alternative is anticipated to provide a benefit to the residents residing in the surrounding communities.

CLIMATE CHANGE

Because of the relatively small scale of the actions in the alternatives in this Environmental Assessment, anticipated emissions of greenhouse gases from implementation of either of the alternatives would have a negligible effect on climate change (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2012; U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2014).

HUMAN HEALTH AND SAFETY

Each alternative would have negligible effects on public health and safety (U.S. Fish and Wildlife Service, 2010; U.S. Fish and Wildlife Service, 2012). Safety of public hunting on national wildlife refuges in Mississippi is managed by regulations promulgated by the State of Mississippi and by the U.S. Fish and Wildlife Service. Trapping and shooting of feral swine on refuges is conducted by trained wildlife professionals in a manner which protects the health and safety of the public as well as those of Service employees and contractors. Notifications, area closures, road closures, and signage will all be used as needed to protect health and safety. Agencies including the U.S. Fish and Wildlife Service and USDA APHIS WS conduct internal safety reviews and training on a regular basis to minimize risk to agency personnel and the public (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2005; U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2014).

REFUGE PHYSICAL ENVIRONMENT

Direct effects of actions covered by both alternatives would have insignificant effects on the physical environment of the refuges. Soil, water quality, hydrology, and air quality would be unaffected or negligibly affected by any of the methods described in either alternative. Reducing feral swine populations may have a positive effect on soil and water quality on the refuges because of the reduction in rooting and wallowing which would occur (U.S. Fish and Wildlife Service, 2010; U.S. Fish and Wildlife Service, 2012).

CULTURAL RESOURCES

None of the methods described in either alternative would have a significant effect on any known or unknown cultural resources on TRNWRC refuges. Reducing populations of feral swine may reduce risk to cultural resources by reducing rooting and wallowing activity (U.S. Fish and Wildlife Service, 2012).

HABITATS

None of the methods described in either alternative would have a significant negative effect on forest, moist soil, cropland, or aquatic habitats on any of the refuges of TRNWRC. Non-significant effects on forest habitat may occur from placement of traps due to minor cutting of brush, attachment of corral panels to trees, and trampling of vegetation inside the trap. Any effects would be transitory and minor. Positive effects of reducing feral swine populations (under either alternative) would accrue on forested habitat, cropland, moist soil habitat, and aquatic habitats due to reduction of rooting, wallowing, defecation, and acorn consumption by feral

swine. Reduction of rooting and wallowing would allow natural vegetation to recover and provide forage and cover for native wildlife. Reducing soil disturbance and defecation in riparian areas would reduce sedimentation and the introduction of coliform bacteria into water bodies, improving water quality and aquatic habitats. Reducing acorn and other forage consumption by feral swine would increase supplies of those food resources for native wildlife.

EFFECTS ON WILDLIFE

Effects on Non-target Wildlife, Including Listed Species

Game Animals, Including Waterfowl

Direct negative effects of methods common to both alternatives (trapping, opportunistic take by hunters, and ground-based shooting) on deer, turkey, waterfowl, squirrels, rabbits, and other game animals would be negligible. Trapping protocols call for frequent trap checks and immediate release of non-target animals. Disturbance to wildlife would be minimal and not different from that caused by other common activities on refuges such as hunting and vehicle operation. A small risk of accidental lethal take of non-target wildlife by shooting or trapping exists. This risk would be minimized, rendering the effect negligible, by using only trained wildlife professionals for trapping and shooting operations. Reduction of feral swine populations would have beneficial effects on native wildlife populations by reducing resource competition, direct predation, and disease transmission from feral swine to native wildlife.

Nongame Migratory Birds

As for game animals, the direct negative effects of ground-based shooting, trapping, and opportunistic take by hunters on nongame migratory birds is negligible. Some small amount of disturbance would result from opportunistic take by hunters, but this would not differ from that which accompanies take of game animals. Hunting seasons do not coincide with the breeding seasons of most nongame migratory birds on TRNWRC. Likewise, ground-based shooting of feral swine by Service personnel or contractors and activity related to trapping would not be expected to have a significant effect on migratory birds.

Threatened and Endangered Species

Six listed species occur or may occur in the 7-county area covered by TRNWRC: least tern (interior population) (*Sterna antillarum*), Endangered, fat pocketbook mussel (*Potamilus capax*), Endangered, rabbitsfoot mussel (*Quadrula cylindrica cylindrica*), Threatened, pallid sturgeon (*Scaphirhynchus albus*), Endangered, pondberry (*Lindera melissifolia*), Endangered, and Louisiana black bear (*Ursus americanus luteolus*), Threatened. No significant adverse effects of any of the feral swine control measures common to both alternatives are expected on least tern, fat pocketbook, rabbitsfoot, pallid sturgeon, or pondberry. Some beneficial effects of reducing feral swine populations may occur for least tern and pondberry, because of reduction of habitat disturbance, and in the case of least tern, direct predation of nests, by feral swine (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2014).

The potential exists for adverse effects to Louisiana black bear from actions common to both alternatives. It is possible that take of bears could occur in a cage-type trap. It is also possible that lethal take of a bear could occur from shooting operations or because of mistaken identification by a hunter. USDA APHIS Wildlife Services analyzed the effects of their feral swine management program in Louisiana and made a “may affect, likely to adversely affect” determination for Louisiana black bear based on the potential for take during swine control activities. USDA APHIS Wildlife Services initiated a formal consultation with USFWS Ecological

Services, which issued a Biological Opinion (BO) stating that their proposed swine management activities "would not jeopardize the continued existence of the Louisiana black bear" (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2014). This BO, which would carry over to the entire listed range of the Louisiana black bear (Weller, 2014), contained a list of Reasonable and Prudent Measures designed to minimize incidental take of Louisiana black bears:

1. USDA-WS personnel shall take all necessary precautions to minimize the likelihood of incidental capture of Louisiana black bears (e.g., avoid trap sites and techniques with a high potential to capture non-targets, and use technical assistance opportunities to educate landowners about techniques used to avoid capturing non-targets).
2. USDA-WS personnel shall minimize impacts to Louisiana black bear breeding and/or critical habitat if "minor habitat management" techniques are performed during the implementation of the feral swine damage management program.
3. USDA-WS personnel shall monitor incidental take to ensure compliance with exempted take levels.

The BO also contained a set of Terms and Conditions under which USDA APHIS Wildlife Services must operate to be exempt from section 9 of the Endangered Species Act:

1. USDA-WS shall fully adhere to all snaring zone restrictions as stated in the "Factors to be Considered" section of this document. USDA-WS shall also provide copies of the snaring zone map and the verbal description of the zone boundaries to all personnel utilizing cable restraints/snares as part of their feral swine damage management program.
2. USDA-WS shall provide information to cooperators participating in the feral swine damage management program about appropriate techniques and precautions for avoiding incidental capture of Louisiana black bears.
3. USDA-WS shall inform cooperators that they should immediately contact LDWF communications (225-765-2706) or their nearest LDWF office in the event of an incidental capture of a Louisiana black bear.
4. USDA-WS shall ensure that all personnel responding to a report of a captured Louisiana black bear in a cable restraint/snare be formally trained in the administration of chemical immobilization drugs for wildlife.
5. USDA-WS shall immediately cease snaring operations in any area where evidence of bear presence is discovered, regardless of the snare-zone association of the subject site. Snaring shall only be resumed following coordination with, and concurrence from, the Louisiana Ecological Services Office.
6. USDA-WS shall coordinate with the Service prior to any "minor habitat management" that would impact Louisiana black bear breeding and/or critical habitat as a component of the feral swine damage management program. Such coordination shall focus on the development of techniques that would completely avoid, or significantly reduce, detrimental effects to those habitats (e.g., avoiding all impacts to trees greater than 36 inches in diameter, using small-scale hand clearing methods rather than large-scale mechanical clearing, implementing techniques that would facilitate the reversion of

habitats to their previous/unmodified state, and restoring modified habitats as necessary after management activities are completed on impacted sites).

7. USDA-WS shall immediately notify the Louisiana Ecological Services Office, the Service's Law Enforcement Office in Lafayette, Louisiana, and the LDWF if a dead, injured, or sick Louisiana black bear is discovered in or adjacent to a feral swine trap site operated by its personnel. Injured individuals shall be handled appropriately and dead specimens disposed of in coordination with the Service and LDWF (USDA-WS shall coordinate with LDWF on the transfer of dead bears to an LDWF wildlife veterinarian for a necropsy).
8. USDA-WS shall submit annual monitoring reports to the Louisiana Ecological Services Office. Those reports shall contain the following information: parishes within which trap sites were located, the type of trapping activities conducted, the number of Louisiana black bears trapped and/or killed, the types of traps responsible for Louisiana black bear captures, as well as any other pertinent information.

Neither alternative in this Environmental Assessment proposes the use of snares or cable restraints; therefore, restrictions on that method in the BO are not relevant to TRNWRC's Feral Swine Damage Management Plan. If snaring were to be proposed on TRNWRC lands, further consultation with the Mississippi Ecological Services office of USFWS would be necessary to establish zones similar to those established for Louisiana (Weller, 2014). Reasonable and prudent measures and Terms and Conditions which apply to trapping, provision of information to cooperators, notification, and habitat modification would apply to operations on TRNWRC. Any reports and consultations for TRNWRC actions would be conducted with the Mississippi Ecological Services office of USFWS. With these measures, terms, and conditions in place, effects of methods common to both alternatives would be non-significant.

An Intra-Service Section 7 Evaluation was conducted for the action proposed in the accompanying Feral Swine Damage Management Plan. It was determined that the actions proposed in this plan would not be likely to adversely affect Louisiana black bear or any other known listed species on TRNWRC lands.

Beneficial effects of both alternatives on Louisiana black bear would be similar to those listed above for deer, turkey, and waterfowl. Reducing the population of feral swine on TRNWRC refuges would reduce resource competition from swine and improve habitat quality for bears.

Effects on Feral Swine Populations

USDA APHIS Wildlife Services analyzed the effects of their state-wide control programs in Georgia and Louisiana on the population of feral swine in those states (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2005; U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2014). Although lethal removal of feral swine has the potential to adversely affect swine populations, USDA APHIS Wildlife Services concluded that their proposed actions, which could result in the removal of 10,000 feral swine per year in Louisiana and 1,000 per year in Georgia, would have a negligible effect on overall populations of feral swine in those states. In Mississippi, USDA APHIS Wildlife Services analyzed the effect of their lethal removal efforts on feral swine populations and concluded that, because their portion of the annual take was less than 1 percent of the total harvest by hunters in the state, their efforts would have a negligible effect on feral swine populations there (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2012). The much smaller scale efforts at TRNWRC would

also be expected to have a negligible effect on the Mississippi population of feral swine, although local reductions may occur.

HUMANENESS OF CONTROL METHODS

USDA APHIS Wildlife Services analyzed the animal welfare effects of their control methods in Mississippi, Louisiana and Georgia on feral swine in those states (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2005; U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2012; U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2014). All of the methods common to both alternatives in this Environmental Assessment are included in those analyses. Trapping protocols call for frequent trap checks to ensure that trapped animals, both feral swine and non-target animals, do not suffer unduly because of long confinement. Euthanasia of swine in traps by gunshot as well as shooting of unconfined feral swine are considered by some members of the public as inhumane; however, the use of generally accepted protocols for euthanizing confined animals and killing unconfined animals was considered to have a non-significant, temporary effect on animal suffering.

SUMMARY OF EFFECTS

The proposed alternative differs from the no-action alternative only by the addition of aerial gunning as a control method. Therefore, this summary will focus on unique effects of that method in the proposed alternative. There are no unique effects of the no-action alternative.

CLIMATE CHANGE

No significant effects of aerial gunning would be expected on global climate change. Although the operation of aircraft involves the burning of fossil fuel and the emission of atmospheric carbon, the scale of the operations proposed in this plan are insignificant.

HUMAN HEALTH AND SAFETY

Low altitude aerial operations inherently involve certain risks for personnel involved and for the public. The U.S. Department of the Interior and the Service have developed policy (DM Parts 350-353; 330 FW 1-4) and Department of the Interior has published a handbook (U.S. Department of the Interior, n.d.) to ensure that aerial wildlife operations are conducted in as safe a manner as possible. In a Memorandum of Understanding (MOU) dated January 14, 2014, the Service and USDA APHIS Wildlife Services agreed to procedures and guidelines for joint operations for wildlife damage management activities on national wildlife refuges. Under this MOU, the most restrictive limitations on flight and duty (DOI) apply to joint operations. USDA APHIS Wildlife Services analyzed the effects of aerial wildlife operations on human health and safety (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2014), including the possibility of starting wildfires, fuel spills, oil/fluid spills, and human safety. They concluded that “[t]he risks to human safety from the use of non-lethal and lethal methods, when used appropriately and by trained personnel, is considered low.”

REFUGE PHYSICAL ENVIRONMENT

Aerial operations may pose a slight risk to the physical environment of the refuges. The effects of fuel/oil/fluid spills and fires, discussed above, has been analyzed and determined to be non-significant due to their low risk and small scale.

CULTURAL RESOURCES

There is a remote risk that an aircraft would crash into a historic structure and a slightly less remote risk of starting a fire which damaged a historic structure. However, conditions which would allow a wildfire to propagate in the environments of TRNWRC (bottomland hardwoods, moist soil areas, crop lands) are exceedingly rare. For these reasons, the effects of aerial operations on cultural resources are considered non-significant.

HABITATS

No effects of aerial operations on habitats other than those discussed above under Refuge Physical Environment could be identified.

EFFECTS ON WILDLIFE

Effects on Non-target Wildlife, Including Listed Species

There is a risk of disturbance of non-target wildlife associated with low-altitude overflights by aircraft involved in aerial gunning. USDA APHIS Wildlife Services provided a detailed analysis of possible effects on waterbirds, waterfowl, raptors, passerine birds, domestic livestock, and large and small mammals, and concluded that, because the disturbance from aircraft overflights would be infrequent and brief, available research indicates that the effects of such disturbance would not be significant (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2014). Effects on migratory birds would be further mitigated by timing the aerial operations to precede the breeding season for these birds. Any possible effects on waterfowl would be mitigated by restricting operations to areas where waterfowl are not present (i.e. non-flooded areas) and/or by conducting operations after wintering migratory waterfowl have started their spring migration and are no longer present on the refuge complex.

The presence of Louisiana black bears warrants consideration of the risk that aerial operations will result in an unintentional “take” of this species. Because of the rarity of this species on the refuges and the infrequent and brief nature of proposed aerial operations, the risk of disturbing a Louisiana black bear is remote. If a bear were to be sighted during aerial operations, the pilot would make every effort to avoid disturbing it by avoiding direct overflight and maintaining a reasonable distance. The risk of accidentally shooting a Louisiana black bear, although non-zero, is very remote. All personnel involved in aerial gunning operations are trained wildlife professionals. Positive identification of feral swine would in all cases be made before they are targeted.

An Intra-Service Section 7 Evaluation was conducted for the action proposed in the accompanying Feral Swine Damage Management Plan. U.S. Fish and Wildlife Service Ecological Services concurred that the actions proposed in this plan would not be likely to adversely affect Louisiana black bear or any other known listed species on TRNWRC lands.

Effects on Feral Swine Populations

Although aerial operations are hoped to provide a more effective means of reducing feral swine populations on TRNWRC, the scale of any operations mounted on the refuge complex would be minor in comparison to the overall population of feral swine in Mississippi and would result in, at best, a local, temporary reduction in swine numbers. Therefore, we conclude that the effects of aerial gunning on feral swine populations would be insignificant.

HUMANENESS OF CONTROL MEASURES

As with the humaneness of other lethal control measures, public perception of the humaneness of aerial gunning of feral swine depends on individual beliefs and conceptions about killing animals. Aerial gunning operations would in all cases be carried out by experienced wildlife professionals and follow protocols designed to minimize animal suffering. For operations conducted by USDA APHIS Wildlife Services, lethal control will be governed by WS Directive 2.505 (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2011).

CUMULATIVE IMPACTS ANALYSIS

A cumulative impact is defined as an impact on the natural or human environment, which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions (40 Code of Federal Regulations, 1508.7).

Cumulative impacts are the overall, net effects on a resource that arise from multiple actions. Impacts can “accumulate” spatially, when different actions affect different areas of the same resource. They can also accumulate over the course of time, from actions in the past, the present, and the future. A thorough analysis of impacts always considers their cumulative aspects, because actions do not take place in a vacuum: there are virtually always some other actions that have affected that resource in some way in the past, or are affecting it in the present, or will affect it in the reasonably foreseeable future. So any assessment of a specific action’s effects must in fact be made with consideration of what else has happened to that resource, what else is happening, or what else will likely happen to it.

ENVIRONMENTAL JUSTICE

Neither of the management alternatives described in this environmental assessment, when added to impacts from other past, present, and reasonably foreseeable future actions, are expected to disproportionately place any adverse environmental, economic, social, or health impacts on minority and low-income populations. Implementation of the action alternative is anticipated to provide a benefit to the residents residing in the surrounding communities. Reduction of feral swine populations resulting from either of the alternatives on TRNWRC is expected to result in modest improvement in the human environment.

CLIMATE CHANGE

No activities in either of the alternatives would have a significant effect on atmospheric carbon or climate. Non-significant releases of atmospheric carbon may be offset by deferral of swine

population management efforts by other agencies or individuals due to swine population reductions achieved by the actions in the alternatives. Efficiencies achieved by aerial gunning (proposed alternative) may result in an overall reduction in greenhouse gas emissions when swine population management efforts across all agencies is considered.

HUMAN HEALTH AND SAFETY

All of the methods described in both alternatives would be employed on a temporary basis and have no residual effects, and therefore none would cause cumulative impacts to human health and safety.

REFUGE PHYSICAL ENVIRONMENT, CULTURAL RESOURCES, AND HABITATS

All of the methods in both alternatives would be deployed on a short-term basis and over limited spatial extent, and none have residual effects. No actions by other agencies would be conducted on refuge lands, and the only actions by individuals (opportunistic take by hunters) are already included in the analysis of the two alternatives in this EA. Therefore, no adverse cumulative effects would be expected on refuge physical environment, cultural resources, or habitats.

EFFECTS ON WILDLIFE

Effects on Non-target Wildlife, Including Listed Species

All of the methods in both alternatives would be deployed on a short-term basis and over limited spatial extent, and none have residual effects. As noted above, any cumulative effects of these actions would be non-significant because of the ephemeral nature of the potential disturbance or interaction. No actions by other agencies or individuals are anticipated whose effects, when combined with those of the actions in the alternatives, would produce a significant cumulative impact on non-target wildlife.

Effects on Feral Swine Populations

Feral swine population reduction methods described in both alternatives would, by definition, be intended to have an effect ~~of~~ on feral swine populations. However, as we have seen above, those effects are expected to be small-scale and temporary. It is possible that Service efforts, combined with those of other agencies, for example, the State of Mississippi, would have a larger effect on feral swine populations in the state. However, feral swine populations have risen and swine have become more widespread in Mississippi over the past two decades, despite ongoing efforts by State and Federal agencies and others to reverse the trend (U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2012). It is unlikely that actions in the proposed alternative would, if combined with reasonably foreseeable future actions by the State of Mississippi or other actors, be able to have long-term, significant cumulative effects on feral swine populations.

HUMANENESS OF CONTROL MEASURES

The ephemeral nature of euthanasia of confined animals and shooting of unconfined animals precludes the possibility that there could be cumulative impacts on the animals killed. When some, but not all, members of a group of feral swine (sounder) are killed, there is the possibility

that a form of suffering could be experienced by the remaining members of the sounder. No less an authority than Charles Darwin (Darwin, 1872) recognized and documented apparent expressions of grief in non-human primates, elephants, and other animals. Popular accounts of behavior resembling human grief in many species of mammals and birds abound (Bekoff, 2009). These behavioral changes may persist for a few weeks before the surviving animal or group of animals resumes normal behavior. There is some evidence that when social bonds in swine are broken by the death of a sibling they may not suffer distress, since their primary interactions are competitive (Keeling & Gonyou, 2001). However, there is very little information specific to pigs which would indicate the extent to which surviving members of a sounder may suffer when some members are killed. Therefore, while it is possible that removing some members of a sounder has a negative effect on surviving members, this effect is thought to be temporary and non-significant and would not constitute a cumulative impact under any reasonably foreseeable combination of actions by Federal, State, and other actors.

CHAPTER 5 CONSULTATION AND COORDINATION

Extensive planning has been conducted for all of the refuges in TRNWRC. A CCP was completed for the five refuges which then composed TRNWRC in 2006. Input from Tribes, the State of Mississippi, partner organizations, and the general public was solicited at scoping and during a public comment period on the draft CCP/EA (U.S. Fish and Wildlife Service, 2005). In 2013, the CCP planning process was begun for Holt Collier and Theodore Roosevelt NWRs, which had been added to the complex. Again, scoping was conducted with Tribes, the State, partner organizations, and the public. The Draft CCP/EA will be available for public comment in 2015. Both of these planning documents provide for feral swine management through lethal removal.

Internal and Intergovernmental (Tribal) scoping was conducted for the Draft Feral Swine Damage Management Plan that accompanies this Environmental Assessment. The Service will make this Draft Plan and EA available on its website and as a hard copy obtainable at the Refuge Complex office for a 30-day public comment period in January, 2015. Notifications will be sent to the media, partner organizations, Tribes, County, State and Federal elected officials, Mississippi Department of Wildlife, Fisheries, and Parks, and other interested parties.

LITERATURE CITED

Bekoff, M., 2009. Animal Emotions. *Psychology Today*, 29 October.

Darwin, C., 1872. *The expression of the emotions in man and animals*. London: John Murray.

Geisser, H. & Reyer, H., 2005. The influence of food and temperature on population density of wild boar Sus scrofa in the Thurgau (Switzerland). *Journal of Zoology*, 267, pp.89-96.

Keeling, L. & Gonyou, H., eds., 2001. *Social Behavior in Farm Animals*. New York, NY: CABI.

Killian, G. et al., 2007. Management strategies for addressing wildlife disease transmission: the case for fertility control. In Nolte, D., Arjo, W. & Stalman, D., eds. *Proceedings of the Wildlife Damage Management Conference, April 9-12, 2007*. Corpus Christi, TX, 2007.

Massei, G., Sugoto, R. & Bunting, R., 2011. Too many hogs? A review of methods to mitigate impact by wild boar and feral hogs. *Human-Wildlife Interactions*, 5(1), pp.79-99.

U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2005. *Environmental Assessment Reducing Feral Hog Damage through an Integrated Wildlife Damage Management Program in the State of Georgia*. Environmental Assessment. http://www.aphis.usda.gov/regulations/pdfs/nepa/GA%20Feral%20Hog%20EA.pdf: USDA APHIS Wildlife Services.

U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2011. *WS Directive 2.505*. [Online] Available at: http://www.aphis.usda.gov/wildlife_damage/directives/2.505_ws_dir_lethal_control_of_animals.pdf [Accessed 4 December 2014].

U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2012. *Environmental assessment mammal damage management in Mississippi*. Environmental Assessment. U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services.

U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services, 2014. *Environmental Assessment Feral Swine Damage and Disease Management in Louisiana*. Environmental Assessment. USDA APHIS Wildlife Services.

U.S. Department of the Interior, n.d. *Aerial capture, eradication and tagging of animals (ACETA) handbook*. [Online] (351 DM 2 - 351 DM 3) Available at: http://oas.doi.gov/library/handbooks/library/acetahb.pdf [Accessed 26 November 2014].

U.S. Fish and Wildlife Service, 2005. *Draft comprehensive conservation plan and environmental assessment, Theodore Roosevelt National Wildlife Refuge Complex*. Atlanta, GA: U.S. Department of the Interior Fish and Wildlife Service Southeast Region.

U.S. Fish and Wildlife Service, 2006. *Theodore Roosevelt National Wildlife Refuge Complex Comprehensive Conservation Plan*. Atlanta, GA: U.S. Department of the Interior Fish and Wildlife Service, Southeast Region.

U.S. Fish and Wildlife Service, 2010. *Environmental Assessment 2010 Feral Hog Management for Sabine National Wildlife Refuge*. Environmental Assessment. Bell City, LA: U.S. Department of the Interior Fish and Wildlife Service.

U.S. Fish and Wildlife Service, 2012. *Environmental Assessment 2012 Nuisance Animal Plan on North Louisiana Refuges Complex*. Environmental Assessment. Farmerville, LA: U.S. Department of the Interior Fish and Wildlife Service.

Weller, J., 2014. *Personal Communication*. Biological Opinion.