

DRAFT ENVIRONMENTAL ASSESSMENT (EA)

**POLK SWAMP CONTINUING AUTHORITIES PROGRAM (CAP) SECTION 206
AQUATIC ECOSYSTEM RESTORATION PROJECT
DORCHESTER COUNTY, SOUTH CAROLINA**



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CHAPTER 1 INTRODUCTION

This Environmental Assessment (EA) has been prepared by the U.S. Army Corps of Engineers, Charleston District (Corps) in compliance with the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321- 4370f, and its implementing regulations, 40 C.F.R. §§ 1500-1508, and 33 C.F.R. Part 230, to evaluate the proposed Aquatic Ecosystem Restoration Project at Polk Swamp.

Polk Swamp is about 38,000 acres in size and is located in Dorchester and Orangeburg Counties within the Coastal Plain of South Carolina (Figure 1). It is the main tributary for the watershed and is joined by Cowtail Creek and Bear Branch. Polk Swamp joins with Indian Field Swamp before it empties into the Edisto River. The project area is located west of the Town of St. George in Dorchester County, SC. St. George is located approximately 50 miles northwest of Charleston, SC. The project area begins just south of Polk Swamp's intersection with Interstate 95 and follows Polk Swamp for approximately 5 miles to the swamp's intersection with US Highway 15 (Figure 2).

The Polk Swamp study is being conducted under Section 206, Aquatic Ecosystem Restoration, of the Water Resources Development Act (WRDA) of 1996 (P. L. 104-303), as amended. Section 206 authorizes the Corps of Engineers to initiate investigations and implement projects for aquatic ecosystem restoration with the objective of restoring degraded ecosystem structure, function, and dynamic processes to a less degraded, more natural condition considering the ecosystem's natural integrity, productivity, stability, and biological diversity. Dorchester County requested initiation of this study through the submittal of a letter request to the Corps on December 13, 2010. As a result of this letter, a Federal Interest Determination (FID) was undertaken by the Corps and a Feasibility Study was initiated. This environmental assessment (EA) addresses the proposed re-establishment of the historic channel through a reach of the Polk Swamp, followed by the planting of cypress, tupelo, and other bottomland hardwood trees as appropriate. Dorchester County would be responsible for maintaining the reach in a free-flowing condition after the restoration work is complete.

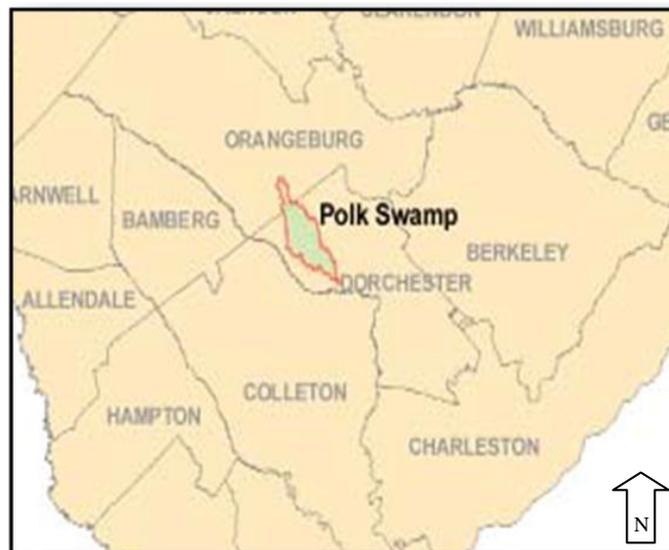


Figure 1: Location of Polk Swamp within the South Carolina Coastal Plain *not to scale.

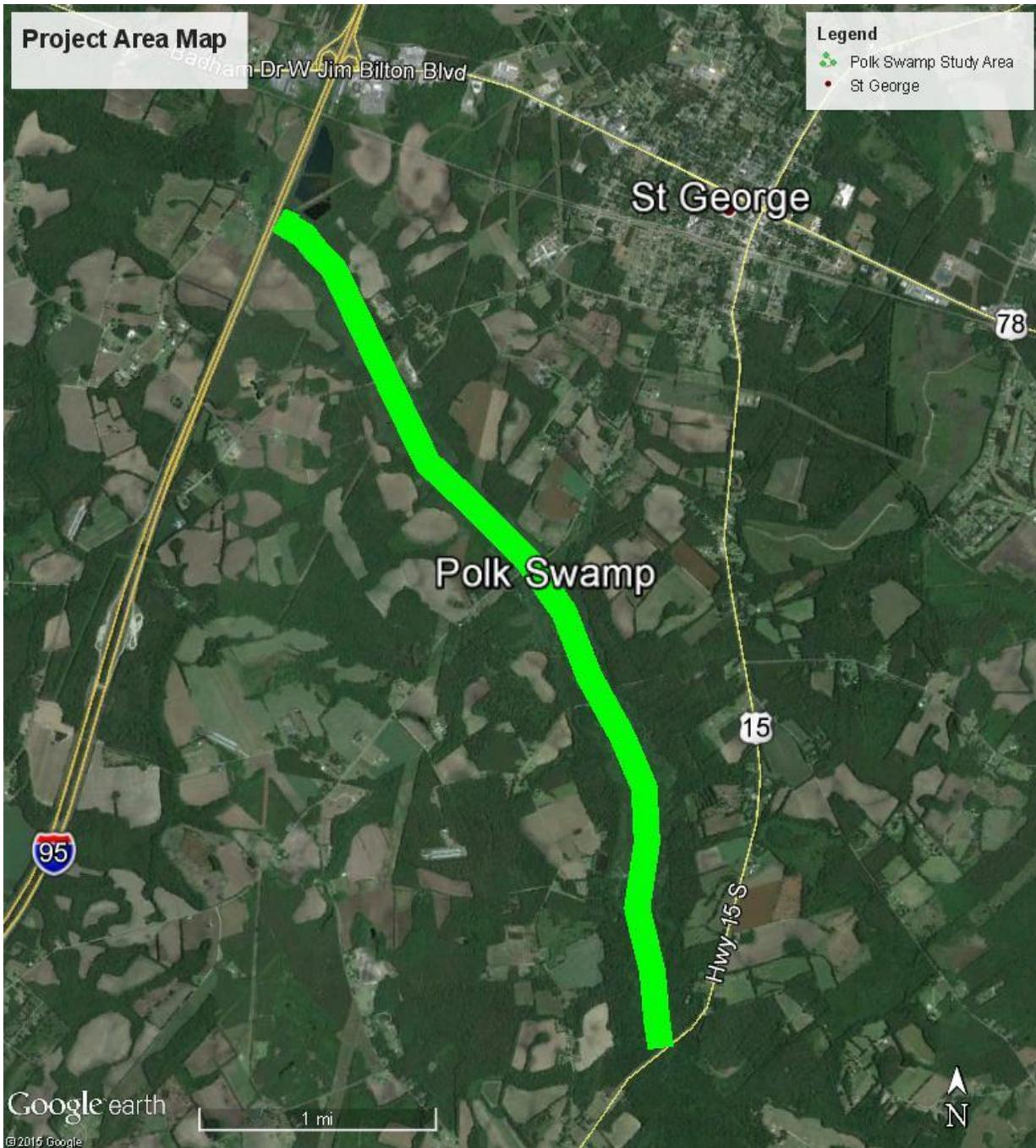


Figure 2: Project Area. General location of Polk Swamp Study Area highlighted bright green.

CHAPTER 2 PURPOSE AND NEED

The aquatic ecosystem of Polk Swamp has been severely degraded by a substantial loss of bottomland hardwood forest habitat. This degradation is characterized by losses of bottomland hardwood trees, defined stream channels, the tree canopy (which provided shade and contributed to diversity of habitat types), an explosion of invasive aquatic species, persistent flooding of areas that were only periodically inundated in the past and a

significant increase in stagnant water during non-flood periods. The degradation has been attributed to the restriction of flow through the swamp's stream channel. The Corps has determined that anthropogenic watershed changes such as flow blockages from construction, bridges, rail road crossings, and utility rights-of-way and natural and weather phenomenon (debris left over from Hurricane Hugo (1989), debris from the winter storms of 2014 and beaver colonization as a result of conditions in the swamp after Hurricane Hugo) are among the primary causes of the flow changes. The large number of downed trees in the channels following Hurricane Hugo started a process that increasingly slowed flows, captured debris, and persistently elevated water levels causing the remaining trees and canopy to die out. Without the canopy, the area was exposed to elevated levels of sunlight, causing an explosion of invasive and nuisance aquatic vegetation which further restricted flows, degraded habitat and reduced the diversity of both plant and animal species (Appendix A).

An estimated 290 acres of bottomland hardwood forest within the project area has died off. The most impacted reach is an approximately 5 mile reach located between Interstate 95 and State Highway 15 (Figure 2). A series of photographs showing the bottomland hardwood forest that once dominated the study area in comparison to the current conditions is provided in Appendix B.

CHAPTER 3 BASELINE ENVIRONMENTAL SETTING

Climate

The climate in the region consists of long hot summers and cool winters. Summers are warm and humid (average July high and low temperatures are 92°F and 71°F, respectively). Winters are relatively mild (average January high and low temperatures are 58°F and 35°F, respectively). Precipitation occurs chiefly as rainfall and averages about 49.5 inches per year with approximately one-third of that total occurring during the months of June, July, and August.

Land Use

The primary land use within the watershed is a mix of forested and row crops (SCDHEC 2006) (Table 1). Cotton, feed corn, hay, and soybeans are the most common commercial crops within the project area. The majority of the farmland is considered prime farmland or farmland of statewide importance (USDA 2010). USDA defines prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and which is available for these uses. Prime farmland can be cropland, pastureland, range land, forest land, or other open vegetated lands, but cannot be urban built-up land or water.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation. It also has favorable temperature and growing season, acceptable acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent.

Table 1: Estimated Land Use Summary in the Polk Swamp Watershed

Land Use	Area(mi ²)	Percent
Row Crops	35.03	33.90
Pasture	5.54	5.30
Forested	37.7	36.5
Woody Wetlands	19.29	18.67
Emergent Herbaceous Wetlands	0.39	0.38
Developed (Residential and Commercial)	1.69	1.64
Other (Bar, Recreation Grass, Transitional)	3.37	3.26

USDA defines unique farmland as land other than prime farmland used for the production of specific high value food and other fiber crops. Unique farmlands can economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods.

With respect to larger considerations, Polk Swamp is a part of the Edisto River watershed. The U.S. Department of Agriculture, Soil Conservation Service has classified 63% of the Edisto Basin as either Prime Farmland (24%) or statewide important farmland (39%). A majority of the farmland adjacent to the project area also falls within these two classifications (NRCS 2010). However, no part of the project foot print is designated as prime, unique, or statewide important farmland.

There are no urbanized areas within the project area. However, the towns of Reeseville and St. George are nearby. The land adjacent to the project area is mainly a mix of farmland and forests. There are a few houses adjacent to the project area. The only heavy land use or commercial development proximate to the project are the St. George Waste Water Treatment Plant and a South Carolina Department of Transportation Storage area.

Water Resources and Aquatic Habitat

Polk Swamp is tributary to the Edisto River and is located within the upper Coastal Plain of South Carolina. The Coastal Plain of South Carolina sits atop marine deposits of limestones and sands (SCDNR 1985). Shallow aquifers, including the Floridian and Tertiary are extensively used for water supply (SCDNR 2009). The groundwater supply potential of the Edisto Basin is considered healthy and groundwater quality is not an issue (SCDNR 2009). There are no permanent impoundments on Polk Swamp.

The State of South Carolina has designated the Polk Swamp as “Freshwater” (FW). FW waterbodies are considered suitable for primary and secondary contact recreation, industrial and agricultural uses, and drinking water supply after conventional treatment (SCDHEC 2012). From 1998 to 2006, however, Polk Swamp was on the South Carolina’s 303(d) list for not fully supporting recreational uses due to the exceedance of the South Carolina’s fecal coliform bacteria standards. A Total Maximum Daily Load (TMDL) developed for Polk Swamp by the State of South Carolina concluded that the primary sources of fecal coliform bacteria were nonpoint source in nature (wildlife, waterfowl, livestock, and waste application to cropland) and concluded that load reductions would be reduced through the implementation of a nonpoint source pollution education program and the implementation of better agricultural best management practices (BMPs) (SCDHEC 2006).

The Town of St. George has a permitted National Pollution Discharge Elimination System (NPDES) discharge for treated wastewater within the project area. This discharge is considered by SCDHEC to be minor, with a permitted discharge of 0.8 million gallons of water per day. Since 1989, there have only been 6 reported violations of the facility's permitted limits for fecal coliform bacteria, with most fecal discharges being less than 1 fecal count per 100 ml of water. This facility is not considered to be a source of impairment to the watershed (SCDHEC, 2006).

The aquatic habitat of the project area consist of a heavily herbaceous community structure, with invasive cattail as the dominant species. A low density of scattered dead trees are still standing within the area and little to no living cypress, tupelo or bottomland hardwood tree species are present. This monotypic habitat provides little habitat value for most native aquatic fish, wading birds or invertebrates found in other parts of the watershed.

Field reconnaissance identified 58 obstructions in the project area and revealed very few areas where channel reestablishment outside of the blockages would be necessary to restore historic flow patterns. Throughout the project area water depth varies from 6 inches to 6 to 8 feet. Natural seasonal periods of flooding and drying do not occur with the project. Much of the area is inundated with stagnate water year round.

The existing fishery of the project area consists largely of invasive mosquito fish (*Gambusia spp.*) and low densities of native fish such as Bowfin (*Amia calva*), redbreast sunfish (*Lepomis auritus*), and redbreast sunfish (*Lepomis auritus*), and redbreast sunfish (*Lepomis auritus*). In comparison to reaches of Polk Swamp upstream and downstream of the project area densities of native fishes were lower within the project area. The existing community of benthic organisms within the project area is limited to organisms that can persist in a mono-crop of cattails in stagnant water.

Terrestrial Resources and Wildlife

The project area consist of a heavily herbaceous community structure, with invasive cattail as the dominant species. A low density of scattered dead trees are still standing within the area and little to no living cypress, tupelo or bottomland hardwood tree species are present. More typical, natural areas within Polk Swamp consist of bottomland hardwood swamps, bordered by a combination of planted pine stands, mixed hardwoods, and managed agricultural fields. The flora and fauna observed are consistent with those found in the Southeastern Coastal Plains Region of South Carolina.

Furbearers are an important component of these wetlands and include beaver, mink, otter, bobcat, gray fox, raccoon, and opossum. Deer, turkey, bobcat, and feral hogs are important large mammals that frequent both the swamp and adjacent uplands. Other small mammals, such as gray squirrels, rabbits, and several small rodent species are also found within the vicinity of the project area. Invasive species such as coyotes and armadillos have also been observed.

The study area is part of the Atlantic Flyway, and forested wetlands provide important wintering habitat for many waterfowl species and nesting habitat for wood ducks. Bottomland forests provide breeding refuges for multiple migrant species including the Acadian flycatcher, various warbler species, and the northern parula (SCDNR, 2005; Cely, 2003). The adjacent uplands are

foraging and breeding grounds for sparrows, buntings, and nuthatches. Predatory birds such as hawks and ospreys use both the uplands and swamps. Wading birds, including the great blue heron, the green-backed heron, and the ibis, forage within the swamp.

South Carolina Coastal Plain wetlands are very important, supporting a variety of reptiles and amphibians. Wetland habitats support many kinds of frogs, including the bullfrog, bronze frog, southern leopard frog, and several species of tree frogs, cricket frogs, and chorus frogs. Turtles found in these wetlands include river cooter, Florida cooter, pond slider, eastern chicken turtle, snapping turtle, mud turtle, and stinkpot. Snakes found in the wetlands include red-bellied water snake, banded water snake, brown water snake, eastern mud snake, rainbow snake, and eastern cottonmouth. The American alligator has been observed in the project area.

A review of NOAA's Essential Fish Habitat (EFH) mapping program shows that the project area is upstream of any designated EFH or Habitat Areas of Particular Concern (HAPC). This will be confirmed by National Marine Fisheries Service (NMFS).

Air Quality and Noise

The Clean Air Act (CAA), which was last significantly amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The CAA established two types of national ambient air quality standards- primary and secondary. Primary standards are levels established by the EPA to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards are levels established to protect the public welfare, including protection from decreased visibility and damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards has set NAAQS for six principal pollutants which are called "criteria" pollutants. Those pollutants are Carbon Monoxide, Lead, Nitrogen Oxides, Particulate Matter (PM₁₀), Particulate Matter (PM_{2.5}), Ozone and Sulfur Dioxide. All air pollutants are listed as in attainment for Dorchester County (EPA 2012).

The project area is set in a rural setting. Generally the area is not densely populated or heavily industrialized, though agricultural and silviculture practices are employed adjacent to the project area. Noises associated with traffic and agriculture and silviculture practices are the predominant sources of noise in the project area. Naturally occurring noises (buzzing of insects, bird calls, etc.) are also common within the project area.

Cultural Resources

ArchSite is a tool provided by the South Carolina Institute of Archaeology and Anthropology and South Carolina department of Archives and History (<http://archsite.cas.sc.edu/ArchSite>). A search of ArchSite revealed no cultural resources with the project area (Appendix C). Architectural reconnaissance identified no buildings of any kind or landscapes within or immediately adjacent to the footprint of the proposed project.

Endangered Species

Table 2 provides a list of species that have been listed by the U.S. Fish and Wildlife Service as occurring or possibly occurring in Dorchester County (last updated October 23, 2013) (USFWS 2014). A review of the South Carolina Heritage Trust’s Threatened and Endangered Species database revealed no known occurrence of any state or federally listed species within the project area.

Table 2: Federally threatened species (T), federally endangered species (E), federal candidate species (C) and species protected under the Bald and Golden Eagle Protection Act (BGEPA) for Dorchester County

Category	Common Name	Scientific Name	Federal Status
Bird	Bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA
Bird	Red-cockaded woodpecker	<i>Picoides borealis</i>	E
Bird	Wood stork	<i>Mycteria americana</i>	T
Fish	Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	E
Fish	Shortnose sturgeon	<i>Acipenser brevirostrum</i>	E
Plant	Canby’s dropwort	<i>Oxypolis canbyi</i>	E
Plant	Pondberry	<i>Lindera melissifolia</i>	E
Plant	Bog Asphodel	<i>Nartheccium americanum</i>	C
Reptile	Gopher tortoise	<i>Gopherus polyphemus</i>	C

Hazardous Toxic and Radioactive Waste (HTRW)

A site inspection of the project area was conducted by USACE staff. The inspection revealed no signs of HTRW within the project area. Additionally the Environmental Protection Agency (EPA) EnviroMapper was queried on June 21, 2015 (EPA 2015). No immediate sources of Hazardous Toxic or Radioactive Waste were shown to occur within the vicinity of the project area.

Socioeconomics

Table 3 summarizes the population statistics for the Town of St George, South Carolina from the US Census Bureau’s 2010 Census. The socioeconomic conditions of the area are typical for rural areas within the low country of South Carolina.

Table 3: Select U.S. Census Bureau statistics for the town of St George, SC. Estimates are from 2010 Census Data unless otherwise noted.

Subject	Estimate
Population estimate	2,084
Percent of total population that is a minority	48.8%
Median household income	\$17,634
Percent of total population with a High School Diploma or GED	69.3%
Percent of total population with a College degree	11.9%
Percent of total population below the Poverty level	34.2%
Unemployment rate	18.7%

Recreation

There are no designated boat launches within the project area, however small boats (such as canoes, kayaks, and john boats) can be launched at multiple locations throughout the project area. The project area is used for recreational fishing and hunting, as evidenced by the number

of deer hunting stands and fishing tackle remnants observed while performing surveys and investigations of the swamp.

CHAPTER 4 ALTERNATIVES

Alternative 5 (Proposed Project)

The Proposed Project consists of the measures below:

Measure 1: Removal of Blockages

This measure involves the physical removal of blockages within the historic channel throughout the project area. These blockages are primarily comprised of fallen timber, plant growth, choke points where debris has collected, and impoundments created by beaver. The removal of these blockages will allow for the restoration of hydrology, including flood and low water periods. The removal process will include both mechanical and hand clearing. The mechanical removal will be performed using floating mechanized equipment (likely an amphibious track-hoe) to clear blockages within about a 21-foot wide path within the historic channel. Work would start at the downstream end of the project and work upstream. If additional blockages require removal after the initial pass through the project area that work will be performed working back downstream.

Components of the blockages consisting of inorganic material will be taken off site for upland use or disposal using a small barge. Expansion of the historic channel will be avoided to the extent practical to minimize the amount of material that is required to be transported out of the project area. Organic debris will be placed on higher ground adjacent to blockages to create topographic relief within the floodplain of Polk Swamp and promote the development of micro habitats and greater diversity within the restoration area. When feasible, large components of blockages consisting of trees and other organic material will be taken off site along with the inorganic material for upland use or disposal. In areas where significant impoundments exist, the blockages will be removed slowly to avoid large and sudden changes in water quality downstream of the work. Care will be taken to minimize the amount of debris that is allowed to leave the immediate area and screens will be placed in the channel downstream of the work to capture and collect debris that is released into the channel.

Measure 2: Initial Herbicide Application

While removing the blockages and subsequent standing water would help restore the hydrology of the swamp, it would not remove the emergent vegetation, particularly invasive cattails (*Typha*.sp). The cattails must be eradicated prior to the reestablishment of a bottomland hardwood community. This would be done in five phases: 1) broadcast aerial application of herbicides, 2) controlled burning, 3) post-burn selective application of herbicides to prevent the return of invasive emergent vegetation, 4) replanting native tree species, and 5) maintenance.

- 1) ***Initial Herbicide Application:*** The initial herbicide application would be applied to approximately 290 acres of project area that have been converted from bottomland hardwood forest to *Typha* sp. dominated marsh. Due to the size of the area and the difficulty of the terrain, application would be made by helicopter spraying. Through discussions with SCDNR Aquatic Invasive Species Staff the Corps has determined

that the preferred herbicide to be used for the initial spraying is Habitat™ (or a similar herbicide) mixed with a glyphosate (or a similar herbicide). The application rate would be 15-20 gallons/acre. Below is a brief description of the herbicides to be used:

Habitat™ works by affecting enzymes only found in plants. It is absorbed through leaves, stems and roots and causes the plant to cease growing and exhaust its nutrient supply. Habitat is approved by the USEPA and has a history of effective herbicide use. This or a similar product would be applied in accordance with the agricultural pesticide standards. For product information please see: http://www.sepro.com/documents/Habitat_Label.pdf.

Glyphosate is one of the most common, widely used products for weed control and is commonly used in household and commercial weed control products. It is the active ingredient in Round Up™, Ranger Pro™, and Strike Out™. Glyphosates are absorbed in the leaves, travel to the roots, and prevent plants from gathering nutrients. Glyphosates break down and do not travel to be absorbed by other plants. Glyphosates have been long used for aquatic plant control. This or a similar product would be applied in accordance with agricultural pesticide standards. For product information please see: <http://npic.orst.edu/factsheets/glyphotech.html>.

- 2) **Targeted Herbicide Application:** Prior to and after the initial controlled burn, the area would be spot-treated with herbicides to prevent the reintroduction of invasive species (from either germinated seeds or outside sources) that would prevent the successful reestablishment of bottomland hardwood forests. The preferred herbicide to be used for the targeted herbicide application is Clearcast™ (or a similar herbicide) mixed with a glyphosate (or a similar herbicide). Application rate would be 15-20 gallons/acre with backpack spraying being the preferred method of application.

Clearcast™ herbicide is an aqueous formulation that may be applied either directly to water for the control/suppression of certain submerged aquatic vegetation, broadcasted, or used for targeted application on floating and emergent vegetation. Like Habitat™, it attacks plant enzymes and inhibits nutrient uptake, growth, and subsequent survival. It is approved by the USEPA and has a history of use for aquatic plant control.

- 3) **Controlled Burning:** While the herbicide application would be fatal to *Typha sp.* and other emergent aquatics, the cattails would still reside in the project area due to the fact that their root systems are well embedded and the plants would not be transported downstream, nor would they break down in any reasonable amount of time. The dead plant material must be removed, either by physical means or controlled burn. Conducting a controlled burn would be the most efficient means of removing the dead

material and would have the benefit of releasing stored nutrients and carbon back into the system

- 4) **Replanting:** Replanting, to supplement natural regeneration, would include a mix of trees found in bottomland hardwood forests. Specific species mix will include: bald cypress, willow oak, and water oak.
- 5) **Post Planting Maintenance:** After the planting, at least 3 years of targeted spraying with Clearcast™ to prevent the reintroduction of emergent vegetation and allow the seedlings to grow. Seedlings would be monitored to ensure success. Diseased seedlings would be removed and replaced.

Alternative 4

Alternative 4 is identical to Alternative 5 except that it does not include replanting. The blockages would be removed and the initial application of herbicides and controlled burn would be performed. The area would not be replanted.

Alternative 3

Alternative 3 is identical to Alternative 4 except that it does not include controlled burning. The blockages would be removed and the application of herbicides would be performed. However, no controlled burning would occur.

Alternative 2

Alternative 2 is identical to Alternative 3 except that it does not include maintenance herbicide application. The blockages would be removed and the initial application of herbicides would be performed. However, the area would not receive maintenance herbicide application

Alternative 1

Alternative 1 would only remove the blockages. No herbicides would be applied and no controlled burning or replanting would occur. The existing vegetation would be left in place and area would be allowed to regenerate with whatever species naturally colonizes the area over time.

No Action Alternative

A basic alternative to any proposed plan of improvement is the "No Action" alternative. The No Action Alternative is the most probable future condition if no action is taken. The No Action Alternative will not remove the permanently impounded water, restore the climax palustrine forested ecosystem, or improve water quality throughout the watercourse. Although the area may eventually recover naturally, the area would remain only minimally productive for both fish and wildlife resources that are indigenous to this type of environment for the foreseeable future.

CHAPTER 5 ANALYSIS OF ALTERNATIVES

The goals of this study are to restore the natural hydro period of Polk Swamp, remove invasive vegetation and prevent any reestablishment, and to restore the cypress-tupelo and bottomland hardwood forest that historically existed there. A number of conceptual plans were evaluated based on established criteria that considered engineering feasibility, cost effectiveness, environmental impacts, and socioeconomic benefits. Feasible conceptual plans were further refined into viable alternatives consisting of viable restoration measures as described above, and summarized in Table 4.

Several scientific studies have examined regeneration and restoration of cypress-tupelo swamps. Salt water intrusion has been shown to have a strong negative impact to the successful reestablishment of cypress tupelo swamps, however due to the location of Polk Swamp salt water intrusion is not a risk factor for this restoration effort. Other variables that inhibit successful restoration of cypress-tupelo swamps, and are risk factors for this proposed restoration effort include: herbivory, shading, aggressive weeds growth, inadequate seed banks, and altered hydrology (Middleton 2000, Middleton 1998, Conner 1995, Myers, et.al. 1995 and Conner and Flynn 1989).

Natural regeneration of cypress does not occur in areas that are permanently flooded due to the inability of their seeds to germinate underwater. Optimal conditions for natural germination of cypress are flooded winters with dry summers for seed germination and growth (Middleton 1998). Alternatives 1 through 5 would allow the floodplain to undergo natural flooding which could allow for the natural germination and growth of cypress. During a typical year, the physical removal of blockages would result in base flows being constrained to the channel frequently enough to allow bottomland hardwoods, cypress and tupelo to persist, once established (Table 5), and limit the re-establishment of emergent aquatic vegetation. The no action alternative was eliminated due to its failure to meet any of the project objectives within the foreseeable future (Table 6).

Myers et al. (1995) found that weeds can cause cypress to exhibit a spindly growth habit or in some cases lead to mortality. Additionally, Conner (1995) examined cypress-tupelo swamp regeneration after Hurricane Hugo. In areas where growth and recruitment were poor he concluded it was likely due to intense shading and flooding. Though the weeds species in Myers, et al. (1995) were vines parallels can still be drawn with Polk Swamp. Cattails share some characteristics with vines including rapid and aggressive growth. Without removal of cattails from the study area they would quickly envelop any seedling cypress that germinated naturally or were planted, greatly reducing the amount of light reaching the seedling. Due to the aggressive growth and strong shading produced by cattails it can be concluded that without the removal of cattails from Polk Swamp the restoration of any cypress-tupelo swamp would be impossible. Alternatives 1 and 2 were removed from consideration because they would not meet the project objectives outlined in Table 6.

Alternatives 1 through 4 rely solely on natural regeneration to restore Polk Swamp. This method of regeneration would likely be inadequate to restore the swamp in the foreseeable future. Middleton (2000) found that cypress seeds had limited dispersal ranges within a swamp. Few to no mature cypress or tupelo exist in the study reach (Appendix B) and healthy upstream reaches of the swamp likely only provide few seeds this far downstream. The seed bank within the five mile study area is also limited. Middleton (2003) determined that the seeds of cypress trees and other swamp hardwoods remain viable in the environment for only a short time (as briefly as a year) which may makes natural re-colonization difficult in cypress-tupelo swamps. This reach of Polk Swamp has lacked a healthy population of swamp hardwoods for seed stock since sometime between 1994 and 2012 (Appendix B). Based on available literature there is no reason to believe that Polk swamp would restore itself to a cypress-tupelo swamp and bottomland hardwood forest, in the foreseeable future, with only improved flow regimes and/or removal of invasive vegetation. The seed bank in the swamp is inadequate and only small numbers of seeds would be expected to arrive in the area from upstream reaches. Due to these reasons, alternatives 1 thorough 4 would fail at restoring this reach of Polk Swamp to cypress-tupelo swamp and bottomland hardwood forest within the foreseeable future.

Herbivory (consumption of plants by animals) can have a significant negative impact on cypress seedlings. Meyers, et.al. (1995) found that seedlings not protected with sleeves experienced 100% mortality due to herbivory. Similarly, Conner and Flynn (1989) noted that without chicken wire cages cypress saplings experienced unacceptably high mortality due to herbivory. Based on field observations and conversations with local residents Polk Swamp and adjacent areas have a considerable population of white tail deer, beaver, rabbit and other herbivores. Without protection, both planted and naturally germinating saplings would quickly be consumed leading to the failure of the restoration. Therefore, alternatives 3 and 4 would not meet the project objectives because they would do nothing to prevent saplings from being consumed by herbivores, which would result in the failure of the restoration effort.

Alternative 5 was selected as the proposed project because it is the only alternative that meets all of the project objectives (Table 6). None of the other alternatives considered addressed variables present in Polk Swamp that have been found, in several scientific studies, to have a strong negative impact on the restoration of cypress-tupelo swamps. Though Alternative 5 requires the most labor it is also by far the most likely to succeed at restoring the swamp. Myers, et.al. (1995) concluded that management techniques (such as weed management and herbivory control), though labor intensive in the short term were important to long term success of cypress plantings.

Table 4: Polk Swamp Restoration Measures Comprising Each Alternative

Alternative	Physical Removal of Blockages	Initial Herbicide Application	Maintenance Herbicide Application	Burning	Natural Regeneration	Replanting
5	X	X	X	X	X	X
4	X	X	X	X	X	
3	X	X	X		X	
2	X	X			X	
1	X				X	
No Action					X	

Table 5: Flood Duration Tolerance of Common Bottomland Hardwood Trees

Species	Flood Duration tolerance (in months)
Cypress/Tupelo	6-8
Overcup Oak/Red Maple	4-6
Pin Oak/Sweet Gum	1-6
Cherrybark Oak/Willow Oak	1-3

(Fredrickson and Heitmeyer 1988)

Table 6: Comparison of the Success of Alternatives at Meeting Project Objectives

Alternative	Remove Blockages	Restore Natural Hydro period	Limit Cattails/ Herbaceous Species Dominance	Limit Reestablishment of Invasive Vegetation	Promote the Regeneration of Bottomland Hardwood Swamp	Allow for Swamp Regeneration	Allow for Species Targeting and Control During Regeneration
5	X	X	X	X	X	X	X
4	X	X	X	X	X	X	
3	X	X	X		X		
2	X	X					
1	X	X					
No Action							

CHAPTER 6 ENVIRONMENTAL IMPACTS

Climate

No changes to the area’s climate would occur as a result of this project.

Land Use

Construction of the proposed project would not change the existing land use outside the project area. The change from cattail dominated marsh to cypress- tupelo swamp and bottomland hardwoods would allow historic land uses to occur within the project footprint including hunting, fishing, and trapping. The proposed project would have no impact to prime or unique farmland. Temporary and minor erosion would occur throughout portions of the swamp from removal of blockages and operation of mechanical equipment. In order to minimize erosion, best management practices would be implemented for construction activities and the mechanical removal would be performed using floating mechanized equipment (likely an amphibious track-hoe) to clear blockages within the historic channel. Work would start at the downstream end of the project and work upstream. If additional blockages require removal after the initial pass through the project area that work will be performed working back downstream. In areas where significant impoundments exist, the blockages will be removed slowly to avoid large and sudden changes in water quality downstream of the work. Care would be taken to minimize the amount of debris that is allowed to leave the immediate area and screens will be placed in the channel downstream of the work to capture and collect debris that is released into the channel.

Erosion could temporarily increase in areas that have been cleared of invasive cattails. However these areas would be replanted with native vegetation which would re-stabilize the area and prevent any further runoff and/or erosion.

Water Resources and Aquatic Habitat

Temporary changes to water quality and surface waters related to turbidity and sedimentation are anticipated during construction. These impacts would be localized and proper erosion control and filtration control measures would be implemented during construction activities. The proposed project would benefit Polk Swamp by improving water quality (dissolved oxygen, temperature) and flows within the watershed. The project is consistent with applicable South Carolina water quality regulations and would not impair any such standard or fail to meet anti-degradation requirements for point or non point sources. The proposed project would restore the natural conditions of a tributary to Edisto River.

Construction of the proposed project would restore the project area to a more diverse habitat type. This would be accomplished by potentially increasing the density and species richness of the benthic community as well as the native fish assemblage. Removing the hydrologic impediments within Polk Swamp would allow for more effective migration into and out of the swamp from the Edisto River. It is expected that organisms currently established downstream (including more diverse assemblages of aquatic insects and other invertebrates) would re-colonize the project area following construction activities. Similarly, it is expected that a variety of freshwater fish species found downstream would likely increase in density and/or re-colonize the project area once construction is completed. An additional benefit of the project is that the restored connectivity within the swamp would allow native freshwater mussels, found downstream of the project area during initial study reconnaissance but not within the project footprint, to reestablish in the project area.

Wetlands, Stream Crossings and Floodplains

Construction of the proposed project would require work to take place in and around Polk Swamp. Work outside the main channel of Polk Swamp would be kept to a minimum. The blockage removal process would include both mechanical methods and hand clearing. Components of blockages consisting of inorganic material would be taken off site for upland use or disposed of on high ground. Organic debris would be placed adjacent to blockages on higher ground to construct topographic relief within the floodplain of Polk Swamp creating a variety of micro habitats within the restoration area. When feasible, large components of blockages consisting of organic material would be taken off site for upland use or disposal. The proposed project is self mitigating in regards to wetland impacts. The 404(b)(1), included as Appendix D, provides a detailed analysis of impacts to waters of the US and wetlands from construction of the proposed project. No significant negative impacts are expected from construction of the proposed project. Upon completion of the proposed project the invasive cattails that now dominate the project area would be converted to cypress-tupelo swamp and bottomland hardwood forest and more natural flows would be restored in the swamp.

Temporary and minor sedimentation may occur during construction. However, significant movement of materials from the wetlands is not expected to occur. There would be a long term permanent conversion of the project area from invasive cattail dominated marsh to cypress-tupelo swamp and adjacent bottomland hardwood forest. The conversion of the swamp would be a direct result of the restoration of the natural hydro-period due to the removal of invasive species and obstructions within the channel. Plantings of cypress, tupelo and native bottomland

hardwood tree species, along with the periodic herbicide application, would help ensure the area is not colonized by invasive or otherwise undesirable species.

Executive Order 11988 discourages development in the 100-year floodplain for federally funded projects unless no other practical alternative is available. If development is planned within the 100-year floodplain and it is federally funded, there is an eight-step process that must be completed prior to release of funds; however, no development within the 100-year floodplain is planned as part of this project.

Terrestrial Resources and Wildlife

The proposed project would have both positive and temporary negative impacts on wildlife. The proposed project would have positive impacts on natural vegetative communities due to the removal of invasive cattails, reestablishment of native vegetation, and the restoration of natural hydrology to the swamp. The invasive cattails that now dominate the swamp provide habitat for wildlife. Restoration of Polk Swamp would provide a natural habitat for native wildlife species to move into, including game animals, fur bearers, and migratory birds. While there are numerous benefits of the project, there would also be a temporary adverse impact on some forms of fauna. Reptiles, amphibians, and other animals may be displaced to outlying areas during construction activities due to human presence and increased noise levels. However, these animals are expected to return after the construction activities are complete and thrive due to the increased availability of quality habitat.

Air Quality and Noise

The SCDHEC has air quality jurisdiction for the project area. The ambient air quality for Dorchester County has been determined to be in compliance with National Ambient Air Quality Standards and these counties are designated as attainment areas.

While the proposed project would contribute to local emissions, the impacts to air quality are likely to be minor or even negligible in the immediate areas of project construction. controlled burning and construction activities would cause temporary increases in exhaust and dust emissions from equipment operations. However, since project construction would be conducted in relatively small areas at a particular point in time, air quality impacts would be localized and temporary. Upon completion of work activities in any area, emissions would cease.

Implementation of the proposed project would cause temporary increase in noise levels in the areas of project construction. However, since project construction would be conducted in relatively small areas at a particular point in time, increases in noise pollution would be minimal. Upon completion of work activities in any area, noise levels would return to pre-project levels. To further reduce noise pollution construction would be limited to daylight hours in areas near dwellings.

Cultural resources

There are no historic properties within or immediately adjacent to the proposed project. Additionally, the blockages that would be removed have occurred since Hurricane Hugo struck the area in 1989. Based on the information available, the USACE has determined that the undertaking would affect no historic properties. The Corps is currently coordinating with the South Carolina State Historic Preservation Officer (SHPO) to confirm USACE's determinations regarding cultural resources.

Endangered Species

The project is within the range of the species listed in Table 2. During extensive initial site reconnaissance (conducted in February and March of 2015) no threatened or endangered species were observed nor was suitable habitat for listed species observed within the footprint of the proposed project. The USFWS recommended that the Corps conduct a survey to determine if wood storks are present within the study area (Appendix F). This survey is ongoing but no wood storks or significant wood stork habitat were detected during phase one of the survey (conducted in July of 2015) or during the initial site reconnaissance. Additional wood stork surveys will be conducted in August and September of 2015. Based on the evidence available, the Corps has determined that these species and appropriate habitat for them are not present with the project area and therefore there would be no effect to listed species. This determination is being coordinated with the USFWS via consultation on this document.

Hazardous Toxic and Radioactive Waste

There are no known hazardous or toxic waste sites within the immediate vicinity of the project footprint. No hazardous toxic or radioactive waste would be generated as a result of installation or maintenance of the proposed project.

Socioeconomics

According to Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, each federal agency must conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, national origin, or income level. Agencies must ensure that disproportionately adverse effects are not being imposed on minority or low-income areas by federal actions.

The proposed project is not designed to create a benefit for any group or individual, but rather provides a region-wide benefit. There are no indications that the proposed aquatic ecosystem restoration project would be contrary to the goals of Executive Order 12898, nor would the project create disproportionately high or adverse human health or environmental impacts on minority or low-income populations of the surrounding community. Implementation of the proposed project would not cause significant adverse environmental impacts to any of the residents in Dorchester County, or surrounding counties regardless of race, national origin, or

level of income. Therefore, the Corps has satisfied the requirements of the Environmental Justice Executive Order 12898.

Recreation

Implementation of the proposed project would cause a temporary reduction of aesthetic appeal and a minor interference with recreational activities in the areas of project construction. However, since project construction would be conducted in relatively small areas at a particular point in time, recreational and aesthetic impacts would be localized. Upon completion of work activities in any area, aesthetic values and recreational opportunities would be greatly improved. The restoration of the area to a healthy cypress-tupelo swamp and associated bottomland hardwood forest would improve fishing, hunting, bird watching and other recreational activities within the swamp.

CHAPTER 7 CUMULATIVE IMPACTS

Cumulative impacts are defined under section 1508.7 of NEPA 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. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time." The following paragraphs summarize the cumulative impacts expected from the proposed project.

The environmental effects of the proposed project include restoring hydrology and alleviating persistent flooding conditions along the Polk Swamp channel, restoring the historical channel and lost bottomland hardwood forests, and enhancing local wildlife and recreational opportunities. No significant adverse environmental effects or mitigation are anticipated. Present and future development in and around the project area is controlled by management measures including control of floodplain development by zoning ordinances, subdivision regulations, and building codes. Future development in the area would be in compliance with the above listed management measures, minimizing impacts to the environment. The positive cumulative impacts of the proposed project are many. The proposed project would restore the natural conditions of a tributary to Edisto River. The Edisto River is significant in that it is one of the largest free flowing blackwater rivers in North America (NRCS 2010). Additionally the proposed project is located near Four Hole Swamp which is home to the Francis Beidler Forest Audubon Sanctuary. The Sanctuary is home to virgin cypress-tupelo swamp. Restoring Polk Swamp would benefit both the Edisto River and Four Hole Swamp. Restoration would provide additional habitat for migratory birds, fish and wildlife, and likely improve water quality and connectivity in the Edisto River watershed. No negative cumulative impacts associated with the restoration of Polk Swamp have been identified.

The impacts of the proposed project, when considered along with past, present and future actions, are cumulatively insignificant. The overall lack of impacts associated with the proposed project, as documented here, demonstrates both the benign nature and limited impacts of this project. No negative impacts would occur from implementation of the selected alternative. However the proposed project would lead to positive impacts to the natural environment, water

quality, and recreation. Any impacts associated with the proposed project, when added to other past, present and reasonable foreseeable future actions are collectively insignificant.

CHAPTER 8 PUBLIC INVOLVEMENT AND COORDINATION

Executive Order 12372, Intergovernmental Review of Federal Programs, states that Federal agencies shall provide opportunities for consultation by elected officials of those State and local governments that would provide the non-federal funds for or that would be directly affected by, proposed Federal financial assistance or direct Federal development. A public meeting was held on April 16th 2015 at the Kenneth F. Waggoner Services Center-County Council Chambers in St. George, South Carolina to inform and solicit input from the public. The proposed project is being coordinated with Federal, State, and local government agencies having jurisdictional responsibilities, or otherwise having an interest in the project. A list of all parties that received a notice via mail or e-mail of the issuance of this Draft EA and FONSI are attached in Appendix E.

CHAPTER 9 COMPLIANCE WITH OTHER ENVIRONMENTAL LAWS

Clean Water Act

Material would be excavated to remove blockages from the channel but no net wetland fill will occur and the activities are considered self mitigating. The proposed project primarily involves the removal of accumulated organic debris. The removal of excavated inorganic debris, with the exception of incidental removal, is not anticipated. Any significant quantities of organic debris will be removed from the project area and stored outside of waters of the US. Anticipated quantities of fill material are minimal. Organic debris collected to open blockages will be selectively placed with the project area (but not within the channel) to create micro topography and habitat refuge for a variety of species. Over time, the organic material will break down.

A National Pollutant Discharge Elimination System (NPDES) permit is required for this project. Construction activities such as clearing, grading, excavating, grubbing, or filling would result in the disturbance of more than one acre of land. A storm water pollution prevention plan (SWPPP) would be prepared for the project and incorporated into the plans and specifications and would be implemented during construction. Also, to obtain coverage under a general permit for South Carolina, a Notice of Intent (NOI) application would be sent to the state. A Notice of Termination would be provided when the project is completed.

Clean Air Act

The proposed project has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under the proposed project are exempt by 40 C.F.R. Part 93.153.

Endangered Species Act

The requirements of Section 7 of the Endangered Species Act of 1973 would be fulfilled upon completion of the NEPA process. Project documentation is being provided to the USFWS for their review and comment.

Farmland Protection Policy Act

The Farmland Protection Act minimizes the unnecessary and irreversible conversion of farmland to nonagricultural uses. There is no “farmland,” as defined by this Act, impacted by any of the recommended alternatives. No unnecessary and irreversible conversion of farmlands would occur as a result of construction of the proposed project.

Fish and Wildlife Coordination Act

The proposed project is being coordinated with the USFWS in order to fulfill the requirements of Section 2(a) of the Fish and Wildlife Coordination Act.

Floodplain Management (EO 11988)

The objectives of Executive Order 11988 have been considered in the formulation of plans for this project. The following determinations have been made in response to requirements of Executive Order 11988 which pertains to floodplain management.

No practical non-floodplain alternative exists. The considered actions do not conflict with applicable state and local standards concerning floodplain protection. The considered action would not negatively affect the natural and beneficial values of the floodplain.

Protection of Wetlands (EO 11990)

The objectives of Executive Order 11990 have been considered in the formulation of plans for this project. The following determinations have been made in response to requirements of Executive Order 11990 which pertains to wetland management.

No practical non-wetland alternative exists. The considered actions do not conflict with applicable state and local standards concerning wetland protection and permitting and are covered under USACE nationwide permit number 12. The proposed project would positively affect the natural and beneficial values of the impacted wetlands.

National Wild and Scenic Rivers

The National Wild and Scenic Rivers System was created by Congress in 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. A review of the Wild and Scenic River inventory list reveals that the proposed project would not affect a stream or portion of a stream that is included in the National Wild and Scenic Rivers system.

National Historic Preservation Act (NHPA)

The proposed project has been reviewed for historic properties (cultural resources listed on or eligible for listing on, the National Register of Historic Places) pursuant to regulations implementing Section 106 of the National Historic Preservation Act (NHPA). In accordance with 36 C.F.R. §800.4(d)(1), it was determined that the proposed undertaking would have no effect on historic properties. Documentation of this determination is being coordinated with the South Carolina State Historic Preservation Officer.

Coastal Zone Management Act

Dorchester County is one of the counties in South Carolina under the jurisdiction of the Federal Coastal Zone Management Act and the South Carolina Coastal Zone Management Program (SCCZMP). A Coastal Zone Consistency Certification will be applied for and construction would not commence until the certification is issued. There are no technical concerns from construction of the proposed project that would impact the issuance of a Coastal Zone Consistency Certification.

CHAPTER 10 REFERENCES

Conner, W.H. and Flynn, K.

1989. Growth and survival of baldcypress (*Taxodium distichum* (L.) Rich.) planted across a flooding gradient in Louisiana bottomland hardwood forest. *Wetlands*. 9. Pp. 207-217.

Conner, W.H.

1995. Woody plant regeneration in three South Carolina *Taxodium/Nyssa* stands following Hurricane Hugo. *Ecological Engineering* 4 (1995) pp. 227-287.

Fredrickson, L.H., and M.E. Heitmeyer,

1988. Waterfowl Use of Forested Wetlands of the Southern United States: An overview. Chapter 22 in *Waterfowl in Winter*. 1988 University of Minnesota. Milton W. Wellsted. University of Minnesota Press. Minneapolis, MN.

Middleton, B.A.

2000. Hydrochory, seed banks, and regeneration dynamics along the landscape boundaries of a forested wetland. *Plant Ecology* 146. pp. 169-184.

Middleton, B.A.

2003. Soil seed banks and the potential restoration of forested wetlands after farming. *Journal of Applied Ecology* 40. pp. 1025-1034.

Myers, R.S. Shaffer, G.P., and Llewellyn, D.W.

1995. Baldcypress (*Taxodium Distichum* (L.) Rich.) Restoration in Southeast Louisiana: The Relative Effects of Herbivory, Flooding, Competition, and Macronutrients. *Wetlands*, Vol 15, No. 2, June 1995. pp. 141-148.

South Carolina Institute of Archaeology and Anthropology and South Carolina Department of Archives and History.

2015 <http://archsite.cas.sc.edu/ArchSite>. Search conducted July 2015.

South Carolina Department of Health and Environmental Control

2006. Total Maximum Daily Load-Pold Swamp. SCDHEC Technical Report Number: 018-06

South Carolina Department of Health and Environmental Control

2012. 2012 Edisto Watershed Water Quality Assessment.

South Carolina Department of Natural Resources

2009. South Carolina State Water Assessment. Second Edition. Wachob, Park, and Newcome, Jr. (eds).

U.S. Census Bureau

2012. *2010 Census*. <http://2010.census.gov>. Search conducted July 15, 2015.

U.S. Department of Agriculture-Natural Resources Conservation Service

2010. An Assessment of the Edisto Subbasin

U.S. Department of Agriculture.

2012. *Web Soil Survey*. <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. Search conducted July 15, 2015.

U.S. Environmental Protection Agency

2012 *Green Book Non-attainment Areas for Criteria Pollutants*. <http://www.epa.gov/oar/oaqps/greenbk/index.html>. Search conducted July 15, 2015.

U.S. Environmental Protection Agency

2014 EnviroMapper. <http://www.epa.gov/emefdata/em4ef.home>. Search conducted July 15, 2015.

U.S. Fish and Wildlife Service

2012A *Online-Wetlands Mapper*. <http://www.fws.gov/wetlands/Data/Mapper.html>. Search conducted July 15, 2015.

U.S. Fish Wildlife Service South Carolina Field Office

Endangered, Candidate and At-Risk Species County Listings. http://www.fws.gov/charleston/EndangeredSpecies_County.html. Accessed July 15, 2015

APPENDIX A

Photographs of Existing Site Conditions



Photo: 1 Cattails in project area



Photo 2: Knot weed with dead trees in background



Photo 3: Weed choked channel and cattails

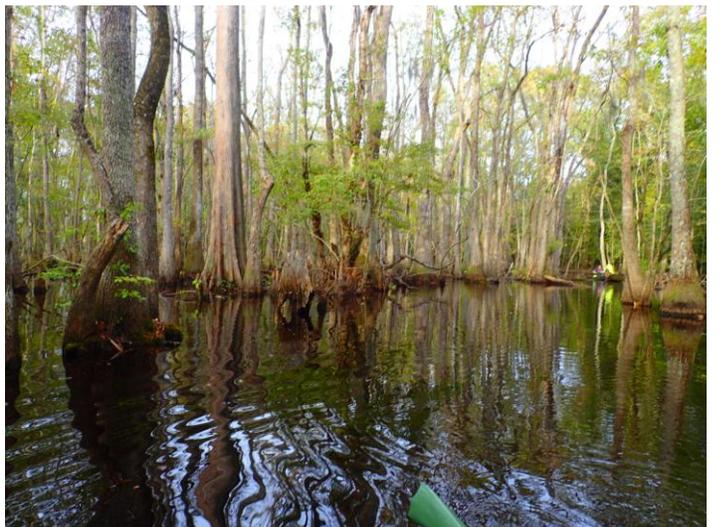


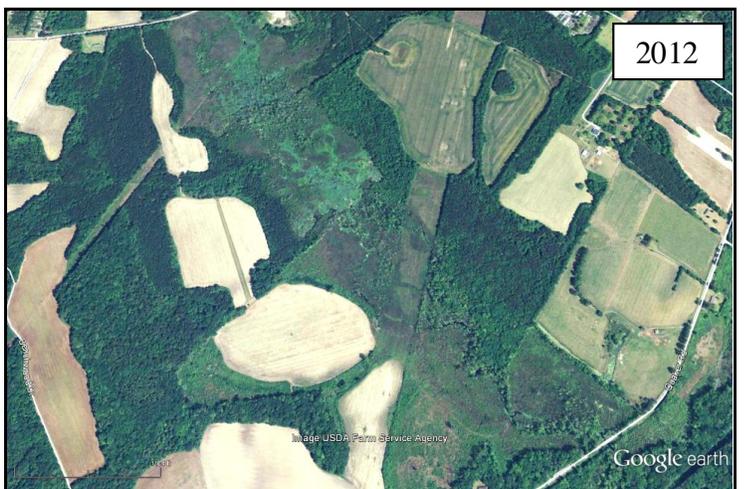
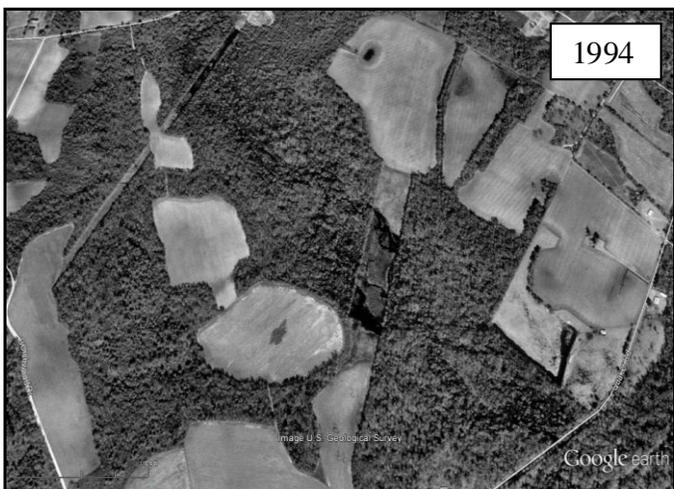
Photo 4: Reference reach

APPENDIX B

Comparison of Historic and Current Aerial Photography of the Study Area



Polk Swamp between I-95 and Old St. George Road



Polk Swamp between Old St. George Road and Quaker Road



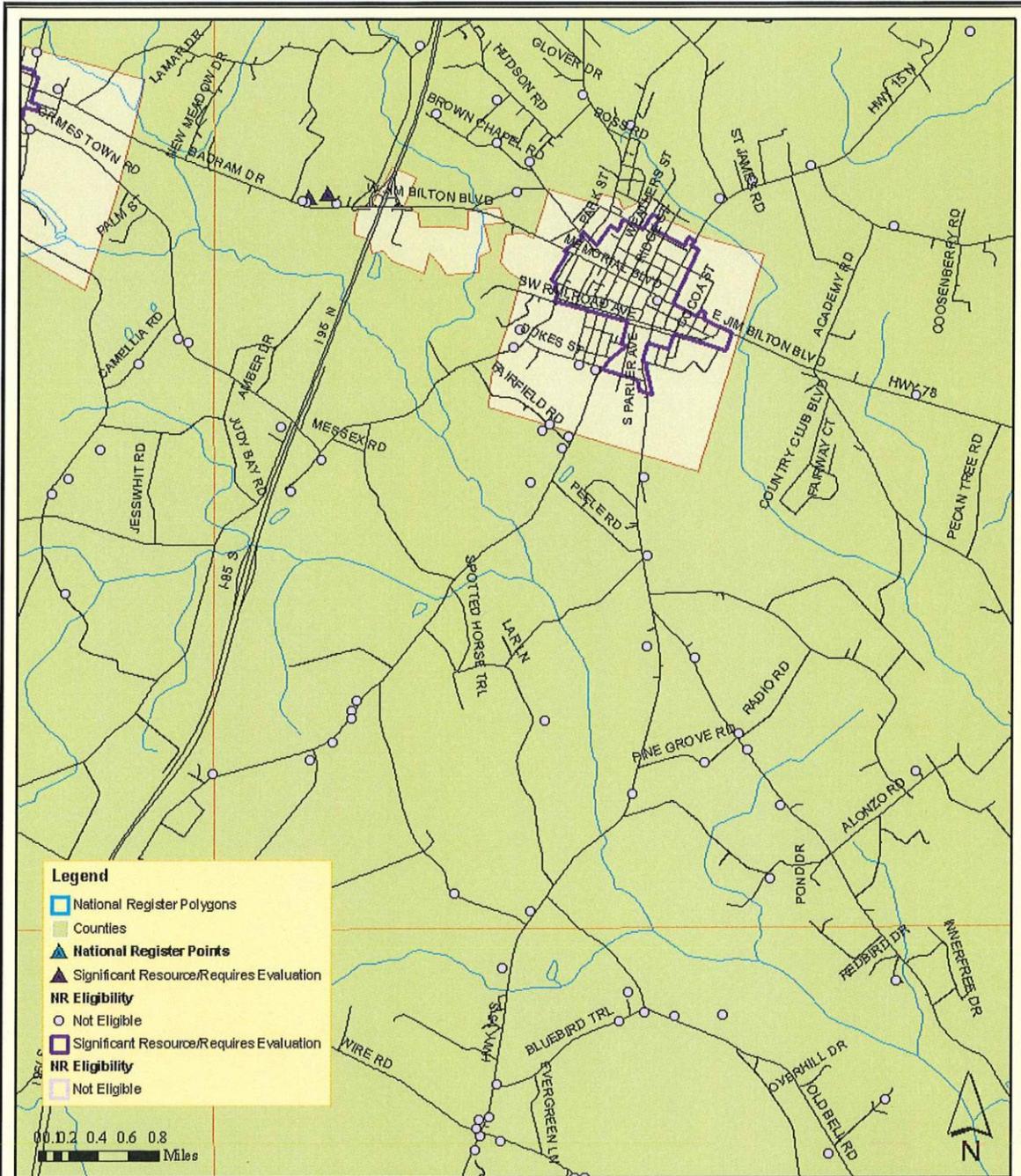
Polk Swamp between Quaker Road and Two Bridges Road



Polk Swamp between Two Bridges Road and US Highway 15

APPENDIX C

Cultural Resources Map



Disclaimer: This map is a product of the University of South Carolina Department of Computer Services. The data depicted on this map have been developed through a joint project involving the South Carolina Institute of Archaeology and Anthropology, the South Carolina Department of Archives and History, and the South Carolina Department of Transportation. These parties expressly disclaim responsibility for damages or liability that may arise from the use of this map.

Polk Swamp



APPENDIX D

404(b)(1) Evaluation

404(b)(1) Evaluation

Polk Swamp Aquatic Ecosystem Restoration

Dorchester County, South Carolina
Between Interstate-95 and US Highway 15

I. PROJECT DESCRIPTION

- a. **Location and General Description.** Polk Swamp is a tributary to the Edisto River and is located within the Coastal Plain of South Carolina. The Project Area includes the approximately 5-mile reach of Polk Swamp between Interstate-95 and SC Highway 15. It is located entirely in Dorchester County. See Figure 1, below.

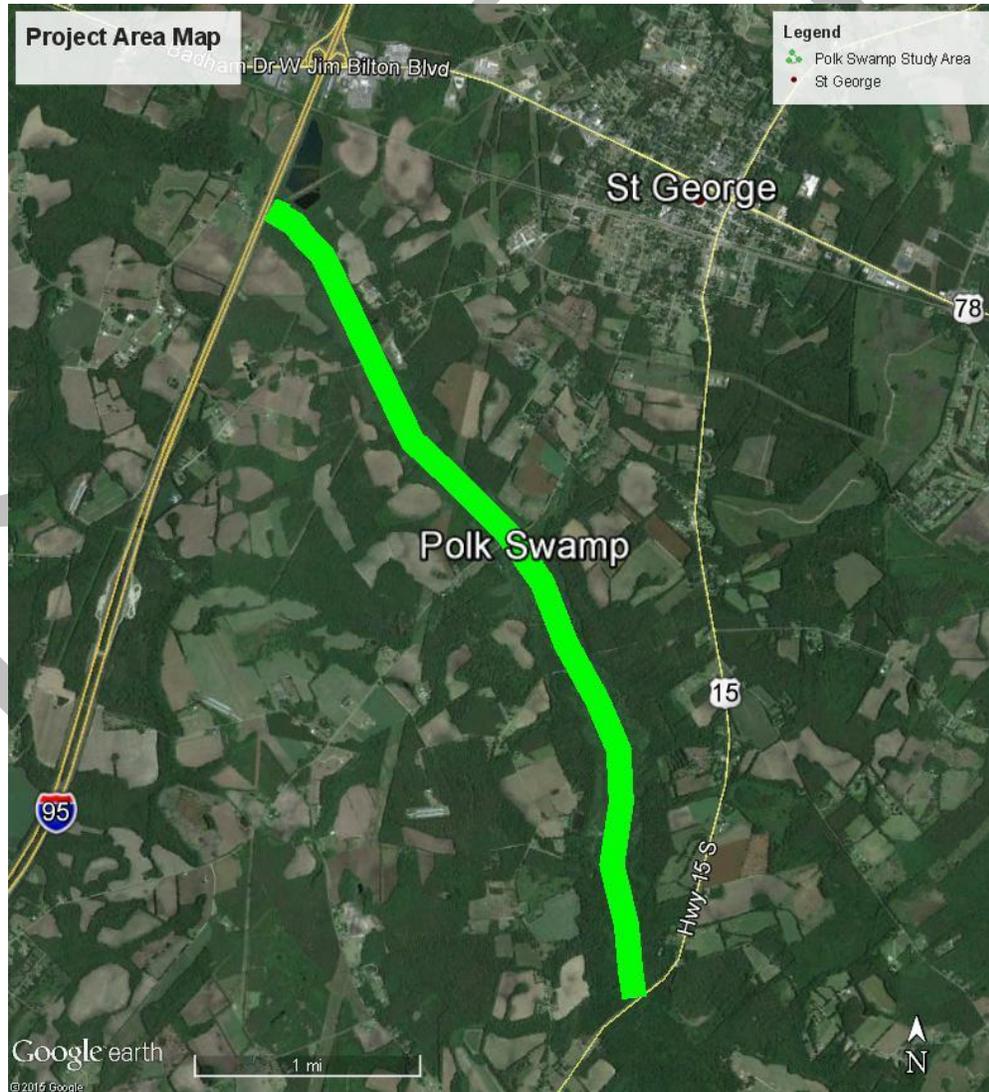


Figure 1: Project Area Map. General location of Polk Swamp highlighted bright green.

The Proposed Project consists of the measures summarized below:

Measure 1: Removal of Blockages

This measure involves the physical removal of blockages within the historic channel throughout the project area. These blockages are primarily comprised of fallen timber, plant growth, choke points where debris has collected, and impoundments created by beaver. The removal of these blockages will allow for the restoration of hydrology, including flood and low water periods. The removal process will include both mechanical and hand clearing. The mechanical removal will be performed using floating mechanized equipment (likely an amphibious track-hoe) to clear blockages within about a 21-foot wide path within the historic channel. Work would start at the downstream end of the project and work upstream. If additional blockages require removal after the initial pass through the project area, that work will be performed working back downstream.

Components of the blockages consisting of inorganic material will be taken off site for upland use or disposal using a small barge. Expansion of the historic channel will be avoided to the extent practical to minimize the amount of material that is required to be transported out of the project area. Organic debris will be placed on higher ground adjacent to blockages to create topographic relief within the floodplain of Polk Swamp and promote the development of micro habitats and greater diversity within the restoration area. When feasible, large components of blockages consisting of trees and other organic material will be taken off site along with the inorganic material for upland use or disposal. In areas where significant impoundments exist, the blockages will be removed slowly to avoid large and sudden changes in water quality downstream of the work. Care will be taken to minimize the amount of debris that is allowed to leave the immediate area and screens will be placed in the channel downstream of the work to capture and collect debris that is released into the channel.

Measure 2: Removal of Emergent Vegetation, Replanting, and Maintenance

While removing the blockages and restoring the channel will help with the hydrology, it will not remove the emergent vegetation, particularly invasive cattails (*Typha*.sp). The cattails must be removed prior to any reestablishment of the bottom land hardwood community. This will be done in five phases: 1) Broadcast aerial application of herbicides, 2) controlled burning, 3) post burn targeted application of herbicides to prevent the return of invasive emergent vegetation, 4) replanting native tree species, and 5) maintenance.

1) Initial Herbicide Application: The initial herbicide application will be applied to approximately 220 acres of project area that have been converted from bottomland hardwood forest to *Typha* sp. dominated marsh. Due to the size of the area and the difficulty of the terrain, application will be performed by helicopter spraying. The preferred herbicide to be used for the initial spraying is Habitat™ mixed with a glyphosate. Application rate will be 15-20 gallons/acre. Habitat™

works by affecting enzymes only found in plants. It is absorbed through leaves, stems and roots and causes the plants to cease growing and exhaust its nutrient supply. Habitat is approved by the USEPA and has a history of effective herbicide use. Glyphosate is one of the most common, widely used products for weed control and is commonly used in household and commercial weed control products. It is the active ingredient in Round Up™, Ranger Pro™, and Strike Out™. Glyphosates are absorbed in the leaves, travels to the roots, and prevents plants from gathering nutrients. Glyphosates break down and do not travel to be absorbed by other plants. Glyphosates have been long used for aquatic plant control.

2) **Controlled Burning:** While the herbicide application will be fatal to *Typha* sp. and other emergent aquatics, the cattails will still reside in the project area due to the fact that their root systems are well embedded and the plants will not be transported downstream, nor will they break down in any reasonable amount of time. The dead plant material must be removed, either by physical means or controlled burn. Conducting a controlled burn would be the most efficient means of removing the dead material and would have the benefit of releasing stored nutrients and carbon back into the system.

3) **Targeted Herbicide Application:** Post burn, the area will be treated again to prevent the reintroduction of invasives (from either germinated seeds or outside sources) that would prevent the successful reestablishment of bottomland hardwood forests. The preferred herbicide to be used for the initial spraying is Clearcast™ mixed with a glyphosate. Application rate will be 15-20 gallons/acre with backpack spraying being the preferred method of application. Clearcast™ herbicide is an aqueous formulation that may be applied either directly to water for the control/suppression of certain submerged aquatic vegetation, broadcasted, or used for targeted application on floating and emergent vegetation. Like Habitat™, it attacks plant enzymes and inhibits nutrient uptake, growth, and subsequent survival. It is approved by the USEPA and has a history of use for aquatic plant control.

4) **Replanting:** Replanting, to supplement natural regeneration, would include a mix of trees found in bottomland hardwood forests. Specific species mix will include the following appropriate available seedlings: bald cypress, willow oak, and water oak.

5) **Post Planting Maintenance:** Post planting maintenance will involve at least 3 years of targeted spraying with Clearcast™ to prevent the reintroduction of emergent vegetation and allow the seedlings to grow. Seedling will have to be monitored to ensure success. Diseased seedlings would be removed.

- b. Authority and Purpose.** Section 206 of the Water Resources Development Act of 1996 provides authority for the U.S. Army Corps of Engineers to carry out aquatic ecosystem restoration and protection projects if the Secretary of the Army

determines that the project will improve the quality of the environment and is in the public interest while being cost-effective. This study was initiated following receipt December 13, 2010 letter request from the Dorchester County seeking assistance. As a result of this letter, a Federal Interest Determination was undertaken by the Charleston District and a Feasibility Study initiated.

Historically, Polk Swamp was a healthy cypress tupelo swamp buffered by bottomland hardwood forest. Beginning after Hurricane Hugo, in the mid 1990's, a steady degradation of the swamp and adjacent bottomland hardwood forest occurred. Currently a large reach of Polk Swamp has no live cypress, tupelo, or bottom land hardwood species as it did historically. This reach of the swamp is now dominated by invasive cattails. The changes that have occurred in Polk Swamp are largely due to changes in the natural flow regime of water through the swamp. The current unnatural flows within the swamp are the result of a mixture of issues. USACE has determined that human intervention (flow blockages from construction, bridges, rail road crossings, and utility rights-of-way) and natural phenomenon (debris left over from Hurricane Hugo, debris from the winter storms of 2014 and beaver colonization as a result of conditions in the swamp post Hurricane Hugo) are among the primary drivers of the flow changes. The purpose of this project is to remove these impediments and restore more natural flows within project area. This will restore normal hydrologic cycles and, when combined with the removal of invasive plants and replanting of keystone hardwood species, will allow for the return of approximately 290 acres of bottomland hardwood swamp that has recently converted to a more herbaceous community structure, with invasive cattail as the dominant species.

- c. **General Description and Quantities of the Dredged or Fill Material.** Material will be excavated to remove blockages from the channel but no net wetland fill will occur and the activities are considered self mitigating. The proposed project primarily involves the removal of accumulated organic debris. The removal of excavated inorganic debris, with the exception of incidental removal, is not anticipated. Any significant quantities of organic debris will be removed from the project area and stored outside of waters of the US. Anticipated quantities of fill material are minimal. Organic debris collected to open blockages will be selectively placed within the project area (but not within the channel) to create micro topography and habitat refuge for a variety of species. Over time, the organic material will break down.
- d. **Description of the Proposed Discharge Site(s).** Organic material will be moved within the wetland. However, no net fill will be placed in wetlands, and there will be no net loss of wetland acreage. Components of blockages consisting of inorganic material will be taken off site. When feasible, components of blockages consisting of organic material will be taken off site as well. Storage of all material removed from the project will be placed in areas outside of waters of the US. These areas will be identified prior to project initiation.

- e. **Description of Disposal Method.** The proposed project involves clearing the main channel of the swamp. This will be accomplished through both mechanized and hand clearing. The blockages have been identified and are primarily organic in composition. No channel excavation or creation is anticipated. Organic debris collected to open blockages will be selectively placed within the project area (but not within the channel) to create micro topography and habitat refuge for a variety of species. When feasible, components of blockages consisting of organic material will be taken off site as well. Storage of all material removed from the project will be placed in areas outside of waters of the US.

II. FACTUAL DETERMINATIONS.

a. Physical Substrate Determinations.

- (1) **Substrate Elevation and Slope.** The change in elevation within the project area (5-mile reach from I-95 to US-15) is about 14 feet. No significant ground excavation would be required for the restoration effort and ground elevation and slope within the project area would not change.
- (2) **Sediment Type.** Not applicable. The material that would be removed is organic in nature.
- (3) **Dredged/Fill Material Movement.** Material would be moved either through hand clearing or the use of floating mechanized equipment. Temporary, minor movement of sediments associated with current flow during construction may occur. However, significant movement of materials removed from the wetlands is not expected to occur. There will be a long term or permanent conversion of the project area from invasive cattail dominated marsh to cypress tupelo swamp and adjacent bottom land hardwood forest. The conversion of the swamp will be a direct result of the restoration of the natural hydro-period due to the removal of invasive species and obstructions within the channel. Plantings of cypress, tupelo and other native bottomland hardwood tree species would help ensure the area is not colonized by invasive or otherwise undesirable species. The floodplain would continue to undergo regular flooding. However, during a typical year, the base flow would be constrained to the channel frequently enough to allow bottomland hardwoods to become established and prevent the re-establishment of emergent aquatic vegetation. There would be no net loss of wetland acreage.
- (4) **Physical Effects on Benthos.** The existing community of benthic organisms within the project area is limited to organisms that can persist in a mono-crop of cattails in generally stagnant water. Implementation of the proposed project would restore the area to a more diverse habitat type and increase the species richness of the benthic community. It is expected that

organisms currently established downstream (including more diverse assemblages of aquatic insects and other invertebrates) would re-colonize the project area following construction activities. A variety of freshwater fish species found downstream would likely quickly re-colonize the project area. The re-colonization of fish species and restored connectivity within the swamp would also allow freshwater mussel species, found downstream of the project area, to reestablish in the project area.

- (5) **Actions Taken to Minimize Impacts.** The overall purpose of the proposed project is a restoration of bottomland hardwood forest. Blockages will be hand cleared when possible to minimize impacts. The mechanized equipment used is designed to float to minimize ground disturbance. Disturbed areas will be replanted. Any unanticipated excavated material will be used or disposed of outside of the project area outside of waters of the US.

b. Water Circulation, Fluctuation and Salinity Determinations.

(1) **Water.**

- (a) **Salinity.** This is a freshwater wetland. There are no coastal or saline influences; therefore, construction will have no impact on salinity.
- (b) **Water Chemistry.** Temporary changes in water chemistry related to increased turbidity levels at the construction site may occur. Impacts would be temporary and minimal in nature. Upon completion of the proposed project both temperature and dissolved oxygen levels should improve.
- (c) **Clarity and Color.** The water may become temporarily clouded at the construction site during construction activity due to increased turbidity levels associated with disturbance of sediments. As noted above, this is expected to return to normal levels shortly after construction activities stop.
- (e) **Odor.** Construction activities may result in a release of hydrogen sulfide (rotten egg) odor from the disturbance of decaying of submerged debris and vegetation. This will be a temporary impact and will not result in long-term impacts.
- (f) **Taste.** The water is not used as a drinking water source, so this is not applicable.
- (g) **Dissolved Gas Levels.** There may be minor impacts to dissolved oxygen levels as a result of increased turbidity levels. However, the impacts will be localized and temporary, relocating through the

wetlands as construction activity moves. Upon completion of the project dissolved oxygen levels should increase and allow fish to repopulate the area.

- (h) **Nutrients.** The lack of flow in this reach of Polk Swamp has resulted in high nutrient retention as evidenced by the amount of emergent vegetation present. These high nutrient loads cause increased growth of undesirable vegetation. Once the project is complete, nutrient levels are expected to improve due to better conveyance of water through the swamp.
- (i) **Eutrophication.** High nutrient loading causes eutrophication. As stated above, once construction is complete, nutrient levels are expected to improve.

(2) **Current Patterns and Circulation.**

- (a) **Current Patterns and Flow.** The area is currently a stagnant shallow marsh dominated by invasive cattails with an unnatural currents and flows moving through the swamp. The proposed project would restore natural current patterns and flow throughout the project area.
- (b) **Velocity.** The area is currently a stagnant shallow marsh dominated by invasive cattails with an unnatural low flow velocity. The proposed project would restore natural water velocity throughout the project area.
- (c) **Stratification.** Not applicable. Water body does not undergo stratification.
- (d) **Hydrologic Regime.** The area is currently a stagnant shallow marsh dominated by invasive cattails with an unnatural hydrologic regime that has caused the death of a once healthy cypress tupelo swamp and adjacent bottomland hardwood forest. The proposed project would restore the historic hydrologic regime throughout the project area, which will allow the reestablishment of a healthy cypress tupelo swamp and adjacent bottomland hardwood forest.

- (3) **Normal Water Level Fluctuations.** The area is currently a stagnant shallow marsh dominated by invasive cattails with unnatural water level fluctuations that has prevented the successful reproduction of cypress and tupelo trees within the project area and allowed invasive cattails to dominate the project area. The proposed project would restore the historic water level fluctuations throughout the project area, which will allow the reestablishment of a reproducing cypress tupelo swamp.

- (4) **Salinity Gradients.** This is a freshwater wetland. There are no coastal or saline influences; therefore, this is not applicable.
- (5) **Actions That Will Be Taken to Minimize Impacts.** Work within the wetlands will be limited to completing only the construction activity necessary for the proposed project. In addition, the following conservation measures/Best Management Practices will be followed:
- Mechanical equipment will be designed to minimize impacts
 - No fill will be placed in wetlands. Adjacent access roads and drainage ditches will not alter natural flow regimes through wetland areas.
 - Prior to the beginning of any construction activities, appropriate erosion control measures, such as silt fences, silt barriers, or other suitable devices, will be placed between the construction area and affected waterways (wetlands) and maintained in a functioning capacity until the area is permanently stabilized upon project completion.
 - Once initiated, the project will be carried to completion in an expeditious manner in order to minimize the period of disturbance to the environment.
 - Upon completion, all disturbed areas will be permanently stabilized with vegetative cover and/or rip-rap, as appropriate.
 - Construction activities will avoid, to the greatest extent practical, encroachment into any wetland areas
 - Excess soil will be removed to an approved upland disposal site.

c. **Suspended Particulate/Turbidity Determinations.**

- (1) **Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site.** Turbidity will increase during construction operations, but will return to normal levels when construction is complete.
- (2) **Effects (degree and duration) on Chemical and Physical Properties of the Water Column.**
- (a) **Light Penetration.** During construction, light penetration will diminish due to a temporary increase in turbidity levels as sediments are disturbed. Light penetration will return to normal or improve shortly after construction for the temporarily impacted wetland areas.
- (b) **Dissolved Oxygen.** Dissolved oxygen (DO) levels may decrease during construction as a result of increased turbidity. However,

Dissolved Oxygen levels should increase shortly after construction due to improved flow.

- (c) **Toxic Metals and Organics.** Testing of sediments from the wetlands has not been conducted. However, the project is located in a rural setting surrounded by either forested land or agricultural land. Therefore, there is no expectation of toxic metal or organic contaminants in the sediments. While it is expected that releases of sediments into the water column will occur during construction, it is not anticipated that any unacceptable adverse impacts will occur. Further, sediment loading will return to normal levels following construction.
- (d) **Pathogens.** Polk Swamp has a TMDL developed for fecal coliform bacteria. This project will have no impact on pathogens within the project area.
- (e) **Aesthetics.** During construction, there would be an increase in the ambient noise levels, which will return to normal levels following construction. During construction a short term degradation of visual aesthetics would occur due to the large stands of dead and burned cattails. The visual aesthetics of the swamp would be improved after completion of the project.

(3) **Effects on Biota.**

- (a) **Primary Production & Photosynthesis.** Primary production and photosynthesis may decrease temporarily during construction due to turbidity increases; however, these factors should return to normal shortly after construction is complete.
- (b) **Suspension/Filter Feeders.** Temporary impacts would include increased turbidity, which may reduce oxygen levels and impact food intake. However, once the project is completed improved flows should enhance conditions for filter feeders.
- (c) **Sight Feeders.** A minimal, temporary disruption due to construction disturbances is possible. A rapid recovery is expected since most sight feeders are transient and can relocate until construction activities are complete.

- (4) **Actions taken to Minimize Impacts.** The above noted impacts are temporary and conditions should improve following construction. It is unlikely that further minimization in these areas is possible.

d. **Contaminant Determinations.** This is a rural environment with little industrial or commercial areas from where high risk contaminants would have originated. As such, there is no reason to believe that unacceptable levels of contaminants would be present and no further examination of contaminants is required.

e. **Aquatic Ecosystem and Organism Determinations.**

- (1) **Effects on Plankton.** Effects on plankton would be related to turbidity associated with the construction activity. Effects would be minor and temporary in duration.
- (2) **Effects on Benthos.** Benthic activity at the construction site would be impacted as sediments are disturbed or removed. These disturbances will be temporary and re-colonization will occur following construction.
- (3) **Effects on Nekton.** The removal of blockages would enhance transport foraging and spawning opportunities for nekton.
- (4) **Effects on Aquatic Food Web.** Not applicable.
- (5) **Effects on Special Aquatic Sites.**
 - (a) **Sanctuaries and Refuges.** Not applicable.
 - (b) **Wetlands.** An estimated 290 acres of bottomland hardwood forest has died off within the project area. Without the canopy, the area is exposed to elevated levels of sunlight, causing an explosion of invasive and nuisance aquatic vegetation, which further restricted flow within the remaining channels and further degraded the habitat and reduced diversity of both plant and animal species. The goals of this project are to remove flow blockages in order to restore the natural hydro period of Polk Swamp, remove invasive vegetation, and prevent its reestablishment, and to restore an estimated 290 acres of cypress-tupelo and bottomland hardwood forest.
 - (c) **Mud Flats.** Not applicable.
 - (d) **Vegetated Shallows.** Not applicable.
 - (e) **Coral Reefs.** Not applicable.
 - (f) **Riffle and Pool Complexes.** Upon completion of the proposed project riffle pool complexes may be reestablished throughout the project area

- (6) **Threatened and Endangered Species.** There are no known threatened or endangered species within the project area. Subsequently, adverse impacts to threatened or endangered species are not anticipated or expected.
- (7) **Other Wildlife.** Impacts to wildlife in the project area would be associated with the construction activities. Wildlife would be expected to leave the area during construction, but would return when construction is complete.
- (8) **Actions to Minimize Impacts.** Plans and specs for the project would specify requirements to ensure impacts to the environment are minimized or avoided. In addition, the following conservation measures/Best Management Practices will be followed:
- Heavy equipment will be designed to minimize impacts
 - No fill will be placed in wetlands. Adjacent access roads and drainage ditches will not alter natural flow regimes through wetland areas.
 - Prior to the beginning of any construction activities, appropriate erosion control measures, such as silt fences, silt barriers, or other suitable devices, will be placed between the construction area and affected waterways (wetlands) and maintained in a functioning capacity until the area is permanently stabilized upon project completion.
 - Once initiated, the project will be carried to completion in an expeditious manner in order to minimize the period of disturbance to the environment.
 - Upon completion, all disturbed areas will be permanently stabilized with vegetative cover as appropriate.
 - Construction activities will avoid, to the greatest extent practical, encroachment into any wetland areas.
 - Excess soil will be removed to an approved upland disposal site.

f. **Proposed Disposal Site Determinations.**

- (1) **Mixing Zone Determination.** Not applicable. The State of South Carolina Department of Health and Environmental Control (SCDHEC) does not recognize mixing zones.
- (2) **Determination of Compliance with Applicable Water Quality Standards.** The proposed project has been determined to be in compliance with the Nationwide Permit Number 12. The South Carolina Department of Health and Environmental Control certified Nationwide Permit Number 12 with 401 Water Quality Certification and Coastal Zone Consistency Specific Conditions and General Conditions on March 15, 2002. The Coastal Zone conditions are not applicable to this project, but

the conditions of the 401 Water Quality Certification are applicable and will be adhered to throughout the project.

(3) Potential Effects on Human Use Characteristics.

- (a) Municipal and Private Water Supply.** This project will have no impact on municipal/private water supplies since these wetland areas are not utilized for municipal or private water supply.
- (b) Water Related Recreation.** The proposed project will increase opportunities, such as fishing and hunting, in this reach of Polk Swamp.
- (c) Aesthetics.** The construction activity will have a negative impact on visual and audible aesthetics. However, the activity will move relatively rapidly, so no one area will endure the aesthetic impacts for long.

- g. Determination of Secondary and Cumulative Effects on the Aquatic Ecosystem.** Initial negative effects related to this project include those associated with turbidity, impacts to the benthic community, and aesthetics. These effects are considered temporary. The proposed project will restore the area to a more natural condition and improve the aquatic ecosystem.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE.

- a.** No significant adaptations of the guidelines were made relative to this evaluation.
- b.** The proposed construction described in this evaluation would not cause or contribute to violations of any known applicable state water quality standards, which would result in permanent damage to the aquatic ecosystem. The proposed project would improve the aquatic ecosystem.
- c.** The proposed construction described in this evaluation would not cause or contribute to violations of any known applicable state water quality standard.
- d.** The proposed project will not violate the Endangered Species Act of 1973.
- e.** The proposed project will not result in significant adverse affects on human health and welfare in regard to municipal and private water supplies, plankton, fish, wildlife, and special aquatic sites. The life states of aquatic life and other wildlife will not be adversely affected. Significant adverse affects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values will not occur.

- f.** Steps taken to minimize potential adverse impacts of the construction on aquatic ecosystems include limiting construction to the minimum alternative needed to provide the required protection. In addition, the conservation measures and Best Management Practices will be incorporated into the plans and specs, which will minimize impacts to threatened and endangered species and other aquatic and terrestrial life.
- g.** The proposed project will not cause unacceptable adverse impacts to any known, significant historic sites.
- h.** On the basis of the guidelines, the proposed construction is specified as complying with the requirement of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

DRAFT

APPENDIX E

List of Addresses for EA and Draft FONSI Review

Mr. Jason Ward
Dorchester County Administrator
201 Johnston St.
St. George, SC 29477

Mr. Richard Rosebrock
Dorchester County Council
P.O. Box 1902
Summerville, SC 29484

A. Karim Khan
Dorchester Co. Public Works Director
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SC Department of Transportation
Drawer 1086
Orangeburg, SC 29116-1086

Ms. Emily Dale
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Columbia, SC 29223

SC Department of Transportation
6355 Fain Blvd
North Charleston, SC 29406-4989

Mr. Dana Beach
SC Coastal Conservation League
P.O. Box 1765
Charleston, SC 29402

Mr. Norman Brunswig
Audubon South Carolina
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Harleyville, SC 29448

SC Department of Transportation
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Columbia, SC 29202

Honorable James E. Clyburn
U.S. House of Representatives
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Columbia, SC 29201

SC Nature Conservancy
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Columbia, SC 29250

South Carolina Sierra Club
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Columbia, SC 29202

Honorable Lindsey Graham
United States Senate
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Mount Pleasant, SC 29464

Honorable Mark Sanford
U.S. House of Representatives
530 Johnnie Dodds Blvd, Suite 201
Mt. Pleasant, SC 29464

Honorable Tim Scott
United States Senate
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North Charleston, SC 29406

US Department of Agriculture
Natural Resources Conservation Service
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Columbia, SC 29201

South Carolina Department of Commerce
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Columbia, SC 29201-3200

South Carolina Wildlife Federation
215 Pickens St.
Columbia, SC 29205

Dr. Pace Wilbur
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Mr. Chuck Hightower, Manager
Water Quality Cert. and Wetlands Section
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Mr. Bob Perry
Director of Environmental Programs
SC Department of Natural Resources
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Columbia, South Carolina 29202

Dr. W. Eric Emerson, Director
SC Department of Archives & History
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Columbia, SC 29223

Mr. Chris Militscher
Office of Policy Management
NEPA Office
US EPA, Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

Mr. Thomas McCoy
Acting Field Supervisor
US Fish and Wildlife Service
176 Croghan Spur Road, Suite 200
Charleston, SC 29407

Mr. Mark Caldwell
US Fish and Wildlife Service
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Charleston, SC 29407

Ms. Barbara Neale
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Charleston, South Carolina 29405

Ms. Jennie Lillard, Mekko
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Wetumka, OK 74883

Mr. Robert Thrower
Tribal Historic Preservation Officer
Poarch Band of Creek Indians
5811 Jack Springs Road
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Dr. Wenonah G. Haire
Tribal Historic Preservation Officer
Catawba Indian Nation
1536 Tom Steven Road
Rock Hill, SC 29730

Dr. Richard Allen
Section 106 and NAGPRA Consultant
Cherokee Nation
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Tahlequah, OK 74465-0948

Ms. Henryetta Ellis
Tribal Historic Preservation Officer
Absentee-Shawnee Tribe of Indians of
Oklahoma
2025 South Gordon Cooper Drive
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Mr. David Wilson, PE
Chief, Bureau of Water
SC Dept. of Health and Env. Control
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Mr. Russell Townsend
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Mr. Charles Coleman
Tribal Historic Preservation Officer
Thlopthlocco Tribal Town
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Weleetka, OK 74880

Mr. Willard Steele
Tribal Historic Preservation Officer
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34725 West Boundary Road
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Mr. Leo Henry, Chief
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2006 Mount Hope Road
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Ms. Josephine Yargee
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Mr. Robert Brown
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Ms. Robin Dushane
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Mr. Emman Spain
Tribal Historic Preservation Officer
Muscogee (Creek) Nation
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Okmulgee, OK 74447

Ms. Virginia Nail, Chickasaw Nation
Historic Preservation Officer
The Chickasaw Nation
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Ada, OK 74820

Ms. Kim Jumper
Section 106 Coordinator
Shawnee Tribe
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Ms. Lisa Stopp
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United Keetoowah Band of Cherokee
Indians
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Mr. Tyler Howe
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P.O. Box 455
Cherokee, NC 28719

APPENDIX F

Resource Agency Coordination Letters Received



United States Department of the Interior



FISH AND WILDLIFE SERVICE

176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

May 12, 2015

Mr. Bret Walters
Chief, Planning and Environmental Branch
U.S. Army Corps of Engineers
69A Hagood Avenue
Charleston, SC 29403-5107

Attn: Colton Bowles

Re: Polk Swamp Habitat Restoration, Dorchester County, South Carolina
FWS Log No. 2015-CPA-0086

Dear Mr. Walters:

The U.S. Fish and Wildlife Service (Service) has received your April 22, 2015, notification of a stream restoration project in a section of Polk Swamp in Dorchester County, South Carolina. The U.S. Army Corps of Engineers-Charleston District (USACE) is partnering with Dorchester County in conducting a feasibility study to consider the potential to restore wetlands and stream flow in Polk Swamp. The hydrologic flows in this section of interest in Polk Swamp have been disrupted by debris and the area is now stagnated. The free flowing bottomland hardwood forested area that previously existed now consists of invasive and emergent vegetation obscuring the natural channel. Re-establishment of the channel through debris and vegetation removal is under consideration and the USACE is seeking comments from the Service that may be useful in evaluation of the project. The Service has reviewed the brief proposal, methodology, and the area in which the activity will occur and offers the following comments.

The Service generally considers the restoration of flow in natural systems as a beneficial activity. We have no objection to the proposed plan but remained concerned about initial impacts that may result from the debris and invasive vegetation blocking the water flow. Upon review of the information provided in your submittal we recommend the USACE evaluate the following:

- Removal of the debris may result in the spread and transport of the existing invasive vegetation downstream to additional areas of Polk Swamp. The restoration plan should incorporate measures to ensure invasive plant material is not propagated downstream.
- The water quality of the stagnated area should be analyzed to determine if downstream habitats may be adversely affected when the water is released. The stagnated water may have a low dissolved oxygen content which may stress downstream aquatic species.

- Removal of the blockages may also release a sediment load that may be physically detrimental to benthic organisms including mussels and macro invertebrates.
- A monitoring and maintenance plan should be established to ensure the long-term success of the restoration project.

Service records do not indicate the presence of federally threatened or endangered (T&E) species or designated critical habitat within the scope of direct impacts; however, the area as it currently exists may contain suitable habitat for the American wood stork (*Mycteria americana*) or other wading birds that use the shallow standing water for roosting or foraging. We recommend a survey be conducted of the project area for the presence of the wood stork and other T&E species in Polk Swamp. We also recommend the USACE consider the potential presence and projects impacts to At-Risk-Species (ARS) that may be in the project area. Although no Federal protections are afforded to ARS, we recommend the USACE consider the potential impacts of this project in your evaluation of Polk Swamp project. We have included a list of the ARS that may occur in Dorchester County, South Carolina. Incorporating proactive measures to avoid or minimize harm to ARS may improve their status and assist with precluding the need to list these species. Additional information on ARS can be found at:

<http://www.fws.gov/southeast/candidateconservation>

Thank you for the opportunity to provide these comments in the early stages of the restoration project. If you should need further clarification regarding the Service's recommendations, please contact Mr. Mark Caldwell at (843) 727-4707 ext. 215, and reference FWS Log No. 2015-CPA-0086.

Sincerely,



for
Thomas D. McCoy
Field Supervisor

TDM/MAC

South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species - Dorchester County

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Amphibian	Gopher frog (ARS)	<i>Lithobates capito</i>	Breeding: October-March	Call survey: February-April
	American wood stork (T)	<i>Mycteria americana</i>	February 15-September 1	Nesting season
	Bald eagle (BGEPA)	<i>Haliaeetus leucocephalus</i>	October 1-May 15	Nesting season
Bird	Red-cockaded woodpecker (E)	<i>Picoides borealis</i>	April 1-July 31	Nesting season
	None Found			
Crustacean	American eel (ARS)	<i>Anguilla rostrata</i>	March 1-May 30; October 1-December 15	Temperature dependent: normally (17-20°C); can be found between 13-25°C
Fish	Atlantic sturgeon * (E)	<i>Acipenser oxyrinchus</i> *	February 1-April 30	Spawning migration
	Blueback herring (ARS)	<i>Alosa aestivalis</i>	Mid-January-mid May	Peak: March-April
	Shortnose sturgeon * (E)	<i>Acipenser brevirostrum</i> *	February 1-April 30	Spawning migration
Insect	None Found			
Mammal	Rafinesque's big-eared bat (ARS)	<i>Corynorhinus rafinesquii</i>	Year round	Found in mines, caves, large hollow trees, buildings, and bat towers
	Tri-colored bat (ARS*)	<i>Perimyotis subflavus</i>	Year round	Found in mines and caves in the winter
Mollusk	None Found			
Plant	American chafseed (E)	<i>Schwalbea americana</i>	May-August	1-2 months after a fire
	Bog asphodel (ARS*)	<i>Narthecium americanum</i>	June-July	
	Boykin's lobelia (ARS)	<i>Lobelia boykinii</i>	May-July/August	
	Canby's dropwort (E)	<i>Oxypolis canbyi</i>	Mid-July-September	
	Carolina-birds-in-a-nest (ARS)	<i>Machridea caroliniana</i>	July-November	
	Carolina bishopweed (ARS)	<i>Ptilimnium ahlesii</i>	May-July	
	Ciliate-leaf tickseed (ARS)	<i>Careopsis integrifolia</i>	August-November	
	Pondberry (E)	<i>Lindera melissifolia</i>	February-March	
	Raven's seedbox (ARS)	<i>Ludwigia revenii</i>	June-October	
	Sun-facing coneflower (ARS)	<i>Rudbeckia heliopsisidis</i>	July-September	
Reptile	Eastern diamondback rattlesnake (ARS)	<i>Crotalus adamanteus</i>	Most of the year	Peak: April-November
	Southern hognose snake (ARS)	<i>Heterodon sinus</i>	Most of the year	
	Spotted turtle (ARS)	<i>Clemmys guttata</i>	February-mid April	

South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species - Dorchester County

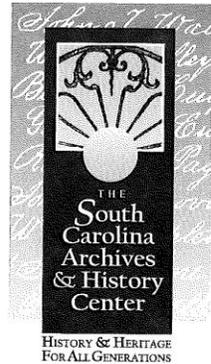
- * Contact National Marine Fisheries Service (NMFS) for more information on this species
- ** The U.S. Fish and Wildlife Service (FWS) and NMFS share jurisdiction of this species
- ARS Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.
- ARS* Species that are either former Candidate Species or are emerging conservation priority species
- BGEPA Federally protected under the Bald and Golden Eagle Protection Act
- C FWS or NMFS has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species
- CH Critical Habitat
- E Federally Endangered
- P or P - CH Proposed for listing or critical habitat in the Federal Register
- S/A Federally protected due to similarity of appearance to a listed species
- T Federally Threatened

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated as deemed necessary and may differ from earlier lists.

For a list of State endangered, threatened, and species of concern, please visit <https://www.dnr.sc.gov/species/index.html>.

2/10/2015

May 12, 2015



Bret Walters
Planning and Environmental Branch
Department of the Army
Charleston District, Corps of Engineers
69-A Hagood Avenue
Charleston, SC 29403

Re: Polk Swamp Restoration Feasibility Study
Dorchester County, South Carolina
SHPO Project Number 15-ED0059

Dear Bret:

Thank you for your letter of April 22, which we received on April 27, regarding the above-referenced project.

In order for our Office to provide comment on this undertaking, we require a completed Section 106 Project Review Form. This document can be found on our website at <http://shpo.sc.gov/programs/revcomp/Documents/106Form.pdf>. Instructions and tips are included on the form.

If you have any questions, please contact me at (803) 896-6181 or edale@scdah.state.sc.us.

Sincerely,

Emily Dale
Staff Archaeologist/GIS Coordinator
State Historic Preservation Office