# NATIONAL PARK SERVICE

## Final Management Plan for Non-native Wild Pigs within Congaree National Park

## (CONG)

## with Environmental Assessment

December 2014

Updated and revised from August 2003, Scott Zengle through NPS Agreement No: F 5240 00 0265, USGS No: 1434-HQ-00-RM-0062

**U.S. Department of the Interior**
**National Park Service**

# Final Management Plan for Non-Native Wild Pigs with Environmental Assessment

**Congaree National Park**
**Richland County, South Carolina**

**December 2014**

## Summary

The National Park Service (NPS) has developed a final management plan for managing non-native wild pigs at Congaree National Park (CONG). The purpose of the plan is to reduce natural and cultural resource impacts associated with wild pigs and to reduce risks to human health and safety.

The environmental assessment (EA) associated with the *draft* management plan analyzed potential impacts to the human environment resulting from two alternative courses of action. The alternatives considered were: Alternative A (no action / continue current management) and Alternative B (implement an integrated non-native wild pig management plan)

Under Alternative A, the NPS would continue to implement an interagency agreement with the United States Department of Agriculture (USDA) Wildlife Services program to conduct limited wild pig management activities. These would include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Monitoring of wild pig disturbance could also continue. Under Alternative B, NPS would implement a comprehensive and sustained non-native wild pig management plan. This plan would be implemented with the goal of reducing natural and cultural resource impacts associated with wild pigs and reducing risks to human health and safety. Management activities would center on a sustained trapping and shooting program. The exclusion of wild pigs from small selected areas using fencing or curtain barriers could also be implemented in extreme cases to protect highly sensitive resources such as special status species or National Register listed or eligible sites at imminent risk of damage. All wild pig management activities would be coordinated through a single designated wild pig program officer from the park's Resource Management program. Coordination with adjacent landowners and users would be conducted to: inform them of wild pig management goals and activities at CONG; to exchange information on wild pig abundance, movement patterns, levels of disturbance, and wild pig management; to encourage the removal of wild pigs from adjacent lands; and to discourage activities that could result in pig introductions to the park (escaped livestock, etc.).

Alternative B is the environmentally preferred alternative. Alternative B is also the NPS selected alternative for this final plan. The impacts from Alternative B range from "negligible" to "moderate." Alternative B will not impair park resources or values. The text of this final plan has been revised slightly in response to public comment received during the EA process.

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**List of abbreviations used in CONG Wild Pig Management Plan and EA**

**APHIS** Animal and Plant Health Inspection Service
**CEQ** Council on Environmental Quality
**CFR** Code of Federal Regulations
**CONG** Congaree National Park
**DEA** Drug Enforcement Administration
**EA** Environmental Assessment
**EIS** Environmental Impact Statement
**EJ** Environmental Justice
**EPMT** Exotic Plant Management Team
**FR** Federal Register
**FONSI** Finding of No Significant Impact
**FSIS** Food Safety and Inspection Services
**GMP** general management plan
**GPS** global positioning system
**NEPA** National Environmental Policy Act
**NOI** Notice of Intent
**NPS** National Park Service
**PEPC** Planning, Environment, and Public Comment
**RCW** Red-Cockaded Woodpecker
**SCDNR** South Carolina Department of Natural Resources
**SEAC** Southeast Archeological Center
**SECN** Southeast Coast Network
**TNC** The Nature Conservancy
**UNESCO** United Nations Educational, Scientific, and Cultural Organizations
**USC** United States Code
**USDA** U.S. Department of Agriculture
**USFWS** U.S. Fish and Wildlife Service
**USGS** U.S. Geological Survey
**WS** Wildlife Services

## 1.0: INTRODUCTION

Wild pigs (*Sus scrofa*), also known as feral swine, wild boar, and feral hogs, include a mix of feral domestic stock, Eurasian wild boar, and hybrids between the two (Wood and Lynn 1977, Rary et al. 1968, Jones 1959). Non-native wild pigs have been present in the Congaree and Wateree River floodplains for at least 200 years if not substantially longer. The De Soto Expedition traveled through the floodplains of the Congaree and Wateree Rivers with a driven herd of pigs in 1540 (Mayer and Brisbin 1991, Clayton et al. 1993, Hudson 1997). When South Carolina's first permanent European colonists settled in the state, Native Americans were already hunting feral pigs in the area (Towne and Wentworth 1950). By the late 19$^{th}$/early 20$^{th}$ centuries, wild pigs were prevalent in the Congaree River floodplain (Adams and O'Meally 1987). Introductions of the Eurasian wild boar and hybrids between wild boar and domestic stock came later. Such introductions are documented from the southeastern states of Tennessee and North Carolina as early as 1912 and have occurred into an established wild pig population in the floodplain of the Congaree River over the years for hunting (Mayer and Brisbin 1991).

(CONG) has long been concerned about the effect of wild pigs on park resources (NPS 1988, NPS 2004) and has funded work to gather information on the park's wild pig population, movements, diseases, and impacts on park lands (Nix and Barry 1992, Gaddy et al. 2000, Friebel 2007, Zengel 2008). In particular, studies conducted through the U.S. Geological Survey's South Carolina Cooperative Fish and Wildlife Research Unit at Clemson University have yielded information on wild pig impacts and improved understanding about the local non-native wild pig population (Friebel 2007, Zengle 2008). Wild pig home ranges are compact and relatively homogeneous within the park when compared to other national and international wild pig studies, suggesting that there is an abundant resource base available to sustain this non-native species within the park (Friebel 2007, Friebel and Jodice 2009). Based upon the findings of this work, it is likely that damage associated with wild pigs is relatively widespread throughout the park with high levels of disturbance within the home ranges of individuals (Friebel 2007). Zengle (2008) investigated substrate disturbance by wild pigs within four community types that included three mature wetland floodplain forest types (cypress-tupelo, mixed bottomland hardwood, seepage forest) and successional upland pine flatwoods adjacent to the floodplain. Pig disturbance was common and abundant in floodplain plots during this study and was found to be severe and chronic in some locations (Zengle 2008). Zengle (2008) found that disturbance by pigs was highest in cypress-tupelo plots, followed by mixed bottomland hardwoods and seepage forest with significantly less disturbance documented in upland pine flatwoods plots. Pig disturbance remained visible on the landscape over the longest period of time in plots located within the seepage forest wetland type, which is habitat for the globally imperiled and state-listed plant Carolina birds-in-a-nest (*Macbridea caroliniana*). During the course of Zengle's (2008) study, drought, low water levels, and the lack of flooding likely intensified wild pig disturbance on the floodplain and in wetter habitats. Once widespread flooding returned to the park, differences in total pig disturbance among habitat types (floodplain wetlands vs. adjacent uplands) were no longer statistically different (Zengle 2008). A seasonal effect was also observed, particularly an increasing trend in total disturbance leading up to the fall months.

## 2.0: PURPOSE AND NEED

### 2.1: Purpose of the Action

The purpose of implementing a management plan for non-native wild pigs at CONG is to reduce natural and cultural resource impacts associated with wild pigs and to reduce risks to human health and safety. A reduction in the number and severity of wild pig related impacts on adjacent lands is also a major goal of this management plan. Engaging the local community in an effort to reduce the number of existing wild pigs and prevent the future release of pigs in the area will be accomplished.

### 2.2: Need for the Action

CONG was originally established as Congaree Swamp National Monument as outlined in Public Law 94-545 (October 18, 1976) for the purpose of preserving a unique old-growth bottomland hardwood forest ecosystem. It was designated the Congaree National Park by Public Law 108-108 Section 135 (November 10, 2003). Because CONG is unique and representative of a primarily intact ecosystem, it has garnered many designations that honor the park's outstanding qualities. CONG is part of the United Nations Educational, Scientific and Cultural Organization's (UNESCO) South Atlantic Coastal Plain Biosphere Reserve (1983). It is designated as a Birdlife International/Audubon Society State level Important Bird Area (1998), an American Bird Conservancy Globally Important Bird Area (2001), a congressionally designated Wilderness area (Public Law 100-524, October 24, 1988), and a Ramsar Convention Wetland of International Importance (2012). In addition to these designations, the portion of Cedar Creek that flows from Weston Lake to the Congaree River comprises South Carolina's only Outstanding Resource Waters (2006).

Non-native wild pigs significantly impact the park's ecosystem and outstanding natural and cultural resources due to disturbance behaviors such as rooting, wallowing, and contribute to the development of established wildlife trails; competition with and predation on native species (Lucas 1977, Beach 1993, Jolley 2007, Campbell and Long 2009, Mayer 2009); spread of non-native invasive plants (Mungall 2001, Campbell and Long 2009); potentially aggressive behavior toward humans (Mayer 2013); potential impairment of water quality (Atwill et al. 1997, Jay et al. 2007, Kaller et al. 2007 ); and disease (USDA 2012). At risk are bottomland hardwood ecosystem function, regeneration of bottomland hardwood canopy tree species, rare and imperiled species and ecological communities (including globally imperiled seepage forest communities and state-listed plants), streams and stream banks, a variety of wetland and aquatic habitats, and numerous other natural resources. Non-native wild pigs are also a threat to upland longleaf pine (*Pinus taeda*) habitats at the park, an imperiled ecological community and potential habitat for the federally-endangered red-cockaded woodpecker (*Picoides borealis*) and numerous rare and endangered plants. The planned restoration of longleaf pine ecosystem at the park would also be at risk of wild pig damage. Cattle mounds and dikes, historic earthen structures associated with agriculture and listed on the National Register of Historic Places, are also at risk from wild pig disturbance. While the presence of wild pigs in this area is well documented for the last 200 years only in the last few decades has this area been managed for wild pigs. Prior to the establishment of CONG, the hardwood ecosystem and cultural resources within the park were subject to repeated and prolonged wild pig damage.

Non-native wild pigs cause physical and visual degradation of recreational resources such as hiking and canoeing trails and degrade the wilderness character of the park. Wild pigs can be a safety risk for park visitors due to potentially aggressive behavior (Mayer 2013). They can also pose a health risk from diseases such as swine brucellosis, pseudorabies, and hog cholera, which can be contracted by livestock and, in the case of brucellosis, by humans as undulant fever if exposed to infected tissue. A variety of other diseases and pathogens can infect wild pigs (Mayer 2009); however, swine brucellosis and pseudorabies are of particular concern within wild pig populations in the United States as a threat to domestic livestock (Nettles 1989, Payeur 1989, Davis 1993). Swine brucellosis and pseudorabies have been documented in wild pig populations at CONG and surrounding areas. In fact, rates of both swine brucellosis and pseudorabies were found to be approximately 18% and 15% higher at CONG than the state-wide average (USDA unpublished data). Given the numerous threats that non-native wild pigs pose to natural resources, cultural resources, and public health and safety at CONG and in surrounding areas, implementation of a management plan for wild pigs within the park is needed.

In addition to damage caused by wild pigs on National Park Service property, the effect of wild pigs on adjacent landowners must be considered. Friebel (2007) found that wild pigs move freely between the park and adjacent private land and likely vice-versa. Approximately 440 wild pigs were shot between May and September of 2012 on private property adjacent to CONG (N. Joy personal communication 2012). Responsible management must include consideration of effects on adjacent private lands. Coordination and cooperation with adjacent land owners is imperative to the park's successful control this species.

Although wild pigs have been present in this ecosystem for a long time, there is ample evidence that the population has risen dramatically within the state of South Carolina (South Carolina Wild Hog Task Force 2011) and that damage by wild pigs is negatively affecting native plant and animal communities at CONG (Allen 2007, Weeks 2009, Southern Appalachian/Piedmont Fire Effects Monitoring Team 2012). National Park Service Management Policy 4.4.4 (2006) states that "Exotic species will not be allowed to displace native species if displacement can be prevented." Evidence of disturbance and displacement of native species includes findings of a negative impact on Carolina birds-in-a-nest populations at CONG due to rooting activity of wild pigs (Weeks 2009). The largest known population of the state-listed species Carolina birds-in-a-nest is encompassed within the boundaries of CONG (Weeks 2009, South Carolina Department of Natural Resources 2012). Rooting by wild pigs is also highly destructive to the seedling layer within CONG's floodplain forest (Gaddy et al. 2000, Allen 2007, Mr. Gavin Blosser, Auburn, personal communication 2012) negatively altering tree regeneration patterns. Not only is the floodplain forest in jeopardy but the upland longleaf pine forest community is also threatened by disturbance caused by wild pigs. Wild pigs feed on seeds and seedlings of longleaf pine and pose a serious obstacle in their regeneration (Wahlenberg 1946) particularly as this ecosystem is substantially reduced in area to date. An interdepartmental MOU among USDA, Interior and Defense identified the longleaf pine (Pinus taeda) ecosystem as a priority resource concern.

## 2.3: Laws, Regulations, and Policies and the Planning Process

Management to reduce impacts of non-native species is consistent with the National Park Service (NPS) policy to protect natural ecosystems. The impacts of non-native wild pigs, the need for a control program, and management objectives to reduce the non-native wild pig population are

described in the CONG's General Management Plan (NPS 1988) and Resource Management Plan (NPS 2004) and in numerous references in the park's resource management files.

Authority for carrying out a pig management program at CONG originates with the Organic Act of the National Park System, August 25, 1916. The Organic Act mandates that the National Park Service:

> "... promote and regulate the use of the Federal areas known as national parks, monuments, and reservations ... by such means and measures as to conform to the fundamental purpose of said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. (6 U.S.C. 1)."

The NPS document, Management Policies 2006 (NPS 2006), provides the following direction in regards to non-native wild pig management:

- The NPS "will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems.";
- "Exotic species are those species that occupy or could occupy park lands directly or indirectly as the result of deliberate or accidental human activities.", (wild pigs at CONG are non-native hybrids of feral animals released or escaped from livestock and feral pig/Eurasian wild boar hybrids introduced for hunting, Mayer and Brisbin 1991);
- "Non-native species will not be allowed to displace native species if this displacement can be prevented by management";
- "All exotic plant and animal species that are not maintained to meet an identified park purpose will be managed—up to and including eradication—if (1) control is prudent and feasible, and (2) the exotic species
    - interferes with natural processes and the perpetuation of natural features, native species or natural habitats, or
    - disrupts the genetic integrity of native species, or
    - disrupts the accurate presentation of a cultural landscape, or
    - damages cultural resources, or
    - significantly hampers the management of park or adjacent lands, or
    - poses a public health hazard as advised by the U.S. Public Health Service (which includes the Centers for Disease Control and the NPS public health program), or
    - creates a hazard to public safety.
- "High priority will be given to managing exotic species that have, or potentially could have, a substantial impact on park resources, and that can reasonably be expected to be successfully controlled...Where an exotic species cannot be successfully eliminated, managers will seek to contain the exotic species to prevent further spread or resource damage."
- When a park selects to manage exotic species, "...superintendents should (1) evaluate the species' current or potential impact on park resources; (2) develop and implement exotic species management plans according to established planning procedures; (3) consult, as appropriate, with federal, tribal, local, and state agencies as well as other interested

groups; and (4) invite public review and comment, where appropriate. Programs to manage exotic species will be designed to avoid causing significant damage to native species, natural ecological communities, natural ecological processes, cultural resources, and human health and safety.

Various management plans developed for CONG address the need to manage wild pigs within the park. According to the General Management Plan (NPS 1988), wild pigs were "relatively common" in the CONG area, competing with other animals for food. The Statement for Management (NPS 1994) and Resource Management Plan (NPS 2004) stressed the need for a wild pig control or eradication program citing an increase in the wild pig population and concomitant resource damage after "all hunting was abolished on park property in 1982." Impacts of wild pig rooting have been observed to cultural resources such as historic cattle mounds on the List of Classified Structures (NPS 1994, 2004). According to the CONG Resource Management Plan (NPS 2004) "Hog impacts currently threaten bottomland hardwood ecosystem function, regeneration of tree species, rare and imperiled species and ecological communities, streams and stream banks, and numerous other natural components of the floodplain ecosystem." At that time, population controls were comprised primarily of natural causes particularly severe flooding which was determined an ineffective means of controlling the population.

Wilderness management is critical to the park decision making process. Wild pig eradication measures undertaken in the wilderness must also protect wilderness values. However, the current population of wild pigs damages those same values. Minimum management tools must be employed to remove this threat to the wilderness.

Prior to the implementation of activities described in the wild pig management plan, the proposed actions and their alternatives must be evaluated in an EA. This evaluation will be technically and legally defensible and in full compliance with the requirements of:

- The National Environmental Policy Act of 1969 (NEPA), as amended;
- The Council of Environmental Quality's (1978) "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act," published in 40 *Code of Federal Regulations* (*CFR*) 1500-1508;
- The Clean Water Act of 1972, including the provisions of Section 404 of the Act governing wetlands;
- Executive Order 11988, Floodplain Management (May 24, 1977);Executive Order 11990, Protection of Wetlands (May 24, 1977);
- Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision-Making (approved 10/5/2010);
- The Endangered Species Act of 1973 as amended (16 U.S.C. 1531 *et seq.*);
- Migratory Bird Treaty Act of 1918 (40 Stat 755);
- Animal Damage Control Act of 1931 (providing authority to remove injurious animals for the protection of birds and other wildlife);
- The Advisory Council on Historic Preservation's Section 106 Regulations, *"Protection of Historic Properties,"* (36 *CFR* 800);
- Section 110 of the National Historic Preservation Act" (FR 53:4727-460);

- Director's Order #28: *Cultural Resource Management Guidelines* (currently being updated);
- The Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation (FR 48:44716-40);
- The Wilderness Act (16 U.S.C 1131 *et seq.*) and associated Minimum Requirements Process;
- Congaree Swamp Expansion and Wilderness Act (Public Law 100-524);
- Director's Order # 41: *Wilderness Preservation and Management* (in development as of 1/13/2013);
- Executive Order 13112: Invasive Species (2/3/1999) and associated National Invasive Species Management Plan;
- Director's Order 28 and Handbook: Cultural Resources Management Guidelines.
- Director's Order 77-1 and Handbook: *Wetland Protection*
- National Park Service Procedural Manual #77-1: *Wetland Protection*

This EA was prepared in compliance with the National Environmental Policy Act of 1969 and its implementing regulations. The EA will be available to the public for a 30-day review. Upon completion of this review, the National Park Service will assess all public comments, and if necessary, modify the EA. A Finding of No Significant Impact (FONSI) would then be issued finalizing the decision, or, if the potential for significant impacts were identified, a Notice of Intent (NOI) would be publicized in the Federal Register for preparation of an Environmental Impact Statement (EIS).

This EA evaluates specific actions to manage non-native wild pigs in the park. It is also a programmatic EA in that it establishes a direction for overall pig management within the park. Additional compliance may be necessary for site-specific actions where the potential for sensitive resources exists or the action is in an area or is of a nature that creates a public concern. The public would be notified of any such proposals prior to implementation. Additionally, to meet current National Park Service wilderness management guidelines (NPS Management Policies 2006 and Director's Order's #41: Wilderness Preservation and Management), a preliminary minimum requirements analysis was conducted by CONG and reviewed and commented on internally during the technical review process (see Draft Minimum Requirements Decision Guide Workbook in Appendix A). This analysis found that in order to reduce the damage caused by wild pigs at CONG, some uses otherwise prohibited in wilderness would be necessary. However, such uses could only take place to the extent authorized by a final minimum requirements determination signed by the Superintendent. That determination will not be made unless and until a final plan is approved. Note that nonconforming uses could be phased out as pig damage is reduced.

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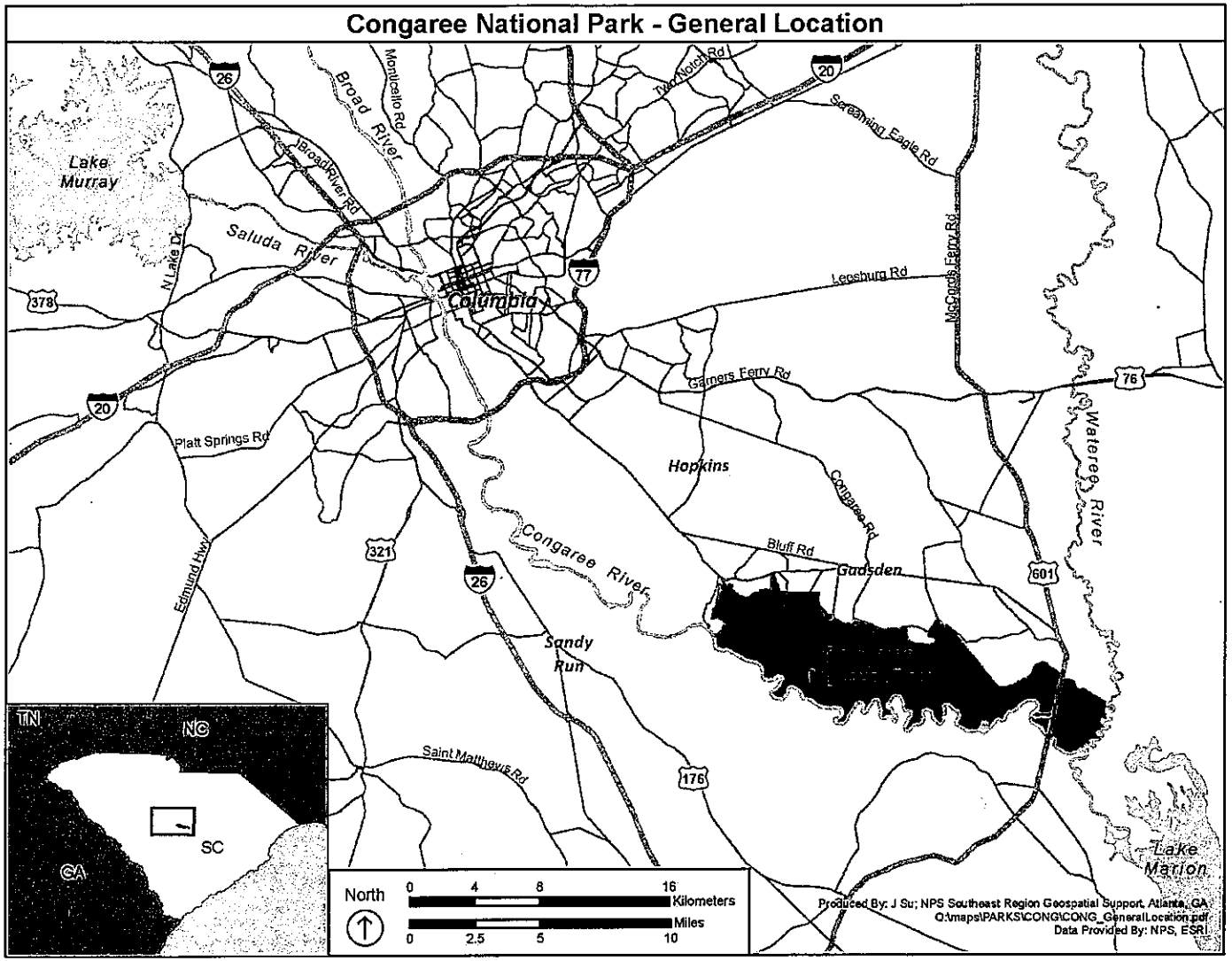


**Figure 1: CONG - General Location Map.**

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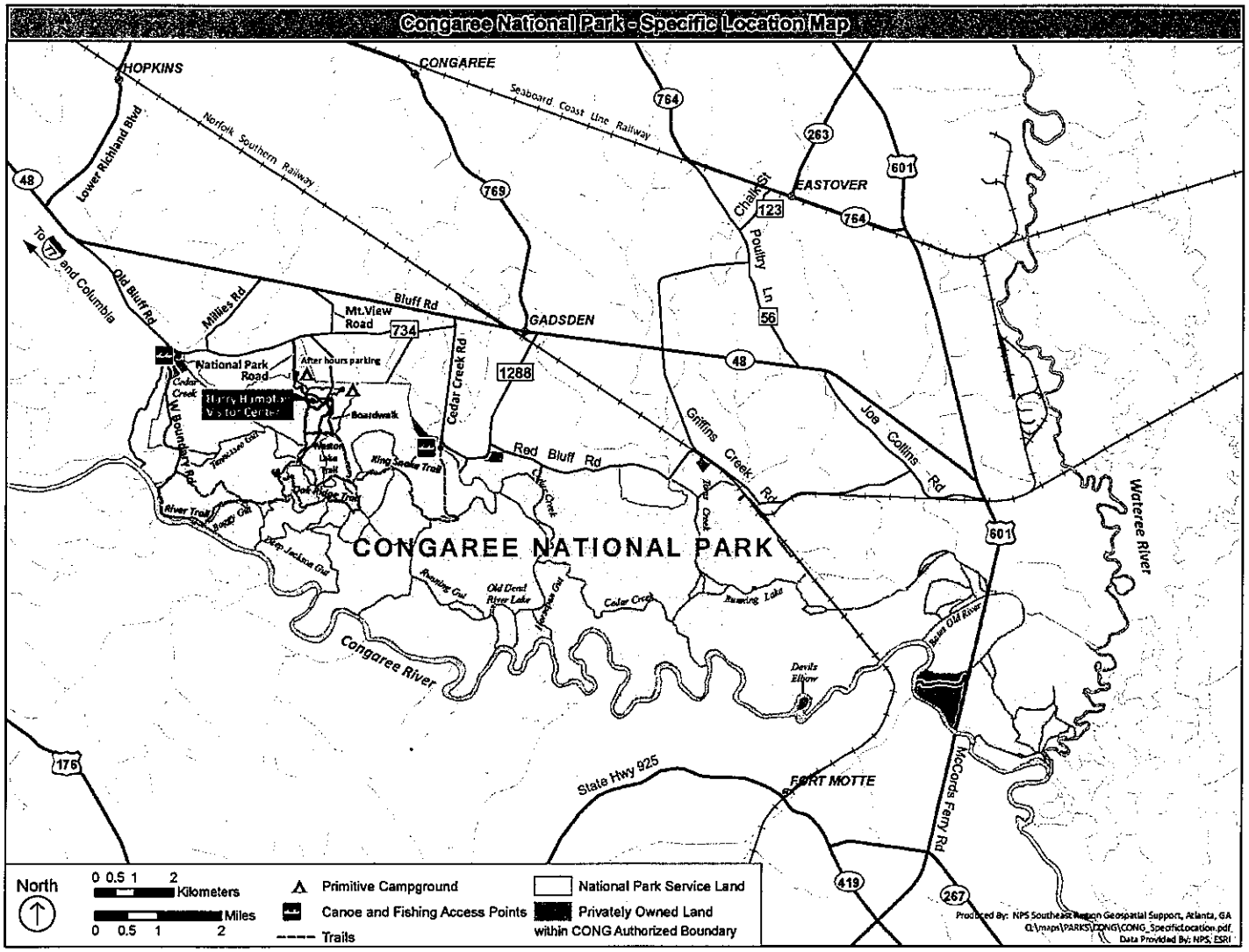


**Figure 2: CONG - Specific Location Map.**

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## 2.4 Objectives in Taking Action

NEPA requires that any decision made with respect to the proposed action be based on analysis of a reasonable range of alternatives that are likely to meet project objectives. Objectives, in turn, are "what must be achieved to a large degree for the action to be considered a success" (NPS Director's Order #12). All alternatives selected for detailed analysis must meet these objectives to a large degree, as well as fulfill the project purpose and need for action. Objectives for the proposed action must be grounded in the park's enabling legislation, as well as its purpose, significance, and mission goals. The objectives must also be compatible with direction and guidance provided by the park's GMP.

The objective in taking this action is to reduce the impacts to natural and cultural resources associated with wild pigs, reduce risks to human health and safety, and improve the visitor experience.

The following specific objectives related to management of wild pigs were developed with park staff during internal scoping:

**General**

- Manage the wild pig population at CONG to prevent further loss of resources.

**Natural Resources**

- Protect natural resources including soil, water, vegetation, and wildlife resources from impacts associated with continued unmanaged wild pig population growth.

**Cultural Resources**

- Protect cultural resources, including historic features and archeological sites currently threatened by non-native wild pig activity.

**Health and Safety**

- Reduce threat to visitor and employee health and safety by decreasing likelihood of visitor and wild pig interactions resulting in physical attacks or spread of disease.

**Wilderness Character**

- Reduce the presence of non-native wild pigs in CONG as a result of human work or activity (exploration and colonization, free-range livestock management, agriculture, introduction for sport hunting) that leaves a substantial mark on the wilderness landscape (abundant signs of rooting, wallows, pig trails).

## 3.0: ISSUES AND IMPACT TOPICS

Issues and concerns affecting this proposal were identified from past NPS planning efforts at this and other parks (including several parks that are planning or implementing wild pig management), environmental groups, and input from other state and federal agencies. Major issues include conformity of the proposal with the requirements of the Congaree Swamp Expansion and Wilderness Act; possible introduction of other non-native species (primarily dogs in this case, as hunting dogs are currently used for wild pig management in other locations); possible impacts on non-target native species; and other potential impacts of the proposed action on natural and cultural resources, visitor use and experience, and park operations.

Specific impact topics were developed to focus discussion of environmental consequences and to allow comparison of the impacts of each alternative. These impact topics were identified based on federal laws, regulations, and Executive Orders, as well as NPS Management Policies 2006 and NPS knowledge of limited or easily affected resources. A brief rationale for the selection of each impact topic is given below together with the rationale for dismissing specific topics from further consideration.

### 3.1: Impact Topics Analyzed in this Environmental Assessment

**Soils:** According to the National Park Service's Management Policies 2006, the National Park Service will actively seek to understand and preserve the soil resources of park units and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil or its contamination of other resources. Wild pig behavior, especially rooting, can result in disturbance to soil resources. Some proposed management activities could also disturb soils. Therefore, soils will be addressed as an impact topic in this EA.

**Vegetation:** The National Environmental Policy Act (42 U.S.C. 4321 *et seq.*) calls for an examination of the impacts a proposed action may have on all components of affected ecosystems. National Park Service policy is to try to maintain all of the components and processes of naturally evolving ecosystems, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems (National Park Service Management Policies 2006). Wild pig activity can impact vegetation communities and plant species populations through disturbance, herbivory, spread of non-native species, etc. In addition, some proposed management actions could also result in short-term disturbance of vegetation. Therefore, vegetation will be addressed as an impact topic in this EA (see also below Wildlife and Special Status Species, where special status plant species are treated).

**Wildlife and Special Status Species:** As noted above, NPS policy requires the protection and perpetuation of naturally occurring wildlife and ecosystems. In addition, the Endangered Species Act requires an examination of impacts on federally-listed threatened or endangered species. National Park Service policy requires assessment of impacts on all species federally proposed for listing and all federal candidate species. NPS policy also requires assessment of impacts on state-listed species, including those designated as threatened, endangered, candidate, proposed, rare, declining, sensitive, and special concern. Special status species currently occurring within CONG include two federally-listed animals and several state-listed animals (Table 1). Suitable

habitat for several federally-listed species exists within CONG. The red-cockaded woodpecker, a federally-endangered species, recently occupied a small portion of the park in a mature longleaf and loblolly pine area above the low northern bluffs. However, no critical habitat for federally-listed species, as defined by USFWS, occurs within the park.

The South Carolina Department of Natural Resources' (SCDNR) list of Rare, Threatened, and Endangered Species and Communities Known to Occur in South Carolina was consulted. Those species presents on the SCDNR list and known to exist within the park are listed in Table 2.

**Table 1: Federal and State-Listed Wildlife Species of Concern known to occur within CONG (Updated May 2013).**

| Scientific Name | Common Name | Federal Rank | State Rank |
|---|---|---|---|
| *Clemmys guttata* | Spotted Turtle | | ST |
| *Corynorhinus rafinesquii* | Rafinesque's big-eared bat | | SE |
| *Elanoides forficatus* | American Swallow-tailed Kite | SC | SE |
| *Haliaeetus leucocephalus* | Bald Eagle | | ST |
| *Mycteria Americana* | Wood Stork | LE | SE |
| *Picoides borealis* | Red-cockaded Woodpecker | LE | SE |

* Federal Status: LE = endangered, SC = species of concern

**State Status: SE = endangered, ST = threatened

(http://www.dnr.sc.gov/species/pdf/SC_state_wide.pdf, February 23, 2012; accessed May 18, 2013)

**Table 2: South Carolina Department of Natural Resources Rare, Threatened, and Endangered Species and Communities known to occur within CONG.**

| **PLANTS** | | |
|---|---|---|
| **Scientific Name** | **Common Name** | **NatureServe Rank** |
| *Carex amphibola* | eastern narrowleaf sedge | G5, SNR |
| *Carex cherokeensis* | Cherokee sedge | G4G5, S2 |
| *Carex crus-corvi* | crowsfoot sedge | G5, S2 |
| *Carex socialis* | low woodland sedge, social sedge | G4, S1 |
| *Cayaponia quinqueloba* | fivelobe cucumber, Cayoponia | G4, S1? |
| *Dichanthelium aciculare* | needleleaf rosette grass | G4G5, SNR |
| *Euonymus atropurpureus* | eastern wahoo | G5, S1 |
| *Ilex amelanchier* | sarvis holly, serviceberry holly | G4, S3 |
| *Lechea torreyi* | Piedmont pinweed | G4, SNR |

| | | |
|---|---|---|
| *Macbridea caroliniana* | Carolina birds-in-a-nest | G2G3, S3 |
| *Menispermum canadense* | Canadian moonseed, Canada moonseed | G5, S2S3 |
| *Ophioglossum vulgatum* | southern adder's-tongue | G5, S2 |
| *Urtica chamaedryoides* | slim stinging nettle, weak nettle | G4G5, S2 |
| **ANIMALS** | | |
| **Scientific Name** | **Common Name** | **NatureServe Rank** |
| *Accipiter cooperii* | Cooper's Hawk | G5, S3? |
| *Aimophila aestivalis* | Bachman's Sparrow | G3, S3 |
| *Condylura cristata* | Star-nosed mole | G5, S3? |
| *Crotalus horridus* | Timber Rattlesnake | G4, SNR |
| *Dendroica virens* | Black-throated Green Warbler | G5, S4 |
| *Egretta caerulea* | Little Blue Heron | G5, SNRB, SNRN |
| *Elliptio congaraea* | Carolina slabshell | G3, S3 |
| *Ictinia mississippiensis* | Mississippi Kite | G5, S4 |
| *Lampsilis cariosa* | yellow lampmussel | *G3G4, S2* |
| *Lampsilis splendida* | rayed pink fatmucket | *G3, S2* |
| *Lanius ludovicianus* | Loggerhead Shrike | G4, S3 |
| *Limnothlypis swainsonii* | Swainson's Warbler | G4, S4 |
| *Melanerpes erythrocephalus* | Red-headed Woodpecker | G5, SNR |
| *Myotis austroriparius* | southeastern myotis | G3G4, S1 |
| *Neotoma floridana* | eastern woodrat | G5, S3S4 |
| *Pyganodon cataracta* | eastern floater | G5, SNR |
| *Rana palustris* | Pickerel Frog | G5, SNR |
| *Sciurus niger* | eastern fox squirrel | G5, S4 |
| *Toxolasma pullus* | Savannah Lilliput | *G2, S1* |
| *Utterbackia imbecillis* | paper pondshell | G5, SNR |

* NatureServe Global Conservation Status: G3 = Vulnerable—At moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors; G4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors; G5 = Secure—Common; widespread and abundant; G#G# = Range Rank—A numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4

** NatureServe Subnational Conservation Status: S1 = Critically Imperiled—Critically imperiled in the jurisdiction because of extreme rarity or because of some factor(s) such as very steep declines making it especially vulnerable to

extirpation from the jurisdiction; S2 = Imperiled—Imperiled in the jurisdiction because of rarity due to very restricted range, very few populations, steep declines, or other factors making it very vulnerable to extirpation from jurisdiction; S3 = Vulnerable—Vulnerable in the jurisdiction due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation; S4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors; S#S# = Range Rank —A numeric range rank (e.g., S2S3 or S1S3) is used to indicate any range of uncertainty about the status of the species or ecosystem. Ranges cannot skip more than two ranks (e.g., SU is used rather than S1S4; SNR = subnational conservation status not yet assessed; B = Breeding; N = Non-breeding

(TNC ranking status from http://www.dnr.sc.gov/species/pdf/SC_state_wide.pdf, February 23, 2012; accessed May 19, 2013)

Wild pig activity can impact wildlife and special status species through disturbance, predation, herbivory, competition, and disease. In addition, some proposed management actions could also result in short-term impacts or disturbance to wildlife and special status species, including non-target native wildlife and state-listed plants. Therefore, the topic of wildlife and special status species will be addressed as an impact topic.

**Cultural Resources:** The National Historic Preservation Act, as amended in 1992 (16 U.S.C. 470 *et seq.*); the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*); the National Park Service's Director's Order #28, Cultural Resource Management Guideline (1997, in the process of updating as of 2014); NPS Management Policies 2006; and Director's Order #12, Conservation Planning, Environmental Impact Analysis, and Decision Making (2011) require the consideration of impacts on cultural resources (i.e., archeological resources, cultural landscapes, ethnographic resources, historic and prehistoric structures, and museum collections) listed or eligible for listing on the National Register of Historic Places.

The area in and around CONG has been inhabited by humans for thousands of years, and various archeological sites have been located within park boundaries. In addition, researchers in the park have identified a number of historic structures, nine of which have been listed in the National Register of Historic Places. These structures include levees and cattle mounds, as well as a set of late 18$^{th}$ century bridge abutments. Wild pig activity, especially rooting, can impact archeological and historic sites. Surface or shallow subsurface archeological sites and historic earthen-work structures (levees and cattle mounds) are particularly at risk. Proposed wild pig management actions could result in minor disturbance to these resources (although in most cases, management actions in the vicinity of known cultural sites would be implemented to protect the resource). Therefore, impacts to cultural resources will be addressed as an impact topic in this EA.

**Water Resources (Water Quality, Hydrology, Wetlands, and Floodplains):** National Park Service policies require protection of water quality consistent with the mandates of the Clean Water Act, including the provisions of Section 404 of the Act governing wetlands. Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, where possible, adversely impacting wetlands. Similarly, Executive Order 11988, Floodplain Management, requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternatives exist. Proposed actions that have the potential to have an adverse effect on wetlands and certain construction activities in the 100-year floodplain must be addressed in a Statement of Findings. Wild pigs can impact water quality, wetlands, and floodplain habitats, although floodplain impacts by pigs do not likely include those specified in Executive Order

11988. Proposed wild pig management actions could impact water resources as well. Therefore, water resources will be addressed as an impact topic in this EA.

**Wilderness Character:** Approximately 84% of the federally-owned land at CONG has been designated wilderness or potential wilderness by Congress (Figure 3). Under the Wilderness Act of 1964, the NPS is obligated to protect the "wilderness character" of wilderness areas. Wilderness character comprises five separate qualities, defined in brief as follows:

- **Natural:** Wilderness maintains ecological systems that are substantially free from the effects of modern civilization.
- **Undeveloped:** Wilderness retains its primeval character and influence, and is essentially without permanent improvements or modern human occupation.
- **Untrammeled:** Wilderness is essentially unhindered and free from modern human control or manipulation.
- **Solitude or Primitive and Unconfined Recreation:** Wilderness provides outstanding opportunities for solitude or a primitive and unconfined type of recreation.
- **Other Features:** In the case of the CONG Wilderness, the wilderness encompasses historic structures listed in the National Register of Historic Places.

As a general rule, vehicular travel and mechanized equipment are prohibited in congressionally designated wilderness areas, as are human-built structures. The presence of non-native wild pigs in CONG is a result of human work or activity (exploration and colonization, free-range livestock management, agriculture, introduction for sport hunting) that leaves a substantial mark on the wilderness landscape (abundant signs of rooting, wallows, pig trails). In addition, some proposed pig management activities could affect wilderness and potential wilderness areas. Therefore, wilderness will be addressed as an impact topic.

**Public Health and Safety:** Wild pigs pose a threat to public health and safety due to their potentially aggressive behavior toward humans and through disease transmission. Certain aspects of the proposed wild pig management, can also pose a threat to public safety. Therefore, public health and safety will be addressed as an impact topic.

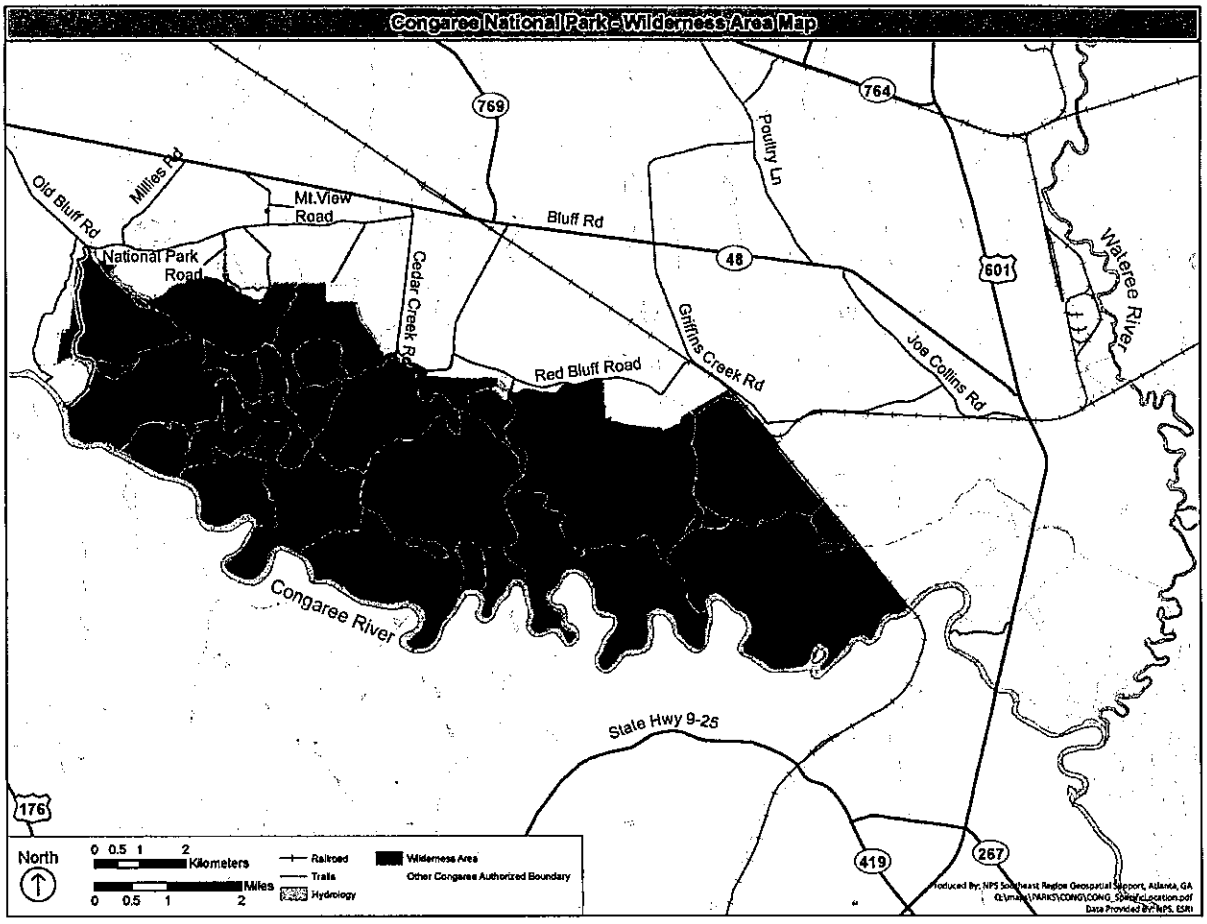


**Figure 3: CONG Wilderness Areas.**

**Visitor Use and Experience:** CONG is open every day of the year except for Thanksgiving and Christmas. Over the past decade, visitation to the park has increased from less than 50,000 to over 120,000 people per year. The presence of non-native wild pigs in the park and the signs of their disturbance can affect visitor experience. Proposed wild pig management activities could also affect visitor use and experience. Therefore, visitor use and experience will be addressed as an impact topic.

**Park Operations:** CONG has a relatively large land base in relation to its small permanent staff. Implementing the proposed wild pig management actions at the park would affect resource management, resource and visitor protection, maintenance and interpretation and education responsibilities of park staff. Therefore, park operations will be addressed as an impact topic in this EA.

3.2: Impact Topics Dismissed from Further Analysis

**Air Quality:** Section 118 of the Clean Air Act, as amended (33 U.S.C. 7401 *et seq.*) requires each park unit to meet all federal, state, and local air pollution standards. CONG is designated as

a Class II air quality area under the Clean Air Act. A Class II designation prescribes the maximum allowable increase in concentrations of sulfur dioxide and particulate matter over baseline concentrations, as specified in Section 163 of the Clean Air Act. Further, the Act provides that the federal land manager has an affirmative obligation to protect air quality-related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse air pollution impacts. Wild pigs are not known to directly impact air quality. Likewise, proposed pig management actions do not have the potential for affecting air quality. Therefore, air quality was dismissed as an impact topic.

**Geology and Topography:** The National Park Service's Management Policies 2006 require the protection of significant geologic and topographic features. The existing geology and topography of the park would not be impacted or change as a result of the proposed wild pig management activities. Therefore, geology and topography were dismissed as impact topics.

**Prime and Unique Farmland:** In August, 1980, the Council on Environmental Quality (CEQ) directed that Federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resource Conservation Service as prime or unique. Prime or unique farmland is defined as soil that particularly produces specialty crops such as fruits, vegetables, and nuts. No qualifying soils exist within CONG. Therefore, prime and unique farmland was dismissed as an impact topic.

**Socioeconomic Environment:** Implementation of the proposed action would likely have no effect on the area's overall population, income, and employment base. Therefore, the socioeconomic environment was dismissed as an impact topic.

**Environmental Justice:** According to the Environmental Protection Agency, environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

Presidential Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed action would not have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Plan EJ 2014 (named in recognition of the 20th anniversary of Executive Order 12898) which is EPA's overarching strategy for implementing environmental justice in the agency's programs, policies, and activities. Therefore, environmental justice was dismissed as an impact topic.

**Noise / Soundscape:** Noise is defined as unwanted sound. Use of firearms during the proposed wild pig management activities could create loud sound bursts of short duration. However, the proposed action includes the use of sound-suppressed rifles or other firearm sound-suppression

devices which will eliminate or severely limit noise disturbance. Therefore, firearm noise will not substantially interfere with human activities or with wildlife behavior in the park. The solitude and tranquility associated with the park will be unchanged. Therefore, this impact topic is eliminated from further analysis in this EA.

**Waste Management:** None of the alternatives considered would generate noteworthy quantities of either hazardous or solid wastes that would need to be disposed of in hazardous waste or general sanitary landfills. Therefore this impact topic is dropped from additional consideration.

**Utilities:** Generally speaking, some kinds of projects, especially those involving construction, may temporarily impact above and below-ground telephone, electrical, natural gas, water, and sewer lines and cables, potentially disrupting service to customers. Other proposed actions may exert a substantial, long-term demand on telephone, electrical, natural gas, water, and sewage infrastructure, sources, and service, thereby compromising existing service levels or causing a need for new facilities to be constructed. None of the alternatives considered would cause any of these effects; therefore utilities are eliminated from additional analysis.

**Land Use:** Visitor and administrative facilities are located within the park. Proposed wild pig management activities would not affect land uses within the park or in adjacent areas; therefore, land use is not included as an impact topic.

**Transportation:** None of the alternatives considered would affect road, railroad, water based, or aerial transportation in and around the park. Therefore, this topic is dismissed from further analysis.

**Indian Trust Resources:** Indian trust assets are owned by Native Americans but held in trust by the United States. Indian trust assets do not occur within CONG and therefore are not evaluated further in this EA.

## 4.0: ALTERNATIVES, INCLUDING THE PROPOSED ACTION

The National Park Service has considered a range of alternatives for non-native wild pig management at CONG. Alternatives selected for full analysis must meet the objectives of the park to a large degree, while also meeting the purpose and need for action. Two alternatives are described in this section, along with several alternatives that were considered but eliminated from further consideration.

### 4.1: Alternative A, No-Action

Under the guidelines of the National Environmental Policy Act of 1969 (NEPA), and the Council on Environmental Quality (CEQ) Regulations (40 CFR 1500-1508), a "No-Action" alternative "may be thought of in terms of continuing with the present course of action until that action is changed." The "No-Action" alternative for CONG would involve a continuing interagency agreement with the USDA Wildlife Services to conduct limited wild pig management activities, which includes trapping and shooting, direct targeted harvest operations, and monitoring for disease. USDA Wildlife Services biologists leave pig carcasses in the field to naturally decompose which is in keeping with wild pig management activities within the NPS and the state

of South Carolina. In 2008, Resource Management staff at CONG completed compliance for this work under a Categorical Exclusion. Under the "No-Action" alternative, monitoring of wild pig disturbance and wild pig population management through the USDA would continue.

4.2: Alternative B, Implement Integrated Non-native Wild Pig Management Plan (Preferred Alternative)

Under this alternative, a comprehensive and sustained non-native wild pig management plan would be implemented with the goal of reducing natural and cultural resource impacts associated with wild pigs and reducing risks to human health and safety. Wild pig populations have the potential to double and triple in size within 4 and 12 months respectively (Barrett and Birmingham 1994, Waithman 2001). Hone and Robards (1980) calculated that it would take nine years to eliminate a population of 1,000 individuals with a sustained population reduction of 70% per year. While a 70% reduction each year may not be achievable in the park given the nature of the terrain and limited staff and resources, these facts highlight the importance of maintaining a comprehensive and sustained wild pig management program. Management activities would center on a sustained trapping and shooting program. The exclusion of wild pigs from small selected areas using fencing or curtain barriers could also be implemented in extreme cases to protect highly sensitive resources such as special status species or National Register listed or eligible sites at imminent risk of damage. All wild pig management activities would be coordinated through a single designated wild pig program officer from the park's Resource Management program. The proposed wild pig management plan is presented below, by individual action or activity headings.

**Trapping:** Trapping is a flexible technique that can be economical in terms of personnel and operating costs (Lukins 1989). It is also the only method to effectively remove entire sounders. Use of traps for wild pig management within CONG would be limited to live-capture traps; kill-traps and snares would not be used. A variety of live-capture trap types may be used including but not limited to corral traps, large enough to capture entire sounders, made of livestock panels that can be disassembled, transported in sections, and reassembled on site. Drop nets of the type currently being used at Great Smoky Mountains National Park are another possibility. Sounders are composed of adult and sub-adult sows and their offspring and may range in size from four to forty pigs (Kurz and Marchington 1972, Wood and Brenneman 1980, Singer et al. 1981, Ilse and Hellgren 1995, Sparklin et al. 2009). Portable, lightweight, single-catch traps constructed of chain-link fencing material, metal, or wood similar in design to traps used at Cumberland Island National Seashore, Great Smoky Mountains National Park and elsewhere (NPS 1993, Barrett and Birmingham 1994) may also be used. Trapping success can be increased at times when wild food availability is limited (i.e., outside the main late summer and fall fruit and mast season or during years with poor acorn production), in the vicinity of key resources, by prebaiting. Strategies will include deploying wildlife cameras at sites exhibiting wild pig damage to identify core use areas, identify entire sounders, and learn when sounders are habituated to the traps. Trapping will also be used in areas where direct shooting is not feasible for safety or other reasons. Trapping could also be used on a limited basis in support of other management efforts described below, which could include trapping wild pigs to fit them with radio collars (and then releasing them as Judas pigs or to determine home range) or to collect blood samples for disease testing. The "Judas" technique for finding the last few animals in an eradication program was developed for goat eradication at Hawaii Volcanoes National Park (Taylor and Katahira 1988). The "Judas" animal

is captured, fitted with a telemetry collar, then released to locate and join up with other un-collared animals. Park managers or their authorized representatives then radio-track the animal to new groups. Wilcox, et al. (2004) determined that use of the Judas pig method is a useful tool when used in conjunction with other proven methods of population management (e.g., shooting, trapping, helicopters, and/or hunting dogs).

There is strong evidence that focusing on removal of entire sounders is more effective than removal of individual wild pigs through shooting (Holtfreter et al. 2010). A sounder is a group of wild pigs composed of adult and sub-adult sows and their offspring. Sounders may range in size from 4 to 40 pigs. Wild pigs within CONG may be territorial at the sounder level (Ilse and Hellgren 1995, Gabor et al. 1999, Sparklin 2009). If wild pigs within CONG are proven to exhibit territorial behavior this could allow for strategic, localized management that would be more effective in the long term than randomly removing pigs. There is much variability within the wild pig population resulting in variation among sounders. Wildlife cameras can be used to identify each sounder. Wildlife cameras also assist in estimating population, number of sounders and their location, and identifying effective trap locations.

A preliminary minimum requirements analysis was conducted as part of this EA to determine the minimum management tools and actions necessary to effectively manage wild pig damage in the Congaree Wilderness and protect wilderness character (Appendix A). Lightweight portable traps that could be transported by hand or on a small trail cart (pushed or pulled by hand) would mainly be used in wilderness areas. Trucks and ORVs may be used for access and transport of traps outside wilderness areas, where vehicles are currently approved for use and where access is possible without expanding or altering existing dirt roads and trails. This includes upland portions of the park where numerous former logging roads are present. In wilderness and floodplain areas where former logging grades and sufficient trails are present, ORVs with wagons could also be used on existing grades and trails. Motorboats would be used for access and transport of traps along the Congaree River. Non-motorized boats may be used to transport traps within the park (such as along guts and creeks leading into the park from the river). During placement and operation of all traps, care would be taken to avoid disturbance of vegetation and soils to the greatest extent possible. Efforts would be made to place traps in areas previously disturbed by wild pig activity. All traps would be placed so they are out of sight from main visitor use areas such as the visitor center, parking areas, trails, boardwalks, Cedar Creek, Weston Lake, Wise Lake, the Congaree River, and any other main visitor use areas. Traps would be placed so as not to disturb cultural sites. Once a trap is no longer actively in use in an area, it would be removed unless there were plans to use the trap in the future at the same location.

NPS personnel or their authorized representatives (e.g., USDA Wildlife Services or Veterinary Services agents or contractors working in coordination with the NPS) would conduct trapping. Traps would be placed and set in areas showing recent wild pig activity and those determined to be core use areas of individual sounder groups. Traps would be baited with appropriate bait that is most likely to attract wild pigs such as shelled corn. Traps would be inspected within a minimum of 24 hours after they are set. Non-target wildlife captured in traps would be released immediately upon discovery. Escape holes for smaller non-target species would be included in the tops of wild pig traps during construction.

Shooting is the only practical method available for humanely euthanizing trapped wild pigs under field conditions (NPS 1993). Captured pigs would be humanely euthanized as quickly and painlessly as possible by a firearm shot directly to the brain. Firearms used for euthanizing captured pigs could include rifles or handguns of appropriate caliber and bullet weight. Small caliber rifles and/or handguns such as the .22 rimfire would be preferable for euthanizing animals in traps. Well-placed shots with a .22 long rifle bullet are capable of achieving acceptable euthanasia results without creating safety issues associated with using larger caliber rounds. CONG would follow guidelines set by the Great Smoky Mountains National Park (NPS 2011) for firearms use and required training for park staff. Sound suppression of firearms would be used whenever possible, to reduce dispersal of pigs from trapping areas and to limit noise disturbance to visitors using other parts of the park. Live capture, transport, and release of wild pigs to other lands would not occur. In 2005, the South Carolina General Assembly passed state law South Carolina Code 50-16-25, which prohibits the removal or transport of live pigs from the wild without a permit. Wild pigs captured in traps and dispatched would be moved away from the trap area and left in the field. Final disposition of pig carcasses is described in more detail under a separate heading below.

Trap records would be kept up to date and include information such as: trap identification number; type of trap; dates and types of trap repairs or modifications; trap placement location(s) (recorded by GPS); habitat type where trap was placed; number of days and dates the trap was set in each location; dates and times that set traps were checked; number of wild pigs captured by date and location; disposition of pigs captured (killed, radio-collared and released, etc.); and names and affiliations of personnel conducting trapping. Basic biological data would also be collected on each captured pig (described below under research and monitoring).

NPS-approved training and certification in wildlife control and firearm use would be required for personnel conducting trapping. Additional firearm training specifications are detailed in the next section. Personnel conducting trapping would also be required to periodically review this document and wild pig management guidelines for other parks (including NPS 1993).

**Shooting:** Direct reduction of wild pigs by shooting would be an important wild pig management activity within and throughout the park (shooting would not be conducted outside park boundaries). Shooting would be conducted on a sustained basis, over an indefinite time-period. Effort may change over time as the wild pig population fluctuates, with greater effort expended at times when numbers were high, signs of wild pig disturbance more abundant, or number of wild pigs killed per unit effort greater. NPS personnel or their authorized representatives (e.g., USDA Wildlife Services agents working in coordination with the NPS) would conduct shooting of wild pigs. Shooting would be conducted while hunting on foot, from ground blinds, and from temporary tree stands. In wilderness, personnel would use only temporary, portable blinds and tree stands. These would be transported as a backpack unit, on a small trail cart (pushed or pulled by hand), or by ORV and cart on existing trails and former logging roads when a trap is also being transported. Blinds and tree stands would be left in place over a few days and then would be moved for use elsewhere or removed from the field if not in use. Baiting may be used in combination with shooting to attract wild pigs to blinds or tree stands. Baits may include sour corn mash, shell corn, or other appropriate baits. Management personnel may establish primitive low impact campsites when shooting in remote areas over a several day period. No fastening devices, nails, screws, stakes, wire, rope or other human-made

materials would be left in the field. When feasible, shell casings would be collected and removed from the field after firearm use.

All personnel involved in shooting activities are required to obtain NPS-approved wildlife control and firearms training and certification. Firearms training and qualification would be conducted on a semi-annual basis, by way of a training and qualification program similar to the program used at Great Smoky Mountain National Park (see NPS 1993). Program specific firearm safety guidelines would be developed and reviewed periodically. Personnel conducting shooting would be required to periodically review this document and wild pig management guidelines for other parks. Personnel conducting shooting would be monitored for firearm safety violations. Violations would result in immediate removal of personnel from wild pig management responsibilities and reprimand up to and including immediate termination.

Certain areas of the park where the likelihood of encountering visitors is higher would not be used for shooting. The designated wild pig program officer from the park's Resource Management program would closely coordinate with law enforcement, maintenance, and interpretation personnel to ensure maximum safety. In some cases, visitor use areas would be closed during shooting operations for safety purposes. Notice of wild pig management activities and closure areas would be posted on the park's web site, social media sites and at the visitor center and in the field, using signage, trail and boardwalk barriers, and other appropriate means. Any animals that are wounded and not immediately killed would be pursued, located, and killed as quickly and humanely as possible. Tracking dogs, not boar dogs or pig dogs that are trained to attack wild pigs, may be used to improve recovery of wounded animals. If a wounded or potentially wounded animal cannot be located during the same day of operations, the area would be returned to and searched during the following day as well.

Shooting could be carried out throughout the park, except where limited by safety constraints. Shooting operations may also sometimes be more focused (e.g., highly sensitive areas thought to be at greater risk of impact by wild pigs, areas where wild pig sign is more abundant or where greater numbers of wild pigs are known to occur). Highly sensitive areas where shooting efforts may be focused could include: seepage forest habitats with organic muck soils; locations with rare or endangered species, particularly plants; along streams and streamside habitats (e.g., Cedar Creek, Tom's Creek); near cultural sites such as cattle mounds and dikes; in recreation and visitor use areas; in old-growth tree stands; near champion trees; in longleaf pine habitats; and in habitat restoration areas.

Firearms used to shoot wild pigs during direct reduction would include rifles and shotguns, of appropriate caliber and bullet weight. CONG would follow recommendations made by Cumberland Island National Seashore and guidelines set by the Great Smoky Mountains National Park (NPS 2011) for firearms use and required training for park staff. High-powered rifles are most appropriate and effective (Hoffman 2009), increasing the probability of quickly and humanely dispatching an animal. Bolt action rifles like .308 and .270 (and comparable calibers) allow one to make an effective shot with a high degree of accuracy in shot placement on an animal. Recommendations include the use of 150 and 180 grain bullets in .308 and 130 and 150 grain bullets in .270. Handguns could be carried by management personnel but would not be used for direct reduction, only for shooting pigs captured in traps and as a safety backup during shooting activities. As required by the NPS' "Get the Lead out" initiative, only non-lead

ammunition would be used for dispatching wild pigs during culling operations. See http://www1.nrintra.nps.gov/BRMD/Gettheleadout/ .

Shooting may be conducted during day or night depending on wild pig behavior and activity, shooting effectiveness, and safety considerations. The majority of shooting operations would take place outside main visitor use periods, such as very early in the morning, late in the evening, and at night. Rifles would be fitted with telescopic scopes for use during daytime shooting. Night-vision goggles, infrared sights, and spotlights could be used for early morning, late evening, and night shooting. Sound suppressed rifles and other sound suppression or silencing devices would be used if such devices exist for the type of firearm being used. The purpose of sound suppression firearms would be to reduce dispersal of wild pigs from target areas and to limit noise disturbance to visitors using other parts of the park. Pig carcasses would be moved away from visitor use areas and surface waters and left in the field. More detail on the final disposition of pig carcasses is described under a separate heading below.

Wild pig shooting records would be kept up to date and would include information such as: area of operation (defined on a map), date and time periods of active shooting, total number of hours of active shooting, type of shooting conducted (stalk, blind, or stand), type of firearm used, number of personnel involved and total time spent including preparing for the field, approximate distance or area covered (if on foot), habitat type(s) covered, any sensitive resources in area and relation to shooting effort, number of firearm discharges, number of pigs shot, disposition of pigs shot (killed, wounded and fled, etc.), locations of killed pigs (recorded by GPS), habitat type where pig killed, and names and affiliations of personnel conducting shooting. Basic biological data would also be collected on each killed pig (described below under research and monitoring).

**Use of Dogs:** Systematic tracking using trained dogs could be used as part of the overall wild pig management strategy at CONG. The use of dogs trained to track and bay wild pigs can be very effective particularly as the wild pig population within the target area is reduced (Mayer et al. 2009). There is precedent for using dogs to track wild pigs within NPS units (Katahira et al. 1993, NPS 2002, McCann and Garcelon 2008). This wild pig management activity would be conducted by professional, trained National Park Service employees or their authorized representatives which includes qualified, reputable contractors that are known to utilize well-trained dogs. Tracking dogs used at CONG would have to be trained to respond to commands from their owner and to only track the scent of pigs, thus reducing the likelihood of dogs harassing native non-target species. Well-trained dogs return to their handler/owner when they are called off the pig. Equipping tracking dogs with radio-collars would reduce the likelihood of escaped or lost dogs adding to the feral dog population that already exists at CONG. As with all activities related to wild pig management that may affect park neighbors, park neighbors would be notified in advance of any shooting with dogs. This type of shooting would be away from private property.

**Protective Fencing:** Fencing could be used in small selected areas to protect highly sensitive resources at imminent risk of damage by wild pigs. Highly sensitive resources includes special status species (rare and imperiled plants for instance) and cultural sites listed or eligible for the National Register. Fencing would be used only in cases where wild pig impacts could result in irreversible damage or loss of a resource, and where fencing could effectively protect the resource. Fencing would also be limited to areas where installation would cause less damage to

park resources than wild pig impacts. A limited number of small fencing exclosures may also be used for research and monitoring purposes, especially if the data collected is used to address wild pig management decisions or other critical resource management needs. The number of research and monitoring exclosures would be limited to the number needed to provide adequate statistical replication to address the research or monitoring question(s) being addressed. All research and monitoring exclosures would be sited so they would not be visible from major visitor use areas (boardwalks, trails, visitor center, parking areas, Cedar Creek, Congaree River, etc.). Fencing to protect sensitive resources would be out of view of visitors to the greatest extent possible.

Fences would be constructed of dark green or black vinyl-coated galvanized chain link fence with metal posts. Dark colored material would be used so that the material would blend into the natural surroundings as much as possible. Posts would be buried or driven into the ground with minimum use of cement. Fence height would be 28 inches or higher (Timmons et al. 2011), preventing wild pigs from entering but allowing passage of native white-tailed deer. The bottom of the fence would be buried to prevent wild pigs from entering the exclosure by rooting from below. Alternatively, the fencing material used could be slightly longer at the base of the fencepost so it lays flat or nearly flat on the ground, projecting outward from the area to be protected (proving a fence "skirt" at the base of the upright fence). Park staff would choose the method that causes the least disturbance to a particular area while effectively excluding wild pigs. During fence installation, care would be taken to avoid vegetation, ground surface, and soil disturbance to the greatest degree possible. Fencing would not be installed in areas where surface water flow may be interrupted or where other hydrologic alternations would be likely (e.g., fencing would not be constructed across creeks, guts, or areas of channelized flooding). Fences would not be installed in areas where cultural resources would be impacted by fence construction.

Fencing would be inspected periodically for damage and maintained regularly by NPS staff or approved personnel. In addition to periodic inspections, fencing would be examined following severe storms where tree fall is likely and following flood events. Any breaches in fencing would be repaired quickly. In cases where fencing at a site is no longer needed for resource protection, fencing proved ineffective, or regular inspection and repair cannot be maintained, fencing would be removed from the field. Records for fencing would be kept, including: installation, inspection, repair, and removal activities, descriptions, and dates; GPS locations of all fencing; explanation of the need for fencing in the area; the resource to be protected; the type and degree of wild pig disturbance or impact; descriptions of fencing damages and causes; and the effectiveness of wild pig exclusion.

**Protective Curtain Barriers:** Protective curtain barriers, similar to those in use at Haleakala National Park in Hawaii, may be used for the same purposes and in the same manner described for protective fencing. Curtain barriers, in contrast to fencing, can also be placed across creeks, guts, and other areas of channelized flow or flooding where fencing is not appropriate. Curtain barriers consist of heavy plastic sheets suspended from cable lines strung between posts. These barriers provide a visual and physical barrier that effectively prevents wild pig passage along watercourses. Enough sheet material is used so that the plastic lays flat on the ground or water surface during low water periods, extending "downstream" of the upright portion of the barrier. During flooding or high water, the plastic moves up and down with the water surface so that flow and flood debris are not impeded. When water levels decline the plastic sheet settles back into

place. Dark colored plastic material (dark green, dark brown, or black) would be used so that the material would blend into the natural surroundings as much as possible. Other than potential use in stream and channelized flow areas, use of curtain barriers would comply with specifications and restrictions described above for protective fencing.

**Radio Tracking:** Radio-tracking could be used in conjunction with shooting and trapping activities or for research and monitoring purposes. Trapping would be used to capture wild pigs to fit with radio collars. A small number of radio-collared pigs could be released and tracked to assist in locating remote wild pig aggregation areas where shooting or trapping would take place. Radio-collars and tracking may be used for research and monitoring purposes, to investigate wild pig movement patterns, habitat preferences, home range sizes, and to calculate population estimates in support of the wild pig management program. The number of radio-collared pigs would be limited to the number needed to provide adequate statistical replication to address the research or monitoring question(s) being addressed.

Fitting of wild pigs with radio collars would require that trapped animals be restrained and immobilized using a fast, safe, effective, and humane method. Sedation and immobilization drugs and associated equipment would be restricted to NPS employees or their authorized representatives responsible for wild pig management (USDA wildlife agents or veterinarians working in coordination with the NPS). NPS employees participating in this component of the management program would be required to complete a Wildlife Immobilization Practitioner Course. A number of drugs such as Telazol, a Schedule III drug and Xylazine, a prescription sedative may be used to tranquilize pigs. All use and storage guidelines specified by the U.S. Drug Enforcement Administration (DEA) would be strictly followed. A DEA license will be acquired as necessary by law and a consulting veterinarian will be consulted. Sedation and immobilization drugs would be stored in a locked safe. Records would be maintained to include the date, amount, purpose, and signatures for each withdrawal of these materials.

**Final Disposition:** Wild pigs that are killed would be left in the field to decompose on the ground surface without burial. This is in keeping with practices nationwide. Care would be taken when handling dead pigs to avoid contact with body fluids. All killed pigs would be moved out of view and at least 200 feet from visitor use areas such as hiking trails, boardwalks, canoe trails, parking areas, and the visitor center. Killed pigs would also be moved at least 200 feet away from the banks of relatively permanent surface waters such as Cedar Creek, Tom's Creek, Wise Lake, Weston Lake, and the Congaree River whenever possible. At least a minimum amount of biological data would be collected from each dead animal (described below under research and monitoring). Researchers could also collect additional data including collection of samples from carcasses (blood samples, tissue samples, gut contents, etc.).

Wild pig carcasses would not be donated for human consumption. Under the Federal Meat Inspection Act, all wild pigs must be inspected prior to entering any establishment in which they are to be slaughtered. Inspections are carried out under the Food Safety and Inspection Services (FSIS) under the USDA. The FSIS has ruled that all wild pigs are amenable to the Federal Meat Inspection Act and even if donated are considered to be in commerce. All animals must be processed under inspection at an official establishment. This would entail examining the animal alive, at rest and in motion from both sides before passing the animal for slaughter. In most instances, it would be difficult to determine fitness for human consumption due to the potential

for wild pigs to carry disease (Wyckoff et al. 2009). As previously mentioned swine brucellosis and pseudorabies were found to be approximately 18% and 15% higher at CONG than state-wide (USDA unpublished data). Transporting live feral swine to slaughter facilities also increases the potential for spreading disease to domestic swine at facilities where swine are being held prior to slaughter. Therefore, feral swine would not be donated to food banks.

**Coordination with Adjacent Landowners/Users:** Coordination with adjacent landowners and users would be conducted to:

1. inform them of wild pig management goals and activities at CONG;
2. exchange information on wild pig abundance, movement patterns, levels of disturbance, and wild pig management;
3. encourage the removal of wild pigs from adjacent lands; and
4. discourage activities that could result in pig introductions to the park (escaped livestock, etc.). Coordination with adjacent landowners and users could extend beyond immediately adjacent properties to include coordination and information exchange with other large land management entities on the floodplain. The park will also continue participating in the South Carolina Wild Hog Task Force.

This will be accomplished via the use of social media, newspaper releases, and activity notices distributed at the park.

**Public Information and Education:** Public awareness of the wild pig management program would be promoted whenever possible. NPS personnel would work with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program would also be regularly conveyed to park visitors through interpretive products produced by the CONG interpretation division. The Old-Growth Bottomland Forest Research and Education Center might also produce educational materials and presentations to assist with outreach. All material presented by the park would focus on the negative impacts of wild pig disturbances and would not glorify the killing of these animals. All presentations would be sensitively conducted so as to not offend the audience. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Staff of the Integrated Resource Management Program would actively seek and create opportunities to make presentations to the general public, universities, schools, hunting clubs, conservation groups, and others. Press opportunities would be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency.

**Research and Monitoring:** Information to be recorded for each pig collected could include:

- an identification/tracking number
- collection date and time
- GPS location
- estimated level of pig disturbance in the area

- collection method (trap, trap and shot, shot, other)
- lifestage (determined using pattern of tooth eruption and replacement (Matschke 1967, Clarke et al. 1992, Choquenot and Saunders 1993) and, to age adult wild pigs, molar wear (Mayer 2002))
- physical condition of animal (poor, fair, good, excellent)
- sex (male, female, unknown)
- actual or estimated weight coat color and pattern (black, reddish brown, black with white shoulder-band, etc.)
- animal appearance (long-term feral/hybrid, short-term feral, domestic escapee)
- reproductive state for females (pregnant and number of fetuses/embryos measured the length of each fetus from the crown of the skull to the base of the tail (crownrump length) to the nearest 1 mm to use as an estimate of time of conception and projected parturition (Henry 1968), lactating, unknown, n/a)
- any other special or significant markings or attributes
- number, size range, and markings of any other pigs encountered with collected animal
- disposition of animal (killed, radio-collared and released, etc.)
- description of samples taken (blood, tissue, etc.)

In addition, blood samples would be taken from a sufficient number of collected animals during the first year of the management effort and forwarded to USDA Veterinary Services' South Carolina office (or another equivalent entity) to be tested for swine brucellosis and pseudorabies. Each blood sample would consist of a minimum of 5-10 cc of blood collected by syringe and transferred to a small vial to be supplied by USDA Veterinary Services. New syringes would be used for each sample to avoid cross contamination. Samples would be labeled and kept cool (not frozen) and forwarded to the laboratory within 3-4 days. During sample collection, personnel collecting or handling blood would wear latex gloves and eye protection. Syringes and other used materials would be disposed of properly as veterinary waste, based on guidelines provided by USDA. Following the first year of the wild pig management program, disease monitoring would be repeated annually. NPS employees or their authorized representatives involved in blood sample collection would be trained in safe collection procedures.

Independent researchers wishing to make use of dispatched animals for research and monitoring purposes could collect additional information or samples from carcasses for research and monitoring purposes (blood samples, tissue samples, hair samples, gut contents, body measurements, etc.). Additional research and monitoring activities making use of dispatched animals in cooperation with the NPS and the wild pig management program would be strongly encouraged.

A wild pig monitoring protocol would be developed and implemented to support the wild pig management program at CONG. The objectives of the monitoring protocol would be: 1) to document baseline levels of pig activity and vegetation/soil disturbance prior to wild pig management at the park, 2) to provide a means for periodically evaluating the effectiveness of wild pig management activities at reducing vegetation/soil disturbance within the park, 3) to provide key information to support adaptive adjustments to the wild pig management program over time. Monitoring would be based on a wild pig disturbance index or indices based on recognizable pig field sign such as rooting, tracks, game trails, wallows, etc. Monitoring would

consist of a series of simple walking transects that may include segments of existing hiking trails, stream banks, slough margins, unimproved roads, old logging grades, and the interior of dominant forest types at the park (mixed bottomland hardwoods, cypress-tupelo swamps) and other targeted habitats or special resource sites as needed. These transects may also incorporate the existing large forest monitoring plots that were used for prior pig disturbance research in the park over several years preceding the onset of management (Zengel 2008), linking the monitoring protocol to prior baseline data. Tasks would include a brief review of recent literature on pig disturbance monitoring. A draft protocol would be developed and tested in the field during an initial baseline data collection event. Following the field testing and initial data collection, a written protocol would be finalized and park staff would be field trained in the application of the protocol. Specific details concerning the length and number of transects, monitoring frequency, and whether transects would be fixed and repeated or randomly selected for each monitoring interval would be determined during protocol development. A mix of approaches could also be prescribed to meet the needs of the park and the wild pig management program. Monitoring conducted just prior to leaf fall may best indicate cumulative disturbance over several weeks to months; while monitoring conducted shortly after leaf fall may best indicate new rooting over short time-frames, providing a snapshot of pig distribution and perhaps abundance (Zengle 2008). Photo-quadrats, found to provide clear visual documentation of the differences in disturbed and non-disturbed areas in each habitat type (Zengle 2008), could also be used.

Other research and monitoring efforts conducted in support of the wild pig management program could include the following: wild pig population estimates and monitoring, wild pig natural history studies, radio-tracking studies, habitat studies, food availability studies, studies on alternative or refined wild pig management techniques, monitoring of pig disturbance or other impacts on native ecosystems and species, etc. Methods to efficiently estimate and monitor wild pig population dynamics, and studies on pig disturbance or impacts focusing on native vegetation, soils, and aquatic habitats such as small creeks could be particularly valuable.

### 4.3: Alternatives Considered but Eliminated from Detailed Analysis

Several wild pig management alternatives were considered but eliminated from detailed analysis due to incompatibility with conditions at CONG or due to other factors described below.

**Park-wide or Large-area Fencing:** Fencing the perimeter of CONG or large areas within the park to conduct fenced-zone removal of wild pigs and to prevent or reduce movement of wild pigs into the park was eliminated from further analysis due to: wilderness impacts; impacts to visitor experience; potential alterations that fencing could have on the natural movement of water, sediments, flood debris, native biota, etc. within and through the park; the frequent and severe damage that flooding would cause to fences; and the prohibitive cost of installation and maintenance.

**Use of Snares:** Snares and trapping methods other than live capture traps were eliminated from further analysis due to the concern that native non-target wildlife could be negatively affected by these methods and the questionable humaneness of the method.

**Live Capture and Relocation:** Live capture and relocation of wild pigs from CONG was eliminated from further analysis. Live capture and relocation of wild pigs is illegal within the state of South Carolina without a permit. Also, swine brucellosis and pseudorabies has been documented in wild pig populations at CONG and the surrounding area. Movement and relocation of live animals could result in infection of other feral populations and livestock. The USDA would strongly object and prohibit the relocation of non-native wild pigs.

**Poisoning/Toxicants:** Use of poisoning agents or toxicants was eliminated from further analysis due to the concern that native non-target wildlife could be negatively affected. Although research into species specific delivery methods is being conducted, no species specific delivery method has been found and no toxicants are currently registered for use with feral ungulates in the United States. If poisons/toxicants and species-specific delivery technologies for controlling non-native wild pigs are developed in the future, this alternative could be re-evaluated.

**Contraceptives or Sterilization:** Contraceptives or sterilization could be a low-impact means to reduce non-native wild pig populations; however, no effective or feasible means of sterilization or contraception are currently available for non-native wild pigs. Therefore, this alternative was eliminated from further analysis. If sterilization and contraceptive technologies for controlling non-native wild pigs are developed in the future, this alternative could be re-evaluated.

**Public Hunting on NPS Property:** Public hunting on NPS property was eliminated from further consideration for several reasons. First and foremost, public hunting is prohibited by the establishing legislation for the park and by applicable federal regulations (36 CFR 2.2). In addition, public hunting is unlikely to contribute substantially to pig management efforts within the park. Recreational hunting can achieve reduction of animals with relatively low reproductive potential. However, animals with very high reproductive potential, such as non-native wild pigs, are much more difficult to control and require a well-focused, comprehensive, and sustained effort by wildlife reduction professionals. The substantial effort which would be required to manage public hunting at the park would be cost prohibitive and public hunting would be incompatible with other visitor uses currently established at the park.

**Biological Controls:** The use of biological controls, such as the reintroduction of predators, was eliminated from further analysis due to lack of feasibility and low likelihood of substantial contribution to wild pig management efforts within the park.

## 4.4: Impact Mitigation for the Proposed Action

### 4.4.1: Protection of Soils and Vegetation

Lightweight portable traps and livestock panels that can be disassembled, tree stands, and blinds will be used in most areas. Likewise, use of fencing and curtain barriers will be restricted to small areas where their use is critical for the protection of highly sensitive resources. Trucks and ORVs may be used for access and transport of traps outside wilderness areas, where vehicles are currently approved for use and where access is possible without expanding or altering existing dirt roads and trails. This includes upland portions of the park where numerous former logging roads are present. In wilderness and floodplain areas where former logging grades and sufficient trails are present, ORVs with wagons could also be used on existing grades and trails. As documented in the Draft Minimum Requirements Decision Guide Workbook, tree removal may

be conducted to make roads passable but no other work will be done to maintain the existing roads. No new roads will be created. Mechanized equipment and motorized vehicles may be restricted by park management in wet conditions to minimize impacts to soils and vegetation. Additionally all wagons and ORVs must be equipped with light weight low pressure tires or other tires designed to reduce impact. During placement and installation of traps, stands, blinds, fences, and curtain barriers, care will be taken to avoid and minimize disturbance of vegetation and soils. Efforts would be made to place traps in areas previously disturbed by wild pig activity. Any backcountry camps would use only primitive, temporary, low impact materials and methods, and would be housed in utility boxes painted dark green, dark brown, or black, to blend in with the surrounding environment. Dispatched wild pigs would be left to decompose in place, and would not be buried or covered with soil, limiting soil disturbance and returning nutrients to the soil. If significant soil or vegetation disturbance does occur as a result of trap placement, soils would be re-contoured and the area seeded or planted with native species as necessary.

4.4.2: Protection of Wildlife and Special Status Species

Methods or actions that could result in negative effects or impacts on native, non-target wildlife are not planned or have been minimized. Minimal animal mortality including deer, turkey, raccoons, crow, and squirrels are expected to result from this plan however they are not expected to be numerous. Snares, other kill-traps, poisons, and toxicants would not be used. Non-target wildlife captured in traps would be immediately released upon discovery and traps would be checked within a maximum of 24 hours after they have been set. Escape holes for smaller native species would be built into the tops of box traps. Fencing would be of a height that would not restrict movement of white-tailed deer. Dogs could be used at Congaree as one wild pig management strategy. This management activity would be conducted by professional, trained National Park Service employees or their authorized representatives that includes qualified, reputable contractors that utilize well-trained dogs. Tracking dogs used at CONG would have to be trained to respond to commands from their owner and to only track the scent of pigs thus reducing the likelihood of dogs harassing native non-target species. Well-trained dogs return to their handler/owner when they are called off the pig. Equipping tracking dogs with radio-collars would reduce the likelihood of escaped or lost dogs adding to the feral dog population that already exists at CONG. Captured pigs would not be relocated, limiting the introduction of non-native wild pigs to other properties and preventing the spread of wildlife disease.

Impacts to special status species, particularly plants, would be avoided or minimized by the same means described above for protection of vegetation and soils, with care taken to limit disturbance during the transport, installation and removal of traps, and fences. In addition, review of known special status species' locations would be conducted when planning the placement of traps, fencing, and other equipment. Wild pig management personnel would be made aware of known special status species locations, and trained on recognizing special status species that could be affected by wild pig management activities (mainly plants). If these species are found during placement of traps or fences, placement activities would be temporarily stopped and plans re-evaluated. In most cases, traps and research exclosures could simply be moved to a comparable nearby location or reconfigured so that special status species would not be disturbed. For exclosures intended to protect a specific sensitive resource, more detailed planning would be conducted if potential special status species concerns are identified. In such a case, planning would include consultation with resource experts and the appropriate federal and state agencies. A localized special status species field survey would also be conducted, if needed. In most cases,

placement of fencing near a special status species site would be intended to protect the resource from wild pig disturbance. Fencing would only be used in areas with special status species if the impacts of wild pig damage would be substantially greater than impacts associated with the installation of protective fencing.

4.4.3: Protection of Cultural Resources

Traps, fencing, curtain barriers, and other equipment would be placed to avoid impacts to cultural resources. Review of known cultural resource locations would be conducted when planning the placement of traps, fencing, and other equipment. Wild pig management personnel would be made aware of known cultural resource sites, and trained on recognizing potential cultural resources that could be encountered in the field. If potential cultural resources are found during placement of traps or fences, placement activities would be temporarily stopped and plans revaluated. In most cases, traps and research exclosures could simply be moved to a comparable nearby location where cultural resources would not be disturbed. For exclosures intended to protect a specific sensitive resource, more detailed planning would be conducted if potential cultural resource impacts are identified. In such a case, planning would include consultation with NPS and state cultural resource experts. A localized cultural resource survey would also be conducted, if needed. In most cases, placement of fencing near a cultural resource site would be intended to protect the resource from wild pig disturbance. Fencing would only be used in such areas if the impacts of wild pig damage would be substantially greater than impacts associated with the installation of protective fencing.

4.4.4: Protection of Water Resources

Fences would not be used in areas where streams or other channelized flows are present, to avoid the retention of flood debris and the alteration of water movement. Where exclusion of wild pigs from such areas is necessary, floating curtain barriers would be installed instead of fencing. Collected pigs would also be moved at least 200 feet away from the banks of streams, lakes, and the Congaree River to protect water quality. Other potential impacts to water resources would be avoided and minimized by the same means described above for protection of vegetation and soils, with care taken to limit disturbance during the transport, installation and removal of traps, fences, etc.

4.4.5: Protection of Wilderness

As noted previously, wild pig management actions are subject to a minimum requirements analysis process. The first step of this process is to ascertain whether it is necessary for the action to take place in wilderness or potential wilderness. If it is found that the action must take place in wilderness, the next step is to determine the minimum tool(s) necessary to accomplish the objectives of the proposed action. Under the preferred alternative, the park would use the minimum tools and impact methods described in the Draft Minimum Requirements Decision Guide Workbook (Appendix A). These tools and methods would minimize or prevent damage to wilderness, and are summarized below.

Trucks and ORVs may be used for access and transport of traps outside wilderness areas, where vehicles are currently approved for use and where access is possible without expanding or altering existing dirt roads and trails. This includes upland portions of the park where numerous former logging roads are present. In wilderness and floodplain areas where former logging grades and sufficient trails are present, ORVs with wagons could also be used on existing grades

and trails. As documented in the Draft Minimum Requirements Decision Guide Workbook, tree removal may be conducted to make roads passable but no other work will be done to maintain the existing roads. Tree removal and vegetation clearing will be kept to the minimum necessary to allow passage of an ORV. No new roads will be created. Mechanized equipment and motorized vehicles may be restricted by park management in wet conditions to minimize impacts to soils and vegetation. Additionally all wagons and ORVs must be equipped with light weight low pressure tires or other tires designed to reduce impact Only lightweight portable tree stands and blinds would be used in wilderness areas, mainly transported by hand or human-powered trail cart if, through minimum requirements analysis, determined to be the minimum tool. Likewise, use of fencing and curtain barriers would be restricted to small areas where their use is critical for protection of highly sensitive resources. During placement and installation of traps, stands, blinds, fences, and curtain barriers, care would be taken to avoid and minimize disturbance of vegetation and soils. Traps, fencing, curtain barriers, stands, and blinds would also be promptly removed once they are no longer in active or effective use (traps could remain in areas if their future use was planned, e.g., periodic use in certain seasons for instance). Careful record keeping of trap and fencing locations, status, and usage would ensure materials are promptly removed and not abandoned in wilderness areas. Any backcountry camps would use only primitive, temporary, low impact materials and methods and would be removed after use leaving no long-term signs of human activity. All man-made materials associated with installation of traps, stands, blinds, and primitive camps would be removed. Sound-suppression of firearms would be used to reduce noise generation during shooting operations. Shell casings released during shooting operations would be collected and removed when feasible. Any unused bait would also be removed from trap and bait stations.

4.4.6: Protection of Public Health and Safety, Visitor Use and Experience, and Park Operations Public information and education activities would be conducted to inform park visitors and others about non-native wild pigs and wild pig management activities taking place in the park. Coordination with adjacent landowners and managers would serve the purpose of raising awareness with park neighbors. Shooting operations would be planned and coordinated with Law Enforcement, Interpretive, and Maintenance personnel, resulting in increased safety for park personnel and visitors. Temporary closures of small portions of the park would be conducted if necessary to protect visitor safety. The majority of shooting activity would likely take place outside main visitor use time-periods (during very early morning, late evening, and at night). Firearms training and qualification would be required for all staff participating in trapping and shooting activities. Firearm use would be monitored with violations resulting in severe penalties including immediate dismissal. Sound suppression of firearm discharges would be used whenever possible to limit disturbance to park visitors and neighbors. Dispatched animals would be moved out of sight and at least 200 feet away from all main visitor use areas. Traps, fencing, and other materials would also be placed out of visitor sight to the greatest degree possible. Any research or monitoring exclosures would be placed out of visitor sight and at least 200 feet from visitor use areas. Fencing and curtain barrier materials would be colored dark green, dark brown, or black, to blend in with the surrounding environment. Captured wild pigs would not be relocated and released outside of CONG in accordance with South Carolina law. However, the use of "Judas pigs" could require capture and relocation of radio-collared individuals within the park. Personnel taking blood samples or handling blood samples during disease monitoring would use appropriate PPE including latex gloves, eye protection, and any other methods necessary to prevent contact with wild pig body fluids. Veterinary waste associated with disease

monitoring would be disposed of properly following USDA guidelines. To reduce the impact of wild pig management on park operations, funding would be pursued for additional staff to support the activities associated with the proposed pig management program. As at the Great Smoky Mountains National Park, youth interns such as Student Conservation Association volunteers may also be involved with wild pig management. The USDA Wildlife Services agents would continue to participate in wild pig management. Additional funding for personnel, equipment, and supplies would be pursued as necessary.

4.5: Environmentally Preferable Alternative

The NPS is also required to identify the environmentally preferable alternative, which may not necessarily be the same as the preferred alternative. Council on Environmental Quality (CEQ) guidance defines the environmentally preferable alternative as one that:

> causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves and enhances historic, cultural and natural resources.

In this case, the preferred alternative (Alternative B) is also the environmentally preferable alternative.

Alternative B would:

- Reduce the impacts of non-native wild pigs on natural and cultural resources;
- Improve the safety, healthfulness, and esthetics of the surroundings;
- Reduce risks to public health and safety;
- Provide better protection of natural and cultural resources for succeeding generations.

To a greater extent than the other alternatives, Alternative B would reduce the impacts of non-native wild pigs on natural and cultural resources while protecting and restoring park resources and values. Therefore, Alternative B is the environmentally preferable alternative.

4.6 How the Alternatives Meet the Objectives of the Proposed Action

Table 3 (below) provides a comparative summary of the two alternatives and whether each alternative would meet the project objectives. As shown on the table, the action alternative would successfully meet all of the objectives of this project. The alternative of no action/continue current management would meet only a third of the project objectives, principally because it does not take a comprehensive approach to managing the wild pig population. Reliance on external agencies for management of the wild pig population is not a sustainable long-term option.

**Table 3: Ability of the Alternatives to Meet Project Objectives**

| Objectives | Alternative A No Action/Continue Current Management | Alternative B Comprehensive Wild Pig Management Plan (Preferred Alternative) |
|---|---|---|
| Comprehensively manage the wild pig population at CONG to prevent further loss of resources. | No | Yes |
| Protect natural resources including soil, water, vegetation, and wildlife resources from impacts associated with continued unmanaged wild pig population growth. | No | Yes |
| Protect cultural resources, including historic structures and possible archeological sites. | Yes | Yes |
| Protect the context of existing features that are on, or are eligible for listing on, the National Register of Historic Places. | Yes | Yes |
| Reduce threat to visitor and employee health and safety by decreasing likelihood of visitor and wild pig interactions resulting in physical attacks or spread of disease. | No | Yes |
| Enhance wilderness character of park | No | Yes |

A long-term commitment to sustained wild pig management is necessary to achieve observable results in population reduction at CONG. Removal of large numbers of pigs with high reproductive capabilities would need to be accomplished before obvious benefits are realized. The removal of these non-native animals is necessary to protect the park's natural and cultural resources and increase visitor safety and satisfaction. While the management actions proposed to accomplish these goals in the preferred alternative will have short-term adverse effects to the wilderness character, the long-term benefits of the preferred alternative will result in an improvement to the natural quality of the wilderness.

The park believes a measurable reduction in the wild pig population can be achieved by following the procedures outlined in the preferred alternative. A combination of active shooting, tracking with dogs, and trapping will significantly reduce the wild pig population within the

park. In order to accomplish the goal of population reductions it will be necessary to negatively affect certain aspects of wilderness character. Maintaining old roadbeds and trails for motorized use would negatively affect the Untrammeled and Undeveloped qualities of wilderness, as well as opportunities for Solitude (see p. 16 above for definitions of these terms). In the long term, however, improved access to the wilderness via motorized vehicles and using existing logging roads, old road beds, and trails would increase the effectiveness of control activities by facilitating the movement of people, equipment, and supplies (traps in particular). Increased efficiency has the potential to reduce wild pig populations to a level that would substantially reduce pig damage and its effect on the Natural quality of wilderness and Other Features of value (e.g., cattle mounds and dikes). The park believes that the beneficial aspects to the increase in the natural quality of wilderness, employee and visitor safety, and a reduction in natural and cultural resource damage significantly outweighs the short-term negative effects to the wilderness character. Difficult terrain and access issues notwithstanding, a comprehensive, multi-faceted reduction strategy discussed in the preferred alternative will significantly improve several key qualities of the park.

## 4.7 Summary of Impacts

Table 4 (below) briefly summarizes the effects of each of the alternatives on the impact topics that were retained for analysis. More detailed information on the effects of the alternatives is provided in Section 6.0 ("Environmental Impacts of the Alternatives").

**Table 4. Summary Table of Environmental Consequences.**

This section describes the environmental consequences of the two alternatives that were analyzed in this environmental assessment for a non-native wild pig control program within CONG. The alternatives include (1) no action, and (2) proposed action, reduction through trapping, shooting, use of dogs, and fencing.

| | **Alternative A** | **Alternative B** |
|---|---|---|
| **Impact** *Category* | **Limited Wild Pig Management** No Action: Limited Wild Pig Management and Disease Surveillance by USDA Personnel | **Integrated Wild Pig Management** Proposed Action: Implement Integrated Non-native Wild Pig Management Plan |
| **Soil Impacts** | Impacts to soils would be negligible to major, short-term and long-term, and adverse.<br>Highest potential for adverse effects as wild pigs continue to reduce plant cover and greatly increase soil erosion, sedimentation of streams, soil contamination of streams, soil compaction, changes in soil bulk density, soil oxidation in areas with highly organic or peat soils (resulting in soil loss), changes in soil nutrient dynamics and other biogeochemical properties, effects on soil biota, etc. | Impacts to soils would be negligible to minor, short-term, resulting in highly localized substrate disturbance associated with limited vehicular access and the placement of additional traps, protective fencing, curtain barriers, blinds, stands, and dogs. Mechanized equipment and motorized vehicles may be restricted by park management in wet conditions to minimize impacts to soils and vegetation. Additionally all wagons and ORVs must be equipped with light weight low pressure tires or other tires designed to reduce impact<br>Lowest potential for adverse impacts as soil disturbing activities of wild pigs would be reduced with implementation.<br>Elimination of wild pig activity after sounder removal would eventually allow disturbed areas to rebound. |
| **Vegetation Impacts** | Impacts to vegetation would be negligible to moderate, short-term and long-term, and adverse.<br>Highest potential for adverse effects as wild pigs continue to damage plant community composition and structure by selective grazing of native vegetation and distributing seeds of exotic plant species. | Impacts to vegetation would be negligible to minor, short-term, highly localized, resulting from limited vegetation removal necessary for use of motorized vehicles on existing former logging roads. This will reduce vegetation impacts caused by non-native wild pigs in time.<br>Lowest potential for adverse effects as reducing the number of wild pigs would cause less damage to plant community composition and structure by selective grazing of native vegetation and distributing seeds of exotic plant species. |

| | Alternative A | Alternative B |
|---|---|---|
| **Impact** *Category* | **Limited Wild Pig Management** No Action: Limited Wild Pig Management and Disease Surveillance by USDA Personnel | **Integrated Wild Pig Management** Proposed Action: Implement Integrated Non-native Wild Pig Management Plan |
| **Wildlife & Special Status Species Impacts** | Impacts to wildlife and special status species would be negligible to moderate, short-term and long-term, and adverse.<br><br>Highest potential for continued adverse impacts from pig populations on native wildlife in the park.<br><br>Native wildlife would continue to be adversely impacted through disturbance, destruction and alteration of habitat, predation, herbivory (on special status plants), competition, spread of non-native plants, and disease. Some species of concern may be negatively affected particularly Carolina birds-in-a-nest which occurs in the seepage forest wetland type and freshwater mussels.<br><br>Overall, due to the widespread presence of wild pigs and the recurring nature of their activities, impacts to wildlife and special status species would be considered long-term. | Impacts to wildlife and special status species would be negligible to minor, short-term, and localized, and intended to reduce negative impacts caused by non-native wild pigs.<br><br>Lowest potential for adverse native wildlife impacts because wild pig populations would be substantially reduced within the park and immigrants would be periodically removed. |
| **Cultural Resources Impacts** | Impacts to cultural resources would be negligible to moderate, short-term and long-term, and adverse.<br><br>Highest potential for adverse impacts as pigs continue to damage archeological and historical sites and affect sites listed on the National Register of Historic Places. | Cultural resource impacts would be negligible to minor, and intended to reduce impacts caused by non-native wild pigs.<br><br>Lowest potential for adverse impacts as pigs would no longer continue to damage archeological and historical sites listed on the National Register of Historic Places. |

| | Alternative A | Alternative B |
|---|---|---|
| **Impact** *Category* | **Limited Wild Pig Management** No Action: Limited Wild Pig Management and Disease Surveillance by USDA Personnel | **Integrated Wild Pig Management** Proposed Action: Implement Integrated Non-native Wild Pig Management Plan |
| **Water Quality Impacts** | Impacts to water resources would be negligible to major, short-term and long-term, and adverse.<br><br>Highest potential for adverse effects as non-native wild pig impacts and threats to water resources, including water quality, hydrology, wetlands, and floodplains, would continue. Water resource impacts associated with wild pigs include increased stream bank and floodplain erosion, sediment contamination of surface waters and wetlands, fecal contamination of surface waters, impacts to hydric soils, impacts to wetland plants, and impacts to wetland wildlife. In addition, because CONG is primarily comprised of wetland and floodplain habitats and was established for the protection of these specific resources, all natural resource impacts, including those described for soils, vegetation, wildlife, special status species, and water resources, directly translate to wetland and floodplain impacts and an overall loss of ecosystem and park functionality. | Water resource impacts would be negligible to minor, short-term, highly localized, and intended to reduce water resource impacts caused by non-native wild pigs.<br><br>Lowest potential for major adverse water quality impacts from wild pigs as population would be reduced in time.<br><br>Potential alteration of surface water flow associated with exclosures and retention of flood debris would be avoided by using curtain barriers rather than fencing where streams or other channelized flows are present. All killed pigs will be moved at least 200 feet away from the banks of relatively permanent surface waters such as Cedar Creek, Tom's Creek, Wise Lake, Weston Lake, and the Congaree River. Moved pig carcasses would readily decompose on land. |

| | Alternative A | Alternative B |
|---|---|---|
| **Impact** *Category* | **Limited Wild Pig Management** No Action: Limited Wild Pig Management and Disease Surveillance by USDA Personnel | **Integrated Wild Pig Management** Proposed Action: Implement Integrated Non-native Wild Pig Management Plan |
| **Wilderness Character** | Impacts to wilderness would be minor to moderate, short-term and long-term, and adverse.<br><br>Highest potential for adverse effects through continuing and cumulative impacts from non-native wild pigs to wilderness. Non-native wild pigs were introduced by human activity (exploration and colonization, historic and recent agricultural land use, former free-range livestock management, introductions for sport hunting, etc.) and represent a readily visible and continuing human-caused intrusion into wilderness due to substrate and vegetation disturbance caused by rooting, wallowing, and the creation and use of game trails. | Wilderness impacts would be minor to moderate, short-term, localized, and intended to reduce wilderness impacts caused by non-native wild pigs.<br><br>Lowest potential for major adverse wilderness impacts from wild pigs as population would be reduced in time. Impacts to wilderness would be related primarily to physical disturbance associated with pig management activities, and the placement of temporary human-built structures to potentially include traps, protective fencing, curtain barriers, blinds, and stands. Protective fencing and curtain barriers, the more intrusive and less temporary structures of those described, would be limited to small areas where their use is critical for the protection of highly sensitive resources. A few small research and monitoring exclosures might also be used to support resource management goals. The limited use of vehicles on existing former logging roads with minimal vegetation clearing would be necessary to significantly reduce the wild pig population. Mechanized equipment and motorized vehicles may be restricted by park management in wet conditions to minimize impacts to soils and vegetation. Additionally all wagons and ORVs must be equipped with light weight low pressure tires or other tires designed to reduce impacts. The use of dogs in wilderness would also impact wilderness character. Tracking dogs will be used when they are determined to be critical. Overall, this alternative will reduce wilderness impacts associated with wild pig disturbance, resulting in a net positive effect on wilderness. |

| | Alternative A | Alternative B |
|---|---|---|
| **Impact** *Category* | **Limited Wild Pig Management** No Action: Limited Wild Pig Management and Disease Surveillance by USDA Personnel | **Integrated Wild Pig Management** Proposed Action: Implement Integrated Non-native Wild Pig Management Plan |
| **Public Health and Safety** | Public health and safety threats would be minor to moderate, short-term and long-term, and adverse.<br><br>Continuing to manage wild pig populations on a limited scale will result in increased spread of diseases that are present in the current population and increase the likelihood of visitor encounters with wild pigs that may result in harm to park staff and the visiting public. Currently, minimization and avoidance of threats to public health and safety related to USDA control operations include dissemination of public information; careful planning of wild pig management activities; extensive firearms training, qualification, and monitoring of personnel engaged in wild pig management; and temporary closures of small portions of the park, when needed. | Public health and safety threats would be minor to moderate, short-term, and intended to reduce threats caused by non-native wild pigs.<br><br>Public health and safety threats are primarily associated with the tightly controlled use of firearms and tracking of pigs by trained dogs during wild pig management activities. Although wild pig management activities would be conducted over the long-term, threats would not continue beyond the duration of the treatment action. Minimization and avoidance of threats to public health and safety include dissemination of public information; careful planning of wild pig management activities; extensive firearms training, qualification, and monitoring of personnel engaged in wild pig management; the use well-trained dogs; and temporary closures of small portions of the park, if needed. This alternative is intended to reduce threats associated with non-native wild pigs, resulting in a net positive effect on public health and safety. |

| | Alternative A | Alternative B |
|---|---|---|
| **Impact** *Category* | **Limited Wild Pig Management** No Action: Limited Wild Pig Management and Disease Surveillance by USDA Personnel | **Integrated Wild Pig Management** Proposed Action: Implement Integrated Non-native Wild Pig Management Plan |
| **Visitor Use and Experience** | Impacts to visitor use and experience would be negligible to major, widespread, short-term and long-term, and adverse for a subset of the visitor population.<br><br>Highest potential for adverse impacts at least for a subset of the visitor population. Substrate and vegetation disturbance caused by non-native wild pigs is readily apparent to park visitors along hiking trails, boardwalks, and Cedar Creek, and is frequently commented upon. Negative comments have been particularly frequent from experienced visitors using Cedar Creek and certain sections of the trails and boardwalk with more abundant wild pig damage. | Impacts to visitor use and experience would be minor to major, localized to widespread, and short-term.<br><br>Lowest potential for adverse impacts related primarily to wild pig management activities. Some park visitors would support wild pig management activities, while others would be opposed, perhaps strongly. Wild pig management would likely be controversial at the onset of the program, and would likely continue to be controversial at times, at least to some subset of the visitor population.<br><br>Avoidance, and minimization of impacts to visitor use and experience include public information and visitor education; careful planning of wild pig management activities; conducting the majority of shooting activity and tracking by trained dogs outside main visitor use periods; sound suppression of firearms; locating equipment such as traps and fencing away from visitor view; moving collected animals out of sight and away from main visitor use areas; etc. This alternative would reduce impacts associated with non-native wild pigs, resulting in a net positive effect on visitor use and experience for a subset of the visitor population. |

| | Alternative A | Alternative B |
|---|---|---|
| **Impact** *Category* | **Limited Wild Pig Management** No Action: Limited Wild Pig Management and Disease Surveillance by USDA Personnel | **Integrated Wild Pig Management** Proposed Action: Implement Integrated Non-native Wild Pig Management Plan |
| **Park Operations Impacts** | This alternative would result in negligible impacts to park operations, since no change in operations and no change in demand on park personnel or resources would occur. | Impacts to park operations under this alternative would be moderate to major, and intended to reduce major adverse impacts to other park resources caused by non-native wild pigs, several of which would result in impairment of park resources and values.<br><br>Impacts would include increased demand on personnel; increased demand on existing equipment; an expanded resource management program; increased need for specialized personnel training and certification; and other needs and adaptations associated with a major resource management effort. Demands on other park programs and operations would likely occur as well, particularly for law enforcement, but also including maintenance, interpretation, and administration. The impact can be mitigated by hiring additional NPS personnel to conduct wild pig management activities; participation by public land corps volunteers; and the continued participation of USDA Wildlife Services agents. Additional funding for personnel, equipment, and supplies would be necessary to fully implement the integrated wild pig management program, and would be required to sustain it over the long-term. |

## 5.0: AFFECTED ENVIRONMENT

CONG is a prime and relatively undisturbed example of a mature Cypress-Gum and bottomland hardwood forest complex and the largest contiguous stand of old-growth southern bottomland forest in the eastern United States. The authorized boundary of the park encompasses approximately 26,800 acres along the north side of the Congaree River and the west side of the Wateree River in southeast Richland County, South Carolina, and is approximately 20 miles southeast of Columbia, the state capital of South Carolina.

Although traditionally referred to as "The Swamp," CONG is actually an alluvial floodplain of the Congaree River. Of property managed by the park in the 1980s, only 10% of the park's area contained permanent surface water, with the remaining 90% of the landscape being forested (Patterson et al. 1985). The floodplain, having an elevation change of only 10 feet within a 13-mile range, contains a wealth of varied and complex vegetative communities. These vegetative communities are the result of slight topographic gradients that, when combined with the sedimentation of the old river channels, create an assortment of successional changes within the forest.

The hydrological cycle of the park is the driving force behind the unique ecosystem that is being preserved. The Congaree River and Wateree River watersheds consist of over 14,000 square miles of land extending into North Carolina. These lands are drained by the Broad and Saluda rivers that converge to form the Congaree River, and the Wateree River which is a continuation of the Catawba River that originates in the Blue Ridge Mountains. Additional tributaries include Cedar Creek that enters the park from the northwest, and Tom's Creek, that enters the park at its north-central portion. Over 90% of the park is forested wetland (SCDNR 1995, USFWS 2013) that is flooded by the rivers to some degree several times a year, and the majority of the park is flooded on average about once per year.

### 5.1: Climate

The climate at the park is temperate, characterized by warm, humid summers and mild winters with average monthly temperatures ranging from 46° to 81° Fahrenheit. Spring is the most variable time of the year with the passage of occasional cold fronts in March to a generally warm and pleasant May. Average annual rainfall is about 39 - 47 inches with the average monthly rainfall calculated over a 30 year period from 1981-2010 varying from seasonal lows in April of roughly 2.5 inches, to highs of 5.5 inches in July (NPS 2012). Long summers are the norm and hot and humid weather usually lasts from May to September with temperatures ranging from 80° to 100° Fahrenheit during the days and relative humidity averaged often above 85% during this period.

### 5.2: Air Quality

The park was classified as a Class II clean air area under the 1977 amendments to the Clean Air Act (42 U.S.C. 7401 *et seq.*). Under Class II, modest increases in air pollution are allowed beyond baseline levels for sulfur dioxide and particulate matter, provided that the National Ambient Air Quality Standards, established by the Environmental Protection Agency, are not

exceeded. However, data collated and analyzed by the Southeast Coast Inventory and Monitoring Network from 2005 to 2009 show that total-Nitrogen wet deposition, total-Sulphur deposition and visibility levels at CONG are considered to be of significant concern, while ozone is of moderate concern (NPS 2012). The overall risk of atmospheric nutrient enrichment is very high at the park which encompasses resources that are highly sensitive to nutrient enrichment from nitrogen deposition (Sullivan et al. 2011a, b).

## 5.3: Geology & Soils

The soils in the park comprise rich, fine textured alluviums extending in places to depths of 10 feet or more. Immediately adjacent to the streams in the park, the soils are primarily loams of the Congaree and Chewacla series. Near the low northern bluffs, the soils change over to Tawcaw silty clay. Throughout the floodplain there are spots of Chastain silt loam, Toccooa loam, and Dorovan muck, which is a peat. All of these soils are poorly drained with slow runoff and permeability. The upland areas of the low northern bluffs contain primarily Persanti fine sandy loams that are moderately well drained with medium runoff and slow permeability. Additionally, Cantey loams and Smithboro silt loams that are poorly drained, with slow to very slow runoff and permeability, are also found on the low northern bluffs.

## 5.4: Forest Types

The park's authorized boundary comprises approximately 26,800 acres, of which more than 90% of is primarily floodplain with a variety of swamp and bottomland hardwood stands of diverging types. The portion of the park not within the floodplain, contains areas of upland timber types and upland depressional wetlands located on and above the low northern bluffs. The most common forest types are:

Communities of Sloughs, Alluvial Flats, and Terraces (Southern Bottomland Hardwoods) are located between the low northern bluffs and the Congaree River. This type most commonly includes bald cypress (*Taxodium distichum*), cottonwood (*Populus deltoids*), green ash (*Fraxinus pennsylvanica*), red maple (*Acer rubrum*), laurel oak (*Quercus laurifolia*), sweetgum (*Liquidambar styraciflua*), swamp tupelo (*Nyssa biflora*), swamp chestnut oak (*Quercus michauxii*), overcup oak (*Quercus lyrata*) and willow oak (*Quercus phellos*), among others. These can be found in both solitary as well as mixed stands with differing degrees of dominance. The majority of this area can be classified as either sweetgum/mixed hardwood type or laurel oak/sweetgum type. The understory consists primarily of dwarf palmetto (*Sabal minor*), paw paw (*Asimina triloba*), ironwood (*Carpinus caroliniana*), possum haw (*Ilex decidua*), and saplings of the associated canopy and understory species.

Loblolly Pine Communities are located primarily on the low northern bluffs and extend into the floodplain in places. This type contains some of the largest loblolly pine trees in the country, with heights up to 170' and circumferences to 15'. Loblollies within the floodplain, mixed with the bottomland hardwoods are an uncommon forest association. Some disruptions of the forest succession in years past enabled the loblollies to become established. Pederson et al. (1997) conjectured that fire, farming and/or hurricanes may have been the disturbances responsible for allowing the loblolly pine to become established within the floodplain.

Pine Plantations are characterized by even-aged stands of 25 - to 40-year old loblolly pine that have been planted or have taken over cleared areas. Located on the north bluffs of the floodplain, these stands were established by prior landowners and acquired as part of the 1988 authorized boundary expansion.

Upland Hardwood Dominated Communities are common to the well-drained soil sites (Tawcaw silty clay and Persanti fine sandy loams) of the floodplain ridges and bluffs. This type consists of a mixture of oaks and hickories along with sycamore (*Plantanus occidentalis*), beech (*Fagus grandifolia*), and sugarberry (*Celtis laevigata*).

Longleaf Pine Communities are restricted in area and represent a globally rare ecosystem type. Within CONG, longleaf pine (*Pinus palustris*) may occur as dominant, co-dominant, or scattered individuals with loblolly pine. Longleaf pine occurs on upland flats on sandy loam soils. At the park, communities with a longleaf pine component range from open savannah-like longleaf dominated canopy to mostly closed canopy dominated by loblolly pine, a moderate to dense shrub layer dominated by dry-mesic tree species as well as more typical shrub species such as wax myrtle (*Myrica cerifera*), arrowwood (*Viburnum dentatum*) and shining sumac (*Rhus copallina*). The herbaceous layer is dominated by little bluestem (*Schizachyrium scoparium*) but other species typical of savannah vegetation are also present. A small population of the red-cockaded woodpecker occurred here until the late 1990s.

Overall, most of the vegetative communities delineated within the park are variations or successional stages of the above listed types. Also identified are a number of plant species of concern that exist within the park. These species have been verified and are listed in Tables 1 and 2.

5.5: Archeological Resources

The meandering of the Congaree River throughout time has probably destroyed many cultural resources as evidenced not only by cultural materials that occur on sandbars, but also by a mosaic of oxbow lakes in various stages of eutrophication. The environment of the floodplain, with its low-lying, frequently flooded and damp nature is of the type that would tend to discourage human utilization. Occupation that did occur was most likely in the form of limited activities such as the extraction of specific flora and fauna for subsistence, minimal cultivation of the rich soils, and the employment of browse and mast for raising livestock. However, historical-document research suggests that more people may have lived and worked in the floodplain during the 18$^{th}$ and first half of the 19$^{th}$ centuries than previously believed (Hardy 2008). A number of unique historic and archeological sites have been identified within the park.

The archeological sites relative to the prehistoric period are limited in number and scope. As documented by Michie (1980) and Hardy (2008), many of these sites are spurious in deposition and resulted from imported soils used to fill and maintain roads prior to the establishment of the National Monument. There were also attempts at building roads and a bridge through the floodplain, along with attempts at flood control through the use of dikes to facilitate cultivation. Additionally, a number of elevated earthen structures, probably cattle mounds, likely provided refuge for livestock during floods. All of these attempts to harness the floodplain resources were

relatively small in scope and of short duration. Due to the subterranean or "earthen" nature of these resources wild pig management activities should have little negative impact on them. Rooting by wild pigs on and around these structures has been documented. Reduction of the wild pig population will reduce rooting and be a benefit.

### 5.6: Wildlife

The park provides some of South Carolina's most exceptional wildlife habitat. Abundant fall mast production and a variety of vegetative cover provide sources of food and ample nesting and resting sites. A large variety of wildlife inhabits the park's grounds, including, but not limited to:

- Wood Ducks
- Wading birds
- Owls
- Wild Turkeys
- Woodpeckers
- Raptors
- Songbirds
- Rabbits
- Fox
- Bobcats
- Bats
- River otters
- Muskrats
- Beavers
- Deer

The principal limiting factor of wildlife inhabitation in the park is the periodic inundation of floodwaters throughout the year.

Reptiles and amphibians are also plentiful, primarily due to the wet environment. Aquatic fauna such as crayfish, clams and snails of multiple varieties proliferate throughout the floodplain. The Congaree River is the primary fishery of the area. On the floodplain, Cedar Creek, Toms Creek and some of the oxbow lakes harbor game fish and non-game fish species such as largemouth bass, bluegill, crappie, perch, gar, shiners and minnows. Additionally, striped bass are found in the Congaree River. All are considered native species.

Suitable habitat for several federally-listed species exists within CONG. The red-cockaded woodpecker, a federally-endangered species, recently occupied a small portion of the park in a mature longleaf and loblolly pine area above the low northern bluffs. Although the habitat required for endangered species such as the ivory-billed woodpecker and the eastern cougar exists within the park, no verifiable sightings have occurred in the park.

Non-native invasive animal species also occur within CONG including non-native wild pigs, feral dogs, and feral cats, which present resource threats to a variety of park resources, including native wildlife.

## 6.0: ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

### 6.1: Introduction

The National Environmental Policy Act requires that federal agencies, before taking an action, discuss the environmental impacts of that action, feasible alternatives to that action, and any adverse environmental effects that cannot be avoided if the proposed action is implemented. This section of the EA describes the potential environmental impacts of implementing each of the alternatives (i.e., the no-action alternative and the proposed action alternative) on natural and

cultural resources, visitor use and experience, and park operations. These impacts provide a basis for comparing the advantages and disadvantages of the alternatives.

This analysis of environmental consequences consists largely of a qualitative assessment of the effects of the alternatives with respect to nine impact topics. The first part of this section discusses the methodology used to identify impacts and includes definitions of terms. The impact topics are then analyzed with reference to each of the alternatives. The discussion of each impact topic includes a description of the positive and negative effects of the alternatives, a discussion of cumulative effects, if any, and a conclusion. The conclusion includes a discussion of whether, and to what extent, the alternative would impair park resources and values. For the analyses, NPS considered the mitigation measures described in section 4.0 of this assessment.

## 6.2: Methodology

Generally, the methodology for resource impact assessments follows direction provided in the Council on Environmental Quality (CEQ) Regulations for Implementing the National Environmental Policy Act, Parts 1502 and 1508. The impact analysis and the conclusions in this part are based largely on the review of existing literature and park studies, information provided by experts within the National Park Service and other agencies, park staff insights and professional judgment.

The impacts from the alternatives were evaluated in terms of the context, duration, and intensity of the impacts, as defined below, and whether the impacts were considered beneficial or adverse to park resources and values.

### 6.2.1: Context

Each impact topic addresses effects on resources inside and outside the park to the extent that those effects are traceable to the actions set forth in the alternatives.

### 6.2.2: Duration and Intensity of Impacts

Impacts are analyzed in terms of their intensity (negligible, minor, moderate, or major) and duration (short - or long-term). The criteria used to define the intensity and duration of impacts associated with the analysis is presented in Table 5.

**Table 5. Impact Threshold and Duration Definitions by Impact Topic**

| Impact Topic | Impact Threshold Definition | | | | Duration |
|---|---|---|---|---|---|
| | Negligible | Minor | Moderate | Major | |
| Soils | Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soil productivity or fertility would be slight and no long-term effects to soils would occur. | The effects to soils would be detectable, but likely short-term. Effects to soil productivity or fertility would be small, as would the area affected. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and likely successful. | The effect on soil productivity or fertility would be readily apparent, long-term, and result in a change to the soil character over a relatively wide area. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful. | The effect on soil productivity or fertility would be readily apparent, long-term, and substantially change the character of the soils over a large area in and out of the park. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed. | Short Term - Recovers in less than 3 years<br>Long Term - Takes more than 3 years to recover |
| Vegetation | No native vegetation would be affected or some individual native plants could be affected as a result of the alternative, but there would be no effect on native species populations. The effects would be short-term, on a small scale, and no species of special concern would be affected. | The alternative would temporarily affect some individual native plants and would also affect a relatively minor portion of that species' population. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective. | The alternative would affect some individual native plants and would also affect a sizeable segment of the species' population in the long-term and over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could also be affected. | The alternative would have a considerable long-term effect on native plant populations, including species of special concern, and affect a relatively large area in and out of the park. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed. | Short Term - Recovers in less than 3 years<br>Long Term - Takes more than 3 years to recover |

| Impact Topic | Impact Threshold Definition | | | | Duration |
|---|---|---|---|---|---|
| | Negligible | Minor | Moderate | Major | |
| Wildlife | Wildlife would not be affected or the effects would be at or below the level of detection, would be short-term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population. | Effects to wildlife would be detectable, although the effects would be localized, and would be small and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful. | Effects to wildlife would be readily detectable, long-term and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful. | Effects to wildlife would be obvious, long-term, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed. | Short Term - Recovers in less than 1 year<br>Long Term - Takes more than 1 year to recover |
| Special Status Species | No federally-listed species would be affected or the alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence to the protected individual or its population. Negligible effect would equate with a "no effect" determination in U.S. Fish and Wildlife Service terms. | The alternative would affect an individual(s) of a listed species or its critical habitat, but the change would be small and would be short-term. Minor effect would equate with a "may effect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species. | An individual or population of a listed species, or its critical habitat would be noticeably affected. The effect would have some long-term consequence to the individual, population, or habitat. Moderate effect would equate with a "may effect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species. | An individual or population of a listed species, or its critical habitat, would be noticeably affected with a long-term, vital consequence to the individual, population, or habitat. Major effect would equate with a "may effect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species or critical habitat. | **Plants**<br>Short Term - Recovers in less than 1 year<br>Long Term - Takes more than 1 year to recover<br>**Animals**<br>Short Term - Recovers in less than 1 year<br>Long Term - Takes more than 1 year to recover |

| Impact Topic | Impact Threshold Definition | | | | Duration |
|---|---|---|---|---|---|
| | Negligible | Minor | Moderate | Major | |
| Cultural Resources | The impact is at the lowest levels of detection – barely perceptible and not measurable. | For archeological resources, the impact affects an archeological site(s) with modest data potential and no significant ties to a living community's cultural identity. The impact does not affect the character defining features of a National Register of Historic Places eligible or listed structure, district, or cultural landscape. | For archeological resources, the impact affects an archeological site(s) with high data potential and no significant ties to a living community's cultural identity. For a National Register eligible or listed structure, district, or cultural landscape, the impact changes a character defining feature(s) of the resource but does not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized. | For archeological resources, the impact affects an archeological site(s) with exceptional data potential or that has significant ties to a living community's cultural identity. For a National Register eligible or listed structure, district, or cultural landscape, the impact changes a character defining feature(s) of the resource, diminishing the integrity of the resource to the extent that it is no longer eligible to be listed in the National Register. | Short term - Treatment effects on the natural elements of a cultural landscape may be comparatively short-term (e.g., three to five years until new vegetation grows or historic plantings are restored, etc.)<br>Long term - Because most cultural resources are non-renewable, any effects on archeological, historic, or ethnographic resources, and on most elements of a cultural landscape would be long term. |

| Impact Topic | Impact Threshold Definition | | | | Duration |
|---|---|---|---|---|---|
| | Negligible | Minor | Moderate | Major | |
| Water Resources: Water Quality and Hydrology | Wetlands or floodplains would not be affected or the effects to the resource would be below or at the lower levels of detection. No long-term effects to wetlands or floodplains would occur and any detectable effects would be slight. No U.S. Army Corps of Engineers 404 permit would be necessary. | The effects to wetlands or floodplains would be detectable and relatively small in terms of area and the nature of the change. A U.S. Army Corps of Engineers 404 permit would not be required. No long-term effects to wetlands or floodplains would likely occur. | The alternative would result in effects to wetlands or floodplains that would be readily apparent, including a long-term effect on wetland vegetation, such that an U.S. Army Corps of Engineers 404 permit could be required. Wetland or floodplain functions would not be affected in the long-term. | Effects to wetlands or floodplains would be observable over a relatively large area, would be long-term, and would require a U.S. Army Corps of Engineers 404 permit. The character of the wetland or floodplain would be changed so that the functions typically provided by the wetland or floodplain would be substantially changed. | Short Term - Recovers in less than 1 year<br>Long Term - Takes more than 1 year to recover |
| Water Resources: Floodplain Wetlands | Wetlands or floodplains would not be affected or the effects to the resource would be below or at the lower levels of detection. No long-term effects to wetlands or floodplains would occur and any detectable effects would be slight. No U.S. Army Corps of Engineers 404 permit would be necessary. | The effects to wetlands or floodplains would be detectable and relatively small in terms of area and the nature of the change. A U.S. Army Corps of Engineers 404 permit would not be required. No long-term effects to wetlands or floodplains would likely occur. | The alternative would result in effects to wetlands or floodplains that would be readily apparent, including a long-term effect on wetland vegetation, such that an U.S. Army Corps of Engineers 404 permit could be required. Wetland or floodplain functions would not be affected in the long-term. | Effects to wetlands or floodplains would be observable over a relatively large area, would be long-term, and would require a U.S. Army Corps of Engineers 404 permit. The character of the wetland or floodplain would be changed so that the functions typically provided by the wetland or floodplain would be substantially changed. | Short Term - Recovers in less than 1 year<br>Long Term - Takes more than 1 year to recover |

| Impact Topic | Impact Threshold Definition | | | | Duration |
|---|---|---|---|---|---|
| | Negligible | Minor | Moderate | Major | |
| Wilderness Character | No effects would occur or the effects to wilderness conditions would be below or at the level of detection. The effect would be slight and no long-term effects to wilderness conditions would occur. | The effects to wilderness conditions would be detectable. Any effects would be small and if mitigation is needed to offset potential adverse effects, it would be successful. | The effects to wilderness conditions would be readily apparent and likely long-term. Any effects would result in changes to wilderness conditions on a local scale. If mitigation is needed to offset potential adverse effects, it could be extensive, but would likely be successful. | The effects to wilderness conditions would be readily apparent, long-term, and would cause substantial changes to wilderness conditions in the region. Mitigation measures to offset potential adverse effects would be extensive and their success could not be guaranteed. | Short Term - Recovers in less than 5years<br>Long Term - Takes more than 5 years to recover |
| Public Health and Safety | Public health and safety would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on the public health or safety. | The effect would be detectable and short-term, but would not have an appreciable effect on public health and safety. If mitigation were needed, it would be relatively simple and likely successful. | The effects would be readily apparent and long-term, and would result in substantial, noticeable effects to public health and safety on a local scale. Mitigation measures would probably be necessary and would likely be successful. | The effects would be readily apparent and long-term, and would result in substantial, noticeable effects to public health and safety on a regional scale. Extensive mitigation measures would be needed, and their success would not be guaranteed. | Short Term - Effects lasting for the duration of the treatment action.<br>Long Term - Effects lasting longer than the duration of the treatment action. |
| Visitor use and experience | Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short-term. The visitor would not likely be aware of the effects associated with the alternative. | Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short-term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight. | Changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes. | Changes in visitor use and/or experience would be readily apparent and have important long-term consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes. | Short Term - occurs only during the treatment effect.<br>Long Term - occurs after the treatment effect. |

| Impact Topic | Impact Threshold Definition | | | | Duration |
|---|---|---|---|---|---|
| | Negligible | Minor | Moderate | Major | |
| Park Operations | Park operations would not be affected or the effect would be at or below the lower levels of detection, and would not have an appreciable effect on park operations. | The effect would be detectable and likely short-term, but would be of a magnitude that would not have an appreciable effect on park operations. If mitigation were needed to offset adverse effects, it would be relatively simple and likely successful. | The effects would be readily apparent, be long-term, and would result in a substantial change in park operations in a manner noticeable to staff and the public. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful. | The effects would be readily apparent, long-term, would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed. | Short Term - effects lasting for the duration of the treatment action.<br>Long Term - effects lasting longer than the duration of the treatment action. |

6.2.3: Impact Type
Unless otherwise noted, impacts would be adverse.

CEQ regulations and the National Park Service's *Conservation Planning, Environmental Impact Analysis and Decision-making* (Director's Order #12) call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g., reducing the intensity of an impact from major to moderate or minor. The preferred alternative assumes that park managers would apply mitigation measures to minimize or avoid impacts. If appropriate mitigation measures were not applied, the potential for resource impacts would increase and the magnitude of those impacts would rise.

6.2.4: Direct versus Indirect Impacts
Direct effects would be caused by an action and would occur at the same time and place as the action. Indirect effects would be caused by the action and would be reasonably foreseeable but would occur later in time, at another place, or to another resource.

6.3: Cumulative Impacts

Regulations implementing NEPA issued by the CEQ require the assessment of cumulative impacts in the decision-making process for federal actions. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The cumulative impacts analyzed in this document consider the incremental effects of the alternatives in conjunction with past, current, and future actions at the park. Cumulative impacts were determined by combining the effects of a given alternative with other past, present, and reasonably foreseeable future actions. The impact analysis and conclusions are based on information available in the literature, data from NPS studies and records, and information provided by experts within the National Park Service and other agencies. Unless otherwise stated, all impacts are assumed to be direct and long-term.

6.4: Soils

**Alternative A - No-Action**

*Analysis:* The no-action alternative, limited wild pig management and disease surveillance by USDA personnel would result in continuing non-native wild pig impacts and threats to natural resources including soils. Soil impacts due to wild pig behavior such as rooting would be considered moderate to major, depending on the location and type of soil present in a disturbed area. Impacts would be widespread, occurring throughout the park and adjacent areas. Soil impacts associated with wild pigs can include soil erosion (particularly along streams), soil contamination of streams, soil compaction, changes in soil bulk density, soil oxidation in areas with highly organic or peat soils (resulting in soil loss), changes in soil nutrient dynamics and other biogeochemical properties, and effects on soil biota. In some cases, single or individual wild pig disturbance events could have short-term effects, while in other cases long-term effects

would result. Overall, due to the widespread and recurring nature of wild pig disturbance activities, soil impacts would be considered long-term. Localized substrate disturbance associated with limited vehicular access and the placement of traps by USDA in their wild pig management activities will occur. These impacts would be negligible and short-term.

*Cumulative Impacts:* Non-native wild pigs have likely been present at CONG since European colonization. However, their numbers have likely increased with growing human settlement, expanding agriculture, and direct introductions, coupled with the biological growth of the wild pig population. Because the no action alternative results in very limited control of the wild pig population at Congaree, incremental cumulative pig impacts to soils within the park will continue, or at a minimum, the currently impacted condition will persist. The wild pig management activities conducted by USDA personnel would contribute negligibly to cumulative adverse impacts on soils because of the small amount of disturbance associated with vehicle use and placement of installations.

*Conclusion:* Under the no-action alternative, impacts to soils would be negligible to major, short-term and long-term, and adverse due to the relatively limited reduction of wild pig numbers possible under this alternative.

**Alternative B - Implement Integrated Non-native Wild Pig Management Plan (Preferred Alternative)**

*Analysis:* Impacts to soils under this alternative would be negligible to minor, short-term, and resulting in highly localized substrate disturbance associated with limited vehicular access and the placement of additional traps, protective fencing, curtain barriers, blinds, stands, and the use of tracking dogs. Minimization and avoidance of soil impacts have been addressed for these activities in Section 4.0 above, as well as mitigation measures, if needed. This alternative is intended to reduce soil impacts associated with pig disturbance, resulting in a net positive effect on soil resources.

*Cumulative Impacts:* The management activities in this alternative would contribute negligibly to cumulative adverse impacts on soils because of the small amount of soil disturbance associated with vehicle use and placement of installations.

*Conclusion:* Soil impacts under this alternative would be negligible to minor, short-term, highly localized, and adverse. The management activities in this alternative are intended to reduce soil impacts caused by non-native wild pigs. Impacts to soils from reduction of the wild pig population would be long-term and beneficial.

6.5: Vegetation

**Alternative A - No-Action**

*Analysis:* The no-action alternative, limited wild pig management and disease surveillance by USDA personnel would result in continuing non-native wild pig impacts and threats to natural resources including vegetation. Vegetation impacts caused by wild pigs would be considered moderate. Impacts would be widespread, occurring throughout the park and adjacent areas. In short, wild pig activity can impact vegetation communities and plant species populations through

disturbance associated with rooting, digging, wallowing, trampling, and use of game trails; destruction or alteration of habitat; herbivory (consumption of mature plants, seedlings, saplings, leaves, stems, roots, flowers, fruit, seeds, etc.); the spread of non-native plants which compete with or exclude native species; etc. Special status plant species can be subjected to these impacts as well. In some cases, a single or individual wild pig activity could have short-term effects, while in other cases effects would be long-term. Overall, due to the widespread and recurring nature of wild pig activities, vegetation impacts would be considered long-term. Impacts to vegetation associated with limited vehicular access and the placement of traps by USDA personnel under this alternative would be negligible to minor, short-term, and highly localized disturbance.

*Cumulative Impacts:* Non-native wild pigs have likely been present at CONG since European colonization, although their numbers likely increased with growing human settlement, expanding agriculture, and direct introductions, coupled with the biological growth of the wild pig population. The no action alternative would result in continuing incremental pig impacts to vegetation within the park, or at a minimum, the perpetuation of the currently impacted condition. The wild pig management activities conducted by USDA personnel would contribute negligibly to cumulative adverse impacts on vegetation because of the small amount of injury or damage associated with vehicle use and placement of installations.

*Conclusion:* Under the no-action alternative, impacts to vegetation would be negligible to moderate, short-term and long-term, and adverse due to the relatively limited reduction of wild pig numbers possible under this alternative.

**Alternative B - Implement Integrated Non-native Wild Pig Management Plan (Preferred Alternative)**

*Analysis:* Impacts to vegetation under this alternative would be negligible to minor, short-term, and highly localized disturbance associated with limited vehicular access and the placement of traps, protective fencing, curtain barriers, blinds, stands, and dogs. Minimization and avoidance of vegetation impacts have been addressed for these activities in Section 4.0 above, as well as mitigation measures, if needed. This alternative is intended to reduce vegetation impacts associated with wild pigs, resulting in a net positive effect on vegetation.

*Cumulative Impacts:* The most pervasive cause of adverse impacts to vegetation in the floodplain is altered hydrology, which results chiefly from the regulation of water flows by Lake Murray and other upstream impoundments. The management activities in this alternative would contribute negligibly to cumulative adverse impacts on vegetation because of the small amount of damage to vegetation associated with vehicle use and placement of installations. The cumulative adverse effects to vegetation would be partially offset by the beneficial impacts resulting from a reduction in the number of wild pigs. However, these beneficial impacts would not return floodplain vegetation to a fully "natural" condition.

*Conclusion:* Vegetation impacts under this alternative due to management activities would be negligible to minor, short-term, highly localized, and adverse. The management activities in this alternative are intended to reduce vegetation impacts caused by non-native wild pigs. Impacts to vegetation from reduction of the wild pig population would be long-term and beneficial.

6.6: Wildlife & Special Status Species

**Alternative A - No-Action**

*Analysis:* The no-action alternative, limited wild pig management and disease surveillance by USDA personnel would result in continuing non-native wild pig impacts and threats to natural resources including wildlife and special status species (special status animals and plants). Wildlife and special status species impacts caused by wild pigs would be considered minor to moderate and adverse. Impacts would be widespread, occurring throughout the park and adjacent areas. Wild pig activity can impact wildlife and special status species through disturbance, destruction or alteration of habitat, predation, herbivory (on special status plants), competition, spread of non-native plants, and disease. Some species of concern are more likely to be negatively affected, particularly Carolina birds-in-a-nest which occurs in the seepage forest wetland type, a habitat known to be used by wild pigs, and freshwater mussels. Overall, due to the widespread presence of wild pigs and the recurring nature of their activities, impacts to wildlife and special status species would be considered long-term. Impacts on wildlife and special status species associated with limited vehicular access and the placement of traps and stands; the temporary capture of non-target wildlife in traps; and limited human disturbance associated with shooting activities by USDA personnel under this alternative would be negligible to minor, short-term, highly localized disturbance.

*Cumulative Impacts:* Non-native wild pigs have likely been present at CONG since European colonization, although their numbers have likely increased with growing human settlement, expanding agriculture, and direct introductions, coupled with the biological growth of the wild pig population. The no action alternative would result in continuing incremental adverse pig impacts to wildlife and special status species within the park, or at a minimum, the perpetuation of the currently impacted condition. The wild pig management activities conducted by USDA personnel would contribute negligibly to cumulative adverse impacts on wildlife and special status species because of the small amount of injury or loss to wildlife associated with vehicle use and placement of installations.

*Conclusion:* Under the no-action alternative, impacts to wildlife and special status species would be negligible to major, short-term and long-term, and adverse due to the relatively limited reduction of wild pig numbers possible under this alternative.

**Alternative B - Implement Integrated Non-native Wild Pig Management Plan (Preferred Alternative)**

*Analysis:* Impacts to wildlife and special status species under this alternative would be negligible to minor, short-term, and localized physical disturbance associated with limited vehicular access and the placement of traps, protective fencing, curtain barriers, blinds, and stands; the temporary capture of non-target wildlife in traps; the use of dogs trained to only track the scent of pigs; and limited human disturbance associated with shooting activities. Use of non-lead ammunition would have beneficial impacts to scavengers and other types of wildlife that might otherwise ingest or be exposed to lead. Minimization, avoidance, and mitigation of wildlife and special status species impacts are addressed for these activities in Section 4.0 above. This alternative is intended to reduce impacts associated with wild pigs, resulting in a net

positive effect on wildlife and special status species. Management activities could result in flushing of the federally-listed wood stork and red-cockaded woodpecker from time to time. (Note: the red-cockaded woodpecker has not been spotted in the park since the late 1990s.) However, improvements to water quality could benefit the wood stork.

*Cumulative Impacts:* The management activities in this alternative would contribute negligibly to cumulative adverse impacts on wildlife and special status species because of the small amount of injury or loss to wildlife associated with vehicle use and placement of installations.

*Conclusion:* Wildlife and special status species impacts under this alternative due to management activities would be negligible to minor, short-term, and localized, and adverse. The management activities in this alternative are intended to reduce negative impacts caused by non-native wild pigs. Impacts to wildlife and special status species from reduction of the wild pig population would be long-term and beneficial.

*Statement regarding consultation under section 7 of the Endangered Species Act:* After applying the relevant criteria from the Endangered Species Act, the National Park Service concludes that implementation of the preferred alternative *may affect, but is not likely to adversely affect* any federally-threatened or endangered species (i.e., wood stork and red-cockaded woodpecker). Concurrence in this determination will be sought from the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act.

6.7: Cultural Resources

**Alternative A - No-Action**

*Analysis:* The no-action alternative, limited wild pig management and disease surveillance by USDA personnel would result in continuing non-native wild pig impacts and threats to cultural resources such as archeological sites and historic structures, including nine resources listed on the National Register of Historic Places. Impacts caused by rooting and other wild pig behaviors would be considered minor to moderate, depending on the type and characteristics of the resource at risk. Impacts include the unearthing and scattering of subsurface artifacts, mixing of soil and artifact layers and the loss of context, and erosion of earthen-work structures such as cattle mounds and levees, where wild pigs are known to congregate during flood periods. Because cultural resources are primarily non-renewable resources, impacts to these resources would be considered long-term. Impacts to cultural resources associated with the wild pig management by USDA personnel under this alternative would be negative, negligible to minor, short-term, and highly localized. The management activities in themselves would have "no adverse effect" on cultural resources within the meaning of Section 106 of the National Historic Preservation Act.

*Cumulative Impacts:* As cultural resources are nonrenewable, damage or loss from any cause would gradually diminish the types and numbers of resources available for study or visitor enjoyment. The no action alternative would result in continuing incremental wild pig impacts to cultural resources. The wild pig management activities conducted by USDA personnel would contribute negligibly to cumulative negative impacts on cultural resources because of the minimal soil disturbance associated with vehicle use and placement of installations.

*Conclusion:* Under the no-action alternative, impacts to cultural resources would be negligible to moderate, short-term and long-term, and negative due to relatively limited reduction of wild pig numbers possible under this alternative.

**Alternative B - Implement Integrated Non-native Wild Pig Management Plan (Preferred Alternative)**

*Analysis:* Impacts to cultural resources under this alternative would be negligible to minor substrate disturbance associated with the placement of traps, protective fencing, and other equipment. Minimization and avoidance of cultural resource impacts is addressed for these activities in Section 4.0 above. This alternative is intended to reduce impacts associated with wild pig disturbance, resulting in a net positive effect on cultural resources.

*Cumulative Impacts:* As cultural resources are nonrenewable, damage or loss from any cause would gradually diminish the types and numbers of resources available for study or visitor enjoyment. This alternative would contribute negligibly to cumulative impacts on cultural resources because of the minimal soil disturbance associated with vehicle use and placement of installations.

*Conclusion:* Cultural resource impacts under this alternative would be negligible to minor, and intended to reduce impacts caused by non-native wild pigs. The management activities in this alternative are intended to reduce negative impacts caused by non-native wild pigs. Impacts to cultural resources from reduction of the wild pig population would be long-term and beneficial.

*Section 106 Assessment*: After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of the management actions set forth in the preferred alternative would *not* have an adverse effect on any historic property, i.e., any area or object included in, or eligible for inclusion in, the National Register of Historic Places. Concurrence in this determination will be sought from the South Carolina State Historic Preservation Officer.

6.8: Water Resources (Water Quality, Hydrology, Wetlands, Floodplains)

**Alternative A - No-Action**

*Analysis:* The no-action alternative, limited wild pig management and disease surveillance by USDA personnel, would result in continuing non-native wild pig impacts and threats to water resources, including water quality, hydrology, wetlands, and floodplains. Water resource impacts associated with wild pigs would be considered moderate to major, long term, and adverse, and would occur on a local to wide-area scale (throughout the park and adjacent areas), depending on the type of resource and impact involved. Water resource impacts associated with wild pigs include increased stream bank and floodplain erosion, sediment contamination of surface waters and wetlands, fecal contamination of surface waters, impacts to hydric soils, impacts to wetland plants, impacts to wetland wildlife, etc. In addition, because CONG is primarily comprised of wetland and floodplain habitats and was established for the protection of these specific resources, all natural resource impacts, including those described for soils, vegetation, wildlife, special status species, and water resources, directly translate to wetland and floodplain impacts and an overall loss of ecosystem and park functionality. Impacts to water resources associated with

limited vehicular access and the placement of traps by USDA personnel under this alternative would be negligible to minor, short-term, highly localized disturbance.

*Cumulative Impacts:* Non-native wild pigs have likely been present at CONG since European colonization, although their numbers likely increased with growing human settlement, expanding agriculture, and direct introductions, coupled with the biological growth of the wild pig population. The no action alternative would result in continuing incremental adverse wild pig impacts to water resources within the park, or at a minimum, the perpetuation of the currently impacted condition. The wild pig management activities conducted by USDA personnel would contribute negligibly to cumulative adverse impacts on water resources because of the small amount of damage to water resources associated with vehicle use and placement of installations.

*Conclusion:* Under the no-action alternative, impacts to water resources would be moderate to major, short-term and long-term, and adverse due to the relatively limited reduction of wild pig numbers possible under this alternative.

**Alternative B - Implement Integrated Non-native Wild Pig Management Plan (Preferred Alternative)**

*Analysis:* Impacts to water resources under this alternative would be negligible to minor, short-term, highly localized disturbance associated with limited vehicular access and the placement of traps, protective fencing, curtain barriers, blinds, and stands. Potential alteration of surface water flow associated with exclosures and retention of flood debris would be avoided by using curtain barriers rather than fencing where streams or other channelized flows are present. Additional minimization and avoidance of water resource impacts have been addressed for these activities under Section 4.0, as well as mitigation measures, if needed. This alternative is intended to reduce impacts associated with wild pigs, resulting in a net positive effect on water resources.

*Cumulative Impacts:* The management activities in this alternative would contribute negligibly to cumulative adverse impacts on water resources because of the small amount of damage to water resources associated with vehicle use and placement of installations.

*Conclusion:* Water resource impacts under this alternative due to management activities would be negligible to minor, short-term, highly localized, and adverse. The management activities in this alternative are intended to reduce water resource impacts caused by non-native wild pigs. Impacts to water resources from reduction of the wild pig population would be long-term and beneficial.

6.9: Wilderness Character

**Alternative A - No-Action**

*Analysis:* The no-action alternative, limited wild pig management and disease surveillance by USDA personnel would result in continuing non-native wild pig impacts and threats to wilderness. Non-native wild pigs were introduced by human activity (exploration and colonization, historic and recent agricultural land use, former free-range livestock management, introductions for sport hunting) and represent a readily visible and continuing human-caused intrusion into wilderness due to substrate and vegetation disturbance caused by rooting,

wallowing, and the creation and use of game trails. Wilderness impacts by non-native wild pigs would be considered minor to moderate, adverse, and widespread, occurring throughout the park and adjacent areas. Overall, due to the widespread and recurring nature of wild pig disturbance activities, wilderness impacts would be considered long-term. Under this alternative, impacts to wilderness character associated with wild pig management activities conducted by USDA personnel would result from short-term, localized disturbance, related primarily to physical disturbance associated with the placement of temporary human-built structures including traps and stands.

The National Park Service is charged with preserving and enhancing the wilderness character of the wilderness areas it administers. Wilderness character is assessed in reference to five separate qualities: "untrammeled," "natural," "undeveloped," "opportunities for solitude or primitive and unconfined recreation," and (where applicable) other features (see definitions at p. 16 above). All five qualities of wilderness character are assessed herein.

Alternative A would have the following impacts to the individual elements of wilderness character:

- *Untrammeled*: The intentional reduction in numbers of a non-native species constitutes a trammeling (manipulation) of the wilderness resource. The impact of pig management on the untrammeled quality of wilderness would be minor to moderate and adverse. The impact would be long-term due to the need to keep manipulating the wilderness resource for years to come.
- *Natural*: Reduction of the numbers of wild pigs and their associated ecosystem impacts would improve the natural quality of the Congaree wilderness. Impacts would be long-term and beneficial, so long as the program is sustained over time.
- *Undeveloped*: Pig management activities would result in the placement of temporary structures in wilderness, together with limited vehicle use. The impact of these activities on the undeveloped quality of wilderness would be minor to moderate, short - and long-term, and adverse.
- *Opportunities for solitude and unconfined recreation*: Pig management activities would occasionally result in noise, visual impacts, and limited area closures. Impacts to solitude and opportunities for unconfined recreation would be minor, long-term, and adverse.
- *Other Features*: Pig reduction activities could result in reduced impacts to historic earthworks in the floodplain. Impacts to this element of wilderness character would be long-term and beneficial, so long as the program is sustained over time.

On balance, Alternative A would result in limited beneficial impacts to the natural quality of wilderness (and to historic structures). This limited benefit is attributable to the relatively small numbers of pigs that could be removed under the measures authorized by Alternative A. Given that large numbers of pigs need to be removed for a pig management program to be effective, the beneficial impacts of Alternative A would only partially offset the alternative's adverse impacts to the untrammeled and undeveloped qualities of wilderness, and to opportunities for solitude and unconfined recreation.

***Cumulative Impacts:*** Non-native wild pigs have likely been present at CONG since European colonization, although their numbers have likely increased with growing human settlement,

expanding agriculture, and direct introductions, coupled with the biological growth of the wild pig population. The no action alternative would result in continuing incremental wild pig impacts to wilderness within the park, or at a minimum, the perpetuation of the currently impacted condition. The wild pig management activities conducted by USDA personnel would contribute a minor incremental amount to cumulative adverse impacts on wilderness character.

***Conclusion:*** Under this alternative, impacts on three of the five elements of wilderness character would be minor or minor to moderate, short-term, localized, and adverse. Impacts to the natural quality of wilderness character would be long-term and beneficial, due to the reduction of the wild pig population.

**Alternative B - Implement Integrated Non-native Wild Pig Management Plan (Preferred Alternative)**

***Analysis:*** Impacts to wilderness under this alternative would be minor to moderate, short-term, and localized, related primarily to physical disturbance associated with pig management activities, and the placement of temporary human-built structures to potentially include traps, protective fencing, curtain barriers, blinds, and stands. Protective fencing and curtain barriers, the more intrusive and less temporary structures of those described, would be limited to small areas where their use is critical for the protection of highly sensitive resources. A few small research and monitoring exclosures might also be used to support resource management goals. The use of dogs in wilderness would also impact wilderness character. Tracking dogs would be used when they are determined to be critical. Minimization, avoidance, and mitigation of wilderness impacts are addressed for these activities in Section 4.0 above. This alternative is intended to reduce wilderness impacts associated with wild pig disturbance, resulting in a net positive effect on wilderness.

CONG personnel involved in wild pig management have used the Minimum Requirement Decision Guide Workbook to complete a preliminary minimum requirements determination (Appendix A) for the specific management activities identified in Section 4(c) of the Wilderness Act, i.e., use of a temporary road, use of motor vehicles, use of motorized equipment (and motorboats), aircraft overflights, the landing of aircraft, use of any form of mechanical transport, and the use of structures or installations. All proposed wild pig management actions in wilderness or potential wilderness have been evaluated using this process. The park Superintendent will make the final minimum requirements determination after reviewing public comments on this EA and the preliminary minimum requirements determination. The Superintendent would likewise make all subsequent management decisions related to implementation of the plan.

Alternative B would have the following impacts to the individual elements of wilderness character:

- *Untrammeled*: The intentional reduction in numbers of a non-native species constitutes a trammeling (manipulation) of the wilderness resource. More trammeling would occur under this alternative than under Alternative A. Impacts on the untrammeled quality of wilderness would be minor to moderate and adverse. The impact would be long-term due to the need to keep manipulating the wilderness resource for years to come.

- *Natural*: Reduction of the numbers of wild pigs and their associated ecosystem impacts would improve the natural quality of the Congaree wilderness. Impacts would be long-term and beneficial, so long as the program is sustained over time. More pigs would be removed under this alternative than under Alternative A, with a corresponding increase in beneficial impacts.
- *Undeveloped*: Pig management activities would result in the placement of temporary structures in wilderness, together with some limited clearing of former logging roads and vehicle use. More nonconforming uses would occur under Alternative B than under Alternative A, resulting in greater adverse impacts to the undeveloped quality of wilderness. Impacts would be minor to moderate, short - and long-term, and adverse.
- *Opportunities for solitude and unconfined recreation*: Pig management activities would occasionally result in noise, visual impacts (from road clearing and temporary structures such as traps), and limited area closures. More nonconforming uses and possible area closures would occur under Alternative B than under Alternative A, resulting in greater adverse impacts to solitude and opportunities for unconfined recreation. Impacts would be minor to moderate, long-term, and adverse.
- *Other Features*: Pig reduction activities could result in reduced impacts to historic earthworks in the floodplain. More active protection of earthworks would occur under Alternative B than under Alternative A. Impacts would be long-term and beneficial, so long as the program is sustained over time.

Alternative B would result in greater beneficial impacts to the natural quality of wilderness (and to historic structures) than Alternative A. This greater benefit is attributable to the larger number of pigs that could be removed under Alternative B than Alternative A. Beneficial impacts on the natural quality of wilderness would more than offset adverse impacts to the untrammeled and undeveloped qualities of wilderness, and to opportunities for solitude and unconfined recreation.

***Cumulative Impacts:*** The management actions in this alternative would contribute a minor amount to cumulative adverse impacts on wilderness character.

***Conclusion:*** Under this alternative, impacts on three of the five elements of wilderness character would be minor to moderate, short-term, localized, and adverse. Impacts to the natural quality of wilderness character would be long-term and beneficial as a result of the reduction in wild pig numbers. Beneficial impacts would be greater than under Alternative A because more pigs would be removed under Alternative B.

6.10: Public Health and Safety

**Alternative A - No-Action**

*Analysis:* The no-action alternative, limited wild pig management and disease surveillance by USDA personnel would result in continuing non-native wild pig threats to public health and safety. Non-native wild pigs pose a threat to public health and safety due to their potentially aggressive behavior toward humans and through the transmission of disease (e.g., brucellosis). Non-native wild pig threats to public health and safety would be considered minor to moderate, long-term, adverse, and widespread. Under this alternative, threats to public health and safety associated with wild pig management activities conducted by USDA personnel would be

adverse, negligible to minor, and mainly associated with the tightly controlled use of firearms. Currently, minimization and avoidance of threats to public health and safety related to USDA control operations include dissemination of public information; careful planning of wild pig management activities; extensive firearms training, qualification, and monitoring of personnel engaged in wild pig management; and temporary closures of small portions of the park, when needed.

*Cumulative Impacts:* Non-native wild pigs have likely been present at CONG since European colonization, although their numbers have likely increased with growing human settlement, expanding agriculture, and direct introductions, coupled with the biological growth of the wild pig population. The no action alternative would result in continuing incremental threats to public health and safety, or at a minimum, the perpetuation of current conditions. The wild pig management activities conducted by USDA personnel would contribute negligibly to cumulative threats to public health and safety because of the limited and localized use of firearms.

*Conclusion:* Public health and safety threats under this alternative would be negligible to moderate, short-term and long-term, and adverse. Continuing to manage wild pig populations on a limited scale will result in increased spread of diseases that are present in the current population and increase the likelihood of visitor encounters with wild pigs that may result in harm to park staff and the visiting public.

**Alternative B - Implement Integrated Non-native Wild Pig Management Plan (Preferred Alternative)**

*Analysis:* Threats to public health and safety under this alternative would be minor to moderate, mainly associated with the tightly controlled use of firearms and tracking of pigs by trained dogs during wild pig management activities. Although wild pig management activities would be conducted over the long-term, impacts would be considered short term relative to the duration of the treatment action (threats would not continue beyond the duration of the treatment action). Minimization and avoidance of threats to public health and safety is addressed for this alternative in Section 4.0 above, and include dissemination of public information; careful planning of wild pig management activities; extensive firearms training, qualification, and monitoring of personnel engaged in wild pig management; the use well-trained dogs trained to only track the scent of pigs reduces the likelihood of dogs harassing native non-target species or park visitors; and temporary closures of small portions of the park, if needed. This alternative is intended to reduce threats associated with non-native wild pigs, resulting in a net positive effect on public health and safety.

*Cumulative Impacts:* This alternative would contribute negligibly to cumulative threats to public health and safety due to the short-term and localized use of use of firearms, night work in wilderness areas, the possibility of slips, trips, falls, cuts, stings, poison ivy, and tracking dogs.

*Conclusion:* Public health and safety threats under this alternative would be negligible to minor, short-term, and intended to reduce threats caused by non-native wild pigs.

6.11: Visitor Use and Experience

**Alternative A - No-Action**

*Analysis:* The no-action alternative, limited wild pig management and disease surveillance by USDA personnel would result in continuing non-native wild pig impacts on visitor use and experience, at least for a subset of the visitor population. Substrate and vegetation disturbance caused by non-native wild pigs is readily apparent to park visitors along hiking trails, boardwalks, and Cedar Creek, and is frequently commented upon. Negative comments have been particularly frequent from experienced visitors using Cedar Creek and certain sections of the trails and boardwalk with more abundant wild pig damage. Some other visitors consider abundant sign and sightings of wild pigs a positive experience (Kulesza et al. 2011), particularly visitors interested in viewing large wildlife species and a subset of visitors interested in sport hunting (outside the park). In addition, some visitors may be neutral to or unaware of non-native wild pig presence in the park. A portion of visitors having positive or neutral experiences relative to wild pigs may not realize that they are a non-native species that can negatively impact natural areas and native flora and fauna. Impacts and threats to visitor use and experience from pigs themselves would thus be considered negligible to major, depending on the particular viewpoint of the visitor. Major impacts to visitor use and experience are included in this range, because some visitors have expressed strong negative opinions concerning the levels of non-native wild pig disturbance visible in the park. Impacts to visitor use and experience from pigs would be considered widespread, occurring throughout the park and adjacent areas. Impacts from the management actions in the alternative would be minor, as most visitors would not encounter control activities during their visit. Overall, the alternative would have moderate adverse impacts to visitor use and experience, due to the limited potential of the alternative to control the pig population. Given the widespread and recurring nature of wild pig disturbance activities, impacts would be considered long-term.

*Cumulative Impacts:* The no action alternative would result in continuing incremental wild pig impacts to visitor use and experience, or at a minimum, the perpetuation of the currently impacted condition. The wild pig management activities conducted by USDA personnel would contribute a minor to moderate amount to cumulative impacts on visitor use and experience.

*Conclusion:* Under the no-action alternative, impacts to visitor use and experience would be negligible to major, localized to widespread, short-term and long-term, and adverse for a subset of the visitor population.

**Alternative B - Implement Integrated Non-native Wild Pig Management Plan (Preferred Alternative)**

*Analysis:* Impacts to visitor use and experience associated with this alternative would include: general visitor disturbance during wild pig management activities (vehicle use, installation and maintenance of equipment); observation of human-built structures such as traps and fencing; viewing or smelling dead animals; possible temporary closures of small portions of the park; negative reactions or concerns associated with encountering management personnel carrying

firearms in the field; negative views or reactions to wildlife management using lethal methods; and unexpected encounters with trained tracking dogs. In addition, though not a direct impact to visitor use and experience, there could be opposition to wild pig management activities related to public hunting: (1) opposition to public hunting not being allowed within the park, and (2) concern that wild pig management in the park would affect wild pig hunting opportunities on adjacent lands. In contrast, there could also be support of wild pig management activities from the hunting public, since wild pig management would benefit white-tailed deer and wild turkey populations, enhancing hunting opportunities for these species on adjacent lands.

Some of the described impacts could affect nearly all segments of the visitor population, while others would affect only a subset of visitors, depending on their particular views. Some park visitors would support wild pig management activities, while others would be opposed, perhaps strongly. A portion of visitors may not realize that wild pigs are a non-native species that can negatively impact natural areas and native flora and fauna. Wild pig management would likely be controversial at the onset of the program, and would likely continue to be controversial at times, at least to some subset of the visitor population. Impacts to visitor use and experience would thus be considered negligible to major, depending on the particular viewpoint of the visitor. Major impacts to visitor use and experience are included in this range, because some visitors would likely express strong negative opinions concerning management of non-native wild pigs in the park. Impacts to visitor use and experience would be considered localized to widespread, depending on the type of impact (localized for impacts such as general disturbance or observation of traps, fencing, or dead animals; widespread for impacts such as opposition to wild pig management due to visitor perception or views). Although wild pig management activities would be conducted over the long-term, impacts would be considered short-term relative to the duration of the treatment action (threats would not continue beyond the duration of the treatment action). Avoidance, and minimization of impacts to visitor use and experience have been addressed for this alternative under Section 4.0, including public information and visitor education; careful planning of wild pig management activities; conducting the majority of shooting activity and tracking by trained dogs outside main visitor use periods; sound suppression of firearms; locating equipment such as traps and fencing away from visitor view; and moving collected animals out of sight and away from main visitor use areas. This alternative would reduce impacts associated with non-native wild pigs, resulting in a net positive effect on visitor use and experience for a subset of the visitor population (described above under Alternative A).

*Cumulative Impacts:* This alternative would contribute a minor to moderate amount to cumulative impacts on visitor use and experience.

*Conclusion:* Under this alternative, impacts to visitor use and experience would be negligible to major, localized to widespread, and short-term. Impacts will vary, depending in large part on how different individuals view the goals and methods of wild pig control.

6.12: Park Operations

**Alternative A - No-Action**

*Analysis:* The no-action alternative, limited wild pig management and disease surveillance by USDA personnel would result in negligible impacts to park operations because there would be no change in operations and no change in demand on park personnel. If funding were lost for the USDA's services, the park would not step in to manage pigs with existing staff.

It should be noted that dwindling resources will affect CONG's ability to fund this program. In 2013, the park budget was reduced through Sequestration. If base funding is not increased in the future, increasing personnel costs will reduce the amount available to fund USDA's work in the future, with attendant adverse impacts on park resources.

*Cumulative Impacts:* The no-action alternative would contribute a negligible amount to cumulative adverse impacts to park operations.

*Conclusion:* This alternative would result in negligible adverse impacts to park operations because there would be no change in operations and no change in demand on park personnel.

**Alternative B - Implement Integrated Non-native Wild Pig Management Plan (Preferred Alternative)**

*Analysis:* Impacts to park operations would be moderate to major for this alterative, and would include increased demand on personnel; increased demand on existing equipment; an expanded resource management program; increased need for specialized personnel training and certification; and other needs and adaptations associated with a major resource management effort. Demands on other park programs and operations would likely occur as well, particularly for law enforcement, but also including maintenance, public education, interpretation, public relations, and administration. Although wild pig management activities would be conducted over the long-term, impacts would be considered short-term relative to the duration of the treatment action (threats would not continue beyond the duration of the treatment action). Mitigation has been addressed for impacts to park operations in Section 4.0 above, including: hiring additional NPS personnel to conduct wild pig management activities; participation by Student Conservation Association volunteers; and the continued participation by USDA Wildlife Services agents. Additional funding for personnel, equipment, and supplies would be necessary to fully implement the integrated wild pig management program and would be required to sustain it over the long-term. Such funding will be pursued. This alternative is intended to reduce major adverse impacts to other park resources identified in this assessment, several of which could potentially result in impairment of park resources and values under the no-action alternative.

*Cumulative Impacts:* This alternative could contribute to cumulative adverse impacts to park operations due to the funding and staff required to implement it adequately.

*Conclusion:* Impacts to park operations under this alternative would be moderate to major, and adverse due to increased demands placed on park staff, equipment, and budget.

## 7.0: COORDINATION AND CONSULTATION

Personnel from the following agencies and organizations were consulted or participated in the original draft of this EA and Non-native Wild Pig Management Plan in 2003 and/or its update beginning in 2012. For those consulted as part of its preparation in 2003 (indicated by *2003* in parentheses), as many of the original consultants as possible, or their counterparts if they have moved on or retired, will be asked to review this draft. Material presented in this report does not necessarily reflect the views or opinions of personnel, agencies, or organizations listed below.

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This EA and Non-native Wild Pig Management Plan was sent to the following agencies and offices for review and comment:

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| **Tracy Stakely** | Superintendent |
| **CONG Management Team** | Chief of Integrated Resource Management, Chief of Resource and Visitor Protection, Facility Manager, Chief of Interpretation, Administrative Officer |
| **CONG Resource Management Staff** | Old-growth Bottomland Hardwood Forest Research and Education Director and Education Coordinator, Southeast Coast Exotic Plant Management Team Liaison and Field Crew Leader, CONG Biological Science Technician |
| **NPS Southeast Regional Office** | |
| **Southeast Regional Office, Division of Science and Natural Resources** | |
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This EA and Non-native Wild Pig Management Plan was sent to the following agencies and offices for review and comment:

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| **Denise Louie** | NPS Pinnacles National Monument, Resource Management Division Chief |
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| **James O. Edens** | USDA-APHIS, Wildlife Services Division, SC USDA Wildlife Services |
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| **LaDonna Brown** | Historic Preservation Officer Chickasaw Nation |
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| **Chief Stuart** | Tuscarora Nation Local Office |

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| **Patterson** | |
| **Robert Thrower** | THPO Poarch Band of Creek Indians |
| **Other Stakeholders** | |
| **John Cely** | Friends of Congaree Swamp |
| **John Grego** | Friends of Congaree Swamp |
| **Dick Watkins** | Friends of Congaree Swamp |
| **Dr. Scott Zengel** | Atkins, Environmental Sciences and Planning, Principal Scientist |

This EA and Non-native Wild Pig Management Plan were prepared by NPS CONG and Clemson University. Significant portions of this EA and Non-native Wild Pig Management Plan were adapted from:

NPS 1993. Wild Pig Management Guideline Great Smoky Mountains National Park. NPS GSMNP, Gatlinburg, TN, 21 pp. plus appendices.

NPS 2002. Final Environmental Assessment of the Management Alternatives, Feral Pig Population Control, Cumberland Island National Seashore. NPS CUIS, St. Marys, GA, 29 pp. plus appendices.

NPS 2003. Final Environmental Assessment, Sustained Reduction Plan for Non-native Wild Pigs within Virgin Islands National Park. NPS Southeast Region, Atlanta, GA, 92 pp.

NPS 2004. Congaree National Park Environmental Assessment of the 2004 Wildland Fire Management Plan. Congaree National Park, Hopkins, SC. 61 pp. plus appendices.

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(Tuberville et al., 2005) Herpetofaunal Species Richness of Southeastern National Parks, 2005 *Southeastern Naturalist* 4(3):537–569

(Loeb 2005) Bat Inventories of Congaree National Park, Final Report, May 2005, Susan Loeb, USDA Forest Service, Southern Research Station

(Williams and Benson 2004) Freshwater Mussels (Family Unionidae) of the Congaree Swamp National Park, Final Report, 30 December 2004.

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**Animals**

| | |
|---|---|
| American swallow-tailed kite | *Elanoides forficatus* |
| Bachman's sparrow | *Aimophila aestivalis* |
| Bald Eagle | *Haliaeetus leucocephalus* |
| Bats | *Chiroptera* |
| Beavers | *Castor* |
| Black-throated green warbler | *Dendroica virens* |
| Bluegill | *Lepomis macrochirus* |
| Bobcats | *Lynx rufus* |
| Carolina slabshell | *Elliptio congaraea* |
| Clams | *Mollusca* |
| Cow, cattle | *Bos taurus* |
| Crappie | *Promoxis* |
| Crayfish | *Astacoidea* |
| Crow | *Corvus brachyrhynchos* |
| Domesticated cat | *Felis catus* |
| Domesticated dog | *Canis familiaris* |
| Ducks | *Anas platyrhynchos* |
| Eastern cougar | *Puma concolor couguar* |
| Eastern floater | *Pyganodon cataracta* |
| Eastern fox squirrel | *Sciurus niger* |
| Eastern woodrat | *Neotoma floridana* |
| Fox | *Vulpini* |
| Gar | *Lepisosteidae* |
| Goat | *Capra aegagrus hircus* |
| Ivory-billed woodpecker | *Campephilus principalis* |
| Largemouth bass | *Micropterus salmoides* |
| Loggerhead shrike | *Lanius ludovicianus* |
| Little blue heron | *Egretta caerulea* |
| Mississippi kite | *Ictinia mississippiensis* |
| Muskrats | *Ondatra zibethicus* |
| Owls | *Strigiformes* |
| Paper pondshell | *Utterbackia imbecillis* |
| Perch | *Perca* |
| Pickerel frog | *Rana palustris* |
| Pig, hog, swine, boar, | *Sus scrofa* |
| Rabbits | *Lepus curpaeums* |
| Raccoon | *Procyon lotor* |
| Rafinesque's big-eared bat | *Corynorhinus rafinesquii* |
| Rayed pink fatmucket | *Lampsilis splendida* |
| Red cockaded woodpecker | *Picoides borealis* |
| Red-headed woodpecker | *Melanerpes erythrocephalus* |
| River otters | *Lontra canadensis* |
| Savannah lilliput | *Toxolasma pullus* |

| | |
|---|---|
| Shiners, Minnows | *Cyprinid* |
| Snails | *Achatinoidea* |
| Songbirds | *Oscines* |
| Southeastern myotis | *Myotis austoriparius* |
| Spotted turtle | *Clemmys guttata* |
| Star-nosed mole | *Condlura cristata* |
| Striped bass | *Morone saxatilis* |
| Swainson's warbler | *Limnothlypis swainsonii* |
| Timber rattlesnake | *Crotalus horridus* |
| White-tailed deer, Deer | *Odocoileus virginianus* |
| Wild turkey, Turkey | *Meleagris gallopavo* |
| Wood duck | *Aix sponsa* |
| Wood stork | *Mycteria Americana* |
| Yellow lampmussel | *Lampsilis cariosa* |

**Plants**

| | |
|---|---|
| Arrowwood | *Viburnum dentatum* |
| Bald Cypress | *Taxodium distichum* |
| Beech | *Fagus grandiflora* |
| Canadian moonseed, Canada moonseed | *Menispermum canadense* |
| Carolina birds-in-a-nest, Carolina bogmint | *Macbridea caroliniana* |
| Cherokee sedge | *Carex cherokeensis* |
| Corn | *Zea mays* |
| Cottonwood | *Populus deltoids* |
| Crowsfoot sedge | *Carex crus-corvi* |
| Dwarf palmetto | *Sabal minor* |
| Eastern narrowleaf sedge | *Carez amphibola* |
| Fivelobe cucumber, Cayoponia | *Cayaponia quinqueloba* |
| Eastern wahoo | *Euonymus atropurpureus* |
| Green ash | *Fraxinus pennslyvanica* |
| Ironwood | *Carpinus caroliniana* |
| Laurel oak | *Quercus laurifolia* |
| Little bluestem | *Schizachyrium scoparium* |
| Loblolly pine | *Pinus taeda* |
| Longleaf pine | *Pinus palustris* |
| Needleleaf rosette grass | *Dicanthelium aciculare* |
| Overcup oak | *Quercus lyrata* |
| Paw paw | *Asimina triloba* |
| Piedmont pinweed | *Lechea torreyi* |
| Poison ivy | *Toxicodendron radicans* |
| Possum haw | *Ilex decidua* |
| Red maple | *Acer rubrum* |
| Sarvis holly, serviceberry holly | *Ilex amelanchier* |
| Shining sumac | *Rhus copallina* |
| Slim stinging nettle, weak nettle | *Urtica chamaedryoides* |
| Southern adder's-tongue | *Ophioglossum vulgatum* |

| | |
|---|---|
| Sugarberry | *Celtis laevigata* |
| Swamp tupelo | *Nyssa biflora* |
| Swamp chestnut oak | *Quercus michauxii* |
| Sweetgum | *Liquidambar styraciflua* |
| Sycamore | *Plantanus occidentalis* |
| Wax myrtle | *Myrica cerifera* |
| Willow oak | *Quercus phellos* |

# APPENDIX A

## Minimum Requirements Determination

ARTHUR CARHART NATIONAL WILDERNESS TRAINING CENTER

# MINIMUM REQUIREMENTS DECISION GUIDE WORKBOOK

*"...except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act..."*

-- The Wilderness Act of 1964

**Project Title: Environmental Assessment and Management Plan for Non-native Wild Pigs within Congaree National Park**

## MRDG STEP 1

*Determine if Administrative Action is Necessary*

**Description of the Situation**
*What is the situation that may prompt administrative action?*

The purpose of implementing a management plan for non-native wild pigs at Congaree National Park (CONG) is to reduce natural and cultural resource impacts associated with wild pigs and to reduce risks to human health and safety.

Non-native wild pigs are a severe threat to the park's ecosystem and outstanding natural and cultural resources due to disturbance behaviors such as rooting, wallowing, and the development of established wildlife trails; competition with and predation on native species (Lucas 1977, Beach 1993, Jolley 2007, Campbell and Long 2009, Mayer 2009); potential spread of non-native invasive plants (Mungall 2001, Campbell and Long 2009); potentially aggressive behavior toward humans; potential impairment of water quality (Atwill et al. 1997, Jay et al. 2007, Kaller et al. 2007); and disease (USDA 2012). At risk are bottomland hardwood ecosystem function, regeneration of bottomland hardwood canopy tree species, rare and imperiled species and ecological communities (including globally imperiled seepage forest communities and state listed plants), streams and stream banks, a variety of wetland and aquatic habitats, and numerous other natural resources. Non-native wild pigs are also a threat to upland longleaf pine habitats at the park, an imperiled ecological community and potential habitat for the federally endangered red-cockaded woodpecker and numerous rare and endangered plants. The planned restoration of longleaf pine ecosystem at the park would

also be at risk of wild pig damage. Cattle mounds and dikes, historic earthen structures associated with agriculture and listed on the National Register of Historic Places, are also at risk from wild pig disturbance. Non-native wild pigs cause physical and visual degradation of recreational resources such as hiking and canoeing trails and degrade the wilderness character of the park. In addition to damage caused by wild pigs on National Park Service property, the effect of wild pigs on adjacent landowners must be considered. Friebel (2007) found that wild pigs move freely between the park and adjacent private land and likely vice-versa. Research indicates that about 70 percent of a wild pig population must be removed each year for a sustained period of time to substantially reduce a wild population. Difficulty accessing the wilderness is likely to reduce the park's ability to achieve this level of population control.

**Options Outside of Wilderness**
*Can action be taken outside of wilderness that adequately addresses the situation?*

☐ YES **STOP – DO NOT TAKE ACTION IN WILDERNESS**

☒ NO **EXPLAIN AND COMPLETE STEP 1 OF THE MRDG**

Explain:

Although management actions outside wilderness may be beneficial, if no management actions are taken within the wilderness boundary, wild pigs will likely retreat to the Congaree National Park wilderness as refuge from outside management actions. In such a case, wild pig density is likely to increase within wilderness as are the impacts of wild pig activities listed above.

**Criteria for Determining Necessity**
*Is action necessary to meet any of the criteria below?*

**A. Valid Existing Rights or Special Provisions of Wilderness Legislation**

*Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that **requires** action? Cite law and section.*

☐ YES ☒ NO

Explain:

A review of applicable legislation indicates that there are no valid existing rights or special provisions in either the Wilderness Act of 1964 or other subsequent wilderness laws that specifically requires action to address wild pig management. It is not necessary to take action to honor any valid existing rights or satisfy Special Provisions of wilderness

legislation.

## B. Requirements of Other Legislation

*Is action necessary to meet the requirements of other federal laws? Cite law and section.*

☒ YES ☐ NO

Explain:

Section 110 of the National Historic Preservation Act (NHPA) of 1966 requires that each federal agency must assume responsibility for the preservation of cultural resources owned or controlled by the agency and manage and maintain cultural resources in a way that considers the preservation of their historic, archeological, architectural, and cultural values. Wild pig damage to historic structures on the List of Classified Structures has been noted multiple times at CONG including in 2013. At least some wild pig damage was noted either on or adjacent to all of the eight structures (of nine CONG LCS) visited in March and April of 2013.

Other legislation supports park management of this non-native invasive species including:
*The Clean Water Act of 1972, including the provisions of Section 404 of the Act governing wetlands;
*Executive Order 11990, Protection of Wetlands (May 24, 1977);
*Migratory Bird Treaty Act of 1918 (40 Stat 755);
*Animal Damage Control Act of 1931 (providing authority to remove injurious animals for the protection of birds and other wildlife); and
*Executive Order 13112: Invasive Species (2/3/1999) and associated National Invasive Species Management Plan.

## C. Wilderness Character

*Is action necessary to preserve one or more of the qualities of wilderness character, including: Untrammeled, Undeveloped, Natural, Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation, or Other Features of Value?*

UNTRAMMELED

☐ YES ☒ NO

Explain:

Untrammeled = Wilderness is essentially unhindered and free from modern human control or manipulation.

Action is not necessary to preserve the untrammeled quality of wilderness character. The Untrammeled quality is defined as a lack of management, manipulation, or hindrance of the natural processes. The wild pig infestation does not constitute active trameling of the park

wilderness. Therefore, removal of feral pigs is not necessary to preserve the Untrameled quality of wilderness character.

UNDEVELOPED

☐ YES ☒ NO

Explain:
Undeveloped = Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern occupation.

Action is not necessary to preserve the Undeveloped quality of wilderness character.

The Undeveloped quality of wilderness character includes temporary roads, structures, installations, and the use of motorized equipment, mechanical transport, or landing of aircraft. The existence of the wild pig infestation is not related to any component of this quality and is not a development.

NATURAL

☒ YES ☐ NO

Explain:
Natural = Wilderness ecological systems are substantially free from the effects of modern civilization.

Taking action is necessary to correct an unnatural condition (i.e., a population of non-native, invasive wild pigs) that is a direct effect of modern civilization. The presence of non-native invasive wild pigs threatens the natural conditions of the wilderness because it prevents or diminishes the presence of native plant species, facilitates the spread of non-native invasive plants, impairs water quality through erosion at sites rooted by wild pigs and from pigs' fecal matter entering the water table and waterbodies, alters bottomland hardwood ecosystem function, reduces regeneration of bottomland hardwood canopy tree species, and threatens state listed rare and imperiled species and ecological communities.

Non-native wild pigs are also a threat to upland longleaf pine habitats, an imperiled ecological community and potential habitat for the federally endangered red-cockaded woodpecker. To allow the wild pig population to continue growing would be a direct effect of unintentional human influence.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

☐ YES ☒ NO

Explain:
Solitude or Primitive & Unconfined Recreation = Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation.

No action is necessary to preserve this quality. Reducing wild pig numbers will not improve opportunities for solitude, primitive recreation, or unconfined recreation. A reduction in pig numbers would reduce damage to park trails and would improve opportunities for visitors to experience natural sights and sounds in the wilderness. However, any such improvements would primarily be attributable to protecting or restoring the natural quality of wilderness character.

OTHER FEATURES OF VALUE

☒ YES ☐ NO

Explain:
Wilderness may contain other features of scientific, educational, scenic, or historical value.

Cattle mounds and dikes, historic earthen structures associated with agriculture and listed on the National Register of Historic Places, are at risk from wild pig disturbance. Ground disturbance caused by wild pigs was observed on or adjacent to all of the eight structures (of nine CONG LCS) visited in March and April of 2013.

Congaree National Park is unique and representative of a primarily intact ecosystem. It has garnered many designations that honor the park's outstanding qualities that are at risk because of the damage caused by non-native wild pigs. Congaree National Park is part of the United Nations Educational, Scientific and Cultural Organization's (UNESCO) South Atlantic Coastal Plain Biosphere Reserve (1983). It is designated as a Birdlife International /Audubon Society State level Important Bird Area (1998), an American Bird Conservancy Globally Important Bird Area (2001), a congressionally designated Wilderness area (Public Law 100-524, October 24, 1988), and a Ramsar Convention Wetland of International Importance (2012). In addition to these designations, the portion of Cedar Creek that flows from Wise Lake to the Congaree River comprises South Carolina's only Outstanding National Resource Water (SC R.61-69 2006). All of these designations may be substantially, negatively affected through the impact of wild pig activities.

**Step 1 Decision**
*Is administrative action <u>necessary</u> in wilderness?*

Decision Criteria

| | | | |
|---|---|---|---|
| A. | Existing Rights or Special Provisions | ☐ YES | ☒ NO |
| B. | Requirements of Other Legislation | ☒ YES | ☐ NO |
| C. | Wilderness Character | | |
| | Untrammeled | ☐ YES | ☒ NO |
| | Undeveloped | ☐ YES | ☒ NO |
| | Natural | ☒ YES | ☐ NO |
| | Outstanding Opportunities | ☐ YES | ☒ NO |
| | Other Features of Value | ☒ YES | ☐ NO |

Is administrative action necessary in wilderness?

☒ YES **EXPLAIN AND PROCEED TO STEP 2 OF THE MRDG**

☐ NO **STOP – DO NOT TAKE ACTION IN WILDERNESS**

Explain:

The disturbance caused by non-native invasive wild pigs negatively affects the Natural quality of wilderness character and Other Features of Value.

Wild pig disturbance threatens the Natural quality of wilderness character because it prevents or diminishes the presence of native plant species, facilitates the spread of non-native invasive plants, impairs water quality through erosion at sites rooted by wild pigs and from pigs' fecal matter entering the water table and waterbodies, alters bottomland hardwood ecosystem function, reduces regeneration of bottomland hardwood canopy tree species, and threatens state listed rare and imperiled species and ecological communities. Non-native wild pigs are also a threat to upland longleaf pine habitats, an imperiled ecological community and potential habitat for the federally endangered red-cockaded woodpecker. To allow the wild pig population to continue growing would be a direct effect of unintentional human influence. Section 110 of the National Historic Preservation Act (NHPA) of 1966 requires that each federal agency must assume responsibility for the preservation of cultural resources owned or controlled by the agency and manage and maintain cultural resources in a way that considers the preservation of their historic, archeological, architectural, and cultural values. Wild pig damage to historic structures on the List of Classified Structures has been noted multiple times at CONG including in 2013. At least some wild pig damage was noted either on or adjacent to all of the eight structures (of nine CONG LCS) visited in March and April of 2013. These historic structures are Other Features of Value that are located within wilderness at Congaree National Park.

# MRDG STEP 2

*Determine the Minimum Activity*

**Other Direction**

*Is there "special provisions" language in legislation (or other Congressional direction) that explicitly **allows** consideration of a use otherwise prohibited by Section 4(c)?*

***AND/OR***

*Has the issue been addressed in agency policy, management plans, species recovery plans, or agreements with other agencies or partners?*

☒ YES **DESCRIBE DOCUMENTS & DIRECTION BELOW**

☐ NO **SKIP AHEAD TO COMPONENTS OF THE ACTION BELOW**

Describe Documents & Direction:

Animal Damage Control Act of 1931 provides authority to remove injurious animals for the protection of birds and other wildlife.

The Executive Order 13112, Invasive Species, mandates that Federal agencies work to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

The NPS Management Policies 2006 (6.3 Wilderness Preservation and Management, 6.3.7. Natural Resource Management) support taking action within wilderness to "...correct past mistakes, the impacts of human use, and influences originating outside of wilderness boundaries."

Congaree Swamp National Monument General Management Plan (1988) long term management objectives includes reducing the spread of, and to the extent necessary and practicable, eliminating existing populations of exotic animals and plants introduced through man's activities.

Congaree National Park's Resource Management Plan (2004) identifies non-native feral hogs as a severe threat to the natural and cultural resources of CONG and, thus, a top management priority.

**Components of the Action**

*What are the discrete components or phases of the action?*

Component X: *Example: Transportation of personnel to the project site*

| | |
|---|---|
| Component 1: | Transportation of personnel to the project site. |
| Component 2: | Transportation of materials and supplies to the project site. |
| Component 3: | Treatment method and timing of treatment. |
| Component 4: | Tools, equipment, and supplies used for wild pig management. |
| Component 5: | Crew camps. |
| Component 6: | Research component. |
| Component 7: | Condition of site after project. |
| Component 8: | Information and education of public and other stakeholders. |
| Component 9: | |

**Proceed to the alternatives.**

Refer to the **MRDG Instructions** regarding alternatives and the effects to each of the comparison criteria.

# MRDG STEP 2: Alternative 1

**Alternative 1:** Continue Current Management - USDA Wildlife Services conducts limited wild pig management activities and monitoring for disease.

**Description of the Alternative**
*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

In this alternative, CONG would continue an existing interagency agreement funded at the current level of $25,000 with the United States Department of Agriculture (USDA) Wildlife Services to conduct limited wild pig management activities. These activities would include trapping and shooting, direct targeted harvest operations, and monitoring for disease. USDA Wildlife Services biologists would leave pig carcasses in the field to naturally decompose, which is in keeping with hog management activities within the NPS and the state of South Carolina. Monitoring of wild pig disturbance and wild pig population management could be conducted through the USDA. Stratified random sampling techniques may be used to select transect locations. Transects would be GPSd and revisited over time. Monitoring would be conducted, at most, on a quarterly basis. (Note: Resource Management staff at CONG completed compliance for this work in 2008 under a Categorical Exclusion.)

Mitigation

Employee training would include information on wilderness regulations and the need to maintain and enhance wilderness character. The selection of work areas, campsites, and travel routes would be made in such a way as to protect wilderness character, as would decisions regarding project timing, temporary closures, or other actions. Temporary plot markers would be discrete. They would consist of rebar pounded deeply into the soil with only a small section (5" - 6") left above the ground. Rebar would be tagged with identifying numbers. Permanent markers would be GPSd using highly accurate GPS units (e.g., Trimble). Traps would be removed when they are no longer in use. Crew camps would be temporary and signs of human activity within a crew camp would be obliterated. Research indicates that about 70 percent of a wild pig population must be removed each year for a sustained period of time to substantially reduce a wild population. Difficulty accessing the wilderness is likely to reduce the park's ability to achieve this level of population control.

**Component Activities**
*How will each of the components of the action be performed under this alternative?*

| Component of the Action | Activity for this Alternative |
|---|---|

| X | *Example: Transportation of personnel to the project site* | *Example: Personnel will travel by horseback* |
|---|---|---|
| 1 | Transportation of personnel to the project site. | Transportation of personnel to the project site is by foot or non-motorized boat. |
| 2 | Transportation of materials and supplies to the project site. | Transportation of materials and supplies to the project site is by foot or non-motorized boat. |
| 3 | Treatment method and timing of treatment. | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Management is limited and will not keep pace with the growing wild pig population. |
| 4 | Tools, equipment, and supplies used for wild pig management. | Equipment and supplies includes traps of varying sizes and firearms. Monitoring tools will include GPS, data sheets, and writing implements. |
| 5 | Crew camps. | Crew camps may be needed. |
| 6 | Research component. | Research includes monitoring of hog disturbance and disease monitoring. |
| 7 | Condition of site after project. | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. |
| 8 | Information and education of public and other stakeholders. | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the |

| | | |
|---|---|---|
| | | management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. |
| 9 | | |

**Wilderness Character**

*What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?*

UNTRAMMELED

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Management is limited and will not keep pace with the growing wild pig population. | ☐ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes and firearms. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of hog disturbance and disease monitoring. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | | | |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 0 | -2 | NE |
| **Untrammeled Total Rating** | | **-2** | | |

Explain:

*Untrammeled = Wilderness is essentially unhindered and free from modern human control or manipulation. This quality is degraded by modern human activities or actions that control or manipulate the components or processes of ecological systems inside the wilderness.*

The trapping and shooting of wild pigs, a non-native, introduced component of the CONG ecosystem, would negatively affect the Untrammeled quality of wilderness character by actively manipulating the biophysical environment. Elements of this alternative involving transportation, use of temporary base camps, and monitoring would not constitute manipulation of the biophysical environment and thus would not affect the Untrammeled quality.

UNDEVELOPED

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Management is limited and will not keep pace with the growing wild pig population. | ☐ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes and firearms. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| 6 | Research includes monitoring of hog disturbance and disease monitoring. | ☐ | ☒ | ☐ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☒ | ☐ | ☐ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +1 | -4 | NE |
| **Undeveloped Total Rating** | | | **-3** | |

Explain:

*Undeveloped = Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern occupation. This quality is degraded by the presence of structures, installations, habitations, and by the use of motor vehicles, motorized equipment, or mechanical transport that increases people's ability to occupy or modify the environment. Permanent markers for long term monitoring will have a negative effect on this quality of wilderness character.*

Plot markers and traps are developments. Although not permanent, even the temporary presence of traps during trapping operations and crew camps would negatively affect the Undeveloped quality of wilderness character. Permanent markers for long term monitoring would also have a negative effect on this quality.

NATURAL

| Component Activity for this Alternative | Positive | Negative | No Effect |
|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Management is limited and will not keep pace with the growing wild pig population. | ☒ | ☐ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes and firearms. Monitoring tools will include GPS, data sheets, writing implements. | ☒ | ☐ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of hog disturbance and disease monitoring. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 2 | 0 | NE |
| **Natural Total Rating** | | **+2** | | |

Explain:

*Natural = Wilderness ecological systems are substantially free from the effects of modern civilization. This quality is affected by intended or unintended effects of modern civilization on the ecological systems inside the wilderness since the area was designated.*

Reducing numbers of non-native wild pigs would substantially improve the Natural quality. Plot markers, traps, and firearms would not affect the Natural quality.

Wild pigs have been introduced by humans, accidentally and purposefully, repeatedly, since 1540. Their presence in the Congaree National Park Wilderness has a substantial negative impact on the Natural quality of wilderness. Non-native wild pigs are a severe threat to the park's ecosystem and outstanding natural resources due to disturbance behaviors. Bottomland hardwood ecosystem function, regeneration of bottomland hardwood canopy tree species, rare and imperiled species and ecological communities (including globally imperiled seepage forest communities and state listed plants), streams and stream banks, a variety of wetland and aquatic habitats, and numerous other natural resources are altered as a consequence of non-native wild pig activities. The upland longleaf pine habitats, an imperiled ecological community and potential habitat for the federally endangered red-cockaded woodpecker and numerous rare and endangered plants, are also substantially impacted.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Management is limited and will not keep pace with the growing wild pig population. | ☒ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes and firearms. Monitoring tools will include GPS, data sheets, writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☒ | ☐ |
| 6 | Research includes monitoring of hog disturbance and disease monitoring. | ☐ | ☒ | ☐ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, pig carcasses will be dragged out of public view and at least 200' from permanent water | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | bodies. | | | |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 1 | -4 | NE |
| **Solitude or Primitive & Unconfined Rec. Total Rating** | | **-3** | | |

Explain:

*Solitude or Primitive & Unconfined Recreation = Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation. This quality is impacted by settings that degrade or improve these opportunities. An alternative which increases solitude, removes infrastructure that diminishes primitive recreation, or removes a management restriction would have a positive impact on this quality. Some management actions may be found to be necessary to preserve one or more of the other qualities even though this quality would be degraded.*

Encountering workers traveling to and from work sites for such short periods of time has virtually no effect on this quality. The presence of individuals in the wilderness conducting monitoring and wild pig population control activities would reduce the opportunity for solitude and primitive recreation. It would also be necessary to close some areas of the park while shooting operations are conducted, which would impinge on the opportunity for unconfined recreation. Positive effects from reducing pig numbers include reduced damage to trails and other recreational resources, as well as improved opportunities for visitors to experience natural sights and sounds in the wilderness. Wild pigs have been introduced to the United States over the course of many years. They cause extensive damage to natural ecosystems.

OTHER FEATURES OF VALUE

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Management is limited and will not keep pace with the growing wild pig population. | ☒ | ☐ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes and firearms. Monitoring tools will include GPS, data sheets, writing implements. | ☐ | ☐ | ☒ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of hog disturbance and disease monitoring. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 1 | 0 | NE |
| **Other Features of Value Total Rating** | | **+1** | | |

Explain:

*An alternative that degrades any values or characteristics of this wilderness (i.e. "ecological, geological, or other features of scientific, educational, scenic, or historical value") that are not accounted for in the above qualities would be a negative impact to this quality. An alternative that improves them would have a positive impact on this quality. Heritage and cultural resources including historic sites, and paleontological localities are included here.*

Reducing wild pig numbers would have a positive effect on historic structures in the park, as well on soil composition and structure, vegetation communities, etc. Reducing the wild pig population will also decrease damage of historic structures caused by wild pig rooting. All of the park's LCS are within the floodplain; the majority of these are adjacent to the Congaree River where pig activity is highest. In the absence of sufficient effort, population control is not possible. The limited control achieved through this alternative, however, would result in continued damage to historic structures by wild pigs.

**Other Criteria**

*What is the effect of each component activity on other comparison criteria? What mitigation measures will be taken?*

MAINTAINING TRADITIONAL SKILLS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☒ | ☐ | ☐ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☒ | ☐ | ☐ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Management is limited and will not keep pace with the growing wild pig population. | ☐ | ☐ | ☒ |
| 4 | Equipment and supplies includes traps of varying sizes and firearms. Monitoring tools will include GPS, data sheets, and writing implements. | ☒ | ☐ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of hog disturbance and disease monitoring. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, pig carcasses will be dragged out of | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | public view and at least 200' from permanent water bodies. | | | |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 3 | 0 | NE |
| **Maintaining Traditional Skills Total Rating** | | **+3** | | |

Explain:

Traditional skills would be maintained by transporting materials and supplies on foot and using hand tools. No motorized/mechanized equipment would be used, apart from GPS units.

SPECIAL PROVISIONS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Management is limited and will not keep pace with the growing wild pig population. | ☐ | ☐ | ☒ |
| 4 | Equipment and supplies includes traps of varying sizes and firearms. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of hog disturbance and disease monitoring. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 0 | 0 | NE |
| **Special Provisions Total Rating** | | **0** | | |

Explain:

There are no special provisions associated with this alternative.

## ECONOMICS & TIME CONSTRAINTS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for | ☐ | ☒ | ☒ |

| | | | | |
|---|---|---|---|---|
| | disease. Pig carcasses are left in the field to naturally decompose. Management is limited and will not keep pace with the growing wild pig population. | | | |
| 4 | Equipment and supplies includes traps of varying sizes and firearms. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of hog disturbance and disease monitoring. | ☐ | ☒ | ☐ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 0 | -3 | NE |
| **Economics & Time Constraints Total Rating** | | **-3** | | |

Explain:

USDA would conduct disease monitoring as able using USDA funds designated for this purpose. NPS would continue to contract at the existing level of $25,000 per year. This amount is insufficient to provide adequate wild pig population control. NPS would conduct rapid assessment in the field. Little additional time would be required for this purpose.

**Safety of Visitors & Workers**

*What is the effect of each component activity on the safety of visitors and workers? What mitigation measures will be taken?*

SAFETY OF VISITORS & WORKERS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Management is limited and will not keep pace with the growing wild pig population. | ☒ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes and firearms. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☐ | ☒ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of hog disturbance and disease monitoring. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a | ☒ | ☐ | ☐ |

| | | | | |
|---|---|---|---|---|
| | regular basis to maintain organization-wide knowledge and consistency. | | | |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 2 | -1 | NE |
| **Safety of Visitors & Workers Total Rating** | | **+1** | | |

Explain:

Implementing this alternative would have minimal impacts on safety for park visitors or workers. Active shooting operations pose some risk of accidental injury to park visitors and workers, but this risk is minimized by established safety procedures. Hiking to work sites, use of hand tools, and conducting monitoring activities would pose minor safety risks. All potential hazards can be mitigated through adequate staff training, development of established safety procedures, and effective communication.

Failure to manage wild pig populations would result in increased spread of diseases that are present in the current population and increase the likelihood of visitor encounters with wild pigs that may result in harm to park staff and the visiting public. Reduction of wild pig numbers would thus enhance the safety of visitors and workers.

## Summary Ratings for Alternative 1

| **Wilderness Character** | |
|---|---|
| Untrammeled | -2 |
| Undeveloped | -3 |
| Natural | +2 |
| Solitude or Primitive & Unconfined Recreation | -3 |
| Other Features of Value | +1 |
| **Wilderness Character Summary Rating** | **-5** |

| **Other Criteria** | |
|---|---|
| Maintaining Traditional Skills | +3 |
| Special Provisions | 0 |
| Economics & Time Constraints | -3 |
| **Other Criteria Summary Rating** | **0** |

| **Safety** |
|---|

| | |
|---|---|
| Safety of Visitors & Workers | +1 |
| **Safety Summary Rating** | **+1** |

# MRDG STEP 2: Alternative 2

**Alternative 2:** Establish an Integrated Wild Pig Management Program, with No Use of Motorized Tools or Transport.

**Description of the Alternative**
*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

This alternative would involve continuing USDA's present pig control work funded at an increased level and training park staff in conducting wild pig management activities. These activities would include trapping, shooting, disease monitoring, pig disturbance monitoring, installing exclosures in sensitive areas, and research. In some instances, pig control could involve the use of dogs. No motorized vehicles or equipment would be used in any pig management activities within the wilderness boundary. All trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling. Overnight camps could be used by USDA and NPS personnel, with no permanent structures. Monitoring of wild pig disturbance and wild pig population management would continue. Stratified random sampling techniques would be used to select transect locations. Transects would be GPSd and revisited over time. Monitoring would be conducted, at most, on a quarterly basis. Limited amounts of rebar or similar material would be used to mark plots.

Mitigation
Same as Alternative 1. Employee training would include information on wilderness regulations and the need to maintain and enhance wilderness character. The selection of work areas, campsites, and travel routes would be made in such a way as to protect wilderness character, as would decisions regarding project timing, temporary closures, or other actions. Permanent plot markers would be discrete. They would consist of rebar pounded deeply into the soil with only a small section (5" - 6") left above the ground. Rebar would be tagged with identifying numbers. Permanent markers would be GPSd using highly accurate GPS units (e.g., Trimble). Traps would be removed when they are no longer in use. Crew camps would be temporary and signs of human activity within a crew camp would be obliterated. Research indicates that about 70 percent of a wild pig population must be removed each year for a sustained period of time to substantially reduce a wild population. Difficulty accessing the wilderness is likely to reduce the park's ability to achieve this level of population control.

**Component Activities**
*How will each of the components of the action be performed under this alternative?*

| Component of the Action | Activity for this Alternative |
|---|---|

| X | *Example: Transportation of personnel to the project site* | *Example: Personnel will travel by horseback* |
|---|---|---|
| 1 | Transportation of personnel to the project site. | Transportation of personnel to the project site is by foot or non-motorized boat. |
| 2 | Transportation of materials and supplies to the project site. | Transportation of materials and supplies to the project site is by foot or non-motorized boat. |
| 3 | Treatment method and timing of treatment. | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Although active management increases, challenges posed by accessing sites on foot or via non-motorized boat is likely to reduce effectiveness. |
| 4 | Tools, equipment, and supplies used for wild pig management. | Equipment and supplies includes traps of varying sizes, protective fencing and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. |
| 5 | Crew camps. | Crew camps may be needed. |
| 6 | Research component. | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. |
| 7 | Condition of site after project. | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. |
| 8 | Information and education of public and other stakeholders. | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following |

| | | |
|---|---|---|
| | | activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. |
| 9 | | |

**Wilderness Character**

*What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?*

UNTRAMMELED

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Although active management increases, challenges posed by accessing sites on foot or via non-motorized boat is likely to reduce effectiveness. | ☐ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☒ | ☐ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | | | |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 0 | -3 | NE |
| **Untrammeled Total Rating** | | **-3** | | |

Explain:

*Untrammeled = Wilderness is essentially unhindered and free from modern human control or manipulation. This quality is degraded by modern human activities or actions that control or manipulate the components or processes of ecological systems inside the wilderness.*

This alternative would increase the scope of wild pig management in the park, thereby negatively affecting the Untrammeled quality of wilderness character. The nature of these impacts would not differ dramatically from those in Alternative 1, but they would be more pervasive in the park. As in Alternative 1, the trapping and shooting of wild pigs would negatively affect the Untrammeled quality of wilderness character by actively manipulating the biophysical environment. The use of exclosures and potentially larger base camps that are established for longer periods of time or with greater frequency would also constitute trammeling. Elements of this alternative involving transportation and monitoring would not affect the Untrammeled quality.

UNDEVELOPED

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Although active management increases, challenges posed by accessing sites on foot or via non-motorized boat is likely to reduce effectiveness. | ☐ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☒ | ☐ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☒ | ☐ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☒ | ☐ | ☐ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | | | |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +1 | -4 | NE |
| **Undeveloped Total Rating** | | **-3** | | |

Explain:

*Undeveloped = Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern occupation. This quality is degraded by the presence of structures, installations, habitations, and by the use of motor vehicles, motorized equipment, or mechanical transport that increases people's ability to occupy or modify the environment.*

This alternative calls for the use of exclosures, in addition to the plot markers and traps called for in Alternative 1. Plot markers, traps, and exclosures are developments and would have a negative effect on the Undeveloped quality of wilderness character. Although not permanent, even the temporary presence of traps, exclosures, and crew camps would negatively affect this quality. Permanent markers for long term monitoring would also have a negative effect on this quality.

NATURAL

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Although active management increases, challenges posed by accessing sites on foot or via non-motorized boat is likely to reduce effectiveness. | ☒ | ☐ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☒ | ☐ | ☐ |

| | | | | |
|---|---|---|---|---|
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +2 | 0 | NE |
| **Natural Total Rating** | | **+2** | | |

Explain:

*Natural = Wilderness ecological systems are substantially free from the effects of modern civilization. This quality is affected by intended or unintended effects of modern civilization on the ecological systems inside the wilderness since the area was designated.*

Impacts to this quality would be substantially the same as under Alternative 1. Reducing numbers of non-native wild pigs would materially improve the Natural quality. Plot markers, traps, exclosures, and firearms would not affect the Natural quality.

The presence of wild pigs in the Congaree National Park Wilderness has a substantial

negative impact on the Natural quality of wilderness. Non-native wild pigs are a severe threat to the park's ecosystem and outstanding natural resources due to disturbance behaviors. Challenges associated with accessing wilderness and transporting equipment and supplies (traps in particular) would likely reduce the efficiency of wild pig management efforts resulting in continued degradation of the Natural quality through pig damage.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Although active management increases, challenges posed by accessing sites on foot or via non-motorized boat is likely to reduce effectiveness. | ☒ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☒ | ☐ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☒ | ☐ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | | | |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +1 | -4 | NE |
| **Solitude or Primitive & Unconfined Rec. Total Rating** | | **-3** | | |

Explain:

*Solitude or Primitive & Unconfined Recreation = Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation. This quality is impacted by settings that degrade or improve these opportunities. An alternative which increases solitude, removes infrastructure that diminishes primitive recreation, or removes a management restriction would have a positive impact on this quality. Some management actions may be found to be necessary to preserve one or more of the other qualities even though this quality would be degraded.*

Encountering workers traveling to and from work sites for such short periods of time has virtually no effect on this quality. Impacts to this quality would be substantially the same as under Alternative 1. The presence of individuals in the wilderness conducting monitoring and wild pig population control activities would reduce the opportunity for solitude and primitive recreation. It would also be necessary to close some areas of the park while shooting operations are conducted, which would impinge on the opportunity for unconfined recreation. Positive effects from reducing pig numbers include improved opportunities for visitors to experience natural sights and sounds in the wilderness.

OTHER FEATURES OF VALUE

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Although active management increases, challenges posed by accessing sites on foot or via non-motorized boat is likely to reduce effectiveness. | ☒ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☐ | ☒ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +1 | -1 | NE |
| **Other Features of Value Total Rating** | | **0** | | |

Explain:

*An alternative that degrades any values or characteristics of this wilderness (i.e. "ecological, geological, or other features of scientific, educational, scenic, or historical value") that are not accounted for in the above qualities would be a negative impact to this quality. An alternative that improves them would have a positive impact on this quality. Heritage and cultural resources including historic sites, and paleontological localities are included here.*

Reducing wild pig numbers would have a positive effect on historic structures in the park, as well on soil composition and structure, vegetation communities, etc. Management effectiveness would be increased through increased control options within this alternative but limitations in accessing and deploying traps within wilderness may result in reduced effectiveness. The component activities for this alternative would have no or negligible impacts on Other Features of Value.

**Other Criteria**

*What is the effect of each component activity on other comparison criteria? What mitigation measures will be taken?*

MAINTAINING TRADITIONAL SKILLS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☒ | ☐ | ☐ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☒ | ☐ | ☐ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Although active management increases, challenges posed by accessing sites on foot or via non-motorized boat is likely to reduce effectiveness. | ☐ | ☐ | ☒ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☒ | ☐ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | | | |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +3 | 0 | NE |
| **Maintaining Traditional Skills Total Rating** | | **+3** | | |

Explain:

Traditional skills would be maintained by transporting materials and supplies on foot and using hand tools. No motorized/mechanized equipment would be used, apart from GPS units.

SPECIAL PROVISIONS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Although active management increases, challenges posed by accessing sites on foot or via non-motorized boat is likely to reduce effectiveness. | | | |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☐ | ☒ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 0 | 0 | NE |
| **Special Provisions Total Rating** | | **0** | | |

Explain:

There are no special provisions associated with this alternative.

ECONOMICS & TIME CONSTRAINTS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Although active management increases, challenges posed by accessing sites on foot or via non-motorized boat is likely to reduce effectiveness. | ☐ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☒ | ☐ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☒ | ☐ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☒ | ☐ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, | ☐ | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| | brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | | | |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 0 | -6 | NE |
| **Economics & Time Constraints Total Rating** | | **-6** | | |

Explain:

Fully funding an integrated program will require additional funds to increase USDA's time on the ground, hire and train CONG staff to conduct wild pig management work, and acquire equipment and supplies to conduct management operations. A range of possible treatment options exist. This is the most ambitious and likely to be the most successful but is also the most costly. Year 1 is estimated to cost approximately $221,220 (two USDA staff and travel @ $70,000, equipment and supplies for USDA and NPS program @ approximately $50,000, one 44 week youth intern @ $13,3384, GS-06 three-year term @ approximately $44,520, one six month seasonal interpreter @ approximately $19,395, vehicle rental and gas for 10 months @ approximately $7,200, travel training @ approximately $3,000). Each year, costs will be reduced. As CONG staff becomes trained, USDA will spend less time on wild pig population control in the park. Interpretive materials will be produced in year 1. Costs for year 2 are estimated to be $184,400 and $165,300 for year 3.

Note that this is an estimate only. Costs will vary depending on many factors.

**Safety of Visitors & Workers**

*What is the effect of each component activity on the safety of visitors and workers? What mitigation measures will be taken?*

SAFETY OF VISITORS & WORKERS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Transportation of personnel to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 2 | Transportation of materials and supplies to the project site is by foot or non-motorized boat. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, | ☒ | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| | direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. Although active management increases, challenges posed by accessing sites on foot or via non-motorized boat is likely to reduce effectiveness. | | | |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☐ | ☒ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☒ | ☐ | ☐ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +2 | -1 | NE |
| **Safety of Visitors & Workers Total Rating** | | **+1** | | |

Explain:

Implementing this alternative would have minimal impacts on safety for park visitors or workers. Active shooting operations pose some risk of accidental injury to park visitors and workers, but this risk is minimized by established safety procedures. Hiking to work sites, use of hand tools, and conducting monitoring activities would pose minor safety risks. All potential hazards can be mitigated through adequate staff training, development of established safety procedures, and effective communication.

Failure to manage wild pig populations would result in increased spread of diseases that are present in the current population and increase the likelihood of visitor encounters with wild pigs that may result in harm to park staff and the visiting public. Reduction of wild pig numbers would thus enhance the safety of visitors and workers.

## Summary Ratings for Alternative 2

| **Wilderness Character** | |
|---|---|
| Untrammeled | -3 |
| Undeveloped | -3 |
| Natural | +2 |
| Solitude or Primitive & Unconfined Recreation | -3 |
| Other Features of Value | 0 |
| **Wilderness Character Summary Rating** | **-7** |

| **Other Criteria** | |
|---|---|
| Maintaining Traditional Skills | +3 |
| Special Provisions | 0 |
| Economics & Time Constraints | -6 |
| **Other Criteria Summary Rating** | **-3** |

| **Safety** | |
|---|---|
| Safety of Visitors & Workers | +1 |
| **Safety Summary Rating** | **+1** |

# MRDG STEP 2: Alternative 3

**Alternative 3:** Establish an Integrated Wild Pig Management Program, with Limited Use of Motorized Tools and Transport.

**Description of the Alternative**
*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

This alternative is similar to Alternative 2, but some limited use of motorized equipment and transport would be allowed.

Like Alternative 2, this alternative would involve continuing USDA's present pig-control work at an increased level, while also training park staff in wild pig management activities. These activities would include trapping, shooting, disease monitoring, pig disturbance monitoring, installing exclosure fencing in sensitive areas, and research. In some instances, pig control could involve the use of dogs. Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; however, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials. Battery operated drills may be used to put traps together. Overnight camps could be used by control personnel, with no permanent structures. Monitoring of wild pig disturbance and wild pig population management would continue. Stratified random sampling techniques would be used to select transect locations. Transects would be GPSd and revisited over time. Monitoring would be conducted, at most, on a quarterly basis. Limited amounts of rebar or similar material would be used to mark plots.

Mitigation
Same as alternatives 1 and 2. Employee training would include information on wilderness regulations and the need to maintain and enhance wilderness character. The selection of work areas, campsites, and travel routes would be made in such a way as to protect wilderness character, as would decisions regarding project timing, temporary closures, or other actions. Permanent plot markers would be discrete. They would consist of rebar pounded deeply into the soil with only a small section (5" - 6") left above the ground. Rebar would be tagged with identifying numbers. Permanent markers would be GPSd using highly accurate GPS units (e.g., Trimble). Traps would be removed when they are no longer in use. Crew camps would be temporary and signs of human activity within a crew camp would be obliterated.

**Component Activities**
*How will each of the components of the action be performed under this alternative?*

| Component of the Action | | Activity for this Alternative |
|---|---|---|
| X | *Example: Transportation of personnel to the project site* | *Example: Personnel will travel by horseback* |
| 1 | Transportation of personnel to the project site. | Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; however, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials. |
| 2 | Transportation of materials and supplies to the project site. | Most of the materials and supplies will be transported to the project site is by foot or non-motorized boat; however, motorized vehicles would be used on existing old roads and trails to transport traps, exclosure materials and other equipment and supplies into the wilderness. |
| 3 | Treatment method and timing of treatment. | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. |
| 4 | Tools, equipment, and supplies used for wild pig management. | Equipment and supplies includes traps of varying sizes, protective fencing, battery operated drills and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. |
| 5 | Crew camps. | Crew camps may be needed. |
| 6 | Research component. | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. |
| 7 | Condition of site after project. | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig |

| | | |
|---|---|---|
| | | carcasses will be dragged out of public view and at least 200' from permanent water bodies. |
| 8 | Information and education of public and other stakeholders. | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. |
| 9 | | |

**Wilderness Character**

*What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?*

UNTRAMMELED

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; however, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials. | ☐ | ☒ | ☐ |
| 2 | Most of the materials and supplies will be transported to the project site is by foot or non-motorized boat; however, motorized vehicles would be used on existing old roads and trails to transport traps, exclosure materials and other equipment and supplies into the wilderness. | ☐ | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. | ☐ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing, battery operated drills and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☒ | ☐ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 0 | -5 | NE |
| **Untrammeled Total Rating** | | **-5** | | |

Explain:

*Untrammeled = Wilderness is essentially unhindered and free from modern human control or manipulation. This quality is degraded by modern human activities or actions that control or manipulate the components or processes of ecological systems inside the wilderness.*

This alternative would increase the scope of wild pig management in the park more than the other two alternatives. The nature of the impacts on the Untrammeled quality of wilderness character would not differ dramatically from those in alternatives 1 and 2, but impacts would be more pervasive due to the greater efficiency achieved by the use of motorized vehicles. As in alternatives 1 and 2, the trapping and shooting of wild pigs would negatively affect the Untrammeled quality of wilderness character by actively manipulating the biophysical environment. The use of exclosures and potentially larger base camps that are established for longer periods of time or with greater frequency would also constitute trammeling, as would clearing vegetation to re-open and maintain old roadbeds. Elements of this alternative involving monitoring would not affect the Untrammeled quality.

UNDEVELOPED

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; however, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials. | ☐ | ☒ | ☐ |
| 2 | Most of the materials and supplies will be transported to the project site is by foot or non-motorized boat; however, motorized vehicles would be used on existing old roads and trails to transport traps, exclosure materials and other equipment and supplies into the wilderness. | ☐ | ☒ | ☐ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. | ☐ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing, battery operated drills and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☒ | ☐ |
| 6 | Research includes monitoring of wild pig disturbance | ☐ | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| | and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | | | |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☒ | ☐ | ☐ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +1 | -6 | NE |
| **Undeveloped Total Rating** | | **-5** | | |

Explain:

*Undeveloped = Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern occupation. This quality is degraded by the presence of structures, installations, habitations, and by the use of motor vehicles, motorized equipment, or mechanical transport that increases people's ability to occupy or modify the environment. Permanent markers for long term monitoring will have a negative effect on this quality of wilderness character.*

Plot markers, traps, exclosures, and mechanized equipment are developments and would have a negative effect on the Undeveloped quality of wilderness character. This alternative calls for the use of motorized equipment, permanent markers for long term monitoring, the temporary presence of traps, exclosure fencing, and temporary crew camps. In addition, old road beds, trails, and former logging roads could be used by motorized equipment to move

equipment and supplies into the wilderness. Motorized equipment and mechanical transport make it easier for people to occupy and modify the land, as do re-opening and maintaining old roads and trails. Although new and permanent roads would not be developed within Congaree's wilderness, some maintenance and use of existing roads and trails will make the imprint of man more evident.

NATURAL

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; however, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials. | ☐ | ☒ | ☐ |
| 2 | Most of the materials and supplies will be transported to the project site is by foot or non-motorized boat; however, motorized vehicles would be used on existing old roads and trails to transport traps, exclosure materials and other equipment and supplies into the wilderness. | ☐ | ☒ | ☐ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. | ☒ | ☐ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing, battery operated drills and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☒ | ☐ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | -2 | +2 | NE |
| **Natural Total Rating** | | **0** | | |

Explain:

*Natural = Wilderness ecological systems are substantially free from the effects of modern civilization. This quality is affected by intended or unintended effects of modern civilization on the ecological systems inside the wilderness since the area was designated.*

Reducing numbers of non-native wild pigs would materially improve the Natural quality of wilderness character.

Plot markers, traps, exclosures, and firearms would not affect the Natural quality.

Re-opening and maintaining old roadbeds and trails for motorized use would negatively affect the Natural quality. In the long term, however, improved access to the wilderness via motorized vehicles and using existing logging roads, old road beds, and trails would increase the effectiveness of control activities by facilitating the movement of people, equipment, and supplies (traps in particular). Increased efficiency has the potential to reduce wild pig populations to a level that would substantially reduce pig damage and its effect on the Natural quality.

## SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; however, motorized vehicles would be used on | ☐ | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| | existing old roads and trails to transport personnel, traps, and exclosure materials. | | | |
| 2 | Most of the materials and supplies will be transported to the project site is by foot or non-motorized boat; however, motorized vehicles would be used on existing old roads and trails to transport traps, exclosure materials and other equipment and supplies into the wilderness. | ☒ | ☒ | ☐ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. | ☒ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing, battery operated drills and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☒ | ☐ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☒ | ☐ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | | | |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +2 | -6 | NE |
| **Solitude or Primitive & Unconfined Rec. Total Rating** | | **-4** | | |

Explain:

*Solitude or Primitive & Unconfined Recreation = Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation. This quality is impacted by settings that degrade or improve these opportunities. An alternative which increases solitude, removes infrastructure that diminishes primitive recreation, or removes a management restriction would have a positive impact on this quality. Some management actions may be found to be necessary to preserve one or more of the other qualities even though this quality would be degraded.*

The presence of individuals in the wilderness conducting monitoring and wild pig population control activities would reduce the opportunity for solitude and primitive recreation. It would also be necessary to close some areas of the park while shooting operations are conducted, which would impinge on the opportunity for unconfined recreation. The sounds of motorized equipment will also degrade this quality of wilderness character. Keeping old roads open and passable will reduce challenges for those seeking a primitive and unconfined recreational opportunity. Improving the ability to transport personnel and equipment and supplies to remote areas will likely increase the efficiency of wild pig management efforts, resulting in reduced physical and visual degradation of recreational resources through wild pig damage.

OTHER FEATURES OF VALUE

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; however, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials. | ☒ | ☐ | ☐ |
| 2 | Most of the materials and supplies will be transported to the project site is by foot or non-motorized boat; however, motorized vehicles would be used on existing old roads and trails to transport traps, exclosure materials and other equipment and supplies into the wilderness. | ☒ | ☐ | ☐ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for | ☒ | ☐ | ☐ |

| | | | | |
|---|---|---|---|---|
| | disease. Pig carcasses are left in the field to naturally decompose. | | | |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing, battery operated drills and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☒ | ☐ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +4 | 0 | NE |
| **Other Features of Value Total Rating** | | **+4** | | |

Explain:

*An alternative that degrades any values or characteristics of this wilderness (i.e. "ecological,*

*geological, or other features of scientific, educational, scenic, or historical value") that are not accounted for in the above qualities would be a negative impact to this quality. An alternative that improves them would have a positive impact on this quality. Heritage and cultural resources including historic sites, and paleontological localities are included here.*

Reducing wild pig numbers would have a positive effect on historic structures in the park, as well on soil composition and structure, vegetation communities, etc. Improving the ability to transport personnel and equipment and supplies to remote areas will likely increase the efficiency of wild pig management efforts, resulting in reduced physical and visual degradation of recreational resources through wild pig damage.

**Other Criteria**
*What is the effect of each component activity on other comparison criteria? What mitigation measures will be taken?*

MAINTAINING TRADITIONAL SKILLS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; however, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials. | ☒ | ☒ | ☐ |
| 2 | Most of the materials and supplies will be transported to the project site is by foot or non-motorized boat; however, motorized vehicles would be used on existing old roads and trails to transport traps, exclosure materials and other equipment and supplies into the wilderness. | ☒ | ☒ | ☐ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. | ☐ | ☐ | ☒ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing, battery operated drills and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☒ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☐ | ☒ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +3 | -3 | NE |
| **Maintaining Traditional Skills Total Rating** | | **0** | | |

Explain:

Traditional skills would be maintained by transporting materials and supplies on foot and using hand tools. Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling. However, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials.

SPECIAL PROVISIONS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | however, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials. | | | |
| 2 | Most of the materials and supplies will be transported to the project site is by foot or non-motorized boat; however, motorized vehicles would be used on existing old roads and trails to transport traps, exclosure materials and other equipment and supplies into the wilderness. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. | ☐ | ☐ | ☒ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing, battery operated drills and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☐ | ☒ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on | ☐ | ☐ | ☒ |

| | | | | |
|---|---|---|---|---|
| | pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | | | |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 0 | 0 | NE |
| **Special Provisions Total Rating** | | **0** | | |

Explain:

There are no special provisions associated with this alternative.

ECONOMICS & TIME CONSTRAINTS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; however, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials. | ☐ | ☐ | ☒ |
| 2 | Most of the materials and supplies will be transported to the project site is by foot or non-motorized boat; however, motorized vehicles would be used on existing old roads and trails to transport traps, exclosure materials and other equipment and supplies into the wilderness. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. | ☐ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing, battery operated drills and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☒ | ☐ |
| 5 | Crew camps may be needed. | ☐ | ☒ | ☐ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and | ☐ | ☒ | ☐ |

| | | | | |
|---|---|---|---|---|
| | animal community. Fencing may be used. | | | |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☒ | ☐ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | ☐ | ☒ | ☐ |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | 0 | -6 | NE |
| **Economics & Time Constraints Total Rating** | | **-6** | | |

Explain:

Fully funding an integrated program will require additional funds to increase USDA's time on the ground, hire and train CONG staff to conduct wild pig management work, and acquire equipment and supplies to conduct management operations. This is the most ambitious and likely to be the most successful but is also the most costly. Year 1 is estimated to cost approximately $221,220 (two USDA staff and travel @ $70,000, equipment and supplies for USDA and NPS program @ approximately $50,000, one 44 week youth intern @ $13,3384, GS-06 three-year term @ approximately $44,520, one six month seasonal interpreter @ approximately $19,395, vehicle rental and gas for 10 months @ approximately $7,200, travel training @ approximately $3,000). Each year, costs will be reduced. As CONG staff becomes trained, USDA will spend less time on wild pig population control in the park. Interpretive materials will be produced in year 1. Costs for year 2 are estimated to be $184,400 and $165,300 for year 3.

Note that this is an estimate only. Costs will vary depending on many factors.

**Safety of Visitors & Workers**

*What is the effect of each component activity on the safety of visitors and workers? What mitigation measures will be taken?*

SAFETY OF VISITORS & WORKERS

| Component Activity for this Alternative | | Positive | Negative | No Effect |
|---|---|---|---|---|
| X | *Example: Personnel will travel by horseback* | ☐ | ☐ | ☒ |
| 1 | Most trapping, monitoring, exclosure, and research sites would be reached on foot or by paddling; however, motorized vehicles would be used on existing old roads and trails to transport personnel, traps, and exclosure materials. | ☐ | ☐ | ☒ |
| 2 | Most of the materials and supplies will be transported to the project site is by foot or non-motorized boat; however, motorized vehicles would be used on existing old roads and trails to transport traps, exclosure materials and other equipment and supplies into the wilderness. | ☐ | ☐ | ☒ |
| 3 | Management activities include trapping and shooting, direct targeted harvest operations, and monitoring for disease. Pig carcasses are left in the field to naturally decompose. | ☐ | ☒ | ☐ |
| 4 | Equipment and supplies includes traps of varying sizes, protective fencing, battery operated drills and firearms. Trained tracking dogs may be used to improve recovery of wounded animals and as the wild pig population within the target area is reduced. Monitoring tools will include GPS, data sheets, and writing implements. | ☐ | ☐ | ☒ |
| 5 | Crew camps may be needed. | ☐ | ☐ | ☒ |
| 6 | Research includes monitoring of wild pig disturbance and disease monitoring. Research may also include, but is not limited to, work conducted to gather information on wild pig movements, sounder composition and territory, and effect on plant and animal community. Fencing may be used. | ☐ | ☐ | ☒ |
| 7 | After control operations are completed, traps will be removed from the field, signs of human activity will be obliterated, and pig carcasses will be dragged out of public view and at least 200' from permanent water bodies. | ☐ | ☐ | ☒ |
| 8 | Public awareness will be promoted by working with community leaders to maintain communication and | ☒ | ☐ | ☐ |

| | | | | |
|---|---|---|---|---|
| | resolve any problems as quickly as possible. Information on the wild pig management program will be regularly conveyed to park visitors through interpretive products. The following activities could be used to communicate information on non-native wild pigs, their impacts on native ecosystems, and the wild pig management program: posters, articles in news bulletins, bulletin board fliers, exhibits, signs, brochures, PowerPoint or video presentations. Press opportunities will be used to circulate factual information on non-native wild pigs and the management program to the public. Information on pig biology, impacts, and the management program would also be presented to park employees on a regular basis to maintain organization-wide knowledge and consistency. | | | |
| 9 | | ☐ | ☐ | ☐ |
| Total Number of Effects | | +1 | -1 | NE |
| **Safety of Visitors & Workers Total Rating** | | **0** | | |

Explain:

Implementing this alternative would have minimal impacts on safety for park visitors or workers. Active shooting operations pose some risk of accidental injury to park visitors and workers, but this risk is minimized by established safety procedures. Hiking to work sites, use of hand tools, and conducting monitoring activities would pose minor safety risks. Use of motorized equipment poses accident-related risks, but access to vehicles in an emergency could speed the provision of needed medical care. All potential hazards can be mitigated through adequate staff training, development of established safety procedures, and effective communication.

Failure to manage wild pig populations would result in increased spread of diseases that are present in the current population and increase the likelihood of visitor encounters with wild pigs that may result in harm to park staff and the visiting public. Reduction of wild pig numbers would thus enhance the safety of visitors and workers.

## Summary Ratings for Alternative 3

| **Wilderness Character** | |
|---|---|
| Untrammeled | -5 |
| Undeveloped | -5 |
| Natural | 0 |

| | |
|---|---|
| Solitude or Primitive & Unconfined Recreation | -4 |
| Other Features of Value | +4 |
| **Wilderness Character Summary Rating** | **-10** |

| **Other Criteria** | |
|---|---|
| Maintaining Traditional Skills | 0 |
| Special Provisions | 0 |
| Economics & Time Constraints | -6 |
| **Other Criteria Summary Rating** | **-6** |

| **Safety** | |
|---|---|
| Safety of Visitors & Workers | 0 |
| **Safety Summary Rating** | **0** |

# MRDG STEP 2: Alternative Comparison

Alternative 1: Continue Current Management - USDA Wildlife Services conducts limited wild pig management activities and monitoring for disease.

Alternative 2: Establish an Integrated Wild Pig Management Program, with No Use of Motorized Tools or Transport.

Alternative 3: Establish an Integrated Wild Pig Management Program, with Limited Use of Motorized Tools and Transport.

Alternative 4:

| **Wilderness Character** | Alt 1 | | Alt 2 | | Alt 3 | | Alt 4 | |
|---|---|---|---|---|---|---|---|---|
| | + | - | + | - | + | - | + | - |
| Untrammeled | 0 | 2 | 0 | 3 | 0 | 5 | | |
| Undeveloped | 1 | 4 | 1 | 4 | 1 | 6 | | |
| Natural | 2 | 0 | 2 | 0 | 2 | 2 | | |
| Solitude or Primitive & Unconfined Rec. | 1 | 4 | 1 | 4 | 2 | 6 | | |
| Other Features of Value | 1 | 0 | 1 | 1 | 4 | 0 | | |
| Total Number of Effects | 5 | 10 | 5 | 12 | 9 | 19 | | |
| **Wilderness Character Rating** | **-5** | | **-7** | | **-10** | | | |

| **Other Criteria** | Alt 1 | | Alt 2 | | Alt 3 | | Alt 4 | |
|---|---|---|---|---|---|---|---|---|
| | + | - | + | - | + | - | + | - |
| Maintaining Traditional Skills | 3 | 0 | 3 | 0 | 3 | 3 | | |
| Special Provisions | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Economics & Time Constraints | 0 | 3 | 0 | 6 | 0 | 6 | | |
| Total Number of Effects | 3 | 3 | 3 | 6 | 3 | 9 | | |
| **Other Criteria Rating** | **0** | | **-3** | | **-6** | | | |

| **Safety** | Alt 1 | | Alt 2 | | Alt 3 | | Alt 4 | |
|---|---|---|---|---|---|---|---|---|
| | + | - | + | - | + | - | + | - |
| Safety of Visitors & Workers | 2 | 1 | 2 | 1 | 1 | 1 | | |
| **Safety Rating** | **+1** | | **+1** | | **0** | | | |

# MRDG STEP 2: Alternatives Not Analyzed

**Alternatives Not Analyzed**
*What alternatives were considered by not analyzed? Why were they not analyzed?*

*1. No wild pig control, wild pig damage would be monitored*
In this alternative, Congaree National Park would not conduct any wild pig management activities. However, disturbance caused by wild pigs would be monitored. Monitoring would be conducted on foot. Monitoring would consist of a series of simple walking transects that could include segments of existing hiking trails, stream banks, slough margins, unimproved roads, old logging grades, and the interior of dominant forest types at the park (mixed bottomland hardwoods, cypress-tupelo swamps) and other targeted habitats or special resource sites as needed. These transects could also incorporate the existing large forest monitoring plots that were used for prior hog disturbance research in the park over several years preceding the onset of management, linking the monitoring protocol to prior baseline data. Permanent plots could be established for long term monitoring. Monitoring would also include use of Southeast Coast Inventory and Monitoring Network's Rapid Vegetation Assessment of wild pig disturbance.

This alternative was not analyzed because it does not meet the purpose and need for the project, as described in the environmental assessment.

*2. Public Hunting*
Public hunting on NPS property was eliminated from further consideration for several reasons. First and foremost, public hunting is prohibited by the establishing legislation and federal regulations (36 CFR 2.2). In addition, public hunting is unlikely to contribute substantially to pig management efforts within the park. Recreational hunting can achieve reduction of animals with relatively low reproductive potential. However, animals with very high reproductive potential, such as non-native wild pigs, are much more difficult to control and require a well-focused, comprehensive, and sustained effort by wildlife reduction professionals. The substantial effort which would be required to manage public hunting at the park would be cost prohibitive and public hunting would be incompatible with other visitor uses currently established at the park.

*3. Trap and relocate*
Live capture and relocation of wild pigs from CONG was eliminated from further analysis. Live capture and relocation of wild pigs is illegal within the state of South Carolina without a permit. Also, swine brucellosis and pseudorabies has been documented in wild pig populations at CONG and the surrounding area. Movement and relocation of live animals could result in infection of other feral populations and livestock. The USDA would strongly object and prohibit the relocation of non-native wild pigs.

*4. Park-wide or Large-area Fencing*

Fencing the perimeter of CONG or large areas within the park to conduct fenced-zone removal of wild pigs and to prevent or reduce movement of wild pigs into the park was eliminated from further analysis due to: wilderness impacts; impacts to visitor experience; potential alterations that fencing could have on the natural movement of water, sediments, flood debris, native biota, etc. within and through the park; the frequent and severe damage that flooding would cause to fences; and the prohibitive cost of installation and maintenance.

*5. Use of Snares*

Snares and trapping methods other than live capture traps were eliminated from further analysis due to the concern that native non-target wildlife could be negatively affected by these methods.

*6. Poisoning/Toxicants/Contraceptives/Sterilization*

Use of poisoning agents or toxicants was eliminated from further analysis due to the concern that native non-target wildlife could be negatively affected. Although research into species specific delivery methods is being conducted, no species specific delivery method has been found and no toxicants are currently registered for use with feral ungulates in the United States.

Contraceptives or sterilization could be a low-impact means to reduce non-native wild pig populations; however, no effective or feasible means of sterilization or contraception are currently available for non-native wild pigs. Therefore, this alternative was eliminated from further analysis. If sterilization and contraceptive technologies for controlling non-native wild pigs are developed in the future, this alternative should be re-evaluated.

*7. Biological Control*

The use of biological controls, such as the reintroduction of predators, was eliminated from further analysis due to lack of feasibility and low likelihood of substantial contribution to wild pig management efforts within the park.

# MRDG STEP 2: Decision

Refer to the **MRDG Instructions** before identifying the selected alternative and explaining the rationale for the selection.

| Selected Alternative | |
|---|---|
| ☐ Alternative 1: | Continue Current Management - USDA Wildlife Services conducts limited wild pig management activities and monitoring for disease. |
| ☐ Alternative 2: | Establish an Integrated Wild Pig Management Program, with No Use of Motorized Tools or Transport. |
| ☒ Alternative 3: | Establish an Integrated Wild Pig Management Program, with Limited Use of Motorized Tools and Transport. |

Explain Rationale for Selection:

Continued disturbance by wild pigs will have an increasingly negative impact on the park's wilderness character. Non-native wild pigs are a severe threat to the park's ecosystem and outstanding natural resources due to disturbance behaviors such as rooting, wallowing, and the development of established wildlife trails; competition with and predation on native species; potential spread of non-native invasive plants; potential impairment of water quality; and disease. At risk are bottomland hardwood ecosystem function, regeneration of bottomland hardwood canopy tree species, rare and imperiled species and ecological communities (including globally imperiled seepage forest communities and state listed plants), streams and stream banks, a variety of wetland and aquatic habitats, and numerous other natural resources. Non-native wild pigs are also a threat to upland longleaf pine habitats at the park, an imperiled ecological community and potential habitat for the federally endangered red-cockaded woodpecker and numerous rare and endangered plants.

The selected alternative is not the alternative that has the least negative impact on wilderness character. However, this alternative represents the minimum requirement necessary for the administration of the Congaree National Park wilderness as wilderness. Research indicates that about 70 percent of a wild pig population must be removed each year for a sustained period of time to substantially reduce a wild population. Difficulty accessing the wilderness is likely to reduce the park's ability to achieve this level of population control.

Management to reduce impacts of non-native species is consistent with the National Park Service (NPS) policy to protect natural ecosystems. The impacts of non-native wild pigs, the need for a control program, and management objectives to reduce the non-native wild pig population are described in the Congaree National Park's General Management Plan and Resource Management Plan and in numerous references in the park's resource management

files. The NPS Management Policies 2006 and NPS 77 provide direction for management of exotic species. The NPS Management Policies 2006 task NPS units with maintaining "as parts of the natural ecosystems of parks all plants and animals native to park ecosystems" and preventing non-native species from displacing native species if this displacement can be prevented by management. "High priority will be given to managing exotic species that have, or potentially could have, a substantial impact on park resources, and that can reasonably be expected to be successfully controlled...Where an exotic species cannot be successfully eliminated, managers will seek to contain the exotic species to prevent further spread or resource damage."

Describe Monitoring & Reporting Requirements:

## Approval of Prohibited Uses

Which of the prohibited uses found in Section 4(c) of the Wilderness Act are approved in the selected alternative and for what quantity?

| | | |
|---|---|---|
| ☒ | Mechanical Transport: | ORVs and potentially wagons may be used to transport traps into the Congaree Wilderness. This will improve the ability of NPS staff and representatives to access areas and intensively trap and remove entire sounders. Traps are heavy. Transporting by hand will pose a safety risk to workers. One to two ORVS and one to two wagons will be permitted to move traps. All wagons and ORVs must be equipped with light weight low pressure tires or other tires designed to reduce impact. Mechanized equipment and motorized vehicles may be restricted by park management in wet conditions. |
| ☒ | Motorized Equipment: | Battery operated drills may be used to put traps together in the field. One to two drills may be used. |
| ☒ | Motor Vehicles: | ORVs and potentially wagons may be used to transport traps into the Congaree Wilderness. This will improve the ability of NPS staff and representatives to access areas and intensively trap and remove entire sounders. Traps are heavy. Transporting by hand will pose a safety risk to workers. One to two ORVS and one to two wagons will be permitted to move traps. All wagons and ORVs must be equipped with light weight low pressure tires or other tires designed to reduce impact. Mechanized equipment and motorized vehicles may be restricted by park management in wet conditions. |
| ☐ | Motorboats: | |

| | | |
|---|---|---|
| ☐ | Landing of Aircraft: | |
| ☒ | Temporary Roads: | All ORVs will be operated on existing logging roads. Tree removal may be conducted to make roads passable but no other work will be done to maintain the existing roads. No new roads will be created. Mechanized equipment and motorized vehicles may be restricted by park management in wet conditions. |
| ☐ | Structures: | |
| ☒ | Installations: | Traps, fences and rebar used to mark monitoring plots are all installations. Traps will not be visible from existing trails, Cedar Creek or the Congaree River. Fences will only be used if needed to protect sensitive resources. They will be out of view of visitors to the greatest extent possible and materials will be selected that help camouflage them. Two to three pieces of rebar or camouflaged PVC pipe may be installed to delineate each monitoring plot. Rebar blends in with surroundings. If PVC is used, it will be camouflaged to blend in with the background. |

Record and report any authorizations of Wilderness Act Section 4(c) prohibited uses according to agency policies or guidance.

Refer to agency policies for the following review and decision authorities:

| | | | |
|---|---|---|---|
| Prepared | Name Terri Hogan | Position Chief, Integrated Resource Management | |
| | | | |
| | Signature | | Date |
| | | | |

| | | | |
|---|---|---|---|
| Recommended | Name | Position | |
| | | | |
| | Signature | | Date |
| | | | |

| Recommended | | |
|---|---|---|
| | Name Mark Kinzer | Position Regional Wilderness Coordinator |
| | | |
| | Signature Mark W. Kinzer | Date 12-8-14 |
| | | |

| Approved | | |
|---|---|---|
| | Name Tracy Stakely | Position Superintendent |
| | | |
| | Signature J. Tracy Stakely | Date 12/16/14 |
| | | |