

**SAC# 2015-0476-SIR**

**BASS DRIVE TRACT  
PERMITTEE RESPONSIBLE MITIGATION PLAN  
ORANGBURG COUNTY, SOUTH CAROLINA**

**APPLICANT:**

**BERKELEY COUNTY  
1003 HIGHWAY 52  
MONCKS CORNER, SOUTH CAROLINA 29461**

**SUBMITTED TO:**

**U.S. Army Corps of Engineers, Charleston District (USACE)**

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## 1. EXECUTIVE SUMMARY

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Berkeley County Economic Development Authority promoted the Camp Hall Commerce Park in Berkeley County to attract Project Soter (Volvo Cars) and received a Department of the Army Section 404 permit in July of 2015 and a Section 401 Clean Water Act Certification in June of 2015 (both permits referenced by SAC-2015-0476-SIR). This project is anticipated to include an initial investment of approximately \$1 billion with a projected labor force of up to 4,000 workers within 10 years of start of production. The development of Project Soter on the Camp Hall Tract would provide a significant positive economic impact on Berkeley County, the Greater Charleston Area, and the State of South Carolina. The permit application was submitted on April 16, 2015 by Berkeley County for the Project Soter development. The Department of the Army Permit No. SAC-2015-0476-SIR was issued to the applicant authorizing fill in waters of the U.S. on July 9, 2015. Within this permit, 192.88 acres of jurisdictional wetlands, 23.14 acres of non-jurisdictional isolated wetlands, and 1.85 acres of jurisdictional relatively permanent waters (RPWs) were originally authorized for impact. On February 18, 2016, Amec Foster Wheeler, on behalf of Berkeley County, submitted a permit modification request to the United States Army Corps of Engineers (USACE) which proposed to increase the wetland impacts by 2.00 acres of jurisdictional wetlands for modifications to internal road projects. The request for permit modification was granted in a letter from the USACE dated March 16, 2016 (SAC-2015-0476-SIR, Modification #2). In addition, two additional modifications have been approved (Modification #1 & Modification #3), both extending the requirement for submittal of evidence that conservation easements for the mitigation plan have been executed and recorded to 240 days and 270 days, respectively.

Amec Foster Wheeler, on behalf of Berkeley County, has submitted a request for permit modification (Modification Request #4) which sought to add an additional 4.93 acres impacts to jurisdictional waters of the U.S. above those approved under SAC-2015-0476-SIR. The additional impacts are required to facilitate the South Carolina Department of Transportation (SCDOT) requested design changes to the I-26 Interstate interchange access to the Project Soter development.

In order to facilitate the increased disturbance to jurisdictional waters of the U.S., Berkeley County and its Agents reached out to the previously identified advocacy groups to identify suitable mitigation for these additional impacts. Amec Foster Wheeler has coordinated with the Audubon South Carolina, in conjunction with their consultant, the Palustrine Group to identify privately-held in-holdings within the Four Holes Watershed and Francis Beidler Forest which are not currently protected. Francis Beidler Forest (RAMSAR Tract no. 1773) is one of only two RAMSAR Tracts in South Carolina, of only 37 tracts in the United States, and 2,000 tracts globally which have been designated by the RAMSAR Convention as “Wetlands of International Importance”.

Audubon South identified the Bass Drive Tract located within Orangeburg County, South Carolina as a potential candidate for inclusion into the Project Soter – Landscape Mitigation plan to provide compensatory mitigation for the additional 4.93 acres of impacts to jurisdictional waters of the U.S. requested under Modification #4. Following approval of the modification request, the Bass Drive Tract will be purchased and transferred in fee simple to Audubon South Carolina for incorporation into the Francis Beidler Forest preserve.

Baseline data collection has been completed on each compensatory mitigation component within the Bass Drive Tract. The proposed mitigation work plan includes wetland preservation only. The Bass Drive parcel will encompass approximately 88 acres of property acquisition located off Bass Drive. The proposed inclusion of wetland preservation within the Bass Drive Tract and additional wetland enhancement within the Bannister Tract (approximately 267 acres) is expected to fully compensate for the impacts to jurisdictional waters of the U.S. Proposed mitigation activities are not anticipated to adversely impact protected species or cultural resources.

In conclusion, the addition of the Bass Drive Tract is designed to enhance the Project Soter – Landscape Mitigation Plan and provide a meaningful landscape conservation outcome based on the guidance of the local and regional environmental groups and also satisfy the requirements of the State and Federal resource agencies.

## **2. PROJECT DESCRIPTION**

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The Project Soter – Landscape Mitigation Plan (hereinafter “Mitigation Project”) last revised on March 10, 2016 included approximately 2,488.04 acres of proposed conservation easement areas located in Orangeburg, Berkeley, and Dorchester Counties, South Carolina. The Mitigation Project Tracts are located along Sandy Run, Dean Swamp, and Walnut Branch, all of which are tributaries to Four Hole Swamp. This Mitigation Project is intended to provide mitigation for jurisdictional impacts to waters of the U.S. associated with the development of Project Soter on the Camp Hall Tract.

The proposed addendum to the Project Soter – Landscape Mitigation Plan (hereinafter “Mitigation Project”) last revised on March 10, 2016 includes the protection of the Bass Drive Tract and its inclusion into the Audubon’s Francis Beidler Forest. The Bass Drive Tract consists of a private land holding and is bordered by Audubon’s properties on three sides. This addendum to the Mitigation Project is intended to provide mitigation for jurisdictional wetland impacts associated with the construction of the I-26 Interchange for the Project Soter Development. The Bass Drive Tract is within the same United States Geologic Survey (USGS) 8-digit Hydrologic Unit Code (HUC) 03050205 of the Four Hole Swamp watershed as the proposed impacts and is wholly located within the Middle Atlantic Coastal Plain EPA Level III Ecoregion (Figure 1 in Appendix A). The proposed Bass Drive parcel will provide the opportunity to protect a large contiguous acreage of wetlands that will further advance the efforts of the Audubon South Carolina within the Four Hole Swamp watershed, provide desirable continuity to previously conserved lands, reduce fragmentation of conserved lands, as well as enhance and protect this RAMSAR resource of global significance (Figure 2). The Bass Drive Tract is also situated within and adjacent to the “Charleston Greenbelt” corridor which consists of protected and productive open lands surrounding Lowcountry cities.

The Bass Drive Tract generally consists of bottomland hardwood, a gum depression, and pine flatwoods wetlands along the main run of Four Hole Swamp. The additional compensatory mitigation will include the permanent protection of approximately 88 acres, of which approximately 67 acres are jurisdictional wetlands which will be preserved in perpetuity through approved deed restrictions.

Upon the approval of the permit modification request to the Mitigation Project by the USACE, the Bass Drive Tract will be purchased in fee simple and ownership will be transferred to Audubon. Audubon South Carolina intends to use deed restrictions for the long-term protection of the property and incorporate the Bass Drive Tract into the Francis Beidler Forest. In summary, Audubon will be responsible for long-term management required to maintain the biological integrity of the Bass Drive Tract as outlined in this Addendum.

### 3. AVAILABLE MITIGATION

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Amec Foster Wheeler, on behalf of Berkley County has submitted a request for permit modification (Modification Request #4) which sought to add an additional 4.93 acres impacts to jurisdictional waters of the U.S. above those approved under SAC-2015-0476-SIR. The additional impacts are required to facilitate the South Carolina Department of Transportation (SCDOT) requested design changes to the I-26 Interstate interchange access to the Project Soter development. In order to provide compensatory mitigation for the increased disturbance to jurisdictional waters of the U.S., the applicant contacted Audubon to identify mitigation candidates with the potential to protect high value resources within the Four Hole Swamp watershed. Audubon South Carolina and the Palustrine Group identified privately-held in-holdings within Four Holes Watershed and Francis Beidler Forest that are not currently protected. This comprehensive effort identified the 87.62-acre Bass Drive Tract located within Orangeburg County, South Carolina as a potential candidate for inclusion into the mitigation project to provide suitable compensatory mitigation for the additional 4.93 acres of impacts to jurisdictional waters of the U.S requested under Modification No. 4 by Berkley County.

The compensatory mitigation provided by the acquisition of the Bass Drive Tract will consist of wetland preservation only. However, the Project Soter–Landscape Mitigation Plan was approved following an approximate wetland determination on the project tracts. Following approval of the preliminary mitigation plan, a final mitigation plan was prepared utilizing a full delineation of the project tracts. The delineation and subsequent modification of the mitigation work plan, indicated an additional 264 acres of wetland enhancement will occur under the original work plan. The proposed inclusion of wetland preservation within the Bass Drive Tract and additional wetland enhancement within the Bannister Tract more than fulfill the requirements of no net loss of aquatic resources within the Four Hole Swamp watershed and 50% enhancement.

A summary of the jurisdictional waters of the U.S. utilized for compensatory mitigation under the Project Soter–Landscape Mitigation Plan is provided below in Table 1.



**Table 1: Summary of Wetland and Stream Mitigation**

<b>Project Soter - Landscape Mitigation Plan (Amended)</b>				
<b>Mitigation Work Plan</b>	<b>Tract Acreage<sup>1</sup></b>	<b>Wetland Preservation Acreage<sup>1</sup></b>	<b>Wetland Enhancement Acreage<sup>1</sup></b>	<b>Stream Preservation Linear Feet<sup>1</sup></b>
<b>Bannister Tract</b>	1,668.84	482.62	781.13	39,582
<b>Dean Swamp Tract</b>	380.38	122.47	78.21	19,872
<b>Singleary Tract</b>	115.87	100.71	0	7,688
<b>Long Tract</b>	70.52	70.52	0	1,379
<b>Mims Tract</b>	182.31	118.30	0	7,594
<b>Salisbury Tract</b>	70.13	70.13	0	134
<b>Bass Drive Tract</b>	87.6	66.87	0	0
<b>Total</b>	<b>2,575.65</b>	<b>1,031.62</b>	<b>859.34</b>	<b>76,249</b>

<sup>1</sup>The wetland acreages shown above illustrates the wetlands that are proposed for wetland mitigation. Wetlands located within forestry access roads, utility easement rights-of-way, and those wetlands which will be enhanced at a future time by SCDNR or Audubon were not included in this assessment. In total the Project Soter- Landscape Mitigation Plan protects an estimated 1,964.73 acres of wetlands and approximately 14.44 miles of stream.

## 4. WATERSHED APPROACH

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A detailed watershed approach was completed within the Project Soter – Landscape Mitigation Plan under **Section 4 Watershed Approach** for the Four Hole Swamp watershed (8-digit HUC 03050205). The Bass Drive Parcel is located within the Four Holes Watershed and within the Lower Four Hole Swamp subwatershed (10-digit HUC 0305020503) as the impact areas and continues to build upon the objectives of the concluded original Project Soter – Landscape Mitigation Plan.

## **5. COMPENSATORY MITIGATION PLAN**

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### **5.1. GOALS AND OBJECTIVES**

Proposed wetland mitigation activities within the Bass Drive Tract are expected to provide preservation opportunities of pine flatwoods and bald cypress/tupelo gum swamp forest wetlands along Four Hole Swamp within the same 8 digit HUC (Four Hole Swamp watershed HUC 03050205) as the proposed impacts associated with the modifications to the interchange project associated with the Project Soter development.

#### **5.1.1. Mitigation Project Objectives**

The proposed preservation of the Bass Drive Tract will provide numerous ecological and water quality benefits within the Four Hole Swamp watershed (HUC 03050205) and the Mid-Atlantic Coastal Plain ecoregion. The Four Hole Swamp watershed is primarily rural and agricultural with some industrial use. Streams and wetlands in the Coastal Plain of South Carolina have been heavily impacted as part of historical silviculture and agriculture land management practices. The potential threat of these practices is likely to impact terrestrial and aquatic habitats and disrupt habitat corridors.

The Bass Drive Tract will allow the preservation of approximately 88 acres in perpetuity and further expand the conservation efforts of the National Audubon Society in the Four Hole Swamp watershed. The proposed preservation of the Bass Drive Tract will potentially include:

- Protection of approximately 67 acres of jurisdictional wetlands and 21 acres of uplands through the establishment of deed restrictions.
- The habitats include preservation of approximately 43.93 acres of mature bald cypress/tupelo gum swamp forest wetlands, 36.49 acres of pine flatwoods, 2.46 acres of gum depression, 1.68 acres of borrow pit/pond, and 3.05 acres of loblolly plantation along the main stem of Four Hole Swamp.
- Connectivity to other conserved lands, such as those managed by National Audubon Society. Fragmented landscapes are viewed as a top threat to wildlife and ecosystems (Land Trust Alliance 2014; NRCS 2010), thus a top conservation goal is connectivity.

Table 2 provides the estimated ecological benefits offered by the proposed Bass Drive Tract to water quality, hydrology, and habitat.

**Table 2. Objectives for the Bass Drive Tract**

<b>Hydrological Function Goals</b>	<b>Accomplished By</b>
Floodplain function	Preserve existing floodplain functions by eliminating subdivision and development, conversion to pine plantations, and large scale silviculture operations. Protection of the habitats will also allow the floodplain of the Four Hole Swamp to function naturally providing benefits to water quality and habitat corridors.
<b>Biological Function Goals</b>	<b>Accomplished By</b>
Habitat for macroinvertebrates and fish	Protecting the existing properties, which are crossed by multiple drainages dotted wetland depressions, will preserve valuable floodplain habitat vital to the native macroinvertebrates and fish that inhabit the Mitigation Project Tracts.
Vegetative Habitat Protection	Preservation of bottomland hardwood ecosystems, which are under threat from conversion to pine plantations to maintain the presence of native species and diverse ecosystems that have historically characterize the Four Hole Swamp, Lower Four Hole Swamp and Dean Swamp watersheds.
Habitat Corridor Protection	The protection of the Bass Drive Tract, with its proximity to previously conserved lands, will preserve natural travel corridors for native species and reduce habitat fragmentation.
Long Term Protection of Ecological Resources	The proposed protective mechanisms for the Bass Drive Tract is expected to protect the proposed ecological benefits in perpetuity.
<b>Conservation Goals</b>	<b>Accomplished By</b>
Reduction of Habitat Fragmentation	Establishment of the proposed conservation and development restriction easements. According to SCDNR's "Comprehensive Wildlife Conservation Strategy: 2005 – 2010", Biologists have identified habitat protection as one of the most important actions to ensure protection of South Carolina priority species. Loss and fragmentation of habitat have been identified as a major threat to many of the species listed as threatened and endangered in South Carolina. The Bass Drive Tract proposed Mitigation Project an in-holding within existing Audubon lands.

## **5.2. SITE SELECTION**

The detailed approach for the site selection process and requirements is documented within the Mitigation Project under **Section 5.2 Site Selection**. This proposed Addendum to the Mitigation Project utilizes the same process outlined in **Section 5.2** to identify and select the Bass Drive Tract and seeks to further enhance the Mitigation Project.

### **5.2.1. Resource Equivalency**

#### **5.2.1.1. Comparison of Wetland Types**

The jurisdictional waters of the U.S. located within the additional impact area consist of wet loblolly pine plantation, mixed pine-hardwood forest, and RPWs. The proposed permit modification #4 will impact an additional 4.93 acres of wetland.

The jurisdictional waters associated with the Bass Drive Tract includes approximately 67 acres of palustrine, forested wetlands classified as a bald cypress/tupelo gum swamp forest, pine flatwoods, gum depression, and isolated ponds. The Bass Drive Tract is also located within Four Hole Swamp watershed (8-digit HUC 03050205) approximately 17 miles northwest of the new proposed I-26 Interchange for the Camp Hall Tract.

The Mitigation Project will provide an excellent opportunity for the preservation of bald cypress/tupelo gum swamp forest and pine flatwood wetlands, within one of the primary focus areas for Audubon within the Four Hole Swamp watershed. Wetlands slated for preservation are generally high quality wetlands which will offset impacts to low quality wetlands. In addition, the addition of the Bass Drive Tract to the Mitigation Project further integrates the Green Belt initiative with a primary goal of establishing a conservation zone around the Charleston metropolitan area and promotes the conservation goals of Audubon South Carolina and the Nature Conservancy in the Four Hole Swamp watershed.

## **5.3. SITE PROTECTION**

Long-term protection of the Bass Drive Tract will involve property transfer to Audubon South Carolina and the incorporation of deed restrictions. The proposed deed restriction instrument will specify permissible activities such as access, hunting, and other recreational uses that the activity causes no negative effect on the functions and values of the aquatic resources within the Bass Drive Tract. The following section provides site protection information for the Bass Drive Tract. The draft deed restriction language can be found in Appendix B.

### **5.3.1. Bass Drive Tract**

#### **5.3.1.1. Ownership of the Mitigation Project**

The Bass Drive Tract will be purchased fee simple by Palustrine Group following the acceptance of this Addendum to the Mitigation Project by the USACE. Palustrine Group will simultaneously transfer ownership of the property to Audubon South Carolina within the time allotted by the permit modification approval following due diligence investigations. It is anticipated that the purchase of the property and transference of ownership to Audubon South Carolina will occur 2016.

#### **5.3.1.2. Long Term Protective Instrument**

The Bass Drive Tract will be encumbered through deed restrictions in a form acceptable to the USACE and SCDHEC. The draft deed restriction language can be found in Appendix B.

**Table 3. Property Information**

Mitigation Tract	Option Holders Name	PIN	County	Total Acres	Protected Area Acres
Bass Drive Tract	Palustrine Group	0314-00-00-001.000	Orangeburg	±88	±88
<b>Totals</b>				<b>±88</b>	<b>±88</b>

The contact information for the option holder of the Bass Drive Tract is provided in Table 4.

**Table 4. Property Option Holder Contact Information**

Option Holders Name	Address	Phone Number	Email
Palustrine Group c/o Norton Webster	P.O. Box 71795 North Charleston, SC 29415	(843) 408-8733	nwebster@palustrinegroup.com

## 5.4. BASELINE CONDITIONS

### 5.4.1. Physiography, Topography, and Land Use

The Bass Drive Tract is located in the Coastal Plain physiographic province of South Carolina within the Four Hole Swamp watershed (8-digit HUC 03050205), specifically the Lower Four Hole Swamp subwatershed (10-digit HUC 03050205-03). The Four Hole Swamp watershed drains two EPA Level III Ecoregions: Southeastern Plains and Middle Atlantic Coastal Plain. The Bass Drive Tract is located within the Mid-Atlantic Floodplains and Low Terraces Level IV Ecoregion.

The Southeastern Plains in the northern portion of the HUC 8 Four Hole Swamp watershed can be described as irregular with broad inter-stream areas with a mosaic of cropland, pasture, woodland, and forest. The Middle Atlantic Coastal Plain Ecoregion, where the Bass Drive Tract is located, consists of low elevation, flat plains, with many swamps, marshes, and estuaries. Its low terraces, marshes, dunes, barrier islands, and beaches are underlain by unconsolidated sediments. Poorly drained soils are common, and the region has a mix of coarse and finer textured soils. Topography across the Bass Drive Tract is generally flat, with lower, bald cypress-tupelo gum swamp closer to the channels of the Four Hole Swamp.

The Bass Drive Tract is utilized for a mix of silvicultural uses and recreation. A small managed stand of loblolly pine (*Pinus taeda*) is located on the eastern portion of the tract. Several existing maintained trails and logging roads are located through the property, utilized for ATV access and recreational hunting (see Figure 9 in Appendix A).

The Four Hole Swamp watershed is comprised of mostly rural land cover. Private land use in the area is a mix of silvicultural and agricultural land, with some interspersed low density residential areas. The largest developed area in the Four Hole Swamp watershed includes the Town of Orangeburg which lies to the upper northwest portion of the watershed. Additional developed area is made up of other small municipalities in the watershed including Cameron, Bowman, Santee, Eutawville, Holly Hill, and Harleyville. Land use within the Lower Four Hole Swamp subwatershed is mostly attributed to forested areas (34-51%), wetlands (24-31%), and agricultural lands (20-30%). The large percent of forested areas mostly attribute to the loblolly pine plantations that were most likely converted from the historical longleaf pine forests within the watershed. The majority of farmland in the watersheds is devoted to field and forage crops. The high percentage of wetland land cover reflects the extensive floodplains of the Four Hole Swamp and its coastal plain tributaries.

#### 5.4.2. Soils

Soils within the Bass Drive Tract have been mapped by the United States Department of Agriculture (the “USDA”) Natural Resource Conservation Service (the “NRCS”) (USDA 2010) and are displayed on Figure 6. Table 5 shows the soil map units found within Bass Drive Tract.

Five soil series are mapped within the Bass Drive Tract: Goldsboro sandy loam, Lynchburg fine sandy loam, Rains sandy loam, and Stalling loamy sand within the terrace above Four Hole Swamp, and Mouzon fine sandy loam within Four Hole Swamp.

**Table 5. Natural Resources Conservation Service Soils**

Map Unit Name	Unit Symbol
Goldsboro sandy loam, 0 to 2 percent slopes	GoA
Lynchburg fine sandy loam, 0 to 2 percent slopes	Ly
Mouzon fine sandy loam	Mo
Rains sandy loam	Ra
Stallings loamy sand	Sa

#### 5.4.3. Jurisdictional Delineation

Wetlands are defined by the presence of three criteria: hydrophytic vegetation, hydric soils, and evidence of wetland hydrology (USACE 1987). Jurisdictional areas were delineated using the three parameter approach in accordance with the *Corps of Engineers Wetland Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coast Plain Region (Version 2.0) November 2010*.

Based on the jurisdictional delineation, the following aquatic resources are located within the Bass Drive Tract:

- The western portion of the tract is dominated by bald cypress-tupelo gum swamp forest, associated with the main run of Four Hole Swamp. The swamp forest throughout the tract is intact and generally of high quality with few recent impacts. Amec Foster Wheeler, utilizing the North Carolina Wetland Assessment Method (NC WAM) to assess the quality of the wetlands, determined that the existing wetlands were of high quality. The swamp forest is intact with the majority of the trees exhibiting an average diameter (DBH) of greater than 12 inches.
- The eastern portion of the property is dominated by a pine flatwoods community, located on a terrace above Four Hole Swamp. The flatwoods are a mosaic of wetlands and uplands with a greater pine presence in uplands and more hardwood species in the wetlands. The terrace shows evidence of logging in the past, with a relatively open canopy. Amec Foster Wheeler, utilizing the North Carolina Wetland Assessment Method (NC WAM) to assess the quality of the wetlands, determined that the wetlands within the pine flatwoods were of high quality.
- Two borrow pits/ponds were identified during field activities. These borrow pits were likely excavated to provide fill material for the forestry road bisecting the property, described below.

A forestry road runs through the center of the property, from the northeastern property line to the southwestern property line. This road was likely used for forestry access to Four Hole Swamp. The road is not well maintained, with numerous breaches in the road noted during the site visit. The road is generally on-grade through the flatwood terrace, with the portion of the road in the swamp forest raised above grade between 3 and 5 feet

A photo log of the existing resources within the Bass Drive Tract has been compiled and is located in Appendix C. A map illustrating the location of photographed resources and data point locations is included as Figure 10 in Appendix A.

Table 6 provides a summary of the jurisdictional features located within the Bass Drive Tract.

**Table 6. Summary of Jurisdictional Features**

Area	Feature Type	Acreage
Wetland A	Wetland A	62.82 acres
Wetland B	Wetland B	2.37 acres
Pond A	Pond A	0.17 acres
Pond B	Pond B	1.51 acres
<b>Total Waters of the U.S.</b>		<b>66.87 acres</b>
<b>Total Upland Acreage</b>		<b>20.75 acres</b>
<b>Total Protected Acreage</b>		<b>87.62 acres</b>

An Approximate-Preliminary JD request is being included as part of this PRMP in Appendix D.

#### 5.4.4. Existing Plant Communities

*The Natural Communities of South Carolina* (Nelson 1986) was utilized to characterize the existing plant communities within the Bass Drive Tract. Four predominant vegetative communities exist within the Tract: bald cypress-tupelo gum swamp, pine flatwoods, loblolly pine plantation, and gum depression. A map illustrating the existing plant communities is included as Figure 9 in Appendix A.

##### Bald Cypress-Tupelo Gum Swamp

The Bald Cypress-Tupelo Gum Swamp community is located within the western half of the Bass Drive Tract, and is associated with Four Hole Swamp. The community is dominated by an overstory of bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*), with scattered swamp chestnut oak (*Quercus michauxii*), sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), swamp cottonwood (*Populus heterophylla*), and diamond leaf oak (*Quercus laurifolia*). The understory of this community is sparsely occupied by dwarf palmetto (*Sabal minor*) and saplings of overstory trees. An herbaceous layer is not present.

##### Pine Flatwoods

The terrace above Four Hole Swamp is dominated by a pine flatwoods community that has a significant hardwood presence due to the lack of fire management. This community is a mosaic of wetlands and uplands with a greater pine presence in uplands, and more hardwood species in the wetlands. Dominant species observed within the overstory of this community include loblolly pine, sweetgum, diamond leaf oak, swamp chestnut oak, water oak (*Quercus nigra*), red maple, tulip poplar (*Liriodendron tulipifera*), black gum (*Nyssa sylvatica*). The understory includes young overstory trees, sweetbay magnolia (*Magnolia virginiana*), red bay (*Persea borbonia*), wax myrtle (*Morella cerifera*), American beautyberry (*Callicarpa americana*), buckeye (*Aesculus pavia*), spruce pine (*Pinus glabra*), ironwood (*Carpinus caroliniana*), American elm (*Ulmus americana*), winged elm (*Ulmus alata*), American holly (*Ilex opaca*), and fetterbush (*Lyonia lucida*). Herbaceous species include sedges (*Carex* spp.), lizard's tail (*Saururus cernuus*), false nettle (*Boehmeria cylindrica*), netted chain-fern (*Woodwardia areolata*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomea*), and various hydrophytic grasses



## **Loblolly Pine Plantation**

A portion of the uplands in the eastern part of the Bass Drive Tract has been planted in loblolly pine. This pine plantation contains even-aged planted loblolly pine. The loblolly pine plantation community overstory is dominated by established loblolly pine, however, occasional sweetgum individuals may also reach the canopy. The stand includes a mid-story, which is densely vegetated, and includes sweetgum, red maple, diamond-leaf oak, water oak, wax myrtle, blackberry (*Rubus spp.*), and sweet pepperbush (*Clethra alnifolia*). The herbaceous stratum is generally sparsely vegetated, but contains bracken fern (*Pteridium aquilinum*), partridge pea (*Chamaecrista fasciculata*), openflower rosette grass (*Dichanthelium laxiflorum*), Carolina elephantsfoot (*Elephantopus carolinianus*), and slender woodoats (*Chasmanthium laxum*). Typical vine species include muscadine (*Vitis rotundifolia*), roundleaf greenbrier (*Smilax rotundifolia*), peppervine (*Ampelopsis arborea*), yellow jasmine (*Gelsemium sempervirens*), Virginia creeper (*Parthenocissus quinquefolia*), and trumpet creeper (*Campsis radicans*).

## **Gum Depression**

A large gum depression is located in the eastern portion of the Bass Drive parcel. This community is dominated by an overstory of swamp tupelo (*Nyssa biflora*), swamp cottonwood, sweetgum, red maple, and diamond-leaf oak. The midstory includes younger hardwood species found in the overstory as well as wax myrtle, high bush blueberry (*Vaccinium corymbosum*), fetterbush, and sweet pepperbush. The herbaceous stratum is generally not well developed, but where present includes southern waxy sedge (*Carex glaucescens*) and cinnamon fern.

### **5.4.5. Wildlife**

The most common big game mammal found on the Bass Drive Tract are the white-tailed deer (*Odocoileus virginianus*) and feral pig (*Sus scrofa*). Small game species that occur on the tract include rabbits (*Sylvilagus spp.*), raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), Eastern wild turkey (*Meleagris gallapavo*) and American woodcock (*Scolopax minor*) and wood duck (*Aix sponsa*). Important mammalian furbearers that were reported to inhabit the area include muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), mink (*Mustela vison*), opossum (*Didelphis virginiana*), river otter (*Lutra canadensis*), red fox (*Vulpes vulpes*), grey fox (*Urocyon cinereoargenteus*), and coyotes (*Canis latrans*).

### **5.4.6. Protected Species**

#### **5.4.6.1. Federally Listed Species**

Plants and animals listed as federally threatened and endangered are protected under the Endangered Species Act (P.L. 92-205) (ESA) which is administered and enforced by the United States Fish and Wildlife Service (USFWS). The bald eagle is federally protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. This biological assessment documents the results of a literature and database search and on-site survey to determine the likelihood that federally endangered or threatened species and the bald eagle will be impacted by preservation of the Bass Drive Tract in Orangeburg County, South Carolina.

A current list of federally endangered and threatened species for Orangeburg County was compiled from the USFWS Charleston Field Office website (USFWS 2016) and the USFWS Information Planning and Conservation System (IPAC) (accessed September 2016). The list is in Table 9. The South Carolina Rare and Endangered Species Inventory website, a Geographic Information System natural resources data layer that includes the locations of all documented occurrences of federally endangered, threatened, or candidate species, was reviewed on September 3, 2016. In addition, Ms. Kathy Boyle, Data Manager for SCDNR, was contacted on September 3, 2016 to review the database for updated potential endangered or threatened species occurrences in Table 7.

**Table 7. Current list of federally protected species in Orangeburg County, SC (USFWS 2012; USFWS 2016; SCDNR 2016) and their habitat types.**

Common Name	Scientific Name	Status	General Habitat Type
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA	coastlines, rivers, large lakes or streams
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	mature pine forests
Wood stork	<i>Mycteria americana</i>	T	marshes, swamps, lagoons, ponds, flooded fields; depressions in marshes are important during drought; also occurs in brackish wetlands
Frosted flatwoods salamander	<i>Ambystoma cingulatum</i>	T, CH	pine areas maintained in an open state by fire with isolated ponds for breeding sites
Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	E	major river systems along the eastern seaboard
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	E	major river systems along the eastern seaboard
Canby's dropwort	<i>Oxypolis canbyi</i>	E	pond-cypress savannahs dominated by grasses, sedges or ditches next to bays; borders and shallows of cypress-pond pine ponds and sloughs

E Federally endangered  
 T Federally threatened  
 CH Critical Habitat designated in Federal Register  
 BGEPA Federally protected under the Bald and Golden Eagle Protection Act

## Methodology

A literature search and an on-site habitat assessment were conducted to determine the likelihood of the presence or absence of each of the above listed species. The lists received from USFWS and SCDNR were used as the baseline for the on-site habitat assessment and comparison. Aerial photography, the on-site habitat characterization, the on-site wetland approximation, and an on-site field survey were used to generalize habitat types on the site. General habitat types located on the tract are described below in the Habitats section.

## Habitats

The western portion of the property is dominated by bad cypress-tupelo gum swamp forest, associated with the main run of Four Hole Swamp. The swamp forest throughout the tract is intact and generally of high quality with few recent impacts. The eastern portion of the property is dominated by a pine flatwoods community, approximately 30 – 40 years old, which has a significant hardwood presence due to the lack of fire management, located on a terrace above Four Hole Swamp. The flatwoods are a mosaic of wetlands and uplands with a greater pine dominance in uplands and more hardwood species in the wetlands. A small portion of the uplands on the terrace are occupied by planted loblolly pine, approximately 12-20 years old. These habitats are described in further detail in **Section 5.4.5**.

### *Literature Search, Database Review, and On-site Habitat Assessment Results*

#### **Bald eagle**

The bald eagle was listed as endangered on March 11, 1967 (USFWS 1967). The species was reclassified from endangered to threatened throughout the lower 48 states on July 12, 1995 (USFWS 1995). It was proposed to be removed from the federal endangered species list on July 6, 1999 (USFWS 1999a). On July 9, 2007, the bald eagle was removed from the endangered species list (USFWS 2007). The bald eagle is still federally protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

The bald eagle, with a wingspread of about seven feet, is mainly dark brown and adults have a pure white head and tail. The bald eagle feeds primarily on fish but also takes a variety of bird, mammals, and turtles when fish are not readily available (USFWS 1992). It nests in large, sturdy trees with open canopies typically near large open water bodies. Many nests are used annually. It has been documented that egg laying for the bald eagle peaks in late December in the South. The nesting season in the Southeast extends from October to May 15.

The nearest known bald eagle nest is approximately three miles northwest of the Bass Drive Parcel. This tract could provide minimally-suitable habitat for nesting and foraging bald eagles.

#### **Red-cockaded woodpecker (RCW)**

In 1970, the RCW was officially listed as endangered (USFWS 2003). With passage of the ESA in 1973, the RCW received the protection afforded listed species under the ESA. The endangered status of the RCW primarily is due to four environmental factors that have been shown to limit its numbers: (1) hardwood encroachment; (2) a shortage of suitable cavity trees; (3) loss and fragmentation of habitat, and (4) demographic isolation (Conner and Rudolph 1991, Walters 1991, Rudolph and Conner 1994).

The RCW is endemic to pine forests of the southeast (Ligon 1970). RCWs are territorial, non-migratory, cooperative breeders (Lennartz et al. 1987). RCWs are unique in that they excavate cavities for roosting and nesting in living pines (USFWS 2003) and use living pines almost exclusively for foraging substrate, preferring longleaf pine when available (Walters 1991). RCWs require open pine woodlands and savannahs with large old pines for nesting and roosting habitat (i.e., cavity trees). Cavity trees must be in open pine stands with little or no hardwood midstory and few or no over-story hardwoods. For purposes of surveying, suitable nesting habitat consists of pine, pine/hardwood, and hardwood/pine stands that contain pines 60 years in age or older and that are within 0.5 mile of suitable foraging habitat. For the purposes of surveying, suitable foraging habitat consists of a pine or pine/hardwood stand in which 50 percent or more of the dominant trees are pines and the dominant pine trees are generally 30 years in age or older. (USFWS 2003)

Based on review of aerial photography and an on-site visit, it was determined that no suitable foraging or nesting habitat occurs on-site for the RCW due to the age of the pines, thickness of the pine and/or hardwoods in the canopy and/or mid-story, and lack of fire. The nearest known RCW occurrences are more than 15 miles southwest and northwest of the tract. Both of these occurrences are historical and prior to 1992. To be considered suitable foraging and/or nesting habitat for the RCW, thinning and mid-story control is necessary.

#### **Wood stork**

The U.S. breeding population of the wood stork was listed as endangered on February 28, 1984 (USFWS 1992). The U.S. breeding population was down-listed to threatened and established as a distinct population segment on July 30, 2014. Wood storks are large, long-legged wading birds. They are white except for black primaries and secondaries and a short black tail. The head and neck are largely unfeathered and dark gray in color. The bill is black, thick at the base, and slightly decurved (USFWS 1992).

Wood storks have been seen in South Carolina during every month of the year. However they are uncommon from December through mid-March (USFWS 1996). They typically nest in cypress/tupelo gum

ponds with standing water. It is a highly colonial species usually nesting in large rookeries and feeding in flocks. The wood stork forages in a wide variety of shallow wetlands, wherever prey concentration reach high enough densities, in water that is shallow and open enough for the birds to be successful in their hunting efforts (Ogden et al. 1978, Browder 1984). Nesting wood storks generally use foraging sites that are located within 31 miles flight range of the colony (USFWS 1996).

The Bass Drive Tract wetlands within the project boundaries may be suitable habitat for foraging or nesting wood storks.

### **Frosted flatwoods salamander**

The flatwoods salamander was listed as threatened on April 1, 1999 (USFWS 1999b). In 2009 the flatwoods salamander was divided into two distinct species: the frosted flatwoods salamander (*Ambystoma cingulatum*) and the reticulated flatwoods salamander (*Ambystoma bishopi*) due to a recognized taxonomic reclassification (USFWS 2009). The frosted flatwoods salamander is located east of the Apalachicola River Basin. Critical habitat (CH) has been designated for the frosted flatwoods salamander in Berkeley, Charleston, and Jasper counties, SC (USFWS 2009) but there is no CH designated in Orangeburg County. The frosted flatwoods salamander occurs in isolated populations scattered across the lower southeastern Coastal Plain in Florida, Georgia, and South Carolina (USFWS 1999b, USFWS 2009). There are four known populations of frosted flatwoods salamander in South Carolina (USFWS 2009) with the closest population over 50 miles away on the FMNF.

It is a slender, small-headed mole salamander. Adult dorsal color ranges from dark black to chocolate black with grayish or silvery network pattern or frosted appearance running along the lateral and dorsal surfaces. Aquatic larvae are long and slender, broad-headed and bushy-gilled, with white bellies and yellow stripes on the sides (Palis 1995).

Typical breeding sites are isolated wetland depressions, which dry completely on a cyclic basis, thus eliminating fish species. The isolated ponds are typically small with an open canopy allowing grasses and sedges to grow on the edge where adult salamanders will lay their eggs in the fall. During the non-breeding season, the fossorial adults return to the upland pine areas that are maintained by frequent fire.

The habitat on-site does not meet the criteria for this species because (1) the pond has a fairly closed canopy, (2) the pond is not truly isolated, and (3) the upland pine habitat has not been managed and allowed to mature, therefore it will not support the fossorial adults. With restoration and management this Tract may have potential as habitat for the frosted flatwoods salamander.

### **Shortnose sturgeon**

The shortnose sturgeon was listed as endangered on March 11, 1967 (32 FR 4001). It is an anadromous fish that spawns in the coastal rivers along the east coast of North America from the St. John River in Canada to the St. Johns River in Florida. In South Carolina, the species is present in the Waccamaw, Pee Dee, Black (Winyah Bay system), Santee, Cooper, Ashepoo, Combahee, Edisto, and Savannah Rivers (NMFS 1998). The shortnose sturgeon prefers the nearshore marine, estuarine and riverine habitat of large river systems (NMFS/NOAA 2012). Adults have separate summer and winter areas.

There is no suitable habitat for the shortnose sturgeon on the Bass Drive Tract.

### **Atlantic sturgeon**

The Carolina and the South Atlantic Distinct Population Segments (DPS) of the Atlantic sturgeon were listed as endangered in February 2012 (NOAA 2012). A DPS is a vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The ESA provides for listing species, subspecies, or distinct population segments of vertebrate species (NOAA 2012).

The Atlantic sturgeon is a long-lived, estuarine dependent, anadromous fish. Spawning adults migrate upriver in spring, beginning in February-March in the south. Adults spawn in freshwater of large rivers and migrate into estuarine and marine waters where they spend most of their lives. They spawn in moderately flowing water (46-76 cm/s) in deep parts of large rivers.

There is no suitable habitat for the Atlantic sturgeon on the Bass Drive Tract.

### Canby's dropwort

Canby's dropwort was listed as endangered on February 25, 1991 (USFWS 1991). It is a perennial herb with erect, hollow stems, aromatic foliage and elongate, stoloniferous rhizomes. It has minute white flowers produced in terminal or axillary umbels; sepals may be tinged red. The fruit is a strongly-winged schizocarp. The species flowers from May through early August and fruits in early fall (USFWS 1991).

This species occurs in pond cypress savannas, shallows and edges of cypress/pond pine sloughs, and wet pine savannas. The healthiest populations seem to occur in open bays or ponds which are wet most of the year and have little or no canopy cover.

Based on review of aerial photography and on-site review, there is minimal suitable habitat on the Bass Drive Tract for this species because the depressional wetland has a relatively closed canopy.

### Conclusion

Based on review of the literature, aerial photography, and on-site visit it is our determination that the proposed mitigation project will have a beneficial effect on the bald eagle, woodstork, RCW, frosted flatwoods salamander, and Canby's dropwort and no effect on the Atlantic sturgeon and short-nose sturgeon.

### 5.4.6.2. State Species of Concern

The South Carolina Nongame and Endangered Species Act outlines the State of South Carolina's role in establishing guidelines to protect wildlife species that have been determined to be of concern in the State. These State species of concern are those thought to have populations that are of declining, rare, or unknown status other than those listed under the Federal Endangered Species Act. While the State species of concern are not protected by law, the list provides a valuable tool for conservation measures and protection planning.

Table 8 provides the State species of concern for Orangeburg County (June 2014) for which there may be suitable habitat within the Bass Drive Tract.

**Table 8. Site Suitable, State Species of Concern for Orangeburg County, South Carolina\***

Common Name	Scientific Name	County	Status <sup>1</sup>	Habitat	Documented Occurrence within 2 Miles of Tract <sup>2</sup>
<b>Vertebrates</b>					
Rafinesque's Big-eared Bat	<i>Corynorhinus rafinesquii</i>	Orangeburg	SE	Roosts in cave entrances, hollow trees, crevices behind bark, and dry leaves in the forest. Also abandoned buildings and under bridges	Yes

Common Name	Scientific Name	County	Status <sup>1</sup>	Habitat	Documented Occurrence within 2 Miles of Tract <sup>2</sup>
Southeastern Bat	<i>Myotis austroriparius</i>	Orangeburg	S1	Roosting in spring and summer typically occurs in buildings and other structures, mines, and hollow trees (e.g., water tupelo, black gum, water hickory, black cypress). Foraging habitat is riparian floodplain forests or wooded wetlands with permanent open water nearby.	Yes
Pine or Gopher Snake	<i>Pituophis melanoleucus</i>	Orangeburg	S3	Flat and dry habitats with open canopies and are most common in sand hill and sandy pine barren habitats	No
Dwarf Siren	<i>Pseudobranchius striatus</i>	Orangeburg	ST	Cypress domes, cypress strands, marshes, lime-sink ponds, ditches, Carolina bays, and other shallow freshwater habitats, including both permanent and temporary waters. Cypress ponds in areas of acid pine flatwoods, thick vegetation or in bottomg mud and debris.	No
Gopher Frog	<i>Rana capito</i>	Orangeburg	S1	Native xeric upland habitats, particularly longleaf pine-turkey oak sand hill associations; also xeric to mesic longleaf pine flat woods, sand pine scrub, xeric oak hammocks, and ruderal successional stages of these habitats.	Yes
<b>Invertebrates</b>					
Carolina Slabshell	<i>Elliptio congrua</i>	Orangeburg	S3	Swift water of medium sized rivers to smaller creeks. Prefers sandy substrates.	No
Savannah Lilliput	<i>Toxolasma pullus</i>	Orangeburg	S1	Lotic streams and ponds, where it prefers mud or sand near banks. Rarely found in deep water, but usually in small colonies in less than six inches of water.	No
<b>Vascular Plants</b>					
Incised Groovebur	<i>Agrimonia incisa</i>	Orangeburg	S2	Fire-maintained longleaf pine-oak community	No
Blue Maiden-cane	<i>Amphicarpum muehlenbergianum</i>	Orangeburg	S2,S3	moist to wet pine savannas and flatwoods, exposed shores and bottoms of ponds and lakes and margins of cypress-gum ponds.	No
Piedmont Three-awned Grass	<i>Aristida condensata</i>	Orangeburg	S2	Sandy soil of low, open, and seasonally wet pineland and savannas	No

Common Name	Scientific Name	County	Status <sup>1</sup>	Habitat	Documented Occurrence within 2 Miles of Tract <sup>2</sup>
Wagner's Spleenwort	<i>Asplenium heteroresiliens</i>	Orangeburg	S1	Limestone and marl outcroppings in dense hardwood forests.	No
Black-stem Spleenwort	<i>Asplenium resiliens</i>	Orangeburg	S1	Base of cliffs or sinkholes, on limestone or other alkaline rocks. Also found in forest on boulders, ledges, and crevices of cliffs.	No
Coastal-plain Water-hyssop	<i>Bacopa cyclophylla</i>	Orangeburg	S1	Moist, sandy soil in low marshy areas near pine flatwoods	No
Window Sedge	<i>Carex basiantha</i>	Orangeburg	S2	Neutral or slightly acidic soils in mesic to wet mesic deciduous forests, usually on lower slopes above flood plains of rivers and streams	No
Cypress-knee Sedge	<i>Carex decomposita</i>	Orangeburg	S2	Undisturbed, organic-rich backwaters of swamps and pond margins. Occurs on floating or partially-submersed rotting logs or stumps.	No
Meadow Sedge	<i>Carex granularis</i>	Orangeburg	S2	Calcareous soils in low, wet woodlands, bottomland swamps, moist depressions in limestone cliffs, and abandoned fields, especially along borders, clearings, streams, and trails	Yes
Southeastern Sneezeweed	<i>Helenium pinnatifidum</i>	Orangeburg	S2	Sandy and peaty substrate in small depressions and flatlands that are seasonally inundated and subject to frequent or occasional fire	No
Sarvis Holly	<i>Ilex amelanchier</i>	Orangeburg	S3	Sandy swamps; wet woods; stream banks	No
River Bank Quillwort	<i>Isoetes riparia</i>	Orangeburg	S2	Margins of lakes, ponds, and streams. Tidal shores or estuaries. Circumneutral or slightly acidic, oligotrophic waters.	No
Pondspice	<i>Litsea aestivalis</i>	Orangeburg	S3	Wet, sandy or peaty, and acidic soil along margins of swamps, lime sink ponds, bay heads, small ponds, natural doline ponds and in low wet woodlands	No
Boykin's Lobelia	<i>Lobelia boykinii</i>	Orangeburg	S3	Cypress-gum depressions or ponds, wet pine savannas and flatwoods in either continuous, shallow standing water or areas that are seasonally very moist or inundated	No

Common Name	Scientific Name	County	Status <sup>1</sup>	Habitat	Documented Occurrence within 2 Miles of Tract <sup>2</sup>
Piedmont Water-milfoil	<i>Myriophyllum laxum</i>	Orangeburg	S2	Shallow, highly acidic water of natural sinkhole ponds and lakes, impoundments and beaver ponds, blackwater streams, backwaters, sloughs, drainage ditches, and canals.	No
Georgia Beargrass	<i>Nolina georgiana</i>	Orangeburg	S3	Sandy soil in pinelands, savanna, turkey-oak woods	No
Pineland Plantain	<i>Plantago sparsiflora</i>	Orangeburg	S2	Marshy/seasonally wet pine savannas and adjacent roadsides and ditches	No
Bottom-land Post Oak	<i>Quercus similis</i>	Orangeburg	S1	Forests in wet stream bottomlands, flatwoods, river valleys	Yes
Awned Meadowbeauty	<i>Rhexia aristosa</i>	Orangeburg	S3	Limesink and depression ponds, Carolina bays, wet savannas	No
Piedmont Azalea	<i>Rhododendron flammeum</i>	Orangeburg	S3	Rocky, dry upland woods on dry slopes, sand hills, and ridges of rivers or stream banks	No
Harper Beakrush	<i>Rhynchospora harperi</i>	Orangeburg	S1	Sandy or peaty soils of bogs, stream banks, and edges of pineland or savanna ponds	No
Tracy Beakrush	<i>Rhynchospora tracyi</i>	Orangeburg	S3	Sandy or peaty soils of shallows of cypress domes, marshes and swales, and depressions and ponds in pineland and savannas	No
Baldwin Nutrush	<i>Scleria baldwinii</i>	Orangeburg	S2	Wet, sandy or peaty soils in pinelands, savannas, and borders of ponds and lagoons	No
Virginia Spiderwort	<i>Tradescantia virginiana</i>	Orangeburg	S1	Moist to mesic black soil prairies, sand prairies, savannas, thickets, openings and edges of woodlands, and sandstone cliffs	No
Carolina Fluff Grass	<i>Tridens carolinianus</i>	Orangeburg	S1	Sandy soils in upland pinelands mesic swales in sandhills	No
Piedmont Bladderwort	<i>Utricularia olivacea</i>	Orangeburg	S2	Seasonally dry ponds/depressions in sand pine scrub	No

<sup>1</sup> ST – State threatened

S1 – Critically imperiled state-wide because of extreme rarity or special factor

S2 – Imperiled state-wide because of extreme rarity

S3 – Rare or uncommon in state

<sup>2</sup>South Carolina Rare, Threatened & Endangered Species Inventory – Data Availability for the Holly Hill Quadrangle, accessed September 6, 2016.

\*Federally protected species are not included here but are discussed in detail in the biological assessment.



#### **5.4.7. Regional Corridors and Adjacent Natural Areas**

The Bass Drive Tract is located in the Lower Four Swamp Watershed (10 digit HUC 03050205-03), situated adjacent to the main run of Four Hole Swamp. The Bass Drive Tract integrates easily into the goals of the Project Soter – Landscape Mitigation Plan, which is focused on the Four Hole Swamp watershed and its tributaries which falls in-line with the existing overall conservation efforts to protect the Four Hole Swamp watershed (8-digit HUC 03050205) (Figure 2).

Within the Four Hole Swamp watershed, Audubon South Carolina in conjunction with the Nature Conservancy owns and protects the Francis Beidler Forest. Beidler Forest is located within the Four Holes Swamp, a matrix of black water creeks and lakes, shallow bottomland hardwoods, and deep bald cypress and tupelo gum flats (Audubon 2016). Over 17,000 acres of the Four Hole Swamp and upland acres are owned by the National Audubon Society, buffered by 6,000 more acres under private conservation easements, and make up what is known as the Francis Beidler Forest (Audubon 2016, LOLT 2011). Beidler Forest is one of the largest forested wetland habitat protection projects on the East Coast of the United States, including approximately 1,800 acres of the largest old growth cypress-tupelo swamp forest in the world (LOLT 2011). The Beidler Forest was named a RAMSAR Wetland of International Importance in 2008 and is recognized as both a National Natural Landmark and an Important Bird Area (LOLT 2011). It is the mission of the Audubon South Carolina to maintain and/or enhance functional integrity of Four Hole Swamp and its watershed, and leverage that success to aid in the protection of the Edisto River Basin, of which Four Hole Swamp is a part (USACE 2000). Hence, incremental ecological improvement of the Four Hole Swamp watershed is offered via conservation of properties that are located directly adjacent to the Francis Beidler Forest conservation tracts.

The Bass Drive Tract is also situated within and adjacent to the “Charleston Greenbelt” corridor which consists of protected and productive open lands surrounding Lowcountry cities. This “Charleston Greenbelt” concept has been developed Lowcountry Open Land Trust (LOLT). It is LOLT’s mission to preserve wildlife habitats, outstanding natural areas, and sites of unique ecological significance, historical sites, forestlands, farmlands, watershed, open space and urban parks. With the proposed mitigation tracts adjacent to this Lowcountry Greenbelt, it will advance connectivity in order to support healthy ecosystems and abundant wildlife in the area. LOLT is a major partner with Audubon, and holds a majority of the conservation easements in the Four Hole Swamp watershed.

#### **5.4.8. Cultural Resources**

Amec Foster Wheeler conducted a cultural resources literature review for the Bass Drive Tract. The goal of the background literature review was to determine if any previously recorded archaeological sites or historic resources were within or adjacent to the project tract. Background research was conducted on September 1, 2016 by an Amec Foster Wheeler Archaeologist.

##### **5.4.8.1. Literature Review**

Amec Foster Wheeler conducted background research at the South Carolina Department of Archives and History (SCDAH) in Columbia, and at the South Carolina Institute of Archaeology and Anthropology (SCIAA) in Columbia. The information collected was supplemented with digital data available from ArchSite, an on-line Geographical Information System created and maintained by SCDAH and SCIAA. The records examined at SCDAH included a review of the SCDAH Finding Aid for previous architectural surveys near the Bass Drive Tract. The records examined at SCIAA include the master archaeological site maps, state archaeological site files, and any associated archaeological reports.

#### **5.4.8.2. Archaeological Sites**

A review of the files and records at SCIAA revealed that no sites were identified within the project tract. There were zero identified recorded sites within a 1.0-mile radius of the project tract. Zero sites within one mile of the project tract have been recommended for additional work or been deemed eligible for the National Register.

#### **5.4.8.3. Archaeological Survey Areas**

An intensive archaeological survey has been conducted within a one-mile radius of the project area. In 2004, New South Associates Inc. surveyed US Route 15 for SCDOT. The work generated a report, Archaeological Reconnaissance and Intensive Architectural Surveys of US Route 15/Four Hole Swamp Bridge Replacements Project. Four historic sites 0159, 1132, 1133, and 1134 (see Table 9) were noted along US Route 15 within a one-mile radius of our project area, none of which were found eligible for the NRHP or recommended for further work.

#### **5.4.8.4. Surveyed Structures**

A review of the ArcSite on-line database files and records at SCIAA and SCDAH revealed that there are four historic structures within a 1.0-mile radius of the project tract; none were identified within the Bass Drive Tract (see Figure 11, Table 9).

**Table 9. Surveyed Structures within a 1.0 Mile Radius of the Project Tract.**

<b>Site No.</b>	<b>Description</b>	<b>NRHP Status</b>
0159	Unknown Structure	Not Eligible
1132	Unknown Structure	Not Eligible
1133	Unknown Structure	Not Eligible
1134	Unknown Structure	Not Eligible

#### **5.4.8.5. National Register Site**

No National Register Site were found in the Bass Drive Tract or within a 1.0 mile radius.

#### **5.4.8.6. Historic Map Review**

A series of historic maps dating from the nineteenth to the mid-twentieth century were examined to determine the likelihood of historic structures within or adjacent to the project tract. USGS historical topographic maps of Eutawville (1920, 1921, and 1943) indicate that there are no zero structures in the vicinity of or within the project tract. USGS historical topographic maps of Augusta (1954, 1957, 1961, and 1969) indicate that there are zero structures within the project tract; two bridges are shown on the 1957 map and neither of these are of historical significance. All of the USGS historical topographic maps reviewed show the project area as swampland until 1957 (Augusta).

#### **5.4.8.7. Summary**

The background literature review identified no previously recorded archaeological site within a 1.0 mile radius of the Bass Drive Tract. There are no records of Traditional Cultural Properties or National Landmark sites in the vicinity of the project area. There are no Structures or Archaeological sites located within the project area. A general predictive model based on the location of cultural resources indicates a relationship exists between archaeological site location, relative topography, and available water sources.

Prehistoric sites in the Coastal Plains are most often located on well drained low slope areas adjacent to water or on uplands overlooking water (Anderson 1996). Since the project area is located within an area that has historically been inundated swampland and made up of predominantly poorly drained soils, it has a low to medium potential to contain intact archaeological resources. It is unlikely that the proposed mitigation project would affect any previously undisturbed cultural resources. While this research does not satisfy the full requirements for the Section 106 process, which may be required for certain federal permits, it is Amec Foster Wheeler's opinion that the proposed mitigation project is not likely to have an effect on historic properties or cultural resources. No additional archaeological investigations are recommended for the Bass Drive Tract.

#### **5.4.9. Phase I Environmental Assessment**

Amec Foster Wheeler conducted a Phase I Environmental Assessment for the Bass Drive Tract, located along the northwest side of US Highway 15 (Bass Drive), approximately one mile southwest of the intersection of Bunch Ford Road (South Carolina Highway 314) and US Highway 15 (Bass Drive) in Orangeburg County, South Carolina. The Bass Drive Tract consists of one parcel of land designated Orangeburg County Tax Map Number 0314-00-00-001.000 and is approximately 88 acres in size. The Tract currently consists of undeveloped woodlands. The tract was accessed from a gate along US 15, which is situated along the southeastern portion of the tract. The tract is bordered in each direction by undeveloped woodlands with agricultural cropland located further to the northeast of the tract.

The Bass Drive Tract was not identified on the regulatory lists reviewed for this assessment. There are no indications that the past or present uses of the tract have created recognized environmental conditions in relation to the tract or its surroundings.

No facilities were identified on the regulatory lists within the established search radii from the tract. The past and present uses of the immediate surroundings to the tract appear to pose no recognized environmental conditions in relation to the tract or the surrounding properties.

This assessment has revealed no evidence of recognized environmental conditions associated with the subject property.

### **5.5. MITIGATION WORK PLAN**

#### **5.5.1. Bass Drive Tract**

The Bass Drive Tract is located within the Four Hole Swamp watershed and generally lies along the main stem of Four Hole Swamp. The Bass Drive Tract is generally located at N 33.310°, W 80.482°. The proposed mitigation tracts is under an option to purchase agreement by the Palustrine Group. The Bass Drive Tract encompasses approximately 88 acres of protected land and is expected to permanently protect approximately 67 acres of wetlands.

The Bass Drive Tract will be included as part of the Mitigation Project and will be purchased from a private landowner, fee simple, and ownership will be transferred to Audubon South Carolina. No construction activities will take place in the preservation areas.

##### **5.5.1.1. Wetland Preservation**

The entirety of the Bass Drive Tract will be used for habitat conservation. The proposed wetland preservation areas are a mix of high quality bald cypress/tupelo gum swamp forest and pine savanna/flatwood. The total acreage for wetland preservation is approximately 67 acres with the upland buffers on the entire tract.

## **5.6. MAINTENANCE PLAN**

The Bass Drive Tract is expected to include preservation mitigation only for impacts associated with the construction of the I-26 Interchange for the Project Soter Development. Once this PRMP is accepted by the USACE and the property is transferred to Audubon South Carolina, it is expected that any inspections or necessary maintenance by Audubon South Carolina within the Bass Drive Tract will be performed in accordance with the Deed Restrictions.

## **5.7. PERFORMANCE STANDARDS**

This addendum proposes preservation mitigation for impacts associated with the permit modification for the interstate interchange redesign of the Project Soter Development. Performance standards for preservation only mitigation are not required since there are expected be no improvements to the Bass Drive Tract.

## **5.8. MONITORING REQUIREMENTS**

Upon acceptance of this addendum to the Project Soter – Landscape Mitigation Plan by the USACE, Audubon South Carolina and/or its Agents will perform annual inspections of the property until that time when the transfer of the Bass Drive Tract is complete.

The baseline documentation report is included in Appendix E and includes maps of the Bass Drive Tract and photographs that illustrate existing conditions, as well as the results of functional, condition, or other assessments used to generate quantitative or qualitative measures utilized to determine the compensatory mitigation value of the tract.

## **5.9. LONG-TERM MANAGEMENT PLAN**

The Long-Term Management and Maintenance Plan ("LTMP") provides a description of how the mitigation area will be managed to ensure the long-term sustainability of the resource, including the party responsible for long-term management.

### **5.9.1. Ownership of the Bass Drive Tract**

The Bass Drive Tract will be purchased fee simple by the Palustrine Group and eventually transferred to Audubon South Carolina following the acceptance of this addendum to the Mitigation Project by the USACE.

### **5.9.2. Identity of the Long-Term Steward**

Upon successful transfer by Palustrine Group, Audubon South Carolina will be the Long-Term Steward of the Bass Drive Tract and the property will be managed in accordance with the deed restrictions. The Long-Term Steward Contact information is provided below.

**Table 10. Long-Term Steward Contact Information**

<b>Property</b>	<b>Long-Term Steward</b>	<b>Contact Name</b>	<b>Phone</b>	<b>Address</b>
Bass Drive Tract	Audubon Society	Mike Dawson	(843) 462-2150	336 Sanctuary Road Harleyville, SC 29448

### **5.9.3. Identification of Long-Term Management Activities**

Long-term management activities for the Bass Drive Tract will be carried out under Audubon South Carolina's management plan for the Francis Beidler Forest.

### **5.9.4. Enforcement**

Enforcement shall be defined in the Deed Restrictions.

### **5.9.5. Long-Term Management Funding Mechanism**

Funds for long-term maintenance of the Bass Drive Tract will be provided in an amount \$75,000 to Audubon South Carolina at the time of property transfer.

## **5.10. ADAPTIVE MANAGEMENT PLAN**

Adaptive management plans for the Bass Drive Tract will be carried out under Audubon's management plan for the Francis Beidler Forest. If all or part of the Protected Property is taken in the exercise of eminent domain so as to substantially abrogate the use restrictions and protections imposed by the Agreement, Audubon South Carolina shall initiate appropriate actions at the time of such taking to recover the full value of the taking, and all incidental and direct damages due to the taking, including but not limited to alternative compensatory mitigation that is acceptable to the USACE and conforms with the requirements of 33 C.F.R. § 332.7(a)(3) and (4).

## **5.11. FINANCIAL ASSURANCES**

A performance bond in the amount of \$1,500,000 was provided to the USACE as Obligee on July 29, 2015 as part of the Project Soter – Landscape Mitigation plan. The Bass Drive Tract is expected to include preservation mitigation only for the additional impacts associated with the Project Soter Development as described in Modification Request No. 4 dated August 11, 2016. Since no restoration or enhancement work is proposed for the Bass Drive Tract, the Applicant request that no additional performance bonds, construction bonds, or monitoring phase bonds be necessary to ensure the success of this addendum to the Mitigation Project.

## 6. REFERENCES

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## **APPENDIX A - FIGURES**



## **APPENDIX B – DRAFT PROTECTION AGREEMENT**

## **APPENDIX C – PHOTO LOG**

## **APPENDIX D – JURISDICTIONAL DETERMINATION REQUEST**

## **APPENDIX E – BASELINE CONDITIONS REPORT**

## **APPENDIX F – PHASE I ENVIRONMENTAL REPORT**