

Recreational Hunting

Draft Decision
Document Package

For

Savannah NWR

Contents

2. Environmental Assessment

Environmental Assessment

for

Big Game (White-tailed Deer, Wild Turkey), Small Game (Squirrel, Rabbit),
Migratory Bird (Waterfowl, Mourning Dove, Wilson's Snipe), Coyote, and
Feral Hog Hunting

on

Savannah National Wildlife Refuge
Chatham and Effingham Counties, Georgia
Jasper County, South Carolina

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Chapter 1: Purpose and Need for Action

1.1 Background

Savannah National Wildlife Refuge (Refuge) was established by Executive Order 4626 on April 6, 1927, in Jasper County, South Carolina, on 2,352 acres of land owned by the United States near the Savannah River. A presidential proclamation on April 10, 1939 closed migratory bird hunting on channels of the Savannah River known as Steamboat River, Houstown Cut, Middle River (from the head of Argyle Island to its confluence with Front River), and Back River (from the mouth of Union Creek to the foot of Argyle Island). This closure set aside these otherwise open state jurisdictional waters as a permanent sanctuary for migratory birds. Originally called the Savannah River Bird Refuge, this area was reserved for use by the Department of Agriculture as a preserve and breeding ground for native birds. Since initial establishment, numerous parcels have been acquired, bringing the current Refuge to 29,452 acres.

Establishing authorities and related purposes of the Refuge include:

“...as a refuge and breeding ground for birds and wild animals subject to future use in navigation if necessary and to valid existing rights if any” (Executive Order 5748, April 6, 1927)

“...for lands acquired under the Migratory Bird Conservation Act “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” (16 U.S.C. 715d)

“...for lands acquired under the Refuge Recreation Act for “(1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species” (16 U.S.C. 460k)

“...for “the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions” (16 U.S.C. 3901(b), 100 Stat. 3583, Emergency Wetlands Resources Act of 1968)

“...for the development, advancement, management, conservation, and protection of fish and wildlife resources” (16 U.S.C. 742f(a)(4))

“...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude” (16 U.S.C. 742f(b1), Fish and Wildlife Act of 1956)

This Environmental Assessment (EA) was prepared using guidelines established under the National Environmental Policy Act (NEPA) of 1969. NEPA requires examination of the effects of proposed actions on the natural and human environment. This EA covers all components of the proposed 2016 Hunt Plan, hunting excerpts from the 2015 Visitor Services Plan, and provides a detailed examination of three hunt program activities that, due to administrative oversight, were not included in the 2007 Hunt Plan but have been administered since that time. These include a mobility-impaired deer hunt, a youth waterfowl hunt, and hunting on parcels acquired since approval of the 2007 Hunt Plan.

In the following sections, three alternatives are described for future hunting opportunities on the Refuge. The environmental consequences of each alternative and the preferred management direction based on those environmental consequences are fully considered when deciding which alternative is most comprehensive in meeting all Refuge purposes.

1.2 Purpose

The purpose of this EA is to evaluate the opportunities and impacts that can be reasonably expected to occur if the Refuge opens newly acquired parcels to limited hunting, opens selected currently closed areas to limited hunting, and adds species to the list of those that are currently open to hunting.

1.3 Need for Action

The National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) provides authority for the U.S. Fish & Wildlife Service (USFWS) to manage the Refuge and its wildlife populations. In addition, this Improvement Act declares that compatible wildlife-dependent public uses are legitimate and appropriate uses of the National Wildlife Refuge System (NWRS) and that they are to receive priority consideration in planning and management. There are six wildlife-dependent public uses: hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation that are specifically named in the Improvement Act. It further directs Refuge Managers to increase recreational opportunities, including hunting, on National Wildlife Refuges (NWR's) when compatible with both the purposes for which the Refuge was established and the mission of the NWRS.

The Refuge completed its first Comprehensive Conservation Plan (CCP) in 2011 (U.S. Fish and Wildlife Service 2011). The CCP is an all-encompassing public process through which the Refuge examines past and present management plans and then determines top management priorities to set the course for future management decisions. Within this document, all existing and proposed public uses are evaluated by using the decision process directed by NEPA, including completing an Intra-Service Section 7 Biological Evaluation, Wilderness Review, and a Finding of No Significant Impact. In addition to NEPA guidance, the CCP also includes public use reviews which are required by the Improvement Act. The Refuge has completed a Finding of Appropriateness of a Refuge Use and Compatibility Determinations on all public uses, including hunting, before final approval was given for all of the proposed Refuge uses contained within the 2011 CCP. The 2011 CCP and associated EA addressed future management of the Refuge and included a recommendation to create additional public hunting opportunities. Public comments from the 2011 CCP regarding hunting are included in Appendix B. This EA provides a complete examination of alternatives for public hunting on Refuge lands that lie in both Georgia and South Carolina.

1.4 Authority, Legal Compliance, and Compatibility

The NWRS includes federal lands managed primarily to provide habitat for a diversity of fish, wildlife and plant species. Refuges are established under many different authorities and funding sources for a variety of purposes. The purposes for this Refuge are listed in Section 1.1.

In the past, the ability to open the Refuge to hunting was covered under the National Wildlife Refuge Administration Act, 16 U.S.C 688dd (a) (2). This Act was amended in 1997 with the Improvement Act. These Acts support past hunting activities on the Refuge and future hunting opportunities, as proposed in this document as follows:

“.... conservation, management, and ... 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...” fl 16 U.S.C. § 668dd(a)(2) (National Wildlife Refuge System Administration Act)

“..... compatible, wildlife-dependent recreation is a legitimate and appropriate general public use of the System, directly related to the mission of the System and the purposes of many refuges...." Public Law 105-57, 111 STAT. 1254, Sec.5. (B) (National Wildlife Refuge Improvement Act of 1997).

The USFWS developed a strategic plan for implementing the Improvement Act. This plan clarifies the vision for the NWRS and outlines strategies for improving delivery of its mission. The 2016 Hunt Plan is compatible with the priorities and strategies outlined in the Improvement Act.

Additional authority delegated by Congress, Code of Federal Regulations, executive orders, and several management plans, such as the 2011 CCP, guide the operation of the Refuge. During development of the 2011 CCP, hunting was determined to be an appropriate and compatible public use. However, as new hunting areas and new species are being considered for inclusion in the hunt program, this updated EA was developed. A list of key laws, executive orders, and regulations that provide a framework for the proposed action can be found in the Appendix of the 2011 CCP.

Chapter 2: Alternatives Including the Proposed Action

The USFWS Regional Director for the Southeast Region (SE Region) will make two decisions based on this EA: 1) select an alternative and 2) determine if the selected alternative is a major Federal action significantly affecting the quality of the human environment, thus requiring preparation of an Environmental Impact Statement (EIS).

The following three alternatives were developed for review. Alternative C is the proposed alternative. The 2016 Savannah NWR Hunt Plan was developed for implementation based on this proposed action Alternative C.

2.1 Alternative A, No Action, Current Management

Under this alternative, hunting would be limited to the lands currently open to hunting and to species that are currently listed as legal game. There would be no change to current public use and wildlife management programs.

This action would require that the Refuge post all parcels acquired since approval of the 2007 Hunt Plan and all future acquired Refuge parcels as *Closed to Hunting*. This would also require an

increase in law enforcement patrols to enforce closure regulations and provide adequate public information to ensure regulatory compliance.

All or parts of the Refuge may be closed to hunting by the Refuge Manager at any time, if necessary, for public safety, to provide wildlife sanctuary for trust species, or for essential management actions.

2.2 Alternative B, Minimal Action

Under this alternative, hunting would be opened on parcels acquired since approval of the 2007 Hunt Plan and future acquired Refuge parcels that lie within the current Refuge acquisition boundary. Current hunting areas proposed for closing would not be closed, except migratory bird hunting areas would be reduced so that no more than 40% of the Refuge would be open to migratory bird hunting, as per Service policy 605 FW2 (See Section 4.3.1.3 **Migratory Birds**). Selected currently closed areas would be opened to mobility-impaired hunters for limited deer, coyote, and feral hog hunting and youth hunters for limited waterfowl hunting, as deemed appropriate by the Refuge Manager. No additions would be made to the list of legally hunted species.

All or parts of the Refuge may be closed to hunting by the Refuge Manager at any time, if necessary, for public safety, to provide wildlife sanctuary for trust species, or for essential management actions.

2.3 Alternative C, Proposed Action, Implement 2016 Hunt Plan

The proposed action would allow implementation of the draft Hunt Plan which would: 1) manage limited hunting on current and future Refuge parcels, 2) open and/or close selected areas for limited hunting, and 3) add to the list of species that can be legally hunted on the Refuge.

The Refuge hunting season framework would generally fall within Georgia Department of Natural Resources (GADNR) and South Carolina Department of Natural Resources (SCDNR) guidelines, but in various instances may be more conservative than state seasons and regulations. Refuge management goals and objectives may require occasional modifications to the hunting program based on harvest data, public use demands, and other Refuge programs. Use of quota hunts for special management purposes may be necessary to meet Refuge specific objectives. All or parts of the Refuge may be closed to hunting by the Refuge Manager at any time, if necessary, for public safety, to provide wildlife sanctuary for trust species, or for essential management actions.

Chapter 3: Affected Environment

Savannah NWR is located in the Lower Coastal Plain physiographic region in portions of Chatham and Effingham Counties, Georgia and Jasper County, South Carolina. The Refuge currently includes 29,452 acres and is roughly bounded by the cities of Savannah, Port Wentworth, and Rincon, Georgia and Hardeeville, South Carolina.

The Service occasionally acquires new parcels from willing sellers and accepts donated properties within the acquisition boundary. Funding and authorization for Refuge land acquisition have been

primarily provided through the Land and Water Conservation Fund Act of 1965 and by acceptance of Georgia Ports Authority acquired mitigation parcels associated with the Savannah Harbor Deepening and Savannah Harbor Expansion Projects. It is anticipated that at least an additional 2,070 acres will be added to the Refuge during the next few years as mitigation related to the current Savannah Harbor Expansion Project.

3.1 Physical Environment

Wetlands dominate the Refuge and adjacent surrounding landscape. Most of the Refuge lies within the primary floodplain of the Savannah River, an alluvial river with headwaters in the mountains of North Carolina. All 31 miles of the river that flow through the Refuge are at least partially influenced by tides from the Atlantic Ocean. Generally, areas further up-river, are more forested with declining salinities, while further down-river areas are mostly tidal marsh with salinities varying with tides, winds, and flow in the Savannah River. Elevations range from near sea level along the lower reaches of the Savannah River to 20 feet above mean sea level (FAMSL) on higher hammocks and river floodplain terraces. Much of the Refuge is accessible only by boat and can vary greatly with water levels in the Savannah River.

The Refuge climate is heavily influenced by the coastal waters of the Atlantic Ocean. In Savannah, Georgia, the average January daily high temperature is 60 degrees Fahrenheit and the average January daily low temperature is 38 degrees Fahrenheit. July is the hottest month of the year with an average daily high temperature of 91 degrees Fahrenheit and average daily low temperature of 72 degrees Fahrenheit (US Climate Data 2016).

3.2 Vegetation

Most of the Refuge, other than administrative areas and Rights-of-Way, is covered with a variety of native vegetation. Vegetation types found here typically depend on soil conditions, historic land use practices, and current wildlife management objectives.

Tidal marsh areas are dominated by giant cutgrass, big cordgrass, cattail, and bulrush, while vegetation composition in forested wetlands depends on the amount of tidal influence and elevation. Wetter, more frequently flooded sites are forested with a mix of bald cypress, water tupelo, green ash, black willow, and red maple with only scattered black willow, dwarf palmetto, and hazel alder as understory components. Less frequently flooded areas contain a mix of sweetgum, laurel oak, water oak, overcup oak, white oak, cherrybark oak, water hickory, and American sycamore with a sparse understory of river cane, greenbriar, wild grape, and dwarf pawpaw.

Managed freshwater impoundments (historic rice fields locally known as pools) provide 3,000 acres of wetlands where water levels are fully controlled for the benefit of migratory birds. These areas are dominated by moist soil plants such as smartweed, fall panicum, barnyard grass, witchgrass, foxtail grass, giant cutgrass, and a variety of sedges and rushes.

The balance of the Refuge is comprised of relatively small upland features. Numerous, small mesic hardwood stands and hammocks are scattered throughout and are comprised of live oak, laurel oak, water oak, cherrybark oak, southern red oak, mockernut hickory, sugarberry, American beech, southern magnolia, black cherry, and scattered loblolly pine. The understory in these areas

is often dense with saw palmetto, yaupon holly, and wax myrtle. Several areas are dominated by stands of varying successional stages of loblolly pine with mixed sweetgum, red maple, and water oak. These areas generally have a dense understory of loblolly pine regeneration, waxmyrtle, and various hardwood saplings.

Unfortunately, historical land uses and settlement of the local area resulted in the introduction of many non-native, invasive species. The Refuge is continually working to minimize negative impacts incurred by the growth of Chinese tallow tree, Chinaberry, alligator weed, water hyacinth, parrot feather, autumn olive, callery pear, Japanese climbing fern, and others.

3.3 Wildlife Resources

Management of the 16 pools enhances the importance of the Refuge as a haven for numerous wildlife species. This area is particularly valuable to migratory bird populations. Heavy emphasis is placed upon habitat management for wintering waterfowl (wood duck, mallard, American widgeon, gadwall, northern shoveler, northern pintail, blue-winged teal, green-winged teal, ring-necked duck, lesser scaup, canvasback, redhead), migratory shorebirds (greater yellowlegs, lesser yellowlegs, killdeer, solitary sandpiper, stilt sandpiper, least sandpiper, western sandpiper, semi-palmated sandpiper, Wilson's snipe), and wading birds (wood stork, great-blue heron, little blue heron, great egret, snowy egret, tri-colored heron, black-crowned night heron, white ibis, glossy ibis, American bittern, least bittern) feeding habitat. Other species, such as white-tailed deer, bobcat, river otter, anhinga, purple gallinule, osprey, bald eagle, red-tailed hawk, red-shouldered hawk, Cooper's hawk, sharp-shinned hawk, northern harrier, peregrine falcon, merlin, American kestrel, Mississippi kite, swallow-tailed kite, red-winged blackbird, bobolink, American alligator, cottonmouth, mud snake, yellow belly slider, mud turtle, musk turtle, snapping turtle, and a variety of freshwater fish thrive in these intensely managed areas.

The tidal marshes within the Refuge boundary vary in salinity from location, tide conditions, and flow of the Savannah River. These areas provide ideal conditions for muskrat, swallow-tailed kite, northern harrier, king rail, clapper rail, marsh wren, sedge wren, red-winged blackbird, rainbow snake, and American alligator.

Forested wetlands, mixed mesic hardwoods and hammocks, and loblolly pine dominated stands provide suitable habitat for numerous resident and migratory wildlife species. Species known to use these forest stands include white-tailed deer, bobcat, gray squirrel, raccoon, river otter, wild turkey, brown-headed nuthatch, Carolina chickadee, tufted titmouse, brown creeper, northern parula, pine warbler, yellow-rumped warbler, Swainson's warbler, black-throated blue warbler, yellow-throated warbler, prothonotary warbler, white-eyed vireo, red-eyed vireo, and rose-breasted grosbeak.

Open waters of the Refuge harbor numerous fish species. Due to varying salinities in the lower Savannah River and tributaries and a direct tie to the Atlantic Ocean, freshwater and saltwater fish species are present year-round in Refuge waters.

3.4 Threatened and Endangered Species

Several endangered, threatened, and species of concern inhabit refuge lands and adjacent open waters including Atlantic sturgeon, shortnose sturgeon, robust redhorse, West Indian manatee,

Rafinesque's big-eared bat, and wood stork. Management actions taken on the Refuge always first consider the well-being of these species and their habitat.

3.5 Invasive Animal Species

Currently, the most important and destructive invasive animal species on the Refuge is the feral hog. Feral hogs are currently distributed throughout the Refuge in varying densities. These animals were introduced to the eastern United States from Eurasia by early European settlers as a free ranging food source. The feral hog population that exists today is a mix of escaped domestic pigs, intentionally raised and released wild pigs, and Eurasian wild boar. The rooting and wallowing activities of feral hogs cause serious erosion to river banks and areas along streams. Feral hogs carry diseases transmittable to humans, such as swine brucellosis, toxoplasmosis, and trichinosis. They compete for food with numerous native wildlife species and are known to consume a variety of herptiles, including salamanders and snakes. Feral hogs create large wallows in wet sites, destroying the integrity of the native plant and soil community (Georgia Wildlife Web 2016). Soil disturbance by rooting and wallowing of feral hogs also nurtures the invasion of exotic plant pests, such as Chinese tallow tree, Chinaberry, and Japanese climbing fern. Daily activities of feral hogs can also destroy archaeological sites (Engeman, et al 2012).

3.6 Cultural Resources

The body of federal historic preservation laws has grown dramatically since the enactment of the Antiquities Act of 1906. Several themes recur in these laws, their promulgating regulations, and more recent Executive Orders. They include: 1) each agency is to systematically inventory the historic properties on their holdings and to scientifically assess each property's eligibility for the National Register of Historic Places; 2) federal agencies are to consider the impacts to cultural resources during the agencies' management activities and seek to avoid or mitigate adverse impacts; 3) the protection of cultural resources from looting and vandalism are to be accomplished through a mix of informed management, law enforcement efforts, and public education; and; 4) the increasing role of consultation with groups, such as Native American tribes, in addressing how a project or management activity may impact specific archaeological sites and landscapes deemed important to those groups. The Service, like other federal agencies, is legally mandated to inventory, assess, and protect cultural resources located on those lands that the agency owns, manages, or controls. Service cultural resource policy is delineated in 614 FW 1-5 and 126 FW 1-3. In the SE Region, the cultural resource review and compliance process is initiated by contacting the Regional Historic Preservation Officer/Regional Archaeologist (RHPO/RA). The RHPO/RA will determine whether the proposed undertaking has the potential to impact cultural resources, identify the "area of potential effect," determine the appropriate level of scientific investigation necessary to ensure legal compliance, and initiates consultation with the pertinent State Historic Preservation Office (SHPO) and federally recognized Tribes. Much of the managed landscape of the Refuge evolved out of the late 18th and 19th century rice plantations and their fields. Following the American Civil War, most of the rice fields were converted into managed impoundments for migratory waterfowl. A historical summary of human inhabitation and land use practices in the area of current Refuge lands is included in the 2011 CCP.

3.7 Wildlife-Dependent Recreation

The area surrounding the Refuge has a rich history of hunting and this wildlife-dependent form of recreation is of significant cultural importance to the local community. The Refuge hunt program serves to increase public awareness of the Refuge and the National Wildlife Refuge System. This awareness has resulted in increased public support of the Refuge and other Refuge programs. Hunters play a significant role in assisting with law enforcement activities. Due to limitation in Refuge staff resources, hunters often provide vital tips to law enforcement officers.

3.8 Socioeconomic Environment

The City of Savannah has historically been the primary economic driver of the coastal region of southeast Georgia and southern South Carolina. The number of jobs in the Savannah Metropolitan Statistical Area is growing at a rate twice as fast as that of the state and nation as a whole (Chatham County 2005). Detailed socioeconomic statistics and local demographics for Chatham, Effingham, and Jasper Counties, are included in the 2011 CCP.

Chapter 4: Environmental Consequences

This chapter describes the foreseeable environmental consequences of implementing each of the management alternatives in Chapter 2. When detailed information is available, a scientific and analytic comparison between alternatives and their anticipated consequences is presented, which is described as “impacts” or “effects.” When detailed information is not available, those comparisons are based on the professional judgment and experience of Refuge staff and Service and State biologists.

4.1 Effects Common to all Alternatives

4.1.1 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’ access to public information and participation in matters relating to human health or the environment. There are several rural communities adjacent to the Refuge that meet some part or all of the criteria identified and protected by Executive Order 12898.

With respect to impacts that may adversely affect minority or low-income populations in the affected area, this EA does not include any adverse environmental or human health effects specific to any of the alternatives. In fact, public hunting opportunities are often the only mechanism for

low-income hunters to enjoy this compatible form of wildlife-based recreation while also supplementing food resources.

4.1.2 Refuge Physical Environment

Impacts of each of the alternatives on the Refuge physical environment would be similar and have minimal effects. Since all current and proposed Refuge hunting opportunities are primarily limited to walk-in or boat-in access, habitat degradation and disturbance to surface soils and topography would be negligible.

Impacts of each of the alternatives on hydrology would also be similar and have negligible effects. The Refuge expects similar impacts of each of the alternatives to air and water quality related to visitor auto and boat emissions on roads, creeks and rivers used to access Refuge lands. The cumulative effect of these Refuge-related activities on overall air and water quality in the region would also be similar between alternatives.

Impacts associated with each alternative on solitude and quality of outdoor experience are expected to be similar and minimal. In each alternative, most areas that are open to hunting are seldom ever visited by the non-hunting public.

4.1.3 Public Health and Safety

Each alternative would have similar and minimal effects on human health and safety. Public safety of Refuge hunting programs is always a top priority and the same standards apply to each alternative.

4.1.4 Cultural Resources

Under each alternative, impacts to cultural resources on the Refuge would be similar and inconsequential. None of the public uses allowed under each alternative would increase opportunities for impacts to cultural resources. Hunting, regardless of method or species targeted, is a public use activity that does not pose any additive threat to cultural resources that may be found on the Refuge. Development of any future infrastructure, such as access roads or parking areas, can potentially impact historic properties and would require review the Regional Archaeologist.

4.1.5 Facilities

Maintenance or improvement of facilities (roads, trails, parking areas) would be the same under the three alternatives as each would have similar, minimal, short-term impacts on those facilities. Facility maintenance and improvement activities are periodically conducted to accommodate daily Refuge management operations and general public uses such as wildlife observation and photography. When these activities are necessary, they would be conducted at times to cause the least amount of disturbance to wildlife.

There are no additional facilities needed for administering the hunt program on new Refuge parcels. All-terrain vehicles (ATVs) and other off road vehicles are not allowed on Refuge roads or trails. Under each alternative, adverse effects to existing facilities would be similar.

4.2 Summary of Effects

4.2.1 Impacts to Habitat

Alternative A, No Action, Current Management

Under this alternative, the 2007 Savannah Refuge Hunt Plan would remain in effect with no changes and hunting would not be opened to the public on any lands acquired since approval of the plan or on any future acquired Refuge parcels within the current Refuge acquisition boundary. Negative impacts to wildlife habitat would be expected on these tracts based on studies related to overabundance of deer and feral hogs. Deer and feral hog populations would likely increase without controlled hunting and could result in measurable negative impacts on other plant and animal species. When habitat carrying capacity is exceeded, competition for limited food resources results in over-browsing by deer. Severe over-browsing alters plant species composition, distribution, and abundance, and reduces understory structural diversity. These changes may have a deleterious impact on local animal communities which depend on healthy vegetative systems for food and cover (Ellingwood and Caturano 1988). Feral hog populations can have disastrous impacts on native plant and animal species. These are the primary habitat impacts that would be likely under Alternative A.

Alternative B, Minimal Action

Opening hunting on parcels acquired since approval of the 2007 Hunt Plan or any future acquired Refuge parcels, as included in this alternative, would be expected to have positive impacts on overall wildlife habitat quality. Maintaining deer and feral hog populations at relatively low densities is a high priority for Refuge management. Implementing this alternative would ensure that these species with the most potential to negatively impact habitat quality can be controlled primarily through public hunting.

Alternative C, Proposed Action, Implement 2016 Hunt Plan

Similarly to Alternative B, this alternative provides reasonable means for controlling both deer and feral hog densities. In the absence of public hunting for deer and feral hogs, higher densities would likely have severe, negative effects on habitat quality for a variety of trust species.

4.2.2 Impacts to Hunted Wildlife

Alternative A, No Action, Current Management

Under this alternative, legal harvest of individual animals would still occur on areas of the Refuge that are currently open to hunting according to the 2007 Savannah Refuge Hunt Plan. Hunting would not be opened on any parcels acquired since approval of that Plan or any future acquired Refuge parcels. Control of poaching is an on-going challenge in areas open to hunting and some mortality would likely still occur on areas not opened to hunting. Disturbance to hunted wildlife would continue on currently open areas.

Alternative B, Minimal Action

Alternative B would continue the legal harvest of individual animals on areas of the Refuge that are currently open to hunting. Hunting would also be open on any parcels acquired since approval of the 2007 Hunt Plan and any future acquired Refuge parcels and on currently closed areas that are proposed for limited hunting. Disturbance to hunted wildlife from hunting activities would continue on currently open areas and also be incurred on areas proposed for opening limited hunting. No new species would be added to list of hunted wildlife on Refuge lands and the current open hunt areas would remain unchanged.

Alternative C, Proposed Action, Implement 2016 Hunt Plan

Implementing this alternative would minimally increase hunting mortality for most hunted species. The limited nature of the proposed hunts and sometime difficult access to hunt areas would result in little increase in disturbance to hunted species or to other Refuge users.

Deer, coyote, and feral hog populations could be controlled throughout the Refuge with minimal added disturbance. All past deer herd health checks by Southeastern Cooperative Wildlife Disease Study (SCWDS) suggest that deer numbers should be maintained at or below the current levels. Coyotes are considered a nuisance species by both Georgia and South Carolina and would be added as hunted species, according to State seasons, with no negative impacts.

Impacts on small game populations would likely be negligible. Research shows that there are only small differences in density and/or mortality rates in gray squirrels on hunted versus non-hunted populations (Mosby 1969, Rose 1977). Rabbit populations are similarly immune to additive mortality from hunting. Hunting of these species would cause only minimal disturbance to other wildlife populations. Everett (1982), monitored movements of wild turkeys before, during and after squirrel, deer, and turkey hunts and found no permanent movement out of established ranges which could be attributed to hunting.

Due to the limited application of proposed migratory bird hunting opportunities, disturbance from these activities would be minimal. Disturbance to hunted species of migratory birds associated with the current Refuge waterfowl season and open areas would continue. Added disturbance by opening an area to limited youth waterfowl, mourning dove, and Wilson's snipe hunting is not likely since these areas would be temporarily closed to all other public uses, that otherwise provide disturbance. Due to the highly restricted, short duration of proposed limited migratory bird hunts, added disturbance to these species would be negligible.

4.2.3 Impacts to Non-hunted Wildlife

Alternative A, No Action, Current Management

Through this alternative, public hunting would not be opened on any parcels acquired since approval of the 2007 Hunt Plan or any future acquired Refuge parcels, no additional limited hunts would be opened, and no new species would be added to the hunt program. Increased disturbance to non-hunted wildlife would not occur as a result of increased hunting opportunities. However, all Refuge parcels would be open to other public uses which would cause disturbance to non-hunted wildlife.

Hunting is an important management tool for natural resource managers. Not allowing hunting on recently acquired and future acquired parcels could have perpetual negative impacts on non-hunted wildlife. Over-abundance of deer and feral hogs can have devastating impacts on a multitude of migrant and resident songbird species through habitat destruction while also directly impacting ground nesting birds, such as Chuck-Will's-widow and turkey.

Alternative B, Minimal Action

This alternative would continue the legal harvest of individual animals on areas of the Refuge that are currently open to hunting. Hunting would also be open on any parcels acquired since approval of the 2007 Hunt Plan and any future acquired Refuge parcels and on currently closed areas that are proposed for limited hunting. Disturbance to non-hunted wildlife from hunting activities would continue on currently open areas and some could also be incurred on areas proposed for opening limited hunting. Controlling the density of deer and feral hog populations through this alternative should result in fewer disturbances by these impactful species on non-hunted wildlife.

Alternative C, Proposed Action, Implement 2016 Hunt Plan

Implementing the 2016 Hunt Plan would result in some additional but likely minimal direct disturbance to non-hunted species. Hunting would be limited in impoundment areas where shorebird, wading bird, and wintering waterfowl numbers are generally the greatest. Limiting hunting in these areas to short duration hunts during times when non-hunted species are minimal in numbers would also ensure negligible disturbance. Controlling the density of deer, coyote, and feral hog populations through this alternative should result in fewer disturbances by these impactful species on non-hunted wildlife.

4.2.4 Impacts to Federally Threatened or Endangered Species

Alternative A, No Action, Current Management

Through this alternative, no changes would be made to the current hunt program. Increased impacts on threatened, endangered, and species of concern would not occur as a result of hunting.

Alternative B, Minimal Action

Implementing this alternative would not result in increased disturbance to any imperiled species that may be found in currently closed areas, future Refuge parcels, or where new species are added to the hunt program. All Refuge parcels would be open to other public uses which would likely cause minimal additional disturbance.

Alternative C, Proposed Action, Implement 2016 Hunt Plan

Additional impacts to threatened, endangered, and species of concern would be negligible under implementation of the 2016 Hunt Plan. It is the policy of the Service to protect and preserve all native species of fish, amphibians, reptiles, birds, mammals, invertebrates, and plants, including their habitats, which are designated threatened or endangered. Several endangered, threatened, and species of concern inhabit refuge lands and adjacent open waters including Atlantic sturgeon,

shortnose sturgeon, robust redhorse, West Indian manatee, Rafinesque's big-eared bat, and wood stork.

With hunting being limited in most areas and more restrictive than state seasons, the proposed Alternative C would not likely affect any threatened, endangered, or species of concern. Optimally matching hunting seasons with times that hunting would incur the least amount of disturbance and the legal authority available to the Refuge Manager to close areas to public access, when necessary, ensures that the proposed alternative would not be any more likely to adversely affect threatened and endangered species than any other alternative.

Intra-Service Section 7 Evaluation Consultations were completed for the 2007 Hunt Plan, 2011 CCP, and are in process for the 2016 Hunt Plan. Findings of "no effect" were determined for all species related to waterfowl hunting in 2007 and 2011. Findings of "not likely to adversely affect" were determined for all species related to all other hunting in 2007 and 2011.

4.2.5 Impacts to Wildlife-Dependent Recreation

Alternative A, No Action, Current Management

Through this required alternative, no impacts would be incurred on non-hunting related wildlife-dependent recreation. However, adopting this alternative would not allow for increased hunting opportunities on the Refuge, as recommended in the 2011 CCP.

Alternative B, Minimal Action

Adopting this alternative would not fully support a restructuring of the hunt program. Although this option does open up additional areas for limited hunting, it does not address adding any new species to the hunt program or open any parcels acquired since approval of the 2007 Hunt Plan or future acquired parcels. All recently acquired and future acquired Refuge parcels would be open to all other public uses, except hunting.

Alternative C, Proposed Action, Implement 2016 Hunt Plan

Compatible wildlife-dependent recreation would be similar through each alternative. Any perceived decline in wildlife viewing and wildlife photography opportunities would likely not be realized with the limited nature of proposed hunts, hunt areas, closed areas, time of season and added hunted species through Alternative C. As future Refuge parcels are acquired, these areas would be opened to compatible public-use activities.

As public use levels likely increase through time, unanticipated conflicts between user groups may occur. These conflicts can be mitigated or resolved by providing competing interests groups with alternative access opportunities. For example, the area that is traversed by the Laurel Hill Wildlife Drive (by far the most visited portion of the Refuge) would be impacted by hunting only during the two day mobility-impaired deer hunt. Much like during scheduled prescribed burns, this impact is minor and short in duration as to not cause long term conflicts between user groups.

4.2.6 Impacts to Facilities (parking areas, roads, trails, levees, buildings)

Alternative A, No Action, Current Management

Under this alternative, all annual impacts related to facilities would remain the same as the current time.

Alternative B, Minimal Action

The possible minor increases in public access through this alternative would not have noticeable impacts on Refuge facilities. No public vehicle access is allowed beyond parking areas and the amount of increased use of roads by Refuge staff managing hunts would be negligible.

Alternative C, Proposed Action, Implement 2016 Hunt Plan

Annual maintenance or improvements of existing facilities (parking areas, roads, trails, levees, buildings, etc.), regardless of alternative, may cause minimal short term impacts to localized soil, water, and wildlife habitat. Facility maintenance and improvement activities are periodically conducted to accommodate daily Refuge management operations and general public uses such as wildlife observation and wildlife photography. When these activities are necessary, they would be scheduled to cause the least amount of disturbance to wildlife. Siltation barriers would be used to minimize soil erosion and all disturbed sites would be restored to a natural condition as much as possible.

4.3 Cumulative Impacts Analysis

4.3.1 Anticipated Direct and Indirect Impacts of Proposed Action on Wildlife Species.

4.3.1.1 Big Game

4.3.1.1.1 Deer

Harvest regulation is an essential part of sound management for white-tailed deer. Regulating the harvest is necessary to keep deer populations at or below habitat carrying capacity and in relative balance with their food supply on Refuge lands. Over-population leads to increased car-deer collisions and poor overall herd health. Due to the relatively small home range size for deer (500-1500 acres), deer hunting does not have regional population impacts. Population estimates in 2015 were 1,200,000 for Georgia (GADNR 2016) and 730,000 for South Carolina (C. Ruth, personal communication, 2015). Only local impacts are likely to occur from deer hunting on the Refuge and those impacts are generally considered beneficial. Deer harvest on the Refuge is estimated at 30-40 per season.

Deer density on any given area of Savannah NWR varies with season, river height, impoundment management, outside hunting pressure, and other factors. Overpopulation of deer can be devastating to the understory component of forested habitat. Excessive browsing has the potential to impact understory dependent species, specifically breeding, migrant, and resident songbirds. Species that could experience negative impacts from deer overpopulation and associated habitat degradation include breeding birds, such as painted bunting, common yellowthroat, and wood

thrush, and migrant birds, including black-throated blue warblers, yellow warbler, worm-eating warbler, hooded warbler, ovenbird, gray-cheeked thrush, Swainson's thrush, and hermit thrush. Habitat quality for resident species, such as gray catbird, brown thrasher, and white-eyed vireo, can also decline in the presence of too many deer.

Deer herd health checks were conducted most recently by the Southeast Cooperative Wildlife Disease Study in 1993. The report for that check concluded that continuation of current herd density may result in declines in herd health or higher rates of disease-induced mortality. The data suggests that some level of disease related mortality may be present. These losses predominantly affect younger animals, 4-12 month of age, mainly during winter and early spring, and be associated with parasitism by stomach worms and lungworms. Any significant increase in density likely would result in declines in population health from this density-dependent parasitism/malnutrition syndrome.

An active deer hunting program on all areas open to hunting is necessary at Savannah NWR to provide and maintain quality habitat for breeding, migrant, and resident birds. The overall health and welfare of the Refuge deer herd is also maintained or improved through an active hunting program.

4.3.1.1.2 Wild Turkey

Once a species that was almost extinct in the U.S in the early 1900's, the wild turkey is now numerous and widely distributed due to reintroduction programs, active management, and regulated hunting. Both Georgia and South Carolina have monitored wild turkey populations throughout each state since the 1980's, and have actively restored populations in all historic ranges. The 2015 turkey population was estimated at 300,000 in Georgia (GADNR 2016). There is no current population estimate for South Carolina.

Turkeys are non-migratory and maintain relatively small home ranges, generally no more 1,500 acres in this region. Gobbler only, spring hunting ensures the survival of hens, allows those hens to be bred, and continues providing this renewable resource. Harvest during limited turkey hunting at Savannah NWR is expected to be no more than 10-15 male turkeys. The limited public hunting of turkeys on the refuge should have no noticeable impacts on sustaining this renewable resource.

4.3.1.2 Small Game (Squirrel, Rabbit)

Small game that can be hunted on the Refuge include squirrel and rabbit. Both are abundant statewide in Georgia and South Carolina. Squirrels are greatly affected by limited food and cover resources with disease influences common with dense populations. Due to limited access and minimal numbers of small game hunters on the Refuge, squirrels and rabbits thrive where adequate food and cover are available to sustain their populations. The bottomland forested habitat of the Refuge can be expected to support huntable populations of squirrels into perpetuity. Rabbits can be found in a variety of habitats, but are primarily associated with the edges of upland openings and dense regeneration areas in woodlands. Annual harvest of squirrel is estimated at 300 while fewer than 25 rabbits are expected to be taken. Road kills likely inflict higher mortality rates on squirrel and rabbit populations on the Refuge than would hunting.

4.3.1.3 Migratory Birds

Migratory game birds are those bird species so designated in conventions between the United States and several foreign nations for the protection and management of these birds. Under the Migratory Bird Treaty Act (16 U.S.C. 703-712), the Secretary of the Interior is authorized to determine when "hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any ... bird, or any part, nest, or egg" of migratory game birds can take place, and to adopt regulations for this purpose. These regulations are written after giving due regard to the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, and are updated annually (16 U.S.C. 704(a)). This responsibility has been delegated to the USFWS as the lead federal agency for managing and conserving migratory birds in the United States. Acknowledging regional differences in hunting conditions, the USFWS has administratively divided the nation into four Flyways for the primary purpose of managing migratory game birds. Each Flyway (Atlantic, Mississippi, Central, and Pacific) has a Flyway Council, a formal organization generally composed of one member from each state and Province in that Flyway. Savannah NWR is within the Atlantic Flyway.

The USFWS, working with partners, annually prescribes a framework, or outer limits, for dates and times when hunting may occur and the number of birds that may be taken and possessed. These frameworks are necessary to allow State selections of season and limits for recreation and sustenance, aid Federal, State, and Tribal governments in the management of migratory game birds, and permit harvests at levels compatible with population status and habitat conditions. Because the Migratory Bird Treaty Act stipulates that all hunting seasons for migratory game birds are closed unless specifically opened by the Secretary of the Interior, the USFWS annually promulgates regulations (50 CFR Part 20) establishing the frameworks from which States may select season dates, bag limits, shooting hours, and other options for each of the migratory bird hunting seasons. The frameworks are essentially permissive in that hunting of migratory birds would not be permitted without them.

States may always be more conservative in their selections than the Federal frameworks but never more liberal. Furthermore, season dates and bag limits for NWR's open to hunting can never be any longer than the State regulations. Each new Refuge hunt must develop an Environmental Assessment (EA) when the NWR opens a new hunting activity, and based upon the findings of the EA, season dates and bag limits are then set.

Service policy 605 FW2 states, "If a refuge, or portion thereof, has been designated, acquired, reserved, or set apart as an inviolate sanctuary, we may only allow hunting of migratory game birds on no more than 40% of that refuge, or portion, at any one time unless we find that taking of any such species in more than 40% of such area would be beneficial to the species." The 2016 Hunt Plan ensures that the management of migratory bird hunts at Savannah NWR adheres to this policy and that migratory bird hunting is restricted to the season, bag limits, and other regulations based on the State in which the hunting occurs.

4.3.1.3.1 Waterfowl

Waterfowl hunting is allowed in many areas of Savannah NWR and regulated by the respective State seasons, some areas are open only to limited waterfowl hunting, and other areas are closed to

all waterfowl hunting. Waterfowl hunting within the impoundments that lie east of the Back River and north of SC170 in South Carolina, under the proposed alternative, would be restricted to a total of 3 half-day youth only hunts with a quota of no more than 12 youth selected per hunt. Harvest numbers from each of these 3 youth waterfowl hunts would be expected at approximately 24 ducks of mixed species, primarily the most common species (green-winged teal, blue-winged teal, northern shoveler), for a total 72 ducks. Based on the USFWS Harvest Report (Raftovich et al., 2015), this estimated harvest represents less than 0.036% of the total annual South Carolina waterfowl harvest for 2014 (200,600) and less than 0.36% of the average annual overwintering duck population (20,000) on Savannah NWR.

4.3.1.3.2 Mourning Dove

The mourning dove is one of the most widely distributed and abundant bird species in North America. A popular game bird, this species is monitored at the national and regional level by the Service and state agencies. The primary management objective of the Service is to maintain dove populations in a healthy, productive state. Population monitoring currently consists of several surveys including Breeding Bird Survey (BBS), Banding Program, Harvest Survey and Parts Collection Survey. Every year, the U.S. Fish and Wildlife Service publishes an annual population status report which includes the most current information collected annually in the United States on survival, recruitment, abundance and harvest of mourning doves. According to the most recent BBS data, the estimated continental population of mourning doves during pre-season 2014 was at about 274,000,000 birds.

Through proposed Alternative C, limited mourning dove hunting would be allowed in the managed impoundments that lie east of the Back River and north of SC170 in South Carolina that are normally closed to hunting. This would be limited to no more than 2 days per week during the established season for South Carolina and only in areas that are not currently flooded for waterfowl habitat, as described at designated hunt entrance points. Based on Breeding Bird Surveys over the past 49 years, mourning dove numbers continue to increase within the Eastern Management Unit (EMU), which includes South Carolina (Seamans, 2015). Based on the USFWS Harvest Report (Raftovich et al., 2015), mourning dove harvest estimates for South Carolina for 2013 and 2014 were 372,200 and 681,500, respectively. Annual harvest variations for South Carolina demonstrate how weather may be a determining factor in hunter success throughout the state when hunting mourning dove. With the limited number of hunting days and area, hunter harvest would be expected to total no more than 200 dove per season or less than 0.03% of the total South Carolina harvest for 2014.

4.3.1.3.3 Wilson's Snipe

Wilson's snipe frequently occur in large concentrations associated with Refuge moist-soil impoundments. Proposed limited snipe hunting would be allowed during the South Carolina season in managed impoundments that lie east of the Back River and north of SC170 that are normally closed to hunting. This would be limited to no more than 2 days per week and only in areas that are not currently flooded for waterfowl habitat. Based on the USFWS Harvest Report (Raftovich et al., 2015), snipe harvest estimates for South Carolina for 2013 and 2014 were 3,500 and 2,000 respectively. Total harvest of snipe for the Atlantic Flyway was 33,000 in 2013 and 55,200 in 2014. Annual harvest variations for South Carolina demonstrate how weather may be a determining factor in hunter success throughout the state. With the limited number of hunting

days and area, hunter harvest is expected to be no more than 200 snipe per season or less than 0.37% of the total South Carolina harvest for 2014.

4.3.1.4 Coyote

Under the proposed action alternative, coyotes would be legal for harvest during all Refuge hunts in those areas open to hunt and using any designated legal firearm or bow for that particular hunt. Although no research projects have been conducted concerning coyote densities and impacts on wildlife populations at Savannah NWR, anecdotal evidence suggest that they first appeared on the Refuge in 1999. The number of coyotes observed by field staff while conducting management activities continues to increase each year (D. Williams, personal communication, 2016). The coyote is considered a non-native, nuisance species by both Georgia DNR and South Carolina DNR.

4.3.1.5 Feral Hogs

Feral hogs are an extremely invasive non-native species and are not considered a game animal by either Georgia or South Carolina DNR. They also harbor several infectious diseases, some of which can be fatal to native wildlife and humans. By rooting and wallowing, feral hogs destroy wildlife habitat. Impacts include severe damage to impoundment dikes, increased erosion along waterways and wetlands, loss of native plants, and soil disturbance that favors the introduction of invasive plants, such as Chinese tallow and Japanese climbing fern. Additionally, feral hogs compete directly for food with native species such as deer, turkeys, squirrels, raccoons, and many other birds and mammals. They are predators of reptiles, small mammals, and ground nesting birds.

Feral hogs are an increasing problem both on Refuge lands and adjoining privately owned lands. They occur throughout Savannah NWR and their numbers appear to be stable but fluctuate greatly depending on water levels of the Savannah River. During prolonged events of flooding in the wetlands along the river, feral hog numbers generally decline but soon recover as flood waters recede and rapid reproduction is achieved. Hunting of feral hogs during all open Refuge hunts would provide the Refuge with a more consistent, proven management tool in reducing this detrimental species, and at the same time, would be widely enjoyed by local hunters.

4.3.1.6 Non-hunted Wildlife

Implementing the proposed action alternative would result in minimal direct disturbance to non-hunted species. Hunting areas where shorebird, wading bird, and wintering waterfowl numbers are generally the greatest. Limiting hunting in these areas to short duration hunts during times when non-hunted species are minimal in numbers would also ensure negligible disturbance. There would be fewer impacts on non-hunted wildlife by controlling the density of deer, coyote, and feral hog populations through the implementation of this alternative.

4.3.1.7 Federally Threatened or Endangered Species

Impacts to imperiled species would be similar under each of the three alternatives. It is the policy of the Service to protect and preserve all native species of fish, amphibians, reptiles, birds, mammals, invertebrates, and plants, including their habitats, which are designated threatened or

endangered. Several endangered, threatened, and species of concern inhabit refuge lands and adjacent open waters including Atlantic sturgeon, shortnose sturgeon, robust redhorse, West Indian manatee, Rafinesque's big-eared bat, and wood stork.

With hunting being limited in most areas and more restrictive than state seasons, the proposed Alternative C would not likely affect any threatened, endangered, or species of concern. Optimally matching hunting seasons with times that hunting would incur the least amount of disturbance and the legal authority available to the Refuge Manager to close areas to public access, when necessary, ensures that the proposed alternative would not be any more likely to adversely affect threatened and endangered species than any other alternative.

Intra-Service Section 7 Evaluation Consultations were completed for the 2007 Hunt Plan, 2011 CCP, and are in process for the 2016 Hunt Plan. Findings of "no effect" were determined for all species related to waterfowl hunting in 2007 and 2011. Findings of "not likely to adversely affect" were determined for all species related to all other hunting in 2007 and 2011.

4.3.2 Anticipated Direct and Indirect Impacts of Proposed Action on Refuge Programs, Facilities, and Cultural Resources.

4.3.2.1 Wildlife-Dependent Recreation

Under the proposed action alternative, acreage of open hunting areas would be increased, additional hunting opportunities would be made available, and species would be added to the list that could be legally hunted. Other forms of compatible wildlife-dependent recreation, such as wildlife observation and photography, would not be impacted by the limited additional hunting opportunities. When future Refuge parcels are acquired, these areas would be opened to all compatible public-use activities.

As public use levels likely increase through time, unanticipated conflicts between user groups may occur. These conflicts can be mitigated or resolved by providing competing interests groups with alternative access opportunities. For example, the area that is traversed by the Laurel Hill Wildlife Drive (by far the most visited portion of the Refuge) would be impacted by hunting only during the two day mobility-impaired deer hunt. Because of the short duration and time of year of the additional hunting opportunities in the most visited areas of the Refuge, the impacts to other user groups is expected to be minimal and temporary.

If Alternative C is implemented, opening Refuge parcels acquired since approval of the 2007 Hunt Plan to hunting would create additional hunting opportunities, as recommended by the 2011 CCP. Additional limited hunting opportunities would also be available, particularly to youth and mobility-impaired hunters. This alternative would also provide hunting opportunities for four additional species (rabbit, mourning dove, Wilson's snipe, coyote) that are not available at the current time. Under this alternative, a careful balance of hunting seasons has been fully examined to ensure that hunting and other wildlife-dependent recreation do not conflict. This alternative would also allow the public to enjoy additional high quality hunting opportunities with little added cost to the Refuge, a primary factor for consideration in an era of reduced Refuge staffing and operating budgets.

4.3.2.2 Refuge Facilities

The Service defines facilities as, “Real property that serves a particular function such as buildings, roads, utilities, water control structures, raceways, etc.” Under the proposed action those facilities most utilized by hunters would be parking areas, roads and trails. Because hunters are permitted to access the Refuge by foot only, no additional maintenance or improvements of existing facilities would be required.

4.3.2.3 Cultural Resources

The proposed changes to the Refuge hunt program do not pose any threat to cultural resources. Hunting could provide some protection of cultural resources from disturbance and destruction by rooting and wallowing activities of feral hogs. Hunting meets only one of the two criteria used to identify an “undertaking” that triggers a federal agency’s need to comply with Section 106 of the National Historic Preservation Act. These criteria, which are delineated in 36 CFR Part 800, state:

1. An undertaking is any project, activity, or program that can alter the character or use of an archaeological or historic site located within the “area of potential effect” and
2. The project, activity, or program must also be either funded, sponsored, performed, licensed, or have received assistance from the agency.

Although consultation with the pertinent State Historic Preservation Office and federally recognized tribes is not required, the Regional Historic Preservation Officer & Archaeologist reviewed this plan and surmised that implementing any of the proposed alternatives would result in no additional impacts to cultural resources.

4.3.3 Anticipated Impacts of Proposed Action on Refuge Environment and Community.

There are no expected noticeable adverse impacts of the proposed action alternative on the Refuge environment, consisting of soils, vegetation, air quality, water quality, and solitude. In some instances, hunting would benefit vegetation as it is used to maintain deer and feral hog populations at reasonable densities. The Refuge would also control access to minimize habitat degradation.

Impacts associated with solitude are expected to be minimal given temporal and spatial management techniques, such as infrequent day closures, used to avoid conflicts among user groups.

No direct or indirect impacts are anticipated on neighboring public or private lands. Approval of Alternative C would result in a net gain of public hunting opportunities positively impacting the general public, nearby residents, and Refuge visitors. The Refuge expects increased visitation and tourism to bring additional revenues to local communities. Through these direct and indirect economic impacts, community support would likely increase for Refuge land acquisition, habitat management, and public use funding.

Traditional uses, such as hunting, have been a way of life for many of the rural communities near the Refuge. In recent years, land use changes around the Refuge have eliminated many areas that were traditionally leased by hunters. Commercial timber lands have been sold to commercial and residential developers. Providing additional hunting opportunities by opening new parcels,

providing special youth and mobility-impaired hunts, and adding new species to the hunt would continue these traditional uses and would have a positive economic impact on local communities.

4.3.4 Other Past, Present, Proposed, and Reasonably Foreseeable Hunts and Anticipated Impacts

Cumulative effects on the environment result from incremental effects of a proposed action when these are added to other past, present, and reasonably foreseeable future actions. While cumulative effects may result from individual minor actions, they could become substantial over time. The preferred, proposed action has been fully evaluated and is designed to be sustainable into perpetuity.

4.3.5 Anticipated Impacts if Individual Hunts are allowed to Accumulate

Refuge staff must conduct the hunt program within the framework of state and federal regulations. Hunting rules and regulations for Savannah NWR are generally more restrictive than those for State Wildlife Management Areas, in both Georgia and South Carolina. By maintaining hunting regulations that are often times more restrictive than State standards, the Refuge can promote a better diversity of management options across the landscape, including those that may favor wildlife observation, outreach, and education. The proposed 2016 Hunt Plan will be reviewed by both Georgia and South Carolina Departments of Natural Resources.

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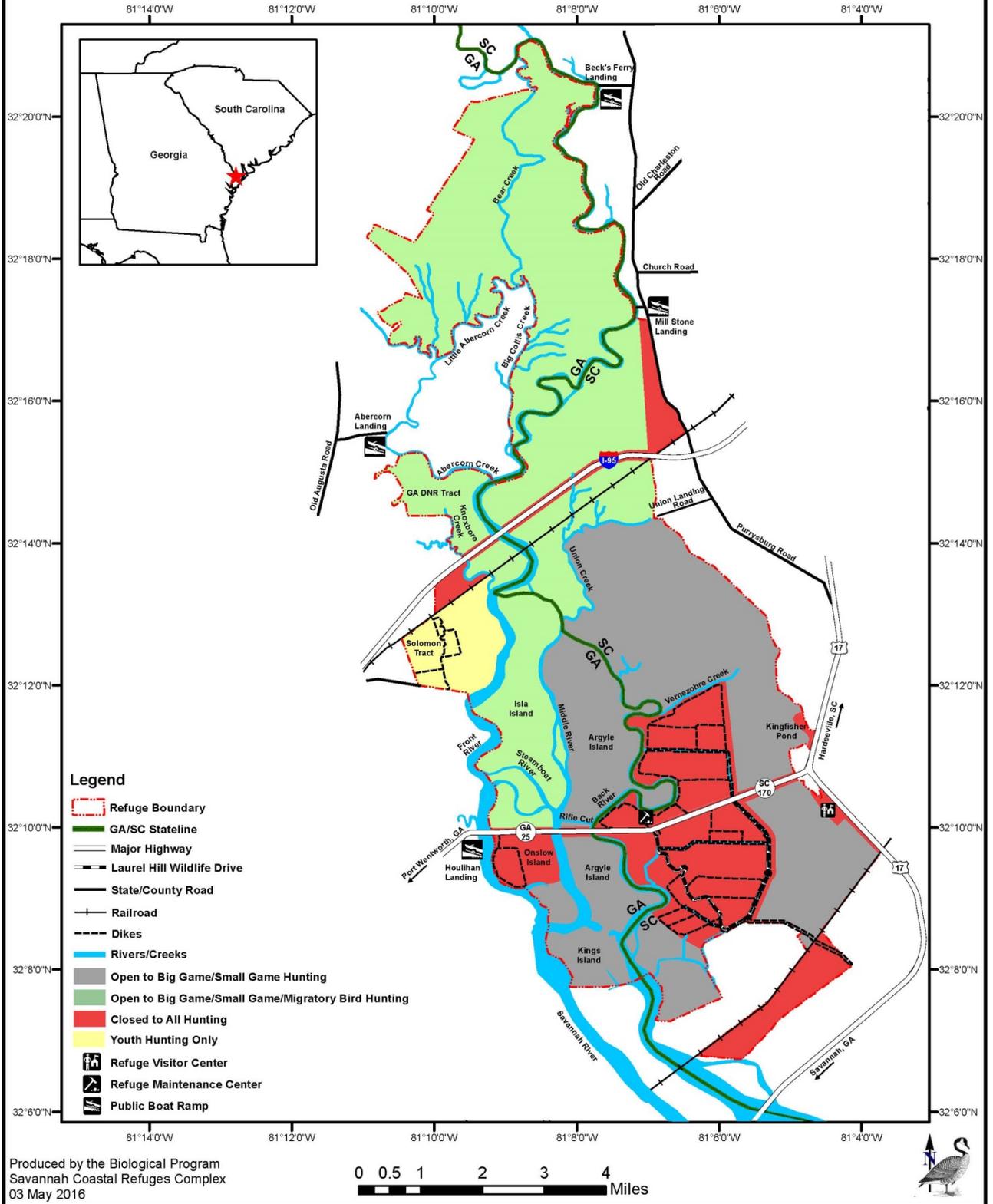
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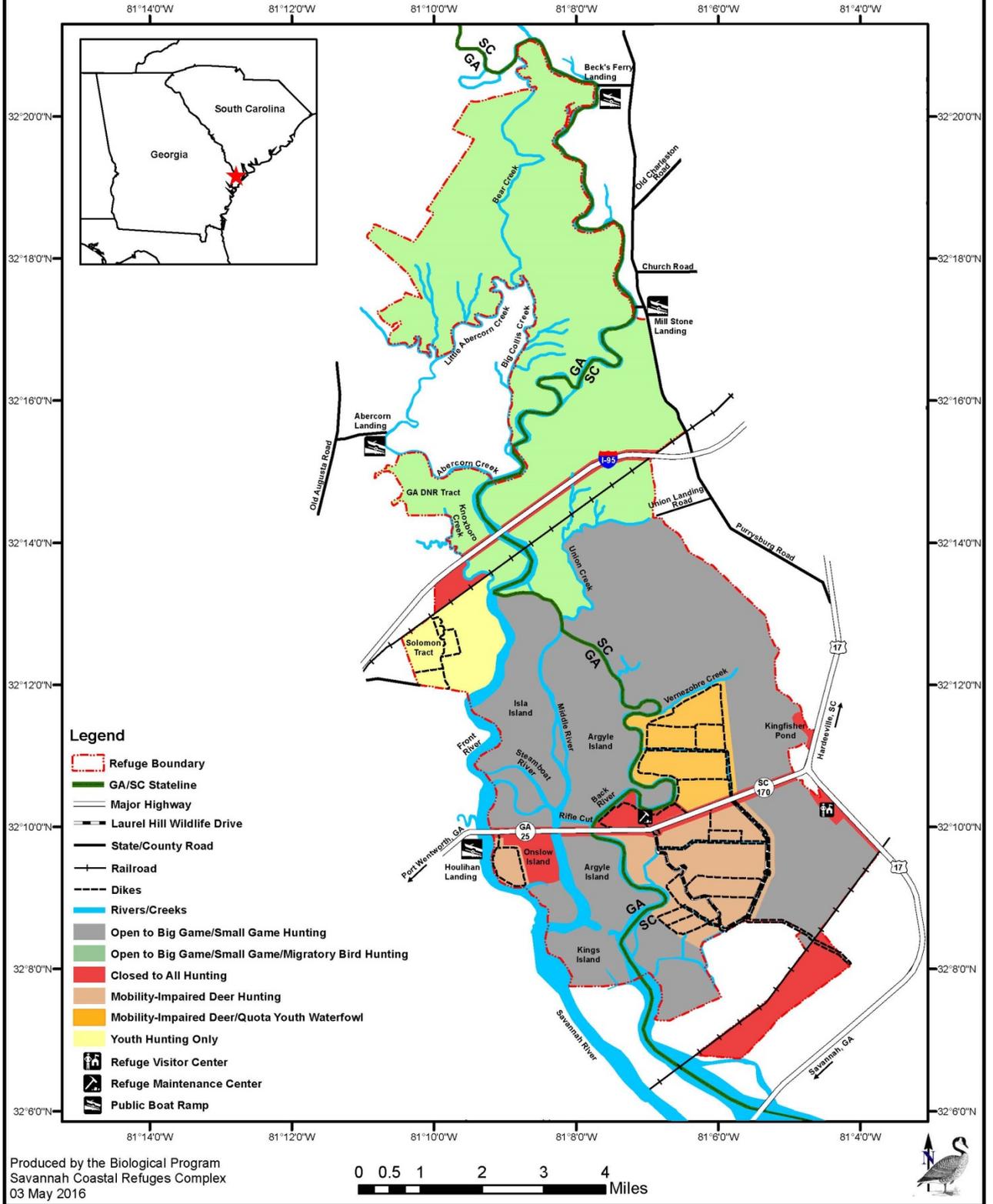
Alternative A, No Action, Current Management





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Savannah National Wildlife Refuge
 Chatham and Effingham Counties, Georgia and Jasper County, South Carolina

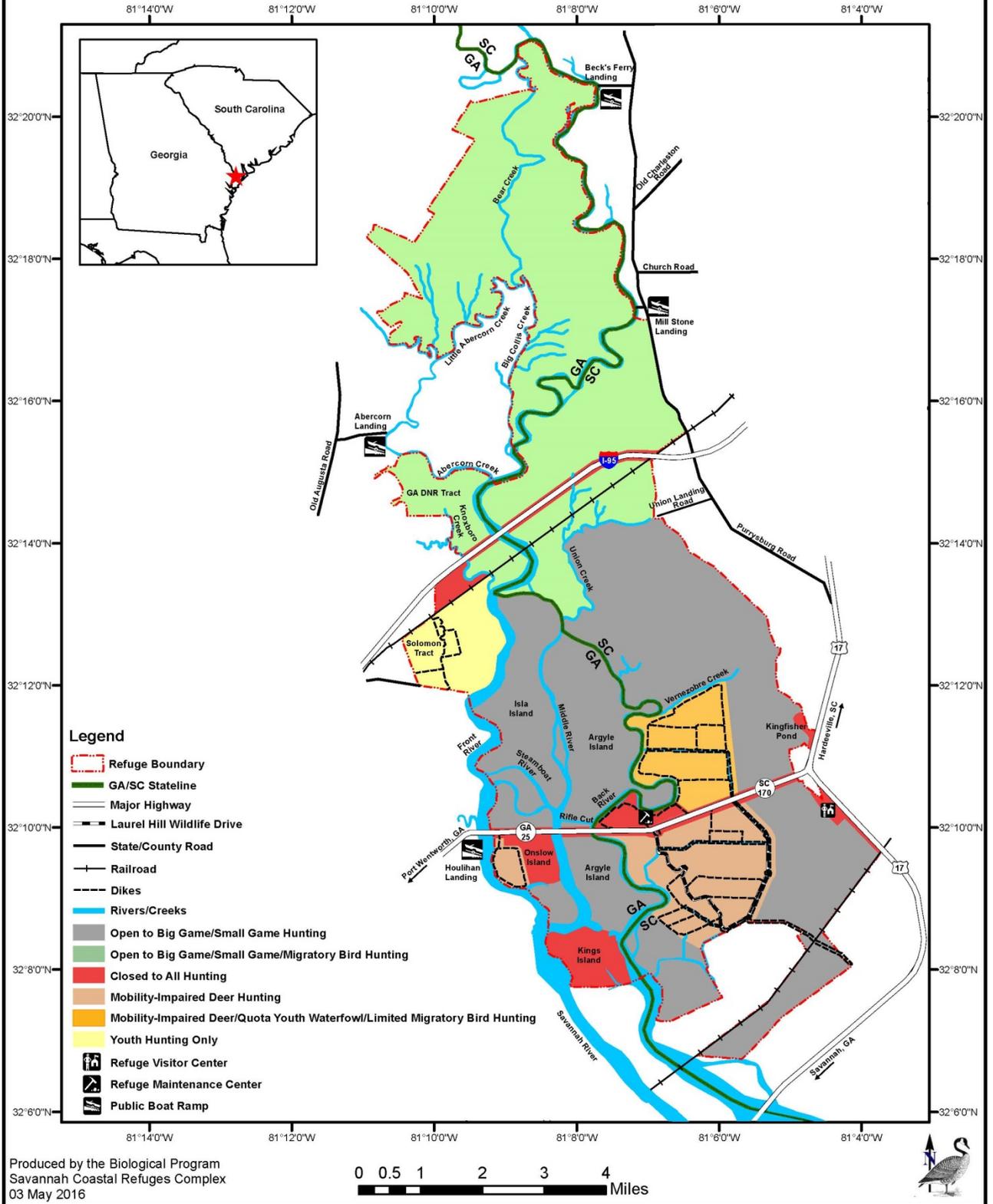
Alternative B, Minimal Action





U.S. Fish & Wildlife Service
Savannah National Wildlife Refuge
 Chatham and Effingham Counties, Georgia and Jasper County, South Carolina

Alternative C, Proposed Action



Produced by the Biological Program
 Savannah Coastal Refuges Complex
 03 May 2016

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Personal Communications

D. Williams, U.S Fish and Wildlife Service, personal communication, 2016

Appendix B: Response to Public Comments