# Appendix I

# Final Mitigation Plan for Gunter's Island

# I-73 Compensatory Mitigation Plan

## Dillon, Horry, Marion and Marlboro Counties, SC

## SAC 2008-1333-DIS

SUBMITTED TO:
U.S. Army Corps of Engineers, Charleston District
U.S. Environmental Protection Agency, Region 4
U.S. Fish and Wildlife Service, Charleston Ecological Services
National Oceanic and Atmospheric Administration, National Marine Fisheries Service
U.S. Department of Agriculture, Natural Resource Conservation Service
S.C. Department of Natural Resources
S.C. Department of Health and Environmental Control

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SCDOT

Executive Summary

I-73 Compensatory Mitigation Plan

South Carolina Department of Transportation (SCDOT) has been diligent to develop a new major interstate project, Interstate 73, which considers both the human and natural environment. To the maximum extent practicable, avoidance and minimization has been incorporated into the development of the project. Through evaluation, coordination, and collaboration with State and federal partner agencies, SCDOT presents this mitigation plan, which fully compensates for the necessary adverse impacts resulting from the construction of Interstate 73.

In an effort to propose the best option available, SCDOT evaluated many different options for mitigation for this large scale highway project and its impacts. As such, the large scale watershed approach to mitigation was determined to be the most reasonable, feasible, and economical method to ensure the project continues to construction authorization while still considering its impacts to the landscape.

On December 3, 2015 the SCDOT Commission unanimously approved the purchase and use of the property known as Gunter's Island for mitigation of the environmental impacts associated with the construction of I-73. Ecological and other attributes of the Interstate 73 mitigation plan include but are not limited to the following:

- Gunter's Island consists of 6,258 acres on the Little Pee Dee River in Horry County.
- 74% of the wetland and 78% of the stream impacts from I-73 occur in Horry County and within the same Little Pee Dee Watershed as Gunter's Island. There is approximately a 13:1 preservation ratio of wetland (acres) protected versus those impacted and approximately a 19:1 preservation ratio of stream (feet) protected versus impacted
- Gunter's Island will become a Department of Natural Resources (DNR) Heritage Preserve (HP), meaning DNR would serve as the property owner and long-term steward, providing public access and recreational opportunities.
- Gunter's Island provides connectivity with other protected lands. Gunter's Island is located in proximity to a majority of the Little Pee Dee River HP. It is directly adjacent to the Little Pee Dee HP Johnson Tract (approximately 200 acres) to the south. Gunter's Island is also located

just upstream along the Little Pee Dee River from Woodbury Wildlife Management Area (WMA).

- With additional protected corridors along the Little Pee Dee River, the conservation community anticipates the preservation of Gunter's Island to provide a focal point of additional growth in conservation efforts between the Little Pee Dee HP, Gunter's Island, and Woodbury WMA.
- Preservation of Gunter's Island protects 89,836 linear feet of stream including, 11 miles of river frontage along the Little Pee Dee River, and 4,618.5 acres of wetlands. Gunter's Island contains 12 identified ox-bow lakes along with numerous other ancient ox-bow channels, and several different categories of wetland type which all provide diversity in aquatic habitats and ecosystems.
- Preservation of Gunter's Island addresses identified watershed needs for protection against threats such as habitat fragmentation, development, silviculture, mining, and hydrological modification by preserving a large contiguous property with intact resources under threat of development.
- Gunter's Island is identified as a high priority tract within the Little Pee Dee-Lumber Focus Area of South Carolina by the South Carolina Department of Natural Resources and other conservation groups.
- Preservation of Gunter's Island safeguards a U.S. Environmental Protection Agency classified Aquatic Resource of National Importance and South Carolina Department of Health and Environmental Control outstanding water resource, the Little Pee Dee River.

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# 1.0 Introduction

South Carolina Department of Transportation (SCDOT), in association with the Federal Highway Administration (FHWA), proposes to construct Interstate 73 (I-73) on new alignment in eastern South Carolina. The I-73 corridor runs through four counties (Dillon, Horry, Marion, and Marlboro) in the northeastern section of South Carolina (Figures 1). The corridor runs for approximately 75 miles from the border with North Carolina just north of Bennettsville in Marlboro county (34.792260, -79.0660296), south of the town of Dillon and north of the town of Marion to intersect with SC 22 just north of the City of Conway in Horry County (33.940903, -79.062486). I-73 is located within the Pee Dee River Basin and three Pee Dee River Basin sub-basins: the Middle Pee Dee River, Little Pee Dee River, and Waccamaw River, Hydrologic Unit Codes (HUC) 03040201, 03040204, and 03040206, respectively (Figure 2). I-73 falls within two EPA Level III Ecoregions Southeastern Plains and Middle Atlantic Coastal Plains (Figure 2).

The potential effects of I-73 were documented in two Environmental Impact Statements (EISs), one covering the area from Hamlet, North Carolina to I-95, and the other from I-95 to U.S. 17. The documents were prepared in collaboration with cooperating state and federal agencies including the National Oceanic and Atmospheric Administration (NOAA), South Carolina Department of Natural Resources (SCDNR), Natural Resources Conservation Service (NRCS), S.C. Department of Archives and History (SCDAH), S.C. Department of Health and Environmental Control (SCDHEC), S.C. Department of Commerce (SCDOC), S.C. Department of Parks, Recreation and Tourism (SCPRT), United States Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), and U.S. Environmental Protection Agency (USEPA). This working group is referred to as the Agency Coordination Team (ACT). Although two EIS documents were prepared for I-73, it was decided that a single Section 404 permit would be sought for the entire length of I-73 in South Carolina. A detailed project description for I-73, including all proposed alternatives, can be found in the Final Environmental Impact Statement (FEIS) located on the SCDOT website (www.i73insc.com).

As prescribed in Section 404(b)(1) Guidelines of the Clean Water Act (40 CFR 230), SCDOT provided details regarding avoidance and minimization measures to limit direct impacts, including evaluation of alternatives, in Chapter 2 of the FEISs and in the Section 404 permit application (SAC 2008-1333-DIS). Avoidance and minimization measures incorporated into the design include the use of 2:1 fill slopes where practicable to reduce the impact footprint, the use of bridges rather than box

culverts where feasible, and a commitment to using best management practices (BMPs) during construction to avoid non-permitted impacts to adjacent wetlands and streams. However, direct impacts to waters of the United States, approximately 4,643 linear feet of stream and 342.3 acres of wetlands, are still proposed after full incorporation of avoidance and minimization measures (Figure 3). Details on the unavoidable direct impacts proposed with this application are provided in Chapter 3 of the FEISs and in the Section 404 Individual Permit Application submitted to the USACE on June 22, 2016.

## 2.0 Existing Mitigation Banks

A review of available mitigation banks and existing credits revealed three commercial mitigation banks that service only a portion of the I-73 project site. These banks are Waccamaw, Vandross Bay, and Carter Stilley banks. No single bank contains enough credits to appropriately mitigate the proposed impacts. Even if credits were purchased from multiple banks, the credits could only be applied to those impacts within their respective service areas which would not fully meet the mitigation needs for I-73. SCDOT also considered debiting acres from the SCDOT owned Black River Mitigation Bank; however, this bank did not have sufficient acres available to meet the mitigation requirements for I-73.

Prior to and during the EIS/permitting process, SCDOT considered watershed needs and decided to develop a Permittee Responsible Mitigation Plan. The Middle Pee-Dee River, Little Pee-Dee River, and Waccamaw River watersheds were evaluated by SCDOT in conjunction with the resource and regulatory agencies for mitigation opportunities that could provide environmental benefits on a watershed and regional scale appropriate for the I-73 project.

The 2008 Mitigation Rule, 33 C.F.R.Parts 325 and 332 and 40 C.F.R.Part 230, directs the District Engineer (DE) to consider what would be "practical ...capable[,]... and environmentally preferable" when evaluating compensatory mitigation options (33 C.F.R.§ 332.3 (a)(l)). The Rule establishes the following hierarchy/preference for mitigation:

1. Mitigation Bank Credits
2. In-Lieu- Fee Program Credits
3. Permittee Responsible Mitigation (PRM)

Notwithstanding this preference, the Rule also provides that "[w]here permitted impacts are not in the service area of an approved mitigation bank or in-lieu-fee program that has the appropriate number and resource type of credits available, permittee responsible mitigation is the only option" (33 C.F.R. § 332.3(b)(4)) .

## 3.0 Watershed Approach

A watershed approach as defined by the US Army Corps of Engineers Charleston District (USACE) in "Guidelines for Preparing a Compensatory Mitigation Plan, 2010":

> "Watershed approach means an analytical process for making compensatory mitigation decisions that support the sustainability or improvement of aquatic resources in a watershed. It involves Consideration of watershed needs, and how locations and types of compensatory mitigation projects address those needs. A landscape perspective is used to identify the types and locations of compensatory mitigation projects that will benefit the watershed and offset losses of aquatic resource functions and services caused by activities authorized by DA permits. The watershed approach may involve consideration of landscape scale, historic and potential aquatic resource conditions, past and projected aquatic resource impacts in the watershed, and terrestrial connections between aquatic resources when determining compensatory mitigation requirements for DA permits."

The goal of a watershed approach is to maintain and improve the quantity of aquatic resources through the strategic selection of compensatory mitigation sites. The selection of the Gunter's Island tract (Figure 3) is a large-scale mitigation opportunity with regional importance based on a watershed approach to promote water quality and protect aquatic resources in accordance with the 2008 Mitigation Rule (33 CFR Parts 325 and 332, 40 CFR Part 230). Watershed factors that were considered through the watershed approach are discussed in further detail in the sections below. Gunter's Island is located in the Little Pee Dee watershed, and within the Middle Atlantic Coastal Plain Level III Ecoregion (Figure 4), where 74% of the wetland impacts and 78% of the stream impacts for the proposed project.

## 3.1 Watershed Descriptions

### 3.1.1 Sub-basins

The impact site is located within the Pee Dee River basin (030402) and three sub basins: Lower Pee Dee River (*03040201)*, Little Pee Dee River (*03040204)*and Waccamaw River *(03040206)* (Figure 2).

#### *3.1.1.1 Lower Pee Dee River Sub-basin (8-Digit HUC 03040201)*

The Lower Pee Dee River watershed extends from the North Carolina border southeast to Winyah Bay, encompassing approximately 2,350 square miles within 8 South Carolina counties, most of Chesterfield, Darlington, Florence and Marlboro Counties and approximately half of Georgetown and Williamsburg Counties. The sub-basin comprises 7.8% of South Carolina's land area. A majority of the watershed is rural with major population centers in Florence, Bennettsville, Darlington, Marion, Hartsville and Cheraw. Offstream water use totaled 355,129 million gallons, ranking it second among the 15 sub-basins in the state, with 97% from surface water and 3% from ground water. Thermoelectric power (Progress Energy's H.B. Robinson electrical generating station) accounts for 83% of water use within the watershed which is the second highest water use for thermoelectric power generation in nine of the State's fifteen sub-basins. The next greatest users of water in the sub-basin were industry at 10%, which is the highest overall industrial water use in the state, and water supply at 6%. All waterbodies within this sub-basin are classified as "Freshwater," except for Winyah Bay, by SCDHEC, meaning they are suitable for aquatic life, recreation, drinking water, fishing, industry and agriculture.

#### *3.1.1.2 Little Pee Dee River Sub-basin (8-Digit HUC 03040204)*

This sub-basin is in the northeastern part of the Pee Dee region with the North Carolina state line as its eastern border. It encompasses part of four counties: Dillon, Marion, Horry and Marlboro covering 1,100 square miles and 3.5% of the State's land area. The majority of this sub-basin is rural with the major urban areas to the east in the Waccamaw sub-basin that includes both Conway on the Little Pee Dee sub-basin's eastern boundary and Bennettsville to the northwest. The major population centers within the sub-basin are Dillon and Mullins. Offstream water use totaled 2,487 million gallons, ranking it fourteenth among the 15 sub-basins in the state, with 98% from ground water and 2% from surface water. Water-supply use accounted for almost 95% of the total water use, followed by industry (3%), golf course use (2%) and irrigation (1%). Most of the water bodies within the Little Pee Dee River sub-basin are designated as "Freshwater," however, a part of the

Little Pee Dee River and Cedar Creek are designated by SCDHEC as "Outstanding Resource Waters," meaning that these freshwater streams provide outstanding recreational or ecological resources and are suitable for drinking water with minimal treatment. 74% of the wetland impacts and 78% of the stream impacts occur within the Little Pee Dee River sub-basin.

#### *3.1.1.3 Waccamaw River Sub-basin (8-Digit HUC 03040206)*

The Waccamaw River sub-basin runs parallel to the coast on the easternmost part of the State and to the north of the basin along the North Carolina border for 30 miles including all of Winyah Bay and the City of Georgetown. Most of Horry County, including the infamous Grand Strand, and part of Georgetown are encompassed in the sub-basin. The sub-basin is about 995 square miles and 3.2% of the State's land area. This is a rapidly expanding area of the state with population projections to increase 30% from 2000 to 2020 in Horry County and Georgetown to increase 19%; this does not include the potential increase in the transient population throughout the tourist season. A majority of this sub-basin is urban with major population centers in Myrtle Beach, Conway and Georgetown. Offstream water use totaled 67,039 million gallons, ranking it eighth among the 15 sub-basins, with 97% from surface water and 3% from ground water. Thermoelectric power production (Santee Cooper's Grainger and Winyah electrical generating stations) accounts for 73%, followed by water supply (13%) and golf courses (7%), which account for more than 1/3 of the statewide golf course water use. Most of the waterbodies within the Waccamaw sub-basin are classified by SCDHEC as "Freshwater," with a few exceptions. Parts of Little River and the Atlantic Intracoastal Waterway and its tributaries (from the crossing of SC 9 to the North Carolina Line) are designated "Tidal Saltwater Class SA," meaning these areas are suitable for indigenous aquatic communities of marine life and average dissolved oxygen level should be at a minimum 5.0 mg/L (milligrams per liter), and no less than 4.0 mg/L. This water is not protected for harvesting clams, mussels or oysters for marketing purposes or human consumption. Winyah Bay and the Sampit River are "Tidal Saltwater Class SB," meaning the same as "Tidal Saltwater Class SA," except the dissolved oxygen averages should be above 4.0 mg/L.

## 3.2 Land Use and Potential for Growth

For the Little and Lower Pee Dee River watersheds, the urban land percentage is comprised chiefly in the Cities of Florence, Darlington, Bennettsville and Dillon. The Waccamaw River watershed's urban land percentage is comprised chiefly in the Cities of Conway, Georgetown, Myrtle Beach and

North Myrtle Beach. Table 1 below provides an overview of the Land Use for the proposed impacts according to the SCDHEC Watershed Assessment.

**Table 1: Land Use**

| **Land Use** | **% Coverage within the Pee Dee River Basin** |
|---|---|
| Agricultural Land | 33.4 |
| Barren Land | 0.2 |
| Forested Land | 25.7 |
| Forested Wetland (Swamp) | 27.9 |
| Non-Forested Wetland (Marsh) | 1.2 |
| Scrub/shrub Land | 2.7 |
| Urban Land | 6.3 |
| Water | 2.6 |
| **Total Acreage in Basin** | **2.5 million** |
| **Land Use** | **% Coverage within the Waccamaw River Basin** |
| Agricultural Land | 26.5 |
| Barren Land | 0.2 |
| Forested Land | 19.2 |
| Forested Wetland (Swamp) | 36.9 |
| Non-Forested Wetland (Marsh) | 2.2 |
| Scrub/shrub Land | 2.8 |
| Urban Land | 10.5 |
| Water | 1.7 |
| **Total Acreage in Basin** | **500,000** |

According to the Second Edition of the SC State Water Assessment, prepared by SCDNR, the table below provides the expected population increases for each of the sub-basins: the Middle Pee Dee River, Little Pee Dee River and the Waccamaw River watersheds. Within the Middle Pee Dee sub-basin, the counties expected to exhibit the largest population increases from 2000 to 2020 include Georgetown (27%) and Florence (12%). In both the Little Pee Dee and Waccamaw sub-basins, both estimates of growth were in Horry County at 19% and 26%, respectively (Table 2).

**Table 2: Estimated Population Growth**

| Sub-basin | 2000 Population estimate | 2020 Population Estimate | % Increase |
|---|---|---|---|
| **Lower Pee Dee** | 227,200 | 271,000 | 19 |
| **Little Pee Dee** | 75,500 | 86,000 | 13 |
| **Waccamaw** | 206,700 | 261,000 | 26 |

## 3.3 Watershed Needs and Threats

The SCDHEC Watershed Water Quality Assessment for the Pee Dee River Basin was used to identify the watershed's needs and threats. This report calls out nine activities or conditions that pose a threat to water quality. These include agriculture, silviculture, urban areas, marinas and recreational boating, mining, hydro-modification (stream channelization, channel modification, and dam construction), wetland loss, land disposal (landfills), and groundwater contamination. The I-73 corridor is located predominantly in undeveloped areas where activities that threaten water quality are mainly agriculture, silviculture, and hydro-modification. These activities negatively impact aquatic habitat by increasing silt and sediment loads, introducing excessive nutrients and contaminants, alter water quality due to irrigation, and instream habitat loss due to stream sand mining.

Wetlands and streams within the four-county I-73 study area have been severely impacted by historic and ongoing agricultural and silvicultural activities. This is especially true of the streams identified within the construction footprint of the I-73 project. The most prevalent impacts to streams observed within the project study area consist of channelization/straightening of streams and disconnection from their floodplains. Nearly 98.5 percent of the stream impacts and 89.1 percent of the wetland impacts associated with the I-73 project occur along the proposed alignment south of I-95; therefore, the southern portion of the project study area was targeted for mitigation.

## 3.4 Water Quality Issues and Needs

As a part of SCDHEC's Watershed Water-Quality Assessment program, 29 surface-water sites were sampled in the Little Pee Dee River sub-basin in 2003 in order to assess the water's suitability for aquatic life and recreational use. Aquatic-life uses were fully supported at 21 sites, or 72% of the

water bodies sampled in this sub-basin; most of the impaired water exhibited dissolved oxygen levels below the concentrations needed to support aquatic life. Recreational use was fully supported in 78% of the sampled water bodies; the water bodies that did not support recreational use exhibited high levels of fecal-coliform bacteria (Table 3).

**Table 3: Little Pee Dee Impaired Waters**

| Water Body Name | Station Number | Use | Status | Water Quality Indicator |
|---|---|---|---|---|
| **Bear Swamp** | PD-368 | Aquatic Life | Nonsupporting | Dissolved oxygen |
| **Little Pee Dee River** | PD-365 | Aquatic Life | Nonsupporting | pH |
| **Buck Swamp** | PD-031 | Recreation | Partially supporting | Fecal coliform |
| **Little Pee Dee River** | PD-029E | Recreation | Partially supporting | Fecal coliform |
| | PD-030A | Aquatic Life | Nonsupporting | Dissolved oxygen |
| | | Recreation | Partially supporting | Fecal coliform |
| | PD-348 | Aquatic Life | Nonsupporting | pH |
| | PD-052 | Aquatic Life | Partially supporting | Copper |
| **Maple Swamp** | PD-030 | Recreation | Partially supporting | Fecal coliform |
| **Loosing Swamp** | RS-03513 | Aquatic Life | Nonsupporting | Dissolved oxygen |
| **Chinners Swamp** | PD-352 | Recreation | Partially supporting | Fecal coliform |
| **White Oak Creek** | PD-037 | Aquatic Life | Partially supporting | Dissolved oxygen |
| | | Recreation | Partially supporting | Fecal coliform |
| **Little Pee Dee River** | PD042 | Aquatic Life | Nonsupporting | Dissolved oxygen and pH |

The five TMDLs are found at the following: one at the Little Pee Dee River at state road S-17-23, one at Maple Swamp at SC Highway 57, one at the Little Pee Dee River below the junction with Maple Swamp, one at White Oak Creek at state road S-34-31and one at Chinners Swamp at Gunter's Island Road off of state road S-26-99 all due to fecal coliform. SCDHEC has assigned fish consumption advisories on the Little Pee Dee due to high mercury levels

For more detail on the sites listed as a part of SCDHEC's Watershed-Water Quality Assessment, visit http://gis.dhec.sc.gov/watersheds/

## 4.0 Proposed Compensatory Mitigation Plan

The purpose of the I-73 Compensatory Mitigation Plan is to provide compensatory mitigation for the impacts of 4,643 linear feet of stream and 342.3 acres of wetlands associated with the construction of I-73. As mitigation banks could not provide adequate compensation and in the absence of in-lieu fee opportunities in South Carolina, permittee responsible mitigation (PRM) is the only feasible option for compensatory mitigation.

As specified in 33 C.F.R. § 332.3 (f) of the Rule, the DE must be satisfied that the type and amount of mitigation provided will compensate for project impacts. This plan demonstrates that the mitigation offered through the preservation of Gunter's Island compensates for impacts resulting from the I-73 in a ratio of approximately 13:1 for wetland acreage and 19:1 for stream feet, and by virtue of the aquatic, cultural, historic, and regionally significant resources that are included.

| | I-73 Impacts | Gunter's Island Preservation | Ratio |
|---|---|---|---|
| **Stream** | 4,643 linear feet | 89,836 linear feet | 1:19 |
| **Wetland** | 342.3 acres | 4,618.5 acres | 1:13 |

The preservation and protection of the Gunter's Island site is consistent with the criteria outlined in the Rule listed below that would allow mitigation through preservation in the sound discretion of the DE (33 C.F.R. § 332.3(f)):

- Resources to be preserved provide important physical, chemical and biological functions and contribute significantly to the ecological sustainability of the watershed;
- The DE determines preservation is appropriate and practicable;
- Resources to be preserved are under threat of destruction or adverse modification; and
- The proposed preservation sites will be permanently protected by third party conservation easement or title transfer to a state resource agency or land trust.

The Rule also authorizes the DE to accept off-site mitigation opportunities, including those in adjacent watersheds that have a "greater likelihood of offsetting project impacts" or are "environmentally preferable" (33 C.F.R. § 332.3(b)(6)). SCDOT proposes in this document off-site,

in-kind and in-watershed mitigation accomplished through the preservation of outstanding aquatic resources. Additionally, the Rule provides that preservation alone may compensate for permitted impacts to aquatic resources "where preservation has been identified as high priority using the watershed approach ..."(33 C.F.R. § 332.3(h)(2)). In determining the suitability of a mitigation site, the DE is to consider a number of factors described at 332.3(d), including, "local or regional goals for restoration or protection of particular habitat types or functions."

The I-73 Compensatory Mitigation plan is consistent with these criteria. The use of a watershed approach, consideration of local and regional goals, the coordination and consultation process that SCDOT conducted with state and federal agencies provided direction to find a site that is regionally significant and especially warrants the protection that the I-73 mitigation plan provides. Additionally; Gunter's Island helps satisfy many of the development stressors identified in the SCDHEC Watershed Assessment and SCDNR Little Pee Dee - Lumber Focus Area Plan by removing the developmental rights on 6,258 acres of property along the Little Pee Dee River.

## 4.1 Goals and Objectives

The goal of this mitigation plan is to provide documentation that the preservation and protection of Gunter's Island meets the criteria for mitigation through preservation as specified in 33 C.F.R. § 332.3 (f) of the Rule. To meet this goal, mitigation will be accomplished by preserving the entirety of Gunter's Island, 6,258 acres, which includes 89,836 linear feet of stream and 4,618.5 acres of wetlands (Figures 6 and 7). In consultation with SCDNR, SCDOT identified the acquisition of the 6,258 acre Gunter's Island Tract to offset in excess the impacts to waters of the United States by preserving approximately nineteen times greater the amount of stream and approximately thirteen times the wetlands to be impacted, with the preservation of 89,836 linear feet of stream and 4,618.5 acres of wetlands.

These waters, including the Little Pee Dee River, are designated as Outstanding Resource Waters by the state of South Carolina. The Little Pee Dee was also designated by the USEPA as an Aquatic Resource of National Importance. The 89,836 linear feet of stream, including 11 miles of waterfront on the Little Pee Dee River, contribute to one of the most ecologically significant drainages in South Carolina. Numerous oxbow lakes dot the landscape comprising approximately 20 acres of open water. The Gunter's Island site also includes an intact 85-acre Carolina Bay, located in the northeastern section of the property. Gunter's Island contains aquatic resources including

approximately 4,563.1 acres of forested wetland, 55.4 acres of emergent wetland, and 31.4 acres of open water.

An abundance of aquatic resources, diversity of resource types and habitat, high scoring functional streams and wetlands, mature vegetation, and designated Outstanding Resource Waters are all located within the Gunter's Island site. All of these characteristics in one contiguous site create an ideal opportunity for preservation of these valuable resources. The preservation of Gunter's Island meets the needs identified within the watershed and will eliminate the threats posed by silviculture, mining, hydro-modification (stream channelization, channel modification, and dam construction), and wetland loss.

In addition to the entire preservation of the tract, including all wetlands and streams, this plan also includes restoration and enhancement through the removal of six (6) culverts and associated roadway fill through wetland areas. The purpose of the restoration and enhancement activities is to allow for more natural flow patterns and allow approximately 2.2 acres of previously filled wetlands to return to a functional wetland state.

This PRM accomplishes in-kind mitigation by protecting similar wetland and stream resources to the impacted resources. The preservation, enhancement, and protection of Gunter's Island is a large-scale mitigation opportunity with regional importance based on a watershed approach to protect aquatic resources in accordance with the 2008 Mitigation Rule (33 CFR Parts 325 and 332, 40 CFR Part 230).

## 4.2 Site Selection

In an effort to promote the environmental stewardship in transportation projects and expedite environmental review of high-priority transportation infrastructure (Executive Order 13274, 2002), the FHWA and SCDOT formed the ACT on July 30, 2004. The ACT was a group of representatives from state and federal cooperating agencies that provided input and helped make project decisions including those that pertained to wetland and stream impacts and the associated mitigation approach. Mitigation was a focus at several ACT meetings and additional meetings were conducted to specifically address mitigation (see Chapter 4.2 of the FEISs for a summary of the ACT meetings). The importance of in-kind mitigation and mitigation within the same watershed, the proximity of the mitigation site to the impact site, and the type of protection the site will receive were all emphasized.

Construction of I-73 will result in approximately 342.3 acres of wetland fill and 4,643 linear feet of stream impacts. Coordination with the affected communities, various agencies and NGO's during this process has resulted in identification and development of this mitigation plan that fully and adequately compensates for all unavoidable impacts.

The linear position of the I-73 project corridor presented challenges to the selection of a mitigation site. The corridor crosses three 8 digit HUC watersheds and two EPA level III ecoregions. In order to meet regulatory requirements and ACT recommendations, the search for an appropriate mitigation site was focused on the 8-digit watershed and ecoregion where the majority of I-73 impacts would occur. Several sites that met these criteria were identified through coordination with SCDNR. During the selection process, SCDOT also had to consider the cost and availability of the site. SCDOT does not have the ability to use the condemnation process for mitigation purposes, and is required to purchase the site from a willing seller.

Gunter's Island was selected as the I-73 mitigation site because the large scale mitigation site was consistent with ACT recommendations, met the requirements for a watershed approach, reduced the stressors of development called out in the SCDHEC Watershed Assessment and SCDNR Little Pee Dee-Lumber Focus Area Plan, was economically feasible for SCDOT, and was available for purchase from a willing seller. The site will provide similar ecological resources as those impacted by the I-73 project, are located in the same ecoregion as the majority of the I-73 impacts, and are in the same 8 digit HUC watershed as the majority of the impacted resources.

### 4.2.1 Ecological Suitability

Wetland and stream resources such as those preserved, restored, and enhanced by the I-73 Compensatory Mitigation Plan provide many important physical, chemical, and biological functions. The relatively undisturbed aquatic resources located on Gunter's Island contribute significantly to the Little Pee Dee watershed by providing these functions. The Little Pee Dee watershed is under threat from various activities such as mining, silviculture, and hydrologic modification. Environmental stressors have degraded water quality in some portions of the watershed and there are several impaired water quality monitoring stations (Table 3). Although the preservation of Gunter's Island alone will not correct all of the impairment issues observed within the watershed, the functions

provided by the aquatic resources located on Gunter's Island will contribute to the ecological sustainability of the watershed by removing some threats from future pollution sources.

Some of the physical functions of the streams and wetlands on Gunter's Island include flow maintenance, retention of stormwater runoff, and reduction of sedimentation from adjacent silviculture and agriculture activities. The landscape position of Gunter's Island will provide high volume storage of flood waters. The high organic content within the soil types found in the Gunter's Island wetlands will provide surface water retention and slow discharge back into the water table.

A high percentage of land use in the Little Pee Dee watershed is agricultural. Agricultural runoff is a common source of nutrient loading that can contribute to low dissolved oxygen (DO) levels in rivers and streams. Several water quality monitoring stations on the Little Pee Dee River (as shown in Table 3) are impaired for DO. The natural streams and wetlands on Gunter's Island provide nutrient removal from upstream agricultural runoff. Additionally, the resources contribute by reducing nitrogen and phosphorous loading, thus preventing oxygen depletion that may result from eutrophication. The protection of the fully functioning wetlands and stream riparian areas found on Gunter's Island contributes to ecological sustainability within the watershed by preserving these important chemical functions. Protection of the site will also prevent the threat from future land use activities, such as agriculture, that could increase DO impairment.

One of the primary threats to the watershed identified in the SCDNR Little Pee Dee-Lumber Focus area plan is habitat fragmentation via land conversion. Protection of the Gunter's Island tract will reduce some of the negative influence of habitat fragmentation on the ecosystem by providing important biological functions. The wetlands preserved as a component of this mitigation plan will provide wildlife habitat and spawning areas for various fish, reptiles, amphibians, birds, and mammals. The tract provides foraging habitat and shelter for various indigenous wildlife species, including wetland dependent species. Gunter's Island and other conservation tracts located in close proximity provide large undisturbed areas which serve as habitat and travel corridors for many species. The Pee Dee-Lumber Focus Area Plan is included in Appendix G.

### 4.2.2 Watershed-scale features

The Gunter's Island site is within SCDNR's Little Pee Dee-Lumber Focus area plan (Figure 9) that encompasses the Lumber and Little Pee Dee Rivers, from the North Carolina-South Carolina state line, southwest to U.S. Hwy 378. The focus area concept encourages conservation on a landscape-scale with the use of partnerships between federal and state land managers and private landowners through voluntary conservation easements. Together, these land protection actions preserve ecologically sensitive areas and enhance the existing outstanding, natural, cultural and recreational resources that surround the rivers within the focus area.

The preservation of Gunter's Island provides an ideal opportunity to pursue landscape-scale, ecologically meaningful stream and wetland mitigation. Gunter's Island encompasses a large tract of contiguous acreage on the floodplain of the Little Pee Dee River and is a contributor to the Great Pee Dee River, located less than 10 miles south southeast of the site. Fourteen miles of the lower Little Pee Dee River from Highway 378 to the confluence with the Great Pee Dee River were designated as a State Scenic River in March of 1990 by the SC Legislature. Immediately upstream of Highway 378, an additional 64-mile section of the Little Pee Dee River was determined eligible for scenic river status in 1997 but was never officially designated. Further upstream, the Little Pee Dee in Dillon County (a 48-mile section) was designated a Scenic River in 2005. The Little Pee Dee River is designated as an Outstanding Water Resource (ORW) by SCDHEC, and an Aquatic Resource of National Importance (ARNI) by the USEPA.

The southern end of the Gunter's Island tract is adjacent to the 200 acre Johnson tract of the Little Pee Dee Heritage Preserve and the northern boundary of Gunter's Island lies approximately 3 miles south of the majority of the Little Pee Dee Heritage Preserve/Wildlife Management Area that protects over 10,406 acres along the Little Pee Dee and its floodplain (Figure 10). Just to the south and across the Little Pee Dee River, Gunter's Island connects with the 25,924 acres of the Woodbury Wildlife Management Area.

The connectivity of these habitats to the Site will not only provide an opportunity for wildlife and plant communities to flourish, but will promote further conservation efforts within the Little Pee Dee-Lumber Focus area plan by state agencies, land protection organizations, and private landowners. The preservation of Gunter's Island will generate a large-scale preservation and conservation corridor along the Little Pee Dee River which meets the goals of the impacted

watersheds by reducing habitat fragmentation, eliminating risk from of development, minimizing potential for wetland loss, and hydro-modifications.

Gunter's Island contains millions of dollars of timber value and there is a known plan for potential mining opportunities on the site and a plan for parceling out the property into smaller tracts for development as well. With all of these activities potential hydro-modifications and wetland loss are realistic possibilities. Additional concerns would be habitat fragmentation and loss as well as land use changes. All of these actions are listed as known threats of the impacted watersheds and the Pee Dee-Lumber Focus Area Plan.

Following the approval of the Permittee-Responsible Mitigation Plan, the Gunter's Island Tract will be transferred to the SCDNR Heritage Trust Program, upon approval by the Heritage Trust Advisory Board. SCDNR will manage the property with traditional management practices similar to those utilized in both the Little Pee Dee Heritage Preserve and the Woodbury Wildlife Management Area.

### 4.2.3 Size and Location

The Gunter's Island Tract is located in western Horry County on the border with Marion County along the Little Pee Dee River. The site is situated west of the Town of Conway just north of US 378, east of SC 908, and west of Pee Dee Road near Jordanville, SC (Figure 3). Gunter's Island is located 25 miles from the SC/NC state line along the Little Pee Dee River.

Gunter's Island encompasses a large tract of contiguous acreage on the floodplain of the Little Pee Dee River and is a contributor to the Great Pee Dee River, located less than 10 miles south southeast of the site. The Gunter's Island Tract is a single parcel (28700000001) containing 6,258 deeded acres (Figure 5). The tract is located in the Middle Atlantic Coastal Plain EPA Level III ecoregion and the Little Pee Dee River watershed where 74 percent of the wetland impacts and 78 percent of the stream impacts occur (HUC 03040204) (Figure 4).

### 4.2.4 Compatibility with Adjacent Land Uses and Watershed Management Plans

The goal to use landscape scale mitigation is consistent with needs of the Pee Dee-Lumber Focus Area Plan and the Horry County Comprehensive Plan which emphasizes the need for large,

undisturbed tracts with various habitat types to support the diversity of wildlife and plant communities.

### 4.2.5 Anticipated Ecological Benefit

Ecological benefits provided by the Gunter's Island mitigation site are listed below.

- Protects aquatic resources by preserving removing the threat of impact to all streams (89,836 linear feet) and wetland features (4,618.5 acres).
- Restores 2.2 acres of wetlands through the removal of culverts and fill associated with roads crossing wetlands.
- Enhances 18.6 acres of wetlands by improving hydrologic connectivity.
- Protects an intact Carolina Bay.
- Provides additional habitat connectivity along the Little Pee Dee River in the Little Pee Dee-Lumber Focus Area.
- Provides additional habitat connectivity for state protected lands as a portion of Gunter's Island is upstream and across the Great Pee Dee River from Woodbury Wildlife Management Area, another portion adjacent to the 200 acre Johnson tract of the Little Pee Dee Heritage Preserve and approximately 3 miles south of the remaining acreage of the Little Pee Dee Heritage Preserve.
- Protects 11 miles of river frontage along the Little Pee Dee River.

### 4.2.6 Cultural Resources

Based on GIS data from the State Historic Preservation Office (SHPO), the Gunter's Island Tract contains a single point located at Hughes Landing that was deemed ineligible for listing on the National Register of Historic Places (NRHP). Several other structures located near the site are considered to be contributing to an eligible district, but not on the NRHP.

Due to the position on the landscape and the history of the area, it is likely other cultural resources, yet to be identified, are present. Consultation under Section 106 of the National Historic Preservation Act of 1966 (as amended) will occur with the (SHPO) and Catawba Indian Nation Tribal Historic Preservation Office (THPO). In areas where wetland or stream enhancement will take place, a

qualified archaeologist will conduct a survey to evaluate cultural resources within the Area of Potential Effect within the Site. The surveys will be performed prior to any ground-disturbing restoration or enhancement activities.

### 4.2.7 Protected Species

Protected species are plants and animals whose protection is mandated by specific acts of the United States Congress, and managed and enforced by various federal authorities. There are four federal acts that are important in conservation, and that need to be addressed for the proposed project: the Endangered Species Act of 1973 (ESA), the Bald and Golden Eagle Protection Act of 1940 (as amended, BGEPA), the Migratory Bird Treaty Act of 1918, and the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (as amended). Additionally, SCDNR maintains a list of plants and animals it considers rare, threatened, and endangered in South Carolina, listed as "Species of Concern". The list comprises species, beyond those federally protected, thought to have populations that are rare, declining, or of unknown status. According to SCDNR's Comprehensive Wildlife Conservation Strategy, the Species of Concern list does not carry the weight of law and is used only as a conservation tool to assist in protection planning and to direct research and survey efforts.

Following is an assessment of the potential presence of, or suitable habitat for, protected species and species of concern. Initially a literature search was performed for the protected species listed for Horry County to determine habitat requirements and to obtain descriptions of the species that would facilitate identification of potentially suitable habitat during a review of aerial photography (true color and false-color infrared), the Horry County soil survey, and field reconnaissance conducted on November 17$^{th}$ and 30$^{th}$, 2016. Important sources of reference information included natural resource agency data and published reports, various botanical and faunal literature, and available U.S. Fish and Wildlife Service (USFWS) Species Recovery Plans. Prior to the limited site reconnaissance, SCDNR's Heritage Trust Database was reviewed to determine if there are any known occurrences of protected species onsite or in close proximity.

#### *4.2.7.1 Endangered Species Act and Bald and Golden Eagle Protection Act*

The USFWS maintains lists of federally protected species that are protected by the ESA. Lists are broken down to the County level and are available on the USFWS Charleston Field Office website. The lists also include At Risk Species (ARS), which are species that are under status review and could be listed as

Endangered (E) or Threatened (T) in the future. Table 4 presents E, T, and ARS species that occur, or potentially occur, in Horry County that would benefit from the protection of the Gunter's Island tract. Species that require marine, beach, or saltmarsh habitats are not included in the table as these habitats do not occur at Gunter's Island.

**Table 4: Horry County Protected Species**

| Common Name | Scientific Name |
|---|---|
| **Birds** | |
| **American wood stork (T)** | *Mycteria americana* |
| **Bald Eagle (BGEPA)** | *Haliaeetus leucocephalus* |
| **Black rail (ARS)** | *Laterallus jamaicensis* |
| **Red-cockaded woodpecker (E)** | *Picoides borealis* |
| **Fish** | |
| **American Eel (ARS)** | *Anguilla rostrata* |
| **Atlantic Sturgeon (E)** | *Acipenser oxyrinchus* |
| **Blueback Herring (ARS)** | *Alosa aestivalis* |
| **Carolina Pygmy Sunfish (ARS)** | *Elassoma boehlkei* |
| **Robust Redhorse (ARS)** | *Moxostoma robustum* |
| **Shortnose Sturgeon (E)** | *Acipenser brevirostrum* |
| **Insects** | |
| **Monarch butterfly (ARS)** | *Danaus plexippus* |
| **Rare skipper (ARS)** | *Problema bulenta* |
| **Mammals** | |
| **Rafinesque's big-eared bat (ARS)** | *Corynorthinus rafinesquii* |
| **Tri-colored bat (ARS*)** | *Perimyotis subflavus* |
| **Mollusks** | |
| **Savannah Lilliput (ARS)** | *Toxoplasma pullus* |
| **Waccamaw Fatmucket (ARS)** | *Lampsilis fullerkati* |
| **Plants** | |
| **American chaffseed (E)** | *Schwalbea Americana* |
| **Canby's dropwort (E)** | *Oxypolis canbyi* |
| **Carolina-birds-in-a-nest (ARS)** | *Macbridea caroliniana* |
| **Ciliate-leaf tickseed (ARS)** | *Coreopsis integrifolia* |
| **Godfrey's stitchwort (ARS)** | *Minuartia godfreyi* |
| **Harper's fimbristylis (ARS)** | *Fimbristylis perpusilla* |
| **Long Beach seedbox (ARS)** | *Ludwigia brevipes* |
| **Pondberry (E)** | *Lindera melissifolia* |
| **Venus flytrap (ARS*)** | *Dionaea muscipula* |
| **Wire-leaved dropseed (ARS)** | *Sporobolus teretifolius* |
| **Yellow pond lily (ARS)** | *Nuphar lutea ssp. Sagittifolia* |
| **Reptiles** | |
| **Southern hognose snake (ARS)** | *Heterdon simus* |
| **Spotted turtle (ARS)** | *Clemmys guttata* |

| Common Name | Scientific Name |
|---|---|
| At Risk 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.<br>ARS*: Species that are either former Candidate Species or are emerging conservation priority species<br>Bald & Golden Eagle Protection Act (BGEPA): Federally protected under the Bald and Golden Eagle Protection Act<br>Critical Habitat (CH)<br>Federally Endangered (E)<br>Federally Threatened (T) | |

A review of SCDNR's Heritage Trust Database yielded two known occurrences within 4-6 miles of Gunter's Island. These are the ARS designated Rafinesque's big-eared bat and the federally protected bald eagle. Additionally, there are documented wading bird colonies within 3-8 miles of Gunter's Island, and a 2004 documented wood stork colony approximately 10 miles to the southwest, with 174 nests observed in the rookery. There are no known occurrences of protected species in Gunter's Island.

During the limited site reconnaissance, four specific locations in Gunter's Island that are mapped as Lynn Haven sand on the soil survey were investigated for suitable pondberry (E) and Carolina-birds-in-a-nest (ARS) habitat. These plants have been found in the Woodbury Wildlife Management Area, located just south along the Little Pee Dee River, in areas mapped with this soil type. One of the areas investigated at Gunter's Island was the Carolina Bay and the other three wetlands are located in the north-central portion of the site. Although none were observed during the site reconnaissance, the Carolina bay appears to be suitable habitat for pondberry based on soils, hydrology, and the associated plant species observed. Herbaceous vegetation in the other three wetlands was severely damaged by floodwaters associated with Hurricane Matthew and no Carolina-birds-in-a-nest was observed. However, the soil conditions and the associated plant community present indicate suitable habitat for this species is present at these wetlands.

Other accessible areas of the site were given a cursory review for threatened and endangered species habitat. It is likely that wood storks utilize the inundated wetlands and ditches for foraging. The trees located in the managed pine areas are not of sufficient age and diameter to support red-cockaded woodpeckers. However, with continued burning and mechanical undergrowth clearing, these upland areas could potentially support colonies, should SCDNR and USFWS decide to relocate birds from other areas of the state. Suitable habitat for American chaffseed and Canby's dropwort were not

observed on aerial photography or during the site reconnaissance. The Little Pee Dee River provides foraging habitat for the bald eagle. Also, it is anticipated that mature trees occur within the floodplain of the river, which were not accessible during the field reconnaissance, are of suitable size to support eagle nests.

Although the endangered shortnose and Atlantic sturgeon do not occur in the Little Pee Dee River, protection of this tract could protect their habitat in Great Pee Dee River, located downstream. This would be done by eliminating the possibility of land disturbance, thereby reducing the amount of sediment entering the river.

The presence of the remaining ARS species listed for Horry County were evaluated based on literature review, habitat observations during the site reconnaissance, and aerial photography review. Based on this review it is anticipated that suitable habitat is present for Carolina pygmy sunfish, black rail, robust redhorse, Rafinesque's big-eared bat, tri-colored bat, Savannah Lilliput, ciliate-leaf tickseed, Godfrey's stitchwort, Harper's fimbristylis, long beach seedbox, yellow pond lily, spotted turtle, and southern hognose snake.

#### *4.2.7.2 Migratory Bird Species Act*

The varied wetland and upland habitats at Gunter's Island provide habitat for a variety of migratory bird species. SCDNR has documented breeding occurrences of 15 species of neo-tropical migratory birds and 35 species of other upland birds on the Little Pee Dee River Heritage Preserve just upstream, and the Woodbury Wildlife Management Area, located just downstream in Marion County, is designated as an Important Bird Area by the Audubon Society. Table 5 provides a summary of typical migratory species that potentially utilize the various habitats located at Gunter's Island in the winter and summer months.

**Table 5: Migratory Bird Species**

| HABITAT | WINTER RESIDENTS | SUMMER RESIDENTS |
|---|---|---|
| **WATER RELATED (Lakes, Rivers, Swamps, Bottomland Hardwoods, etc.)** | American bittern<br>Palm warbler<br>Wilson's snipe<br>Canada goose<br>Gadwall<br>Ring-necked duck<br>Blue-winged teal<br>Green-winged teal<br>Hooded merganser<br>Northern harrier | Acadian flycatcher<br>Black crowned night heron<br>Swallow-tailed kite<br>Least bittern<br>Mississippi kite<br>Acadian flycatcher<br>Northern parula warbler<br>Prothonotary warbler<br>Swainson's warbler<br>Kentucky warbler |

| HABITAT | WINTER RESIDENTS | SUMMER RESIDENTS |
|---|---|---|
| | Yellow-rumped warbler | Hooded warbler |
| **FORESTED (Mixed Woodlands, Pine Woodlands, etc.)** | Yellow-bellied sapsucker<br>Blue-headed vireo<br>Brown creeper<br>Red-breasted nuthatch<br>House wren<br>Winter wren<br>Golden-crowned kinglet<br>Ruby-crowned kinglet<br>Hermit thrush<br>Yellow-rumped warbler<br>Fox sparrow<br>White-throated sparrow<br>Dark-eyed junco<br>Purple finch | Broad-winged hawk<br>Chuck-will's-widow<br>Ruby-throated hummingbird<br>Yellow-billed cuckoo<br>Eastern wood pewee<br>Great crested flycatcher<br>Yellow-throated vireo<br>Red-eyed vireo<br>Blue-gray gnatcatcher<br>Wood thrush<br>Summer tanager<br>Yellow-throated warbler<br>Hooded warbler<br>Kentucky warbler |
| Sources: Potter, E.F., J.F Parnell, and R.P. Teulings. 1980. *Birds of the Carolinas*. The University of North Carolina Press, Chapel Hill, NC.<br>Dunn, J.L. and J. Alderfer. 2008. *A Field Guide to the Birds of Eastern North America*. National Geographic Society, Washington, DC. | | |

During the field reconnaissance, ruby-crowned kinglets and yellow-belly sapsuckers were observed in the managed pine areas.

#### *4.2.7.3 Magnuson-Stevens Fishery Conservation and Management Act*

During the preparation of the I-73 South Environmental Impact Statement, the National Marine Fisheries Service (NMFS) identified all perennial streams within the study corridor as potential habitat for juvenile and adult fish maturation or nursery habitat for diadromous fish species, which are protected under the Magnuson-Stevens Fishery Conservation and Management Act. This includes species such as shortnose sturgeon, Atlantic sturgeon, American shad, blueback herring, hickory shad, American eel, and striped bass.

SCDNR's Stream Assessment data from sampling stations within both the Palmetto and Juniper Swamps, which drain into the Gunter's Island tract, provided that the American eel, a South Carolina Wildlife Action Plan (SWAP) priority species and USFWS ARS species, was present. Species are listed in the SWAP because they are:

- rare or designated as at-risk due to knowledge deficiencies;
- species common in South Carolina but listed rare or declining elsewhere; or,
- species that serve as indicators of detrimental environmental conditions.

Other SWAP priority species that readily utilize the Little Pee Dee River along Gunter's Island are American shad (*Alosa sapidissima*), blueback herring (USFWS ARS species), and hickory shad (*Alosa mediocris*) which are all an important prey base for predatory fish species and a variety of piscivorous birds, including bald eagles. Therefore, protection of Gunter's Island's streams and adjacent wetlands would benefit important fish species.

#### *4.2.7.4 South Carolina State Rare Species*

As mentioned in the introduction of this section, SCDNR maintains a list of rare, threatened, and endangered species and communities known to occur in each County. A literature review was completed for each species for Horry County, and based on the habitats present at Gunter's Island; a list was developed of species that could occur there. Species that were identified in Section 4.2.7.1 as E, T, or ARS are not included in this list. Table 6 provides a list of the species, their state status, and a short description of their habitat requirements.

**Table 6: State Rare Species Potentially Occurring at Gunter's Island**

| Scientific Name | Common Name | Status | Habitat |
|---|---|---|---|
| **Plants** | | | |
| ***Echinodorus parvulus*** | Dwarf burhead | S2 | Drawdown zones of Coastal Plain ponds, pineland ponds, and blackwater riverbanks. |
| ***Fimbristylis perpusilla*** | Harper's fimbristylis | S2 | On muddy bottoms and silty margins of drying pine barren ponds and Coastal Plain blackwater rivers; seasonally exposed mudflats along pond margins, river shores, and in the center of seasonal ponds; silty sandbars in rivers. |
| ***Helenium brevifolium*** | Shortleaf sneezeweed | S1 | Bogs, springhead seepage forests, boggy stream banks, boggy clearings, and other saturated soils. |
| ***Isoetes riparia*** | River bank quillwort | S1 | Wet soil along muddy or sandy shores (including tidal shores and estuaries) of rivers, streams, and in swamps. |
| ***Liliaeopsis carolinensis*** | Carolina lilaeopsis | S1 | Open mud flats of pond shores, swamps, freshwater marshes, interdune ponds, ditches, and shores of brackish to freshwater estuarine sounds and rivers, often immersed in the water. |
| ***Lipocarpha micrantha*** | Half-chaff sedge | S2 | Moist to wet sandy soils, commonly on alluvial sands, of riverbank draw-down zones, pond margins, streams, and ditches. |
| ***Lygodium palmatum*** | American climbing fern | S1S2 | Moist, sandy, woodlands and swamps. |
| ***Scleria baldwinii*** | Baldwin nutrush | S2 | In wet, peaty or sandy soils in pinelands, and borders of ponds, drainage ditches, and borrow-pits, often in shallow water. In our area, it favors wet savannas, under *Pinus serotina, P. palustris*, and/or *Taxodium ascendens.* |
| ***Stylisma pickeringii* var. *pickeringii*** | Pickering's morning-glory | S1 | Coarse, white sands in open sandhills or in other dry, barren, sandy woods with sparse ground cover, scant litter accumulation, and little canopy cover. |
| ***Xyris flabelliformis*** | Savannah yellow- | S1 | Wet pinelands, spodosol pine flatwoods, and Carolina bay edges. |

| Scientific Name | Common Name | Status | Habitat |
|---|---|---|---|
| | eyed grass | | |
| **Animals** | | | |
| ***Fundulus diaphanus*** | Banded killifish | S1 | Blackwater systems, including some with a tidal influence. However, they rarely venture into brackish water. It prefers calm, slow, clear or brown-stained waters of creeks, rivers, lakes, and ponds with a sand and gravel bottom near scattered submerged and emergent vegetation. |
| ***Lampsis splendida*** | Rayed pink flatmucket | S2 | Little Pee Dee River |
| **Notes: S1 = Critically imperiled statewide because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation.<br>S2 = Imperiled statewide because of rarity or factor(s) making it vulnerable.** | | | |

During the site reconnaissance, pondspice (*Litsea aestivalis*), an S3 ranked plant species, was observed in the Carolina bay. SCDNR has also identified important habitats and geological features on the site. Bald cypress-tupelo gum swamps, bottomland hardwoods, pine flatwoods, and xeric sandhill scrub are among the habitats present at Gunter's Island. A Carolina bay, an important geological feature, is also present onsite. As indicated in Table 6, many state species of concern are anticipated to benefit from protection of Gunter's Island.

#### *4.2.7.5 Conclusion*

The varied habitats found at Gunter's Island provide suitable habitat for many protected species and species of concern as discussed above. Long-term management and enhancement of the habitats, to be provided by SCDNR, will increase the possibility that dormant plant seeds of many fire dependent species regenerating the native wildflower and grasses to areas previously disturbed by logging activity. Areas of currently managed loblolly pine (*Pinus taeda*) and future plantings of longleaf pine (*Pinus palustrus*) could someday provide habitat for relocated red-cockaded woodpeckers. Protection of the site will benefit many neo-tropical and other migratory birds that utilize the onsite habitats during winter and summer months. Protection of the onsite streams, adjacent wetlands, and the shoreline of the Little Pee Dee River will benefit many diadromous fish species, including the endangered Atlantic and shortnose sturgeon. SCDNR species of concern, important habitats and a geological feature (Carolina bay) will be protected. The river corridor in the Little Pee Dee River drainage is also habitat for black bear (*Ursus americanus*), an S3 ranked species, and swallow-tailed kite (*Elanoides forficatus*). Both of these species have been reported along the river corridor.

In addition to protected species, the tract provides valuable habitat for deer, turkey and numerous non-game species as well as wintering habitat for a wide variety of waterfowl including wood ducks (*Aix sponsa*), hooded mergansers (*Lophodytes cucullatus*), mallards (*Anas platyrhynchos*), green-

winged teal (*Anas carolinensis*) and ringed-necked ducks (*Aythya collaris*). The forested wetlands also provide important nesting and migration habitat for a large assemblage of migratory birds.

Acquisition and protection of the Gunter's Island tract will complement larger conservation initiatives of the Little Pee Dee-Lumber River Focus Area and the adjacent Winyah Bay Focus Area.

## 4.3 Site Protection

Currently, Gunter's Island is owned by a private company. SCDOT has been working with the current land owner to purchase the property upon approval of the permit for I-73. SCDOT, in coordination with the Federal Highway Administration, prepared a categorical exclusion document for this property purchase and is included as Appendix A. After purchasing the property, SCDOT will immediately transfer the fee simple ownership of the property to SCDNR. SCDNR will then place the property into the Heritage Trust Program. The Heritage Trust Program is a system dedicated to inventorying, preserving, using and managing "outstanding natural or cultural areas and features" in South Carolina. Properties generally enter the Heritage Trust Program through dedication. Properties dedicated to the Heritage Trust Program will be protected in perpetuity. Once the property is received by SCDNR it will be dedicated into the Heritage Trust Program. Any property restrictions are recorded in the county real estate records to complete the dedication into the Heritage Trust Program. Based on baseline evaluations, Gunter's Island would qualify as a Heritage Trust Preserve. In accordance with S.C. Code of Laws §51-17-80 "[t]he following restrictions shall apply to all Heritage Preserves:"

> "The primary dedication as a Heritage Preserve shall be to preserve and protect the natural or cultural character of any area or feature so established. The board of the department and its agents shall in all cases maintain the essential character of any area or feature dedicated, and as such they are hereby declared to be at their highest, best and most important use for the public benefit. No Heritage Preserve shall be taken for any other public purpose unless the approval of both the board of the department and the Governor has been obtained. In no case shall any Heritage Preserve be taken for any private use".

In order to facilitate the transfer of the property and to give assurance the wetland restoration and enhancement activities as described in this plan will be completed in manner consistent with Section 404 permitting requirements; SCDOT has worked with SCDNR to develop a memorandum of agreement (MOA). A draft of the MOA between SCDOT and SCDNR is included in Appendix B. The final MOA will be signed by SCDOT and SCDNR prior to transfer of the property. Included in the MOA are the obligations by each party to cover the transfer of the property. The MOA also includes the provision that SCDNR perform the restoration activities described in Section 4.5.4 of this plan.

A Dedication and Declaration of Trust document will serve as the site protection instrument and will be immediately executed by SCDNR after the property is transferred. A draft of this document is included as Appendix C. The Dedication and Declaration of Trust lists the conditions, restrictions, and terms of use for the property. The document also includes provisions for enforcement by USACE and/or SCDHEC in the event that there is a breach in the terms of the instrument. If for any reason SCDNR does not acquire the property and incorporate it into the Heritage Trust Program, SCDOT will coordinate with the USACE to develop an appropriate site protection instrument on the property.

## 4.4 Baseline Information and Conditions

### 4.4.1 Project Site

The I-73 corridor runs through four counties (Dillon, Horry, Marion and Marlboro) in the northeastern section of South Carolina (Figure 1). The corridor runs for approximately 75 miles from the border with North Carolina just north of Bennettsville in Marlboro County (34.792260, -79.0660296), south towards the town of Latta and thence southeast of the town of Aynor and north of the City of Conway in Horry County to intersect with SC 22 (33.940903, -79.062486). The corridor is located primarily within two EPA Level III Ecoregions: Southeastern Plains and Middle Atlantic Coastal Plains (Figure 2). As previously mentioned, the corridor is located within three 8-digit HUC watersheds: Middle Pee Dee River (03040201), Little Pee Dee River (03040204), and Waccamaw River (03040206). The corridor is primarily rural in character with upland forest and agricultural lands interlaced with low lying drainages, and dotted with small cities and towns including Bennettsville, Marion, Mullins and Aynor, as well as numerous smaller communities. Vegetation community types vary throughout the corridor and consist primarily of natural and managed pine

forests, deciduous upland forests, forested and non-forested wetlands, pasture and agricultural field borders.

The corridor crosses the Little Pee Dee River, Lake Swamp and numerous smaller streams, wetland and open water habitats. Aquatic resources occurring within the corridor include aquatic beds, bay forest, bottomland hardwoods, deciduous shrub swamp, freshwater marsh, pine wet flatwoods, ponds, borrow pits, rivers, canals, and wooded swamp (Nelson, John; *The Natural Communities of South Carolina)*. Detailed information of aquatic habitat types may be found in the FEISs.

Aquatic habitats within the Little Pee Dee-Lumber Focus Area, which include both the impact and mitigation sites, are described as being

> "…defined by classic blackwater river floodplain forests with canopies of bald cypress (Taxodium distichum), swamp tupelo (Nyssa biflora) and red maple (Acer rubrum). Other species commonly associated include tulip poplar (Liriodendron tulipfera), sweet gum (Liquidambar styraciflua), pond pine (Pinus serotina), loblolly pine (P. taeda) and laurel oak (Quercus laurifolia). Floodplain forests are seasonally inundated by the river and represent the most deeply flooded of all southeastern United States forest types. The shrub layer in areas subjected to frequent flooding is open, whereas areas with infrequent flooding may be fairly dense and pocosin-like.
>
> The Little Pee Dee and Lumber rivers' bottomland hardwood forests typically occur between the floodplain forest and drier upland sites. Unlike floodplain forests and longleaf pine (P. palustris) uplands, bottomland hardwoods are quite diverse in terms of the number of overstory species. This ecotype is dominated by a well-developed canopy of water oak (Quercus nigra), overcup oak (Q. lyrata), willow oak (Q. phellos), sweetgum, water hickory (Carya aquatica) and loblolly pine. Bottomland hardwood forests are inundated regularly by the river, but do not typically contain standing water for extended periods of time. The drier conditions result in a better developed herbaceous layer. Loose spangle grass (Uniola laxa) often develops thick stands in open areas.
>
> Some of the most significant resources of the study area are probably the geomorphic features, the oxbow lakes, sloughs, braided streams, sand ridges and other fluvial

formations that have been created by the river within the floodplain. These type features are common on Coastal Plain blackwater rivers; however, the Little Pee Dee and Lumber Rivers have an unusually numerous and well developed array of fluvial formations. Many of these features can be directly accessed from the main river channel. Oxbow lakes are often associated with floodplain forests. Oxbow lakes are former sections of river channel that became isolated when the river changed course.

There are several excellent examples of oxbow lakes along the Little Pee Dee River. Elevated xeric sand ridges run parallel to the rivers throughout the floodplain. This ecosystem is associated with fluvial sand deposited by river currents. The soils are sandy and well drained. Longleaf and sparse loblolly pine dominate the canopy. The mid-story consists primarily of turkey oak (Q. laevis), sand live oak (Q. virginiana var. germinata) and persimmon (Diospyros virginiana). Common understory plants include wiregrass (Aristida stricta), dropseed (Sporobolus spp.), and prickly-pear (Opuntia compressa). The protection of these ridges is essential to the health of the overall aquatic system."

Uplands throughout the I-73 corridor are characterized by dry sandy hillsides, much of which have been timbered, in successional regeneration or are in planted pine production. These areas have been recently cleared and/or may be dominated by such species as loblolly pine, (*Pinus taeda*), white oak (*Q. alba*), post oak (*Q. stellata*), blackjack oak (*Q. marilandica*), dewberry (*Rubus fragellaris*) and American beech (*Fagus grandifolia*). Additional uplands are located in topographically lower areas and along the bottom of hillsides. These areas tend to exhibit slightly higher percentage of hydrophytic vegetation but lack hydric soil and hydrology indicators associated with wetlands. Generally these areas are dominated by forest communities consisting of red maple (*Acer rubrum)*, sweet-gum (*Liquidambar styraciflua*), and American holly, (*Ilex opaca*).

### 4.4.2 Mitigation Site

The Gunter's Island tract is located in western Horry County on the border with Marion County along the Little Pee Dee River. The site is situated west of the Town of Conway just north of US 378, east of SC 908, and west of Pee Dee Road near Jordanville, SC. (Figure 3). The Gunter's Island tract is adjacent to the 200 acre Johnson Tract of the Little Pee Dee Heritage Preserve and just upstream of

the approximately 26,000 acre Woodbury Wildlife Management Area. The site is within the Little Pee Dee-Lumber River Focus Area and the Little Pee Dee Scenic River begins just downstream at the US 378 bridge (Figure 9). Gunter's Island is a single parcel (28700000001) tract containing 6,258 deeded acres (Figure 5). The tract is located in the Middle Atlantic Coastal Plain EPA level III ecoregion and the Little Pee Dee River watershed where 74 percent of the I-73 wetland impacts and 78 percent of the stream impacts occur (HUC 03040204) (Figures 4).

In total, the site contains approximately 4,563.1 acres of forested wetland, 55.4 acres of emergent wetland, 31.4 acres of open water, and 1,608 acres of upland habitat (Figure 6). A GIS desktop survey with field verifications was used to determine the quantity of wetland areas on the site. The publically available spatial data from US Fish and Wildlife Service (National Wetland Inventory), Natural Resource Conservation Service (soils), and US Geological Survey (National Land Cover Database) were combined, utilizing at least two sources, to identify these areas included in the total.

The palustrine forested wetlands are characterized by hydric soil indicators and a mature canopy of hardwoods. The bottomland hardwoods are forested areas usually occurring within floodplains and comprised of the tree species listed in Table 7. Flooding in the bottomland hardwoods usually occurs during the winter and spring months. Wooded swamps are also associated with floodplains, occurring on low flats, oxbows and isolated ponds.

**Table 7: Gunter's Island Wetland Tree Species**

| Common Name | Scientific Name |
|---|---|
| **Bald Cypress** | *Taxodium distichum* |
| **Red Maple** | *Acer rubrum* |
| **River Birch** | *Betula nigra* |
| **Black Willow** | *Salix nigra* |
| **Laurel Oak** | *Quercus laurifolia* |
| **Willow Oak** | *Quercus phellos* |
| **Water Oak** | *Quercus nigra* |
| **Black Gum** | *Nyssa silvatica* |
| **Water Tupelo** | *Nyssa aquatica* |
| **Green Ash** | *Fraxinus pennsylvanica* |

The Gunter's Island tract also includes an intact, 85-acre Carolina Bay, located in the northeastern section of the property. Bay forests occur on peat soils and stay saturated for long periods of time throughout the growing season. According to a tree stand history provided by the current landowner, it appears the Carolina Bay was harvested in 1935 and allowed to naturally regenerate; however, verification through historic aerial photography and observations from biological surveys do not support this theory. Historic aerial photography from 1949 (Figure 11) does not show a 14 year old new growth forest; stumps were also not found during biological surveys in the area. In order for the replanted trees in the bay to survive, the rim of the bay would have been breached to drain the bay and there is no evidence of such activity. American Timberlands has stated that it is possible that when International Paper did the stand survey that the age of the stand was estimated based upon the height of the trees. Based on this evidence, it does not appear the Carolina Bay has been previously cleared. Trees dominating the canopy within the bay are listed in Table 8.

**Table 8: Gunter's Island Carolina Bay Species**

| Common Name | Scientific Name |
|---|---|
| **Bald Cypress** | *Taxodium distichum* |
| **Loblolly Pine** | *Pinus taeda* |
| **Red Maple** | *Acer rubrum* |
| **River Birch** | *Betula nigra* |
| **Red Bay** | *Persea borbonia* |
| **Black Gum** | *Nyssa sylvatica* |
| **Swamp Chestnut Oak** | *Quercus michauxii* |

Numerous oxbow lakes dot the landscape comprising approximately 20 acres of open water. Oxbow lakes are often associated with floodplain forests, as these features are former sections of river channel that became isolated when the river changed course. Excluding relic oxbow channels, the property contains approximately 17 miles of stream, including 11 miles of waterfront on the Little Pee Dee River, one of the most ecologically significant drainages in South Carolina. Data from the US Geological Survey (National Hydrologic Dataset) was used to identify the on-site streams as Evan's Branch and an Unnamed Tributary leading from Jordan Lake to the Little Pee Dee River. Most of these waters, including the Little Pee Dee River, are designated as Outstanding Resource Waters by the state of South Carolina. The Little Pee Dee River was also designated by the EPA as an Aquatic Resource of National Importance.

The aquatic features and habitats cover the majority of the Gunter's Island tract; however, there are also approximately 1,608 acres of uplands on most of which silviculture practices dominate the land use and vegetation community. Loblolly pine, red maple and sweet gum were noted as the dominate species in the transitional areas between the wetland areas and the areas actively managed for silviculture. Dirt and gravel access roads, used for silviculture and hunting, bisect the uplands and cross the wetlands in several locations. The remaining upland areas consist of elevated xeric sand ridges, where fluvial sand was deposited by river currents, which run parallel to the river within the floodplain. Soils are typically sandy and well-drained with longleaf and sparse loblolly pines dominating the canopy. The mid-story typically consists of turkey oak, live oak, and persimmon. Common under story plants include wiregrass, dropseed, and prickly-pear. The protection of these ridges is essential to the health of the overall aquatic system.

The site is under threat of development by the current land owner. The business plan for the property identifies approximately 282 acres for use in sand mining during Phase 1 (Figure 8). The land owner would also begin to construct logging access roads every 2000 feet throughout the mature hardwood stands along the river, allowing access to clear-cut these areas at a time when hardwood prices are at an all-time high. All of the remaining natural stands, including the Carolina Bay, that were below optimum stocking would be clear cut and replanted with genetically improved loblolly pine seedlings at 726 trees per acre. Additional roads would be constructed to support subdividing the property into 50 - 300 acre parcels for sale into the retail market. The river frontage, streams, oxbow lakes, and recent mining areas will provide water features that would be highly desirable in the marketplace.

Historical aerial photographs were obtained for the years of 1949, 1952, 1968, 1973, 1983, and 2003 from the University of South Carolina's Digital Map Collections, South Carolina Aerial Photographs Indexes and from SCDNR (Figures 11-16). The land use practices include forested corridors for recreational hunting, wildlife management, and timber management. Timber management most likely included the harvest of existing soft and hardwood species, minor topography modifications, and replanting. Based on the aerial photos, impervious area within the site has changed very little over the past fifty years and the management activities have remained fairly consistent.

## 4.5 Mitigation Work Plan

Upon issuance of the relevant state and federal permits and authorizations to construct I-73 and prior to the start of any construction activities, SCDOT will purchase the property and transfer the fee simple ownership of the property to SCDNR. The property will then be placed in the Heritage Trust Program as a "Heritage Preserve" through the Dedication and Declaration of Trust process. Provisions in the Dedication and Declaration of Trust document have been included to allow the ecological restoration of wetlands consistent with this mitigation plan. Within one year following acquisition of Gunter's Island, SCDNR agrees to provide for the installation of signs identifying Gunter's Island as a "Heritage Preserve" or to establish an equivalent marking system along the boundary of the protected property. SCDNR has also agreed to complete the restoration activities within one year after dedication. In the event that circumstances beyond the control of SCDNR, such as flooding or other extreme weather events, prevent the completion of the work within the one year timeframe; an extension may be requested from the USACE and/or SCDHEC.

### 4.5.1 Stream Preservation

Preservation of Gunter's Island protects 89,836 linear feet of streams, including 11 miles of river frontage along the Little Pee Dee River. The streams on Gunter's Island are shown on Figure 7. The streams proposed for preservation include the Little Pee Dee River, Evans Branch, and an Unnamed Tributary to the Little Pee Dee River (UT). Stream functional assessment worksheets were completed at representative locations on Evans Branch and the UT. These worksheets are included in Appendix D. The locations of the stream data collection points are shown on Figure 17. Several photos taken along the river in various parts of the project area are included at the end of Appendix D. In addition to the streams, Gunter's Island contains 12 identified ox-bow lakes along with numerous other ancient ox-bow channels, which provide diversity in aquatic habitats and ecosystems.

### 4.5.2 Stream Enhancement

Although no specific stream enhancement activities are proposed in this plan, it is anticipated that some stream enhancement will be accomplished by the protection of existing riparian buffers along one side of approximately 11 miles of the Little Pee Dee River and on both sides of 31,849 linear feet of streams that are located in the interior portion of the Gunter's Island tract. Forested riparian zones are essential to stream natural functions, channel stability, maintenance of water quality and instream habitat. Excess nitrogen is considered a major stressor to aquatic ecosystems, and riparian buffers

provide the chemical function of removing nutrients such as nitrogen. Wider buffers with a width of greater than 50 meters have been shown to be the most consistent at removing nitrogen (Mayer, et al. 2007).

The streams on Gunter's Island will be enhanced by protection of riparian zones which consist primarily of the forested bottomland hardwood wetlands that will be preserved on the tract. Since the entire tract will be protected through dedication as a Heritage Preserve, the width of the riparian buffers will exceed 50 meters throughout most of the site. Because the streams on Gunter's Island are high quality and fully functional, measuring ecological uplift from riparian buffer protection is difficult. As such, SCDOT proposes to maintain or improve the existing fully functional natural state of the streams by protecting these riparian areas.

### 4.5.3 Wetland Preservation

The palustrine forested wetlands are primarily bottomland hardwoods characterized by hydric soil and a mature canopy. The approximately 4,618.5 acres of wetlands on Gunter's Island are comprised of 94 percent forested wetlands interspersed with 5 percent scrub shrub, and 1 percent freshwater emergent (Figure 6). The wetland preservation will comply with §332.3(h)l of the mitigation regulations as the preservation of the bottomland hardwoods provide important physical, chemical, and biological functions for the watershed. By preserving all the wetlands onsite, Gunter's Island will continue to provide these ecological functions to the watershed in perpetuity.

To document the condition of the wetlands on Gunter's Island, seven preservation data collection stations were set in several characteristic wetlands throughout the site. These data collection locations are shown on Figure 17. At each station, USACE data forms were completed to give verification that the monitoring locations have the three characteristics of a wetland. To determine the functional quality of these wetlands, each station was scored using the North Carolina Wetland Assessment Method (NCWAM) protocol. Photographs were also taken at each location. The locations of these preservation stations were determined because the vegetative communities, wetland hydrology, and soil characteristics were representative of the wetlands located throughout Gunter's Island. The NCWAM sheets, wetland preservation data sheets, and photos are included in Appendix E.

The NCWAM protocol was developed by an interagency team of federal and state agencies with the mission to develop a protocol to rapidly and accurately determine the level of function for each of the 16 wetland types in North Carolina. The method is a rapid assessment method that uses field observations to assess the quality of wetlands based on different functional categories including water quality, hydrology, and habitat. Parameters in each of these functional categories are given an assessment score. These scores are then used to generate an overall wetland rating.

NCWAM was selected as the preferred method to evaluate the wetlands on Gunter's Island for several reasons. Gunter's Island is 25 miles from the North Carolina state line and the Little Pee Dee watershed (including the Lumber River) has its headwaters in North Carolina. The method recognizes 16 different wetland types and several of these wetland types are typical of the Middle Atlantic Coastal Plain ecoregion. Because this ecoregion includes portions of North Carolina and a large portion of the South Carolina coastal plain, many of the wetland classifications in NCWAM are applicable to wetlands found on Gunter's Island. Additionally, the rapid field assessment method that is utilized for NCWAM is a convenient way to assess the various wetland areas that are distributed across the 6,285 acre site.

Three of the NCWAM wetland types that were observed on Gunter's Island include Riverine Swamp Forest, Non-Riverine Swamp Forest and Non-tidal Emergent. Five out of the seven preservation monitoring stations were located in Riverine Swamp Forest, which is representative of the vast majority of the forested bottomland hardwood wetlands on Gunter's Island. To evaluate the functional quality of some of the other diverse habitats found on Gunter's Island, one monitoring station (Station WP5 in Appendix E) was located in a non-tidal emergent wetland. Another station (Station WP1 in Appendix E) was located in the Carolina Bay.

All of the preservation stations received an NCWAM score of high. The high scores can be attributed to the observations that there is no evidence of hydrologic modification at these wetlands, there is a high capacity for flood storage within the wetlands, the vegetative communities of these wetlands are intact and comprised of native species, and there is an abundance of woody debris and snags to provide wildlife habitat within these wetlands. The summary of the preservation monitoring scores are shown below in Table 9.

Table 9: Preservation Data Location Scores

| Preservation Location | Hydric Soils | Hydrophytic Vegetation | Hydrology | NCWAM | Photo |
|---|---|---|---|---|---|
| 1 | Yes | Yes | Yes | High | 1 |
| 2 | Yes | Yes | Yes | High | 2 |
| 3 | Yes | Yes | Yes | High | 3 |
| 4 | Yes | Yes | Yes | High | 4 |
| 5 | Yes | Yes | Yes | High | 5 |
| 6 | Yes | Yes | Yes | High | 6 |
| 7 | Yes | Yes | Yes | High | 7 |

### 4.5.4 Wetland Restoration/Enhancement

The Gunter's Island tract contains a network of maintained roads used for recreational access and timber management activities. Many of these roads cross wetlands in various locations. It is generally acknowledged that roadway fill areas crossing wetlands disrupt natural flow and changes wetland hydrology by creation of a barrier that disrupts water movement across the floodplain. During high water events, undersized culverts in these roadways can cause flood waters to flow over the top of the road causing erosion of the fill slope and increased sedimentation in wetland areas downstream from the road crossing. Increased flow velocity through the roadway culverts can cause the formation of large scour holes, wetland channelization, and possibly a perched culvert. These conditions limit aquatic life movement through the floodplain and have a negative impact on hydrologic connectivity. Although the vast majority of wetlands on Gunter's Island have been shown to be fully functional and represent high quality preservation, some ecological benefits can be achieved by the removal of the existing roadway fill in some wetland areas on the site where these negative impacts from the road crossings have been observed. By removal of the existing roadway fill, wetland hydrology is expected to revert back to natural conditions that existed prior to construction of these roadways.

Approximately 2.2 acres of wetlands in six areas will be restored through the removal of culverts and associated causeway fill. A location map of the road removal areas is shown on Figure 18, and more detailed drawings are included in Figures 19-36. With a desire of the long-term steward to maintain a working network of roads on the site for public access and continued management activities, the

wetland restoration areas were carefully selected through coordination with SCDNR. Site reconnaissance produced six areas that could benefit from roadway removal without disrupting access and other management activities.

After the six restoration areas were selected, baseline data was collected at each restoration area that included wetland determination data sheets and NCWAM forms. Table 10 shows the baseline NCWAM scores that were assessed for each restoration monitoring location. The baseline NCWAM scores are low due to limited surface and sub-surface flood storage in the fill slope areas. Because the roadway maintenance activities have created an altered vegetative structure with a lack of larger canopy trees, the roadway fill areas have a low functional rating for habitat. The roadway fill slopes had hydrophytic vegetation present but lacked other wetland characteristics such as hydric soils and wetland hydrology. The wetland data sheets and NCWAM sheets for each restoration location is included in Appendix F. Table 10 also includes the acres of restoration at each of the six locations and the figure numbers depicting the details of each location.

Table 10: Baseline Restoration Data

| Restoration Location | Hydric Soils | Hydrophytic Vegetation | Hydrology | NCWAM | Photo | Acres Restored | Figure Numbers |
|---|---|---|---|---|---|---|---|
| 1 | No | Yes | No | Low | 8, 9 | 0.2 | 19-21 |
| 2 | No | Yes | No | Low | 10, 11 | 0.1 | 22-24 |
| 3 | No | Yes | No | Low | 12 | 0.4 | 25-27 |
| 4 | No | Yes | No | Low | 13 | 0.3 | 28-30 |
| 5 | No | Yes | No | Low | 14 | 0.7 | 31-33 |
| 6 | No | Yes | No | Low | 15 | 0.5 | 33-36 |

It is expected that some hydrologic enhancement in the adjacent wetlands will occur through the removal of the roadway fill areas. The actual area of this hydrologic enhancement is difficult to determine because the areas proposed for enhancement are currently fully functioning wetlands as confirmed by the wetland data forms shown in Appendix F. The wetland enhancement areas currently have an intact vegetative structure free from invasive species, hydric soil characteristics, and several different indicators of wetland hydrology. Because of the existing high functional quality, ecological uplift in the enhancement areas will be subtle and not significant enough to show through rapid field assessment methods as was used for the restoration areas.

The enhancement area is expected to be limited to areas in the vicinity of the removed roadway fill. An analysis of Light Detection and Ranging (LIDAR) data was done to show that the roadway fill area does have a change in elevation and creates a barrier that is affecting flow through the wetland systems where the roads are located. The area of wetland enhancement was determined through analysis of the 6 inch contour LIDAR data. It is expected that removal of this roadway fill will enhance hydrology in the wetland areas both upstream and downstream from the restored areas as shown in figures 19 through 36. Through the removal of these roads, SCDOT expects to hydrologically enhance 18.6 acres of wetlands at 6 locations. Table 11 shows a summary of data collected at each wetland enhancement data point.

Table 11: Wetland Enhancement Data:

| Enhancement Area | Hydric Soils | Hydrophytic Vegetation | Hydrology | Acres Enhanced | Figure Number |
|---|---|---|---|---|---|
| 1a | Yes | Yes | Yes | 0.7 | 21 |
| 1b | Yes | Yes | Yes | 1.4 | 21 |
| 2a | Yes | Yes | Yes | 0.6 | 24 |
| 2b | Yes | Yes | Yes | 0.2 | 24 |
| 3a | Yes | Yes | Yes | 1.7 | 27 |
| 3b | Yes | Yes | Yes | 1.7 | 27 |
| 4a | Yes | Yes | Yes | 1.9 | 30 |
| 4b | Yes | Yes | Yes | 1.5 | 30 |
| 5a | Yes | Yes | Yes | 1.4 | 33 |
| 5b | Yes | Yes | Yes | 2.1 | 33 |
| 6a | Yes | Yes | Yes | 2.7 | 36 |
| 6b | Yes | Yes | Yes | 2.7 | 36 |

SCDNR has agreed to complete the construction activities for the wetland restoration/enhancement areas. SCDOT will enter into an MOA with SCDNR that will include a provision that the proposed work is completed in accordance with the mitigation plan; the draft MOA is included as Appendix B. SCDNR will perform the removal of the culverts and associated roadway fill to return the area as close as possible back to original grade. Removed fill will be placed in an upland area for future needs by SCDNR for roads maintenance. Appropriate sediment and erosion control measures will be used to prevent the migration of disturbed sediment from leaving the construction areas and

SCDNR will perform the removal of the culverts and associated roadway fill to return the area as close as possible back to original grade. Removed fill will be placed in an upland area for future needs by SCDNR for roads maintenance. Appropriate sediment and erosion control measures will be used to prevent the migration of disturbed sediment from leaving the construction areas and impacting the adjacent wetlands. Appropriate native seed mixes may be used to stabilize disturbed areas after construction is complete. Since the causeway removal areas are relatively narrow and with the presence of a good seed source, the areas will be allowed to naturally regenerate after post construction stabilization is complete. Special care will be taken to minimize the number of trees that will be cut back or removed during restoration activities. SCDNR will also secure any necessary sediment and erosion control permits for the construction activities, if any are required.

## 4.6 Maintenance Plan

Due to the nature of the proposed work very little maintenance will be required to ensure the continued viability of the wetland restoration/enhancement areas once the initial construction is completed. Until success has been documented, SCDOT will notify USACE and SCDHEC if any issues develop that requires maintenance within the restoration/enhancement areas. The extent of the issue, measures taken to correct the issue, and whether the issue has been resolved will be documented in the annual monitoring report.

## 4.7 Performance Standards

It is anticipated that in the first year following the removal of culverts and associated fill, native vegetation will begin to move into the previously impacted area and wetland characteristics in the soil will begin to form. Subsequent monitoring years will show continued development of the vegetative community and formation of hydric characteristics in the soils. This will be documented in the restoration areas through NCWAM forms, photographs at established photo points, and with USACE Wetland Determination data forms. Uplift for the restoration areas will be shown through NCWAM results being raised from Low to Medium or High, and photo documentation showing the road fill is removed and restored to the natural wetland grade. This data will be collected each year during the monitoring period until success is documented.

Performance standards for the enhancement areas will be based on wetland determination data forms showing that wetland hydrology in the enhancement areas have either been maintained or improved

similar or more evidence of hydrology as shown on the baseline forms. The NCWAM data collected for the preservation areas will serve as a reference condition for the enhancement areas. The wetland enhancement areas should show a similar NCWAM score as wetlands of the same type in the preserved wetland areas.

## 4.8 Monitoring Requirements

SCDOT will be responsible for any monitoring and has agreed to coordinate monitoring activities with SCDNR to not interfere with other activities taking place on the site. After restoration activities have been completed, SCDOT will submit a report to the USACE within 30 days documenting the completion of the restoration activities. After this initial report, annual monitoring reports will be completed by SCDOT and submitted to the USACE for review. It is expected that success criteria in the restoration/enhancement areas will be met after three years. If, after three years, it is determined that all performance standards have been met, no further monitoring of the site will occur. If performance standards have not been met, SCDOT will continue to monitor the site for two more years. The reports will include a narrative providing an overview of site conditions; NCWAM assessment forms, USACE data forms, maps, and photographs to illustrate conditions at the restoration/enhancement sites. Photographs will be included with dates and clear labels with the direction from which the photo was taken. Maps will show the location of the mitigation site, locations of photographic reference points, and quadrats. SCDOT will include the following components in each monitoring report submitted after construction.

1. Name of party responsible (SCDOT or their designated consultant) for conducting the monitoring and the date(s) of the inspection.
2. A brief description of the approved compensatory mitigation plan and the dates when specific mitigation activities were commenced and/or completed.
3. A paragraph describing whether the mitigation site is developing as expected. This summary will be supported by a detailed description of each of the six sites, and whether or not each site is developing as expected and meeting the necessary performance standards.
4. If one or more sites are not meeting the necessary performance standards, the Applicant will submit a description of the existing condition, identify the reason(s) that the site is not meeting performance standards, and submit a proposal to conduct remedial actions and bring the management unit into compliance with the approved compensatory mitigation plan.

5. Dates of any corrective or maintenance activities conducted since the previous report submission.

## 4.9 Long Term Management

A private landowner currently owns the parcels on which the Site is located. SCDOT has an agreement with the current owner to purchase the property upon approval of the necessary permits/certifications for I-73. Following issuance of the Clean Water Act Section 404 permit by the USACE and the 401 Water Quality Certification, State Navigable Water permit and a Coastal Zone Management permit from SCDHEC; SCDOT will purchase the site and transfer ownership of Gunter's Island to SCDNR for dedication into the Heritage Trust Program. The Heritage Trust Act (51-17-10 et Seq.) defines the primary objective of all Heritage Preserves is to "protect the natural or cultural character of any area or feature" for which the property was dedicated. Objectives for the property are to preserve and enhance natural resources while restoring and enhancing jurisdictional waters on the property.

Additionally, the Heritage Trust Act requires that Heritage Preserves be managed "to provide the maximum public usage . . . which is compatible and consistent with the character of the area" – (S.C. Code of Laws 51-17-40). These uses, consistent with agency mission and management objectives, include providing general public access for hunting, fishing, wildlife or other natural resource observation, wildlife or other natural resource photography, environmental education and environmental interpretation.

### 4.9.1 Identification of Long Term Management Activities

Typical SCDNR management involves the protection of the resource in addition to management. Traditional management involves the enhancement of natural systems to promote appropriate ecological conditions and improve habitat quality for wildlife and plant species. Judicious timber harvesting opens up the canopy and stimulates understory development that is beneficial to certain species of plants and animals, and can be a valuable tool in restoring degraded and altered ecosystems. SCDNR may thin and/or clearcut pine plantations on Gunter's Island. If plantations are removed, they may be allowed to regenerate naturally or be replanted to the appropriate ecological condition. The appropriate ecological condition will be determined by an examination of the soil type of each site and a topographical review of each area. This could

include the conversion of predominately loblolly pine stands to longleaf pine or to a mixed hardwood community.

Other enhancements may include under-planting in certain stands with sparse longleaf pine overstory and selective thinning to enhance natural stands that have achieved crown closure. Traditionally, hardwood stands are protected as a part of SCDNR management, unless tree species composition or stand health can be improved. The use of prescribed fire may also be implemented to restore and maintain fire-dependent ecosystems, promoting both species and habitat diversity.

Prescribed fire, in addition to other appropriate control measures, such as the use of herbicides or mechanical means (i.e. mowing or Gyro trac), may be implemented to control exotic and invasive species. Other management activities may include research studies or the maintenance of roads for public and management access.

### 4.9.2 Funding Mechanism

Any management activities following completion of the monitoring period and closure of the Site as specified in this mitigation plan will be funded through monetary appropriations by SCDNR and the Heritage Trust Program.

## 5.0 Conclusive Summary

The I-73 Compensatory Mitigation Plan represents a unique opportunity to accomplish landscape scale conservation of outstanding resources, consistent with ongoing regional conservation efforts and goals in accordance with the 2008 Mitigation Rule. The Rule describes the components of a mitigation plan (33 C.F.R. § 332.4(c)). All information, documentation, and evidence provided throughout this document meet all criteria set forth in the 2008 Mitigation Rule for a successful and appropriate mitigation plan.

The I-73 Compensatory Mitigation Plan has identified a site that is a high priority for acquisition and preservation within the same watershed as the majority of the impacts from I-73 construction. The plan meets identified watershed goals and objectives, landscape scale watershed approach, and the requirements for preservation as listed in the 2008 rule for mitigation. The site contains outstanding natural resources including:

- Relatively undisturbed ecosystems,
- Management for species of conservation concern,
- Unique landforms,
- Important scientific, educational, aesthetic or recreational characteristics, and
- Cultural resources.

The long-term preservation of Gunter's Island and its outstanding aquatic resources will contribute significantly to the sustainability of the watershed by providing important physical, chemical, and biological functions. The plan documents that the resources on the site are under threat from destruction or adverse modification. The site will be transferred to a third party resource agency and will be protected in perpetuity by dedication into the Heritage Trust Program. This PRM plan fully mitigates for lost aquatic resource functions and services resulting from the construction and operation of I-73. With the detailed documentation provided in this plan, the DE now has ample foundation to conclude that this plan is "environmentally preferable" and meets the requirements for mitigation through preservation as specified in 33 C.F.R. § 332.3 (f) of the Rule.

## 6.0 References


Bogan, A. E and J Alderman. Workbook and Key to the Freshwater Bivalves of South Carolina. 2004.

Mayer, Paul, M; Reynolds, Steven K, McCutchen, Marshall D.; and Canfield, Timothy J. Meta-Analysis of Nitrogen Removal in Riparian Buffers, June 27, 2007.

Nelson, John B. The Natural Communities of South Carolina. 1986

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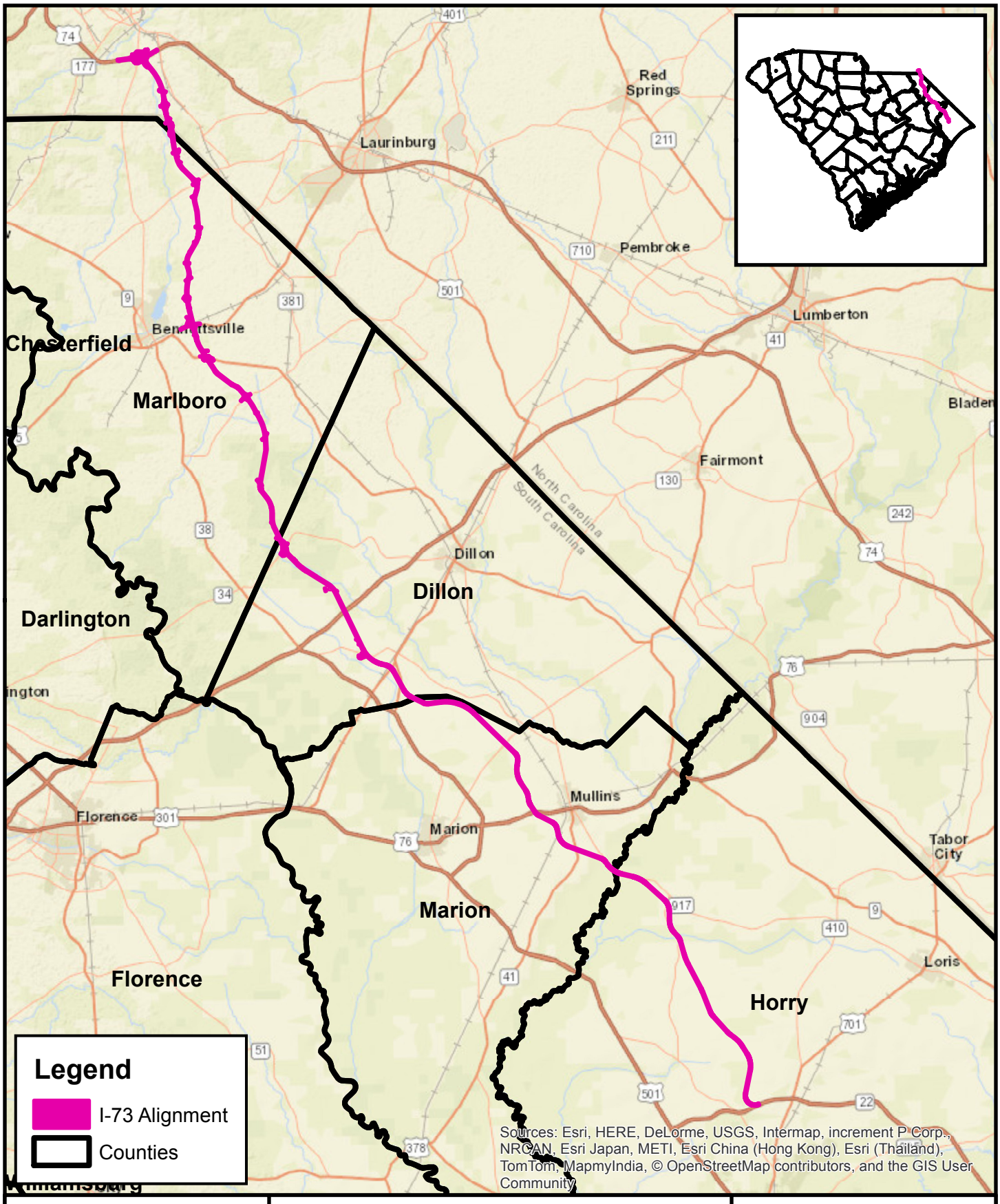
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South Carolina Department of Health and Environmental Control. Watershed Water Quality Assessment Pee Dee River Basin December 2007

Wachob, Andrew, A. Drennen Park, and Roy Newcome, Jr., South Carolina State Water Assessment Second Edition. South Carolina Department of Natural Resources. 2009.

# Figures




SCDOT
South Carolina Department of Transportation

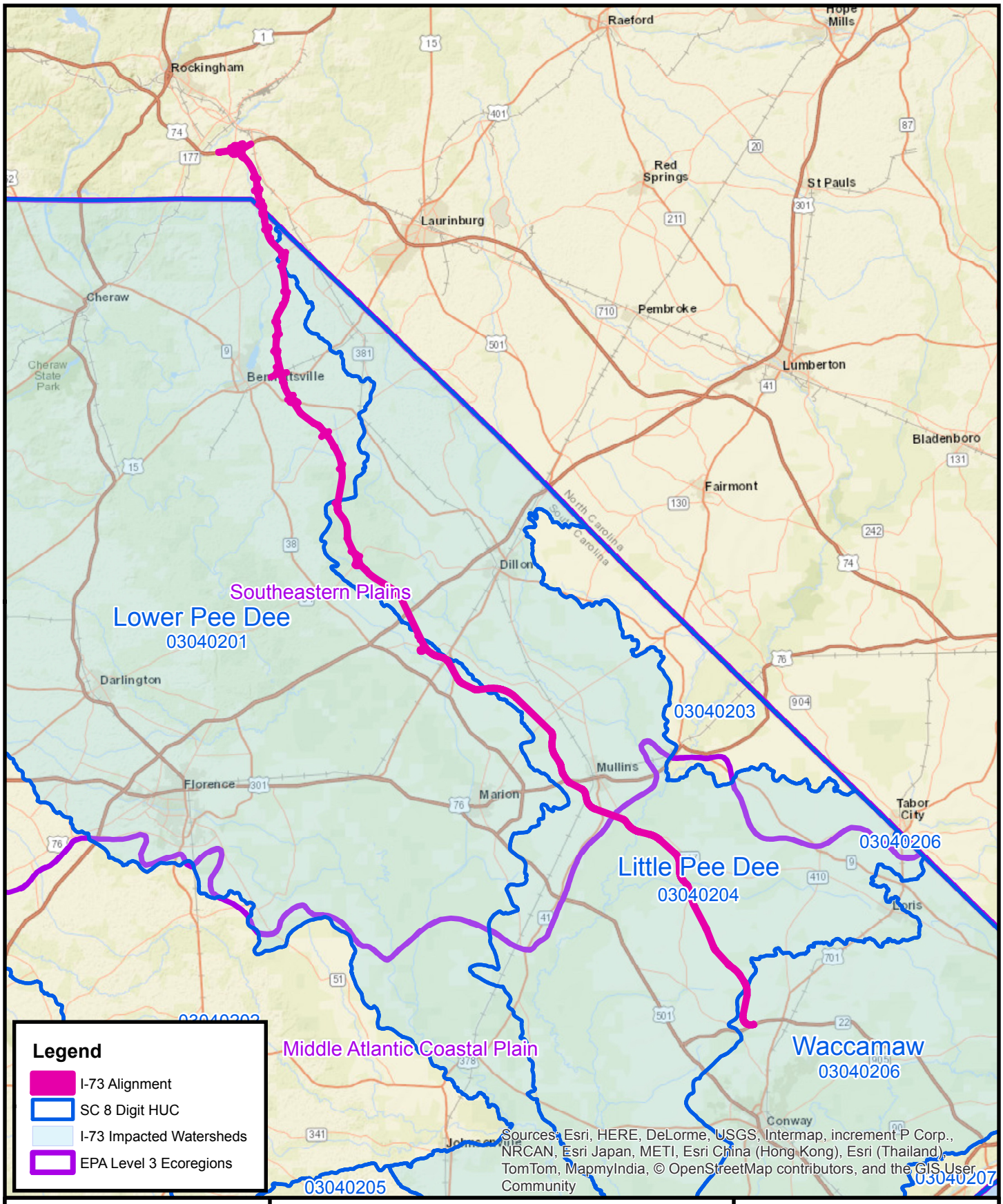
**Figure 1:**
**I-73 Location**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 21, 2017

0 2 4 8 Miles

N




South Carolina Department of Transportation

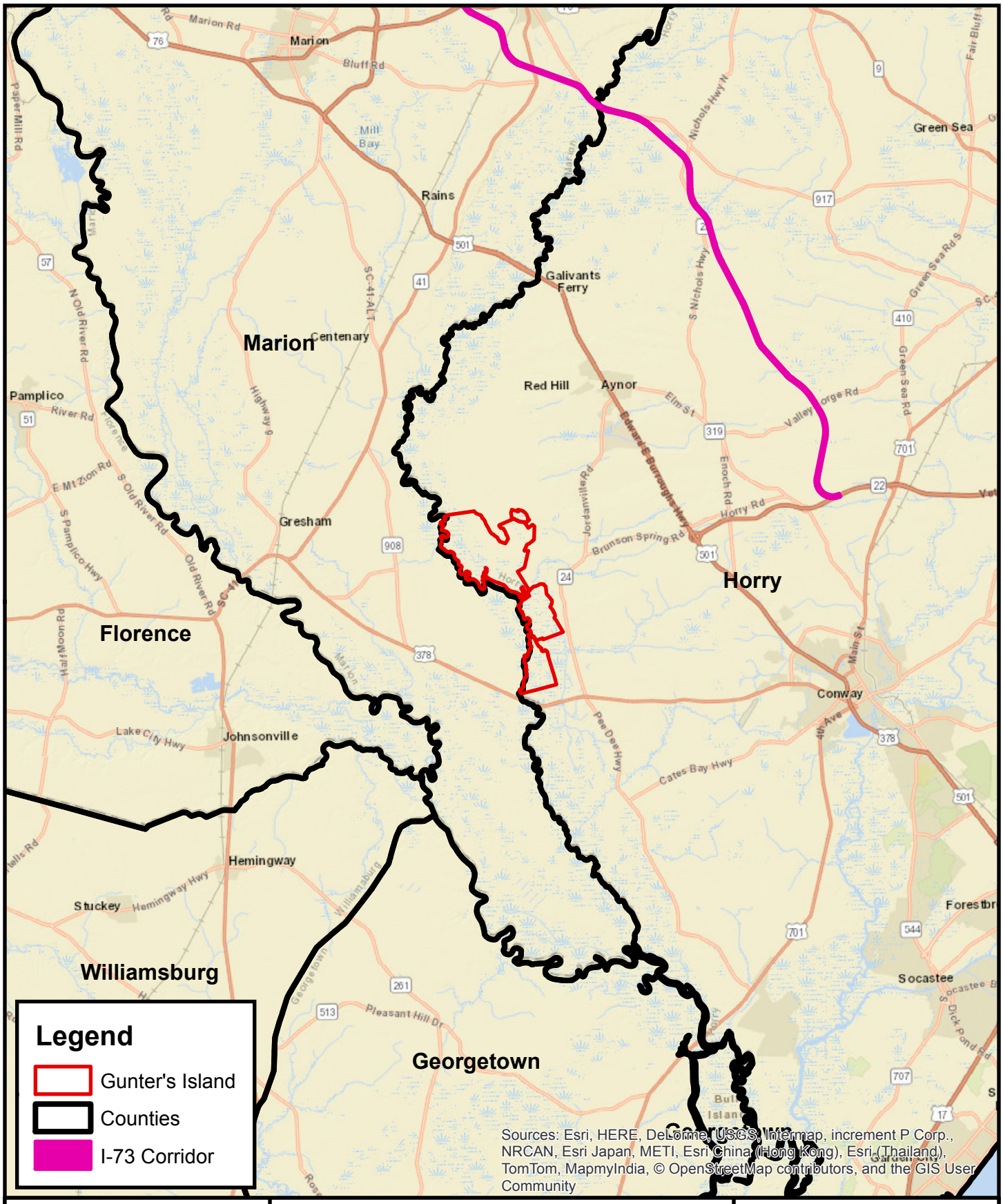
**Figure 2:**
**I-73 Watersheds and EPA Ecoregions**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 21, 2017

N

0 2.5 5 10 Miles




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South Carolina Department of Transportation

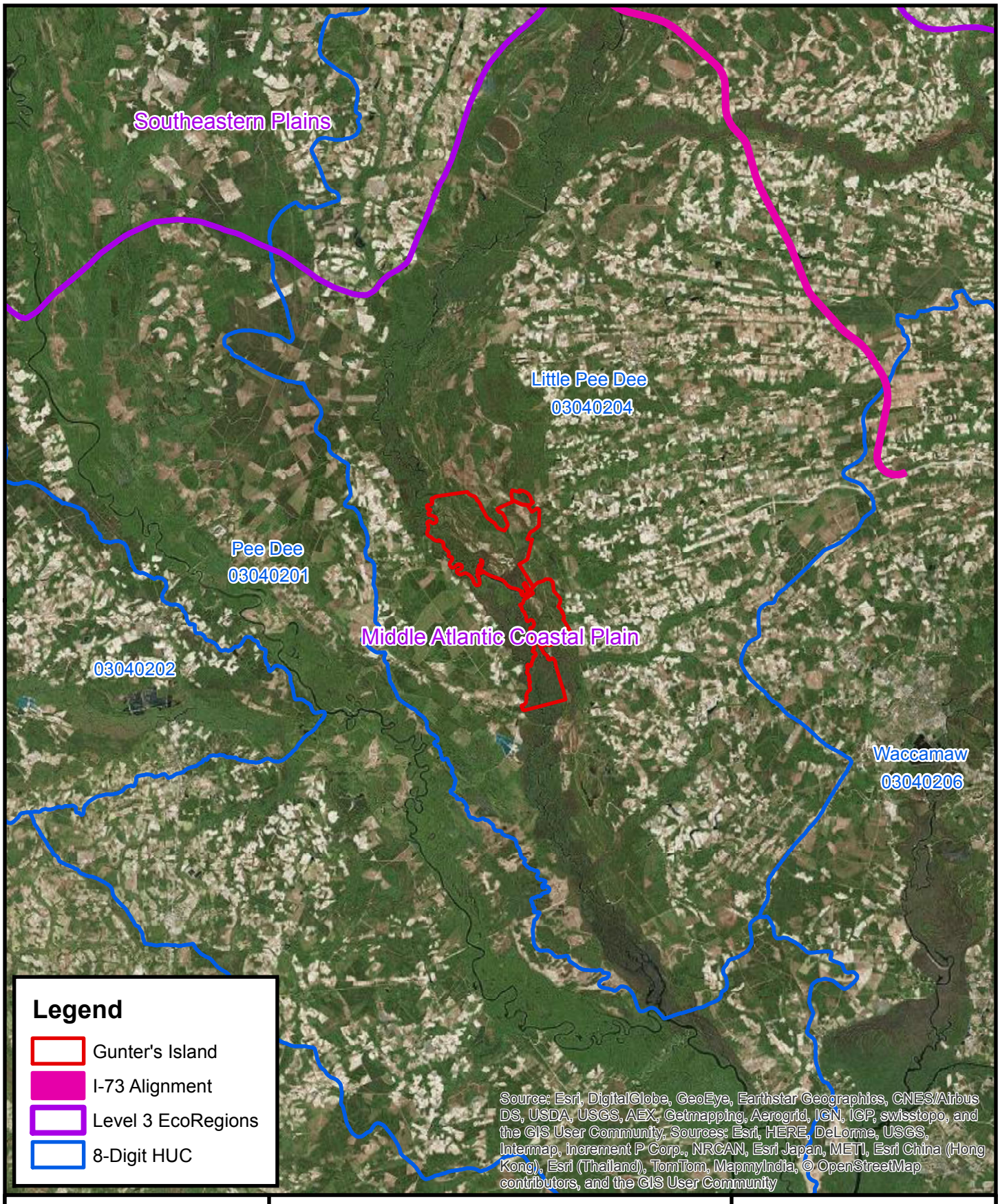
**Figure 3:**
**Gunter's Island Tract Location**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 21, 2017

N

0 2.5 5 Miles




South Carolina Department of Transportation

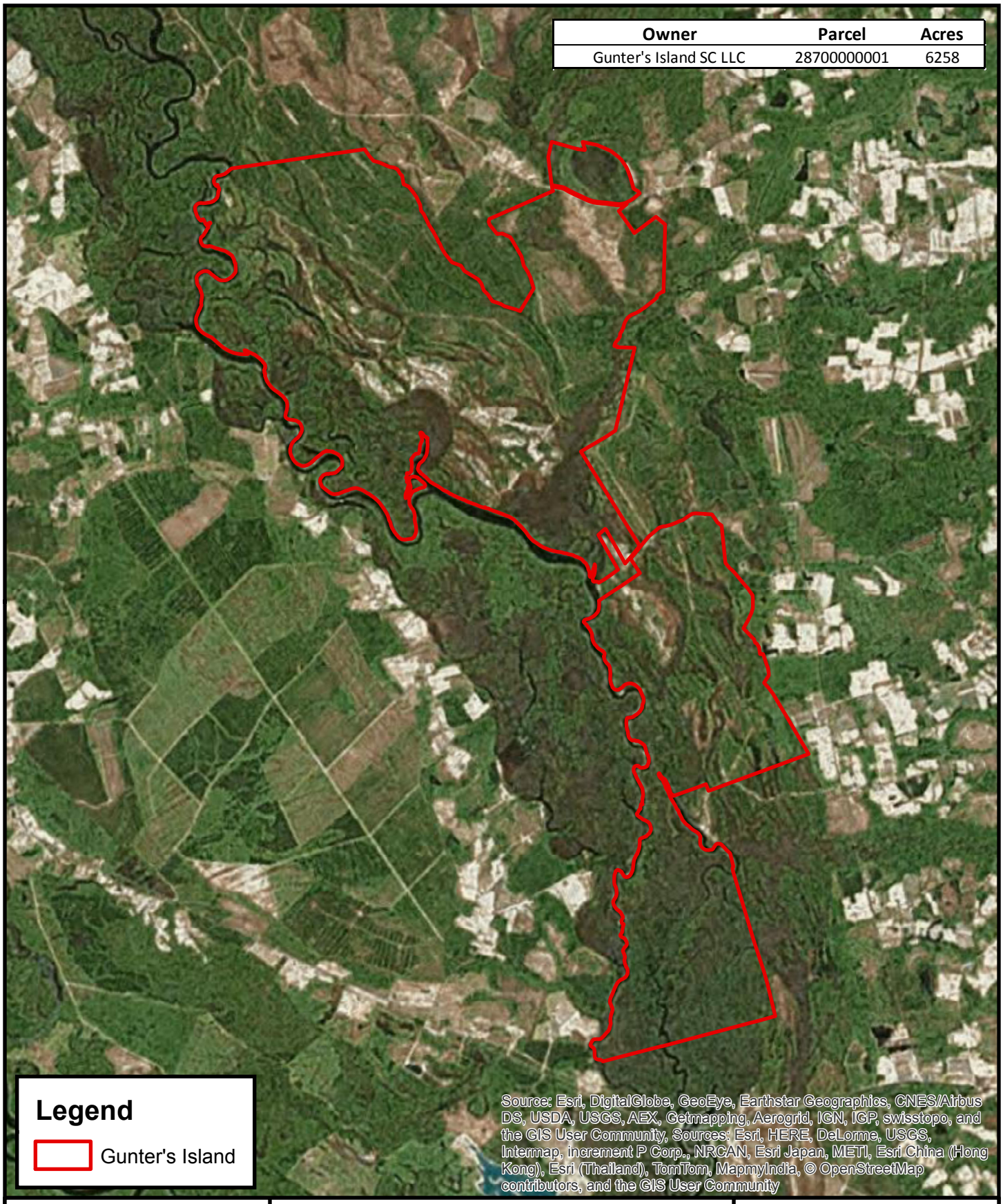
**Figure 4:**
**Gunter's Island Ecoregion and Watershed**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 21, 2017

N

0 2 4 Miles




SCDOT
South Carolina Department of Transportation

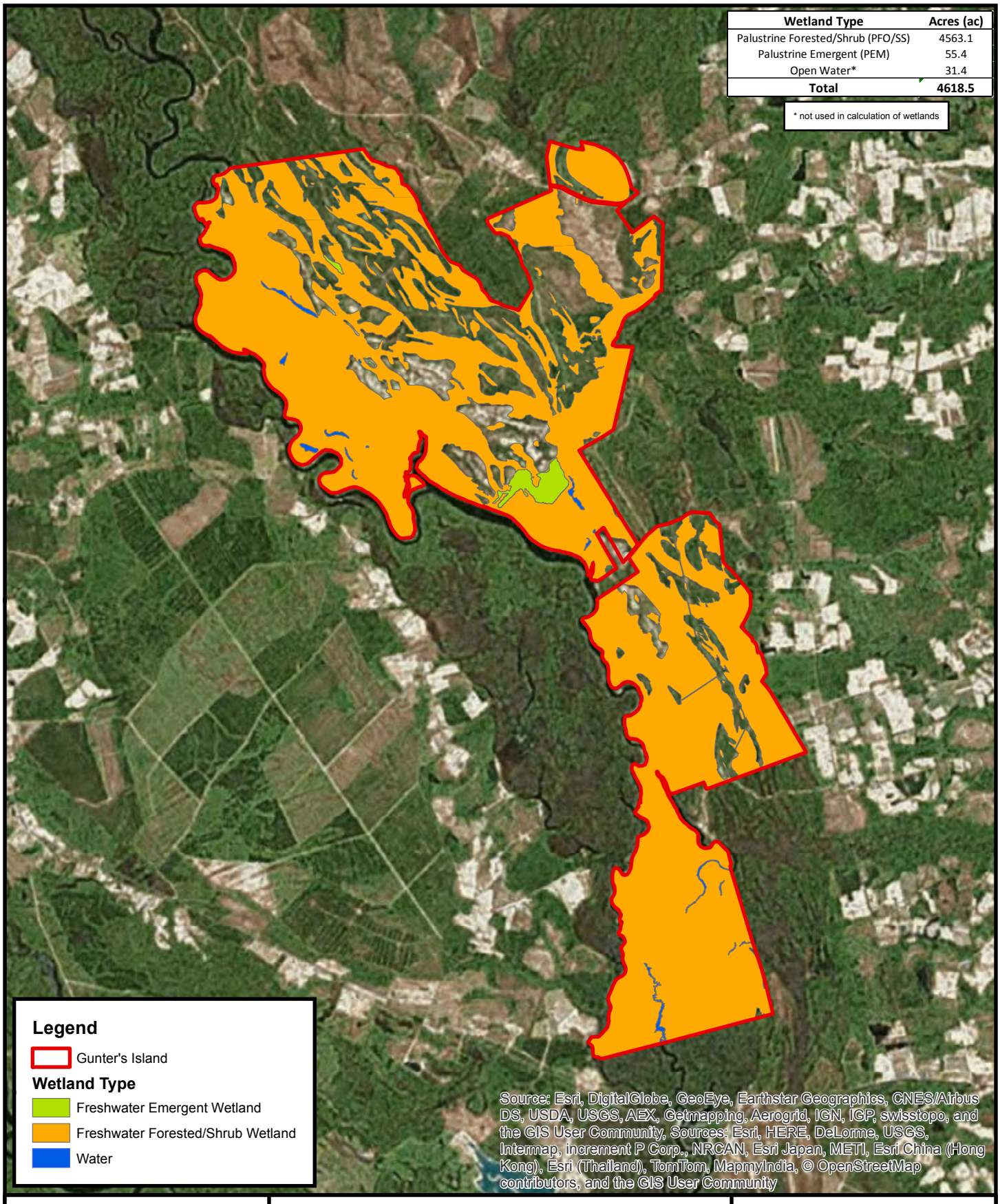
**Figure 5:**
**Gunter's Island Tract**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 21, 2017

0 0.5 1 Miles

N




SCDOT
South Carolina Department of Transportation

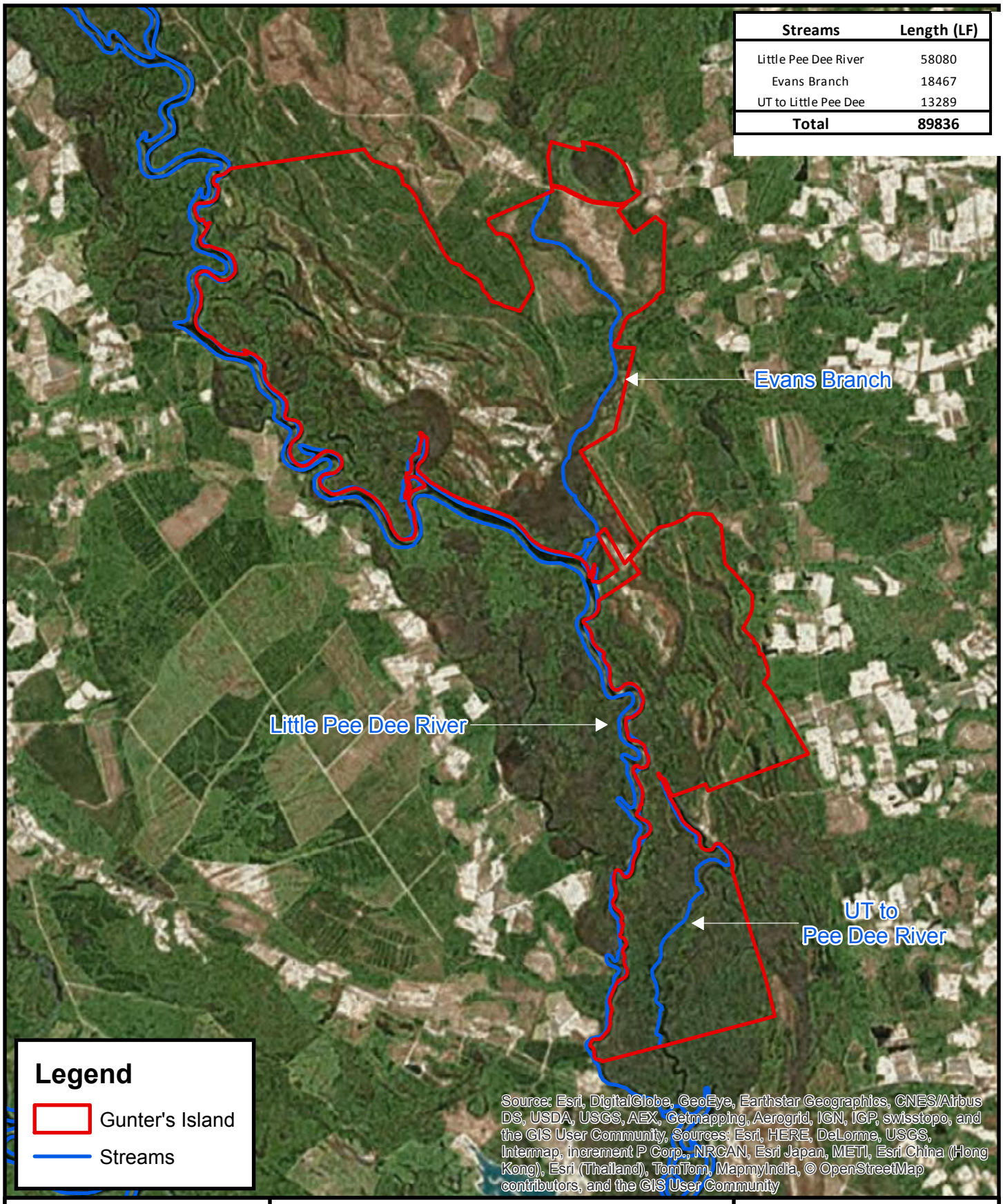
## Figure 6:
## Gunter's Island - Wetlands

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 21, 2017

N

0 0.5 1 Miles




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South Carolina Department of Transportation

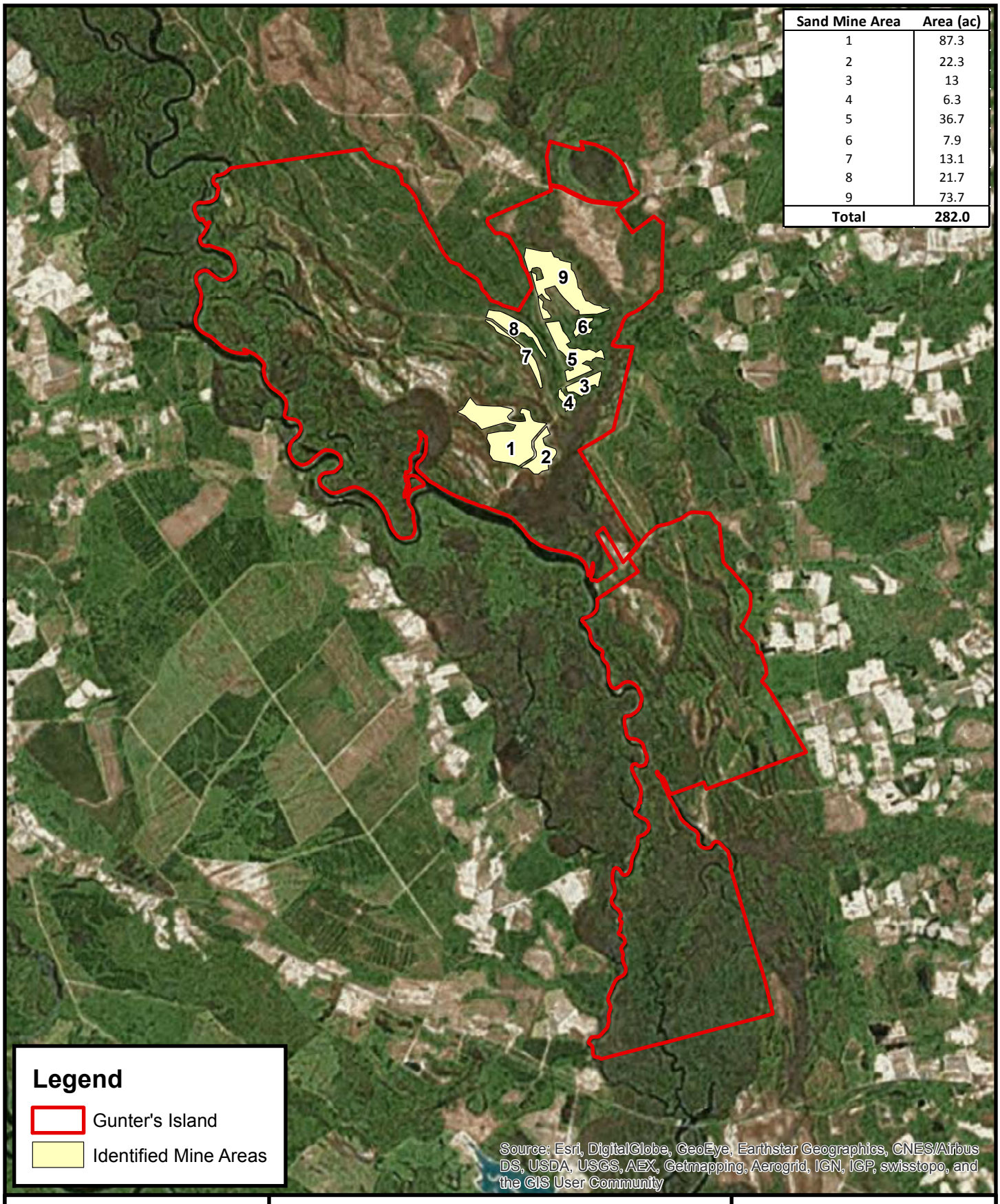
**Figure 7:**
**Gunter's Island - Streams**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 0.5 1 Miles




| Sand Mine Area | Area (ac) |
|---|---|
| 1 | 87.3 |
| 2 | 22.3 |
| 3 | 13 |
| 4 | 6.3 |
| 5 | 36.7 |
| 6 | 7.9 |
| 7 | 13.1 |
| 8 | 21.7 |
| 9 | 73.7 |
| **Total** | **282.0** |

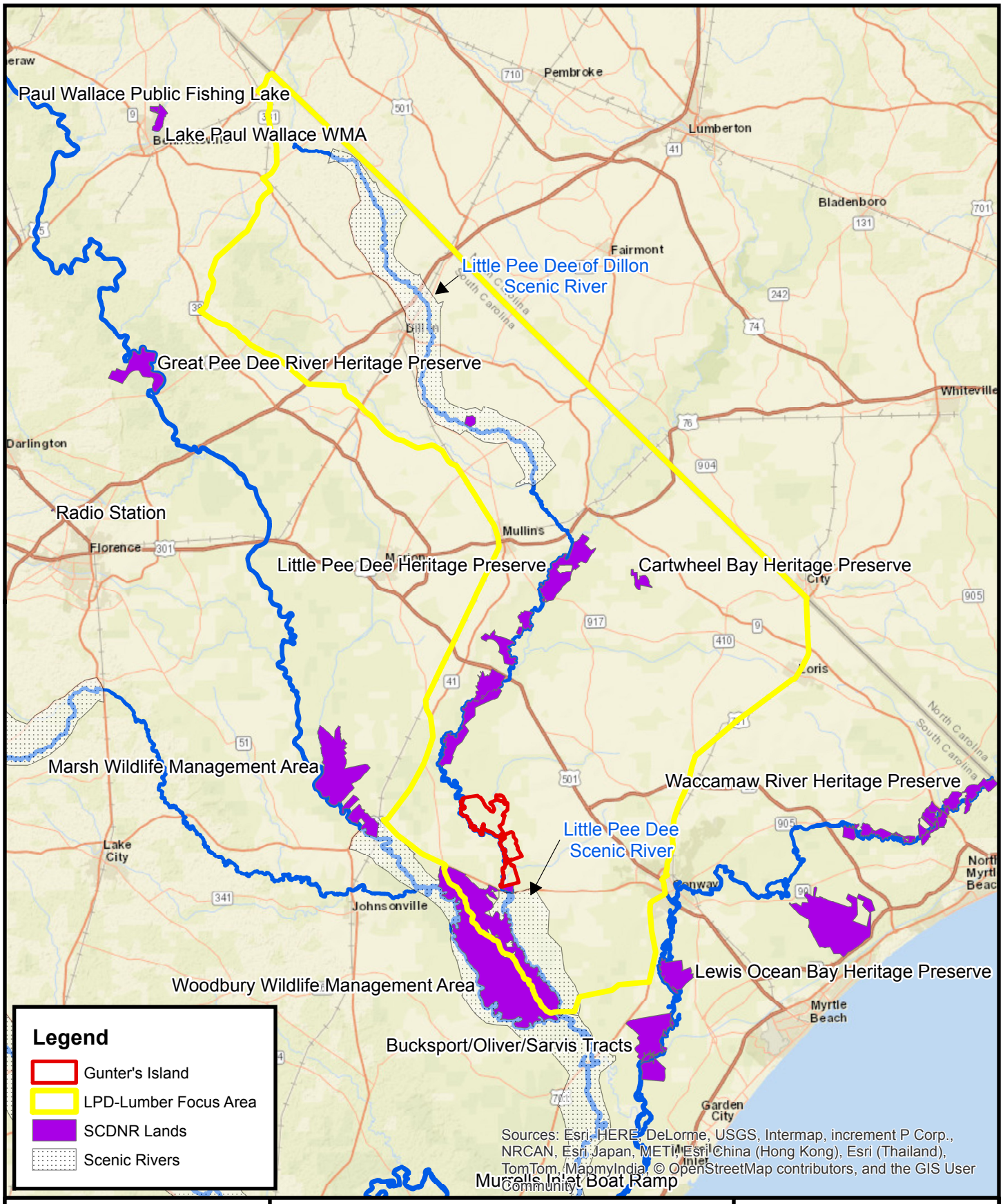
SCDOT
South Carolina Department of Transportation

**Figure 8:**
**Gunter's Island -**
**Areas Identified for Sand Mining**
I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 0.5 1 Miles

N




SCDOT
South Carolina Department of Transportation

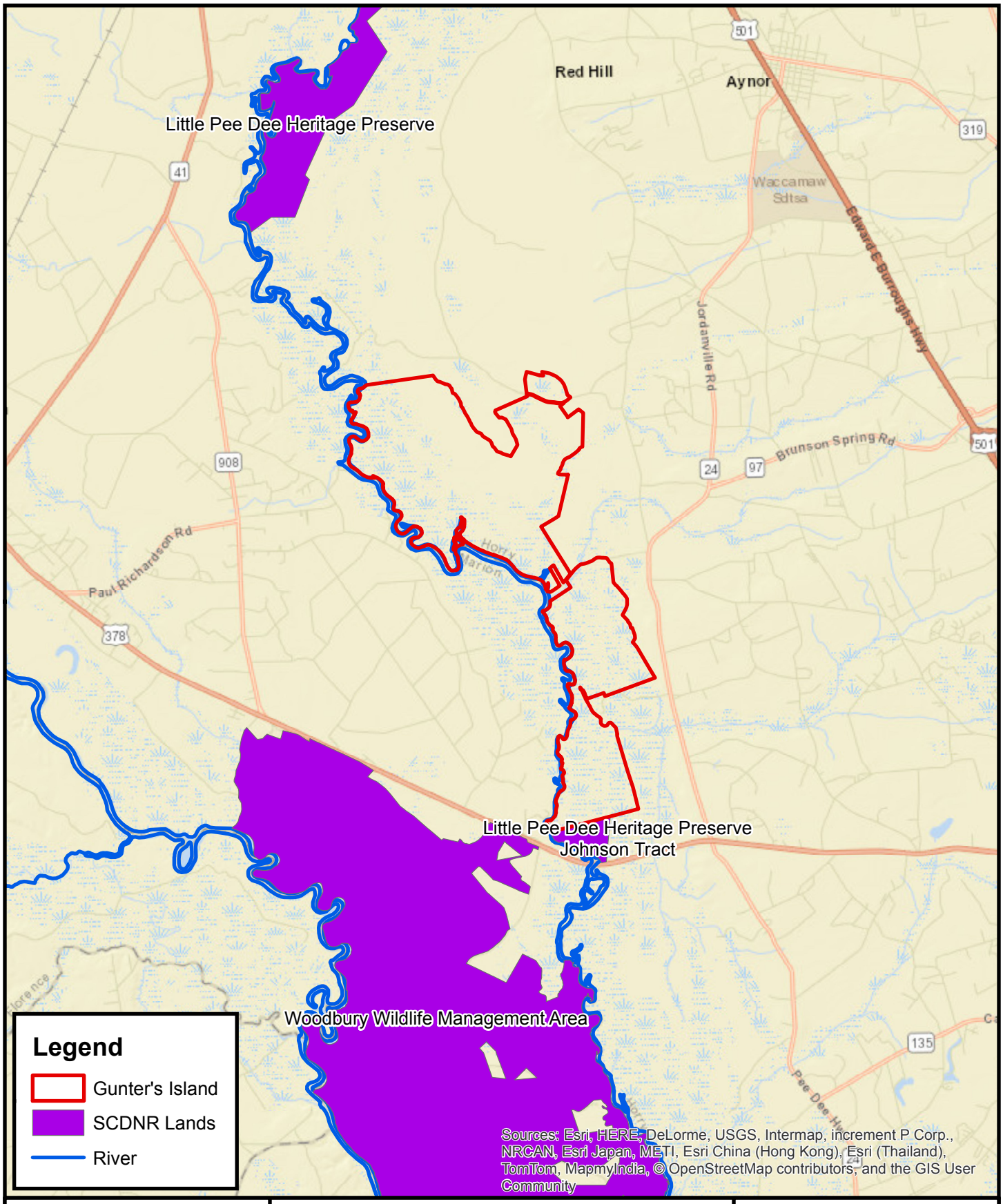
**Figure 9:**
**Little Pee Dee-Lumber Focus Area**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 5 10 Miles




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South Carolina Department of Transportation

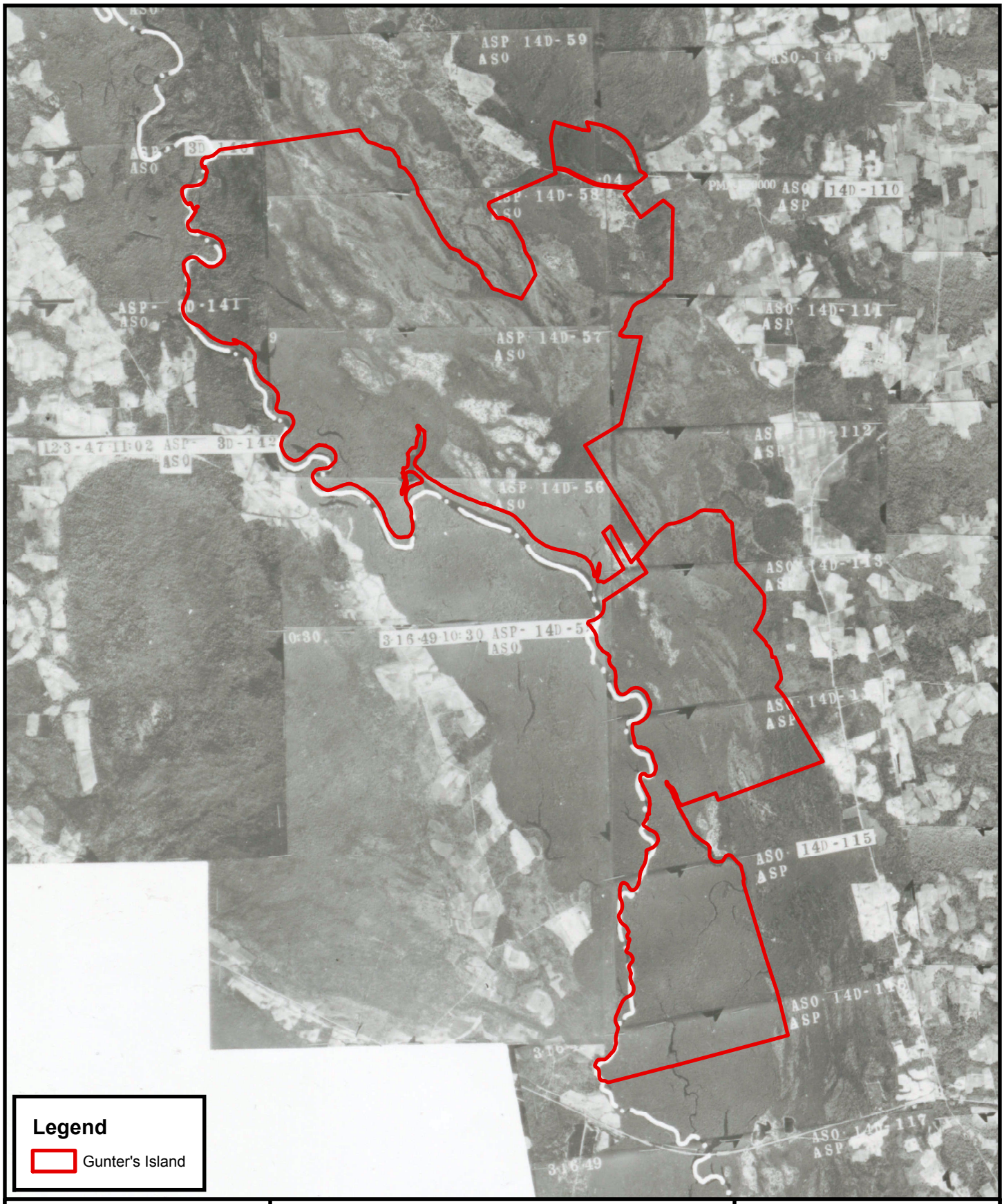
**Figure 10:**
**Gunter's Island - SCDNR Local**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 1 2 Miles




SCDOT
South Carolina Department of Transportation

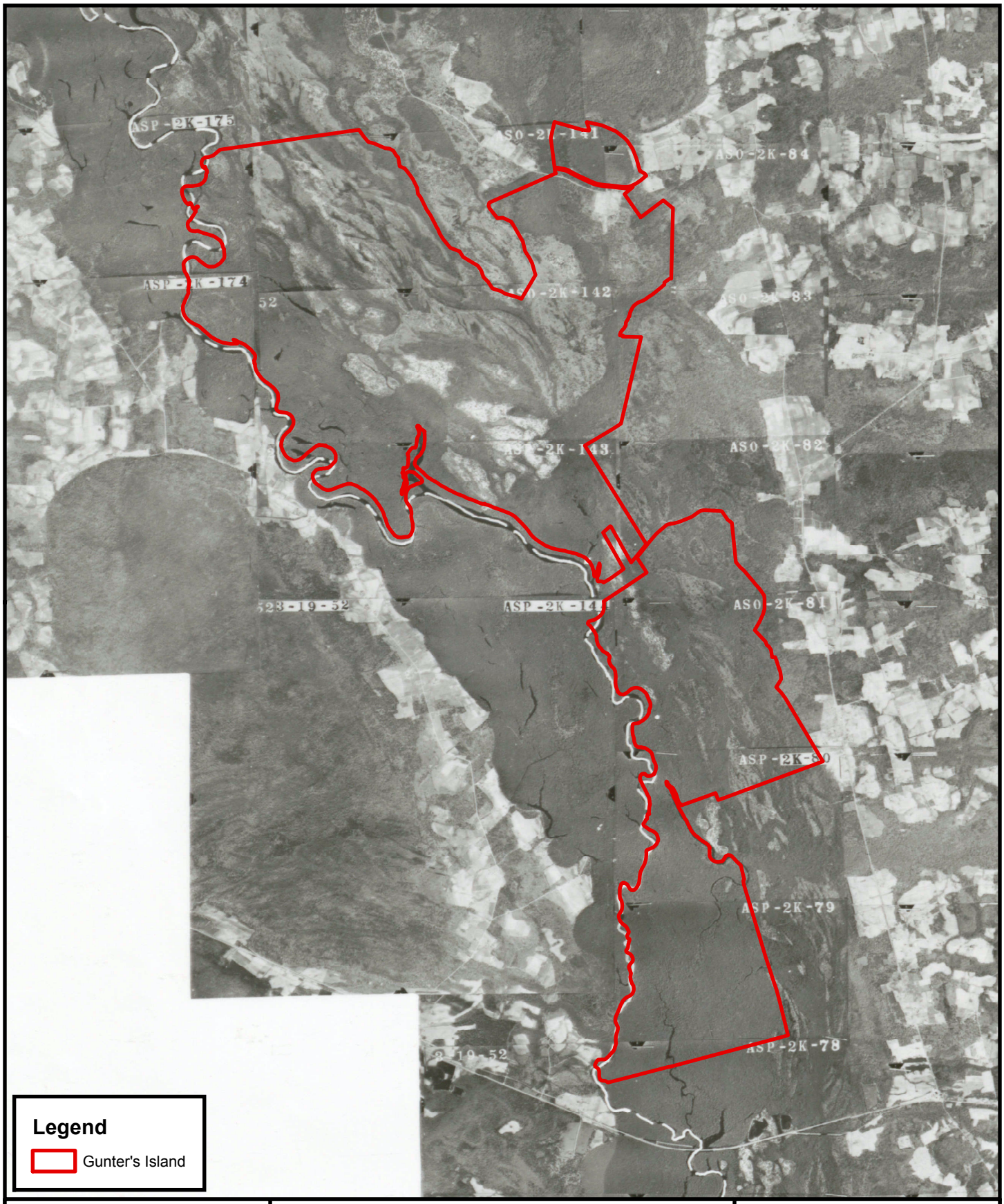
**Figure 11:**
**Gunter's Island - Historic Aerial 1949**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 0.5 1 Miles




SCDOT
South Carolina Department of Transportation

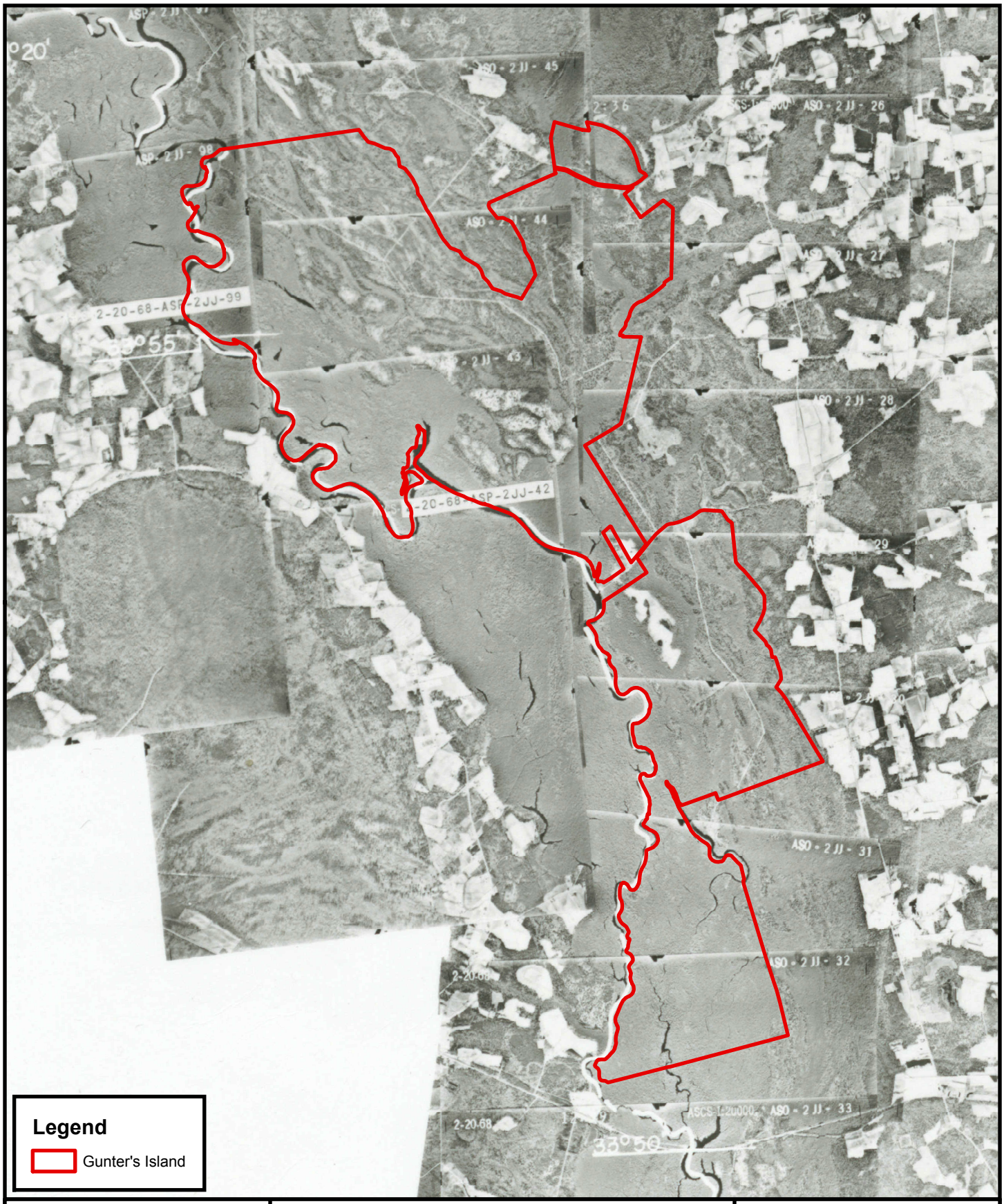
**Figure 12:**
**Gunter's Island - Historic Aerial 1952**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 0.5 1 Miles




South Carolina Department of Transportation

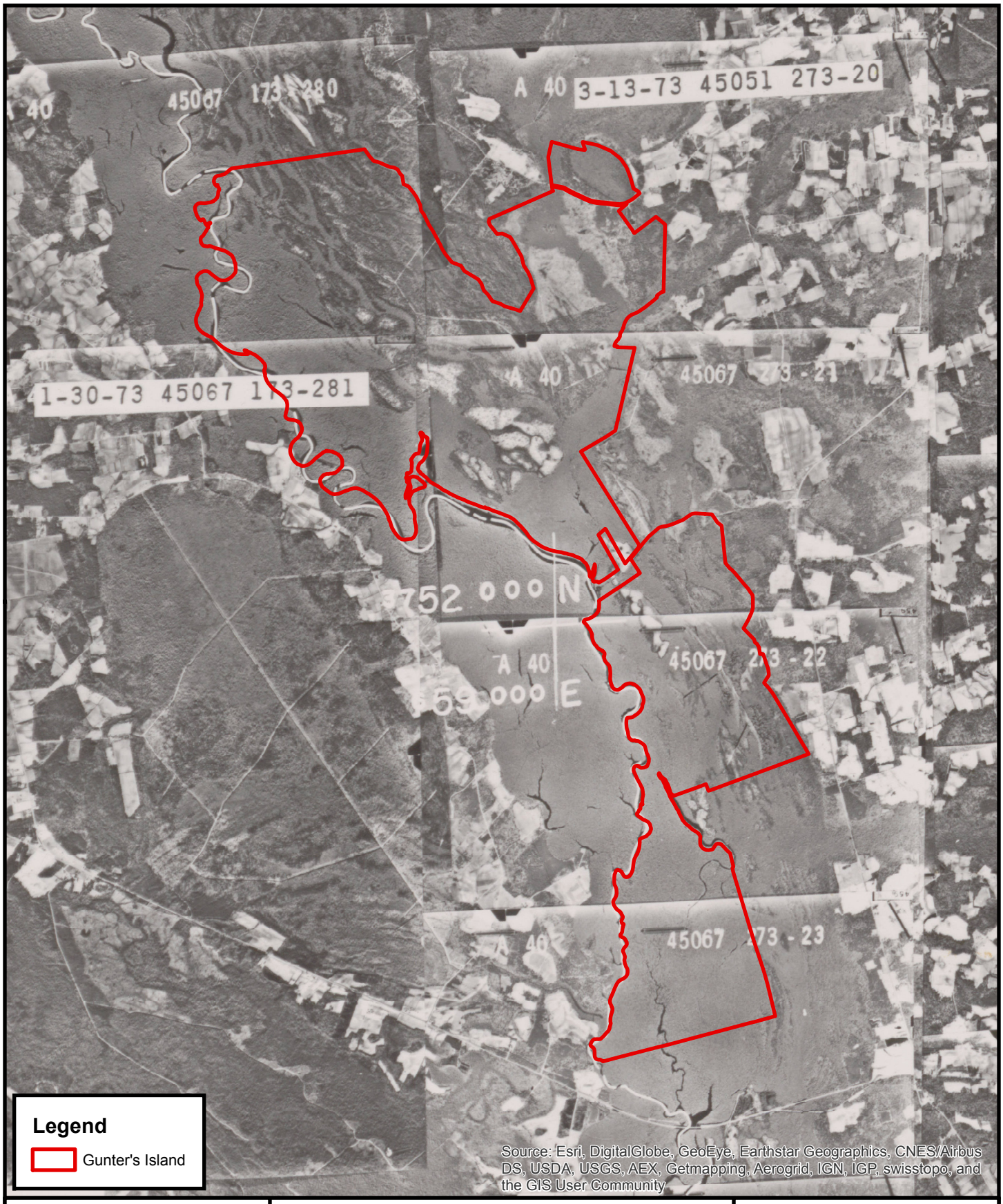
**Figure 13:**
**Gunter's Island - Historic Aerial 1968**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 0.5 1 Miles




South Carolina Department of Transportation

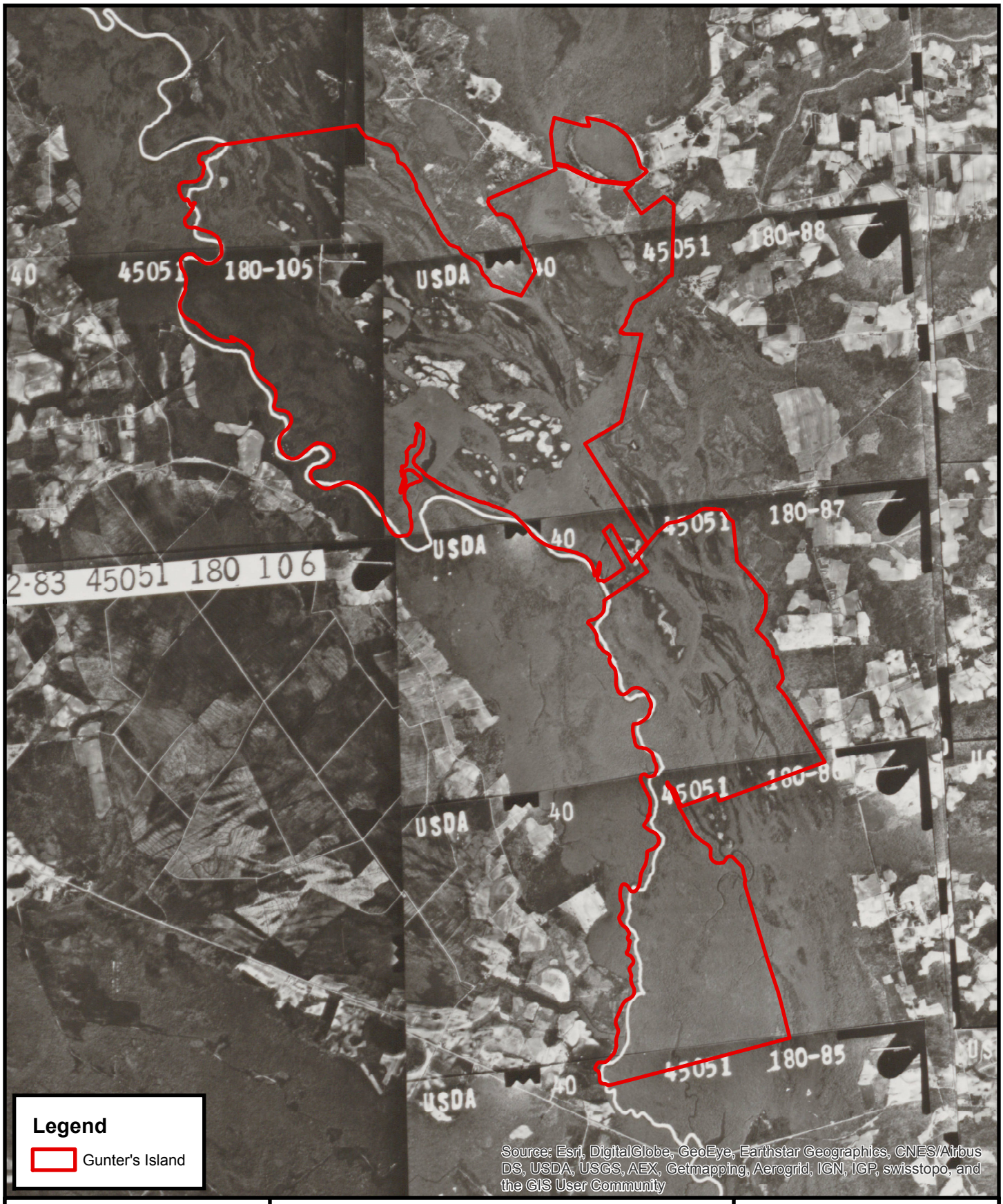
**Figure 14:**
**Gunter's Island - Historic Aerial 1973**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 0.5 1 Miles

N




South Carolina Department of Transportation

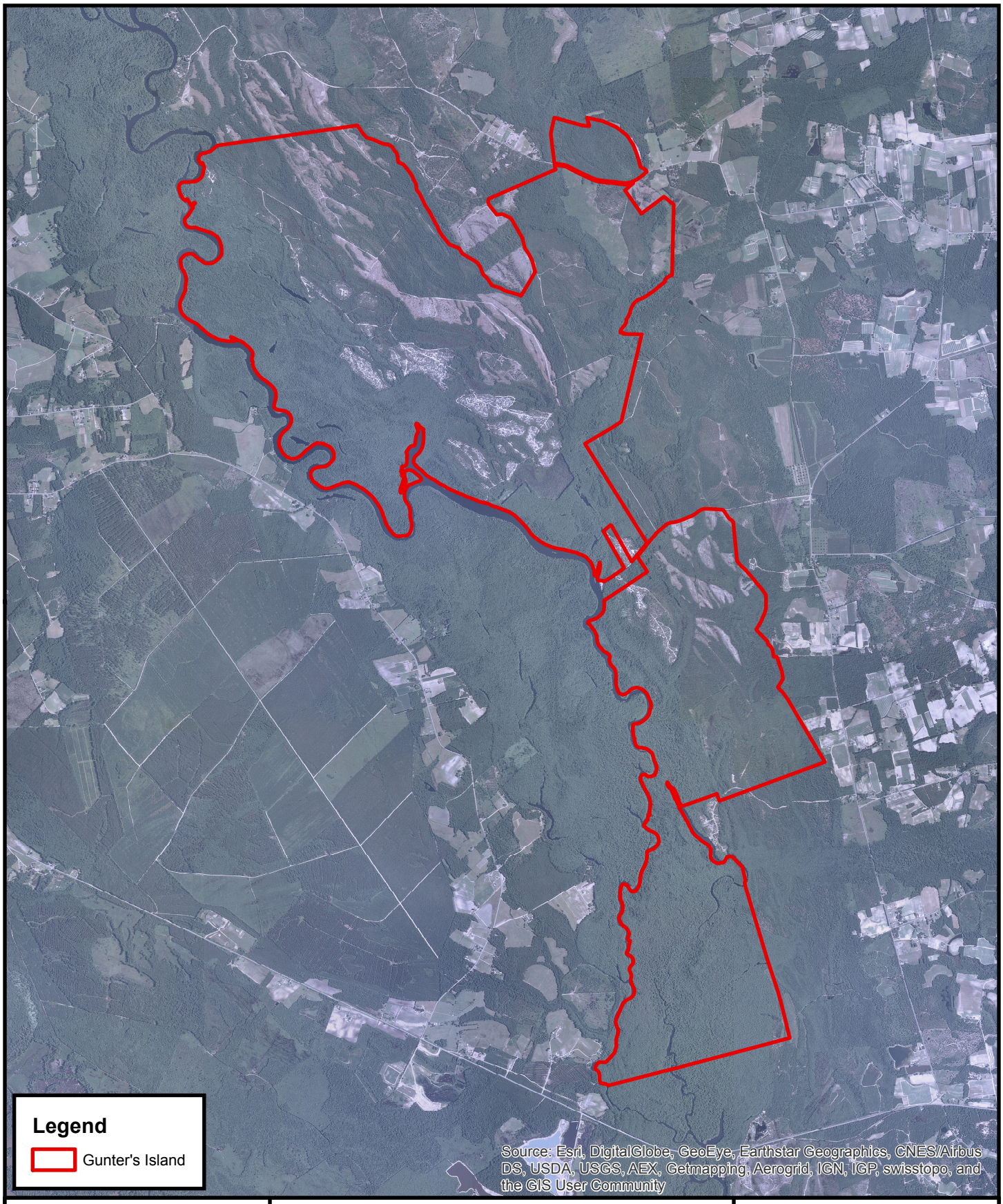
**Figure 15:**
**Gunter's Island - Historic Aerial 1983**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 0.5 1 Miles




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South Carolina Department of Transportation

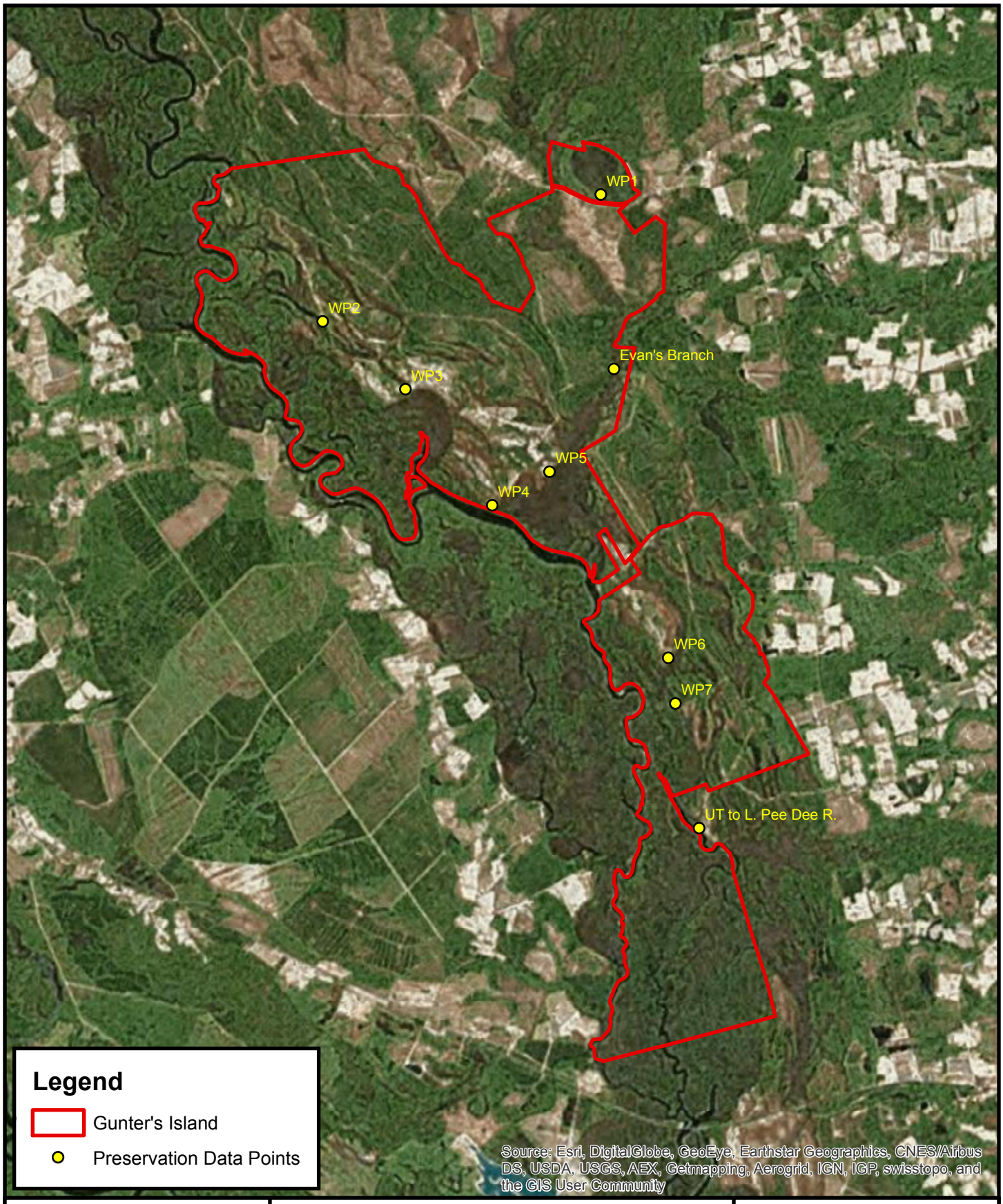
**Figure 16:**
**Gunter's Island - Historic Aerial 2003**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 0.5 1 Miles




South Carolina Department of Transportation

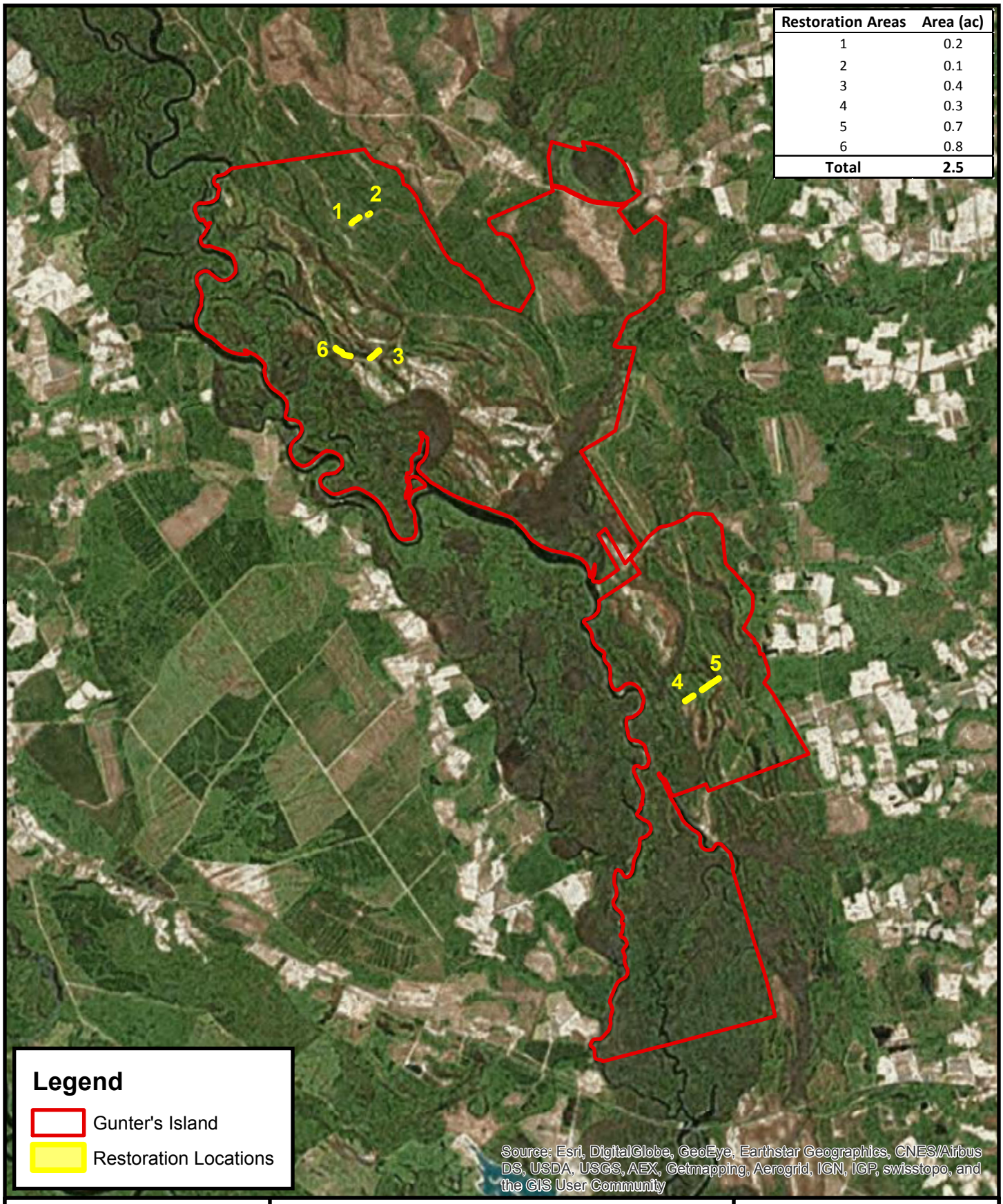
**Figure 17:**
**Gunter's Island - Preservation Locations**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 0.5 1 Miles

N




| Restoration Areas | Area (ac) |
|---|---|
| 1 | 0.2 |
| 2 | 0.1 |
| 3 | 0.4 |
| 4 | 0.3 |
| 5 | 0.7 |
| 6 | 0.8 |
| **Total** | **2.5** |

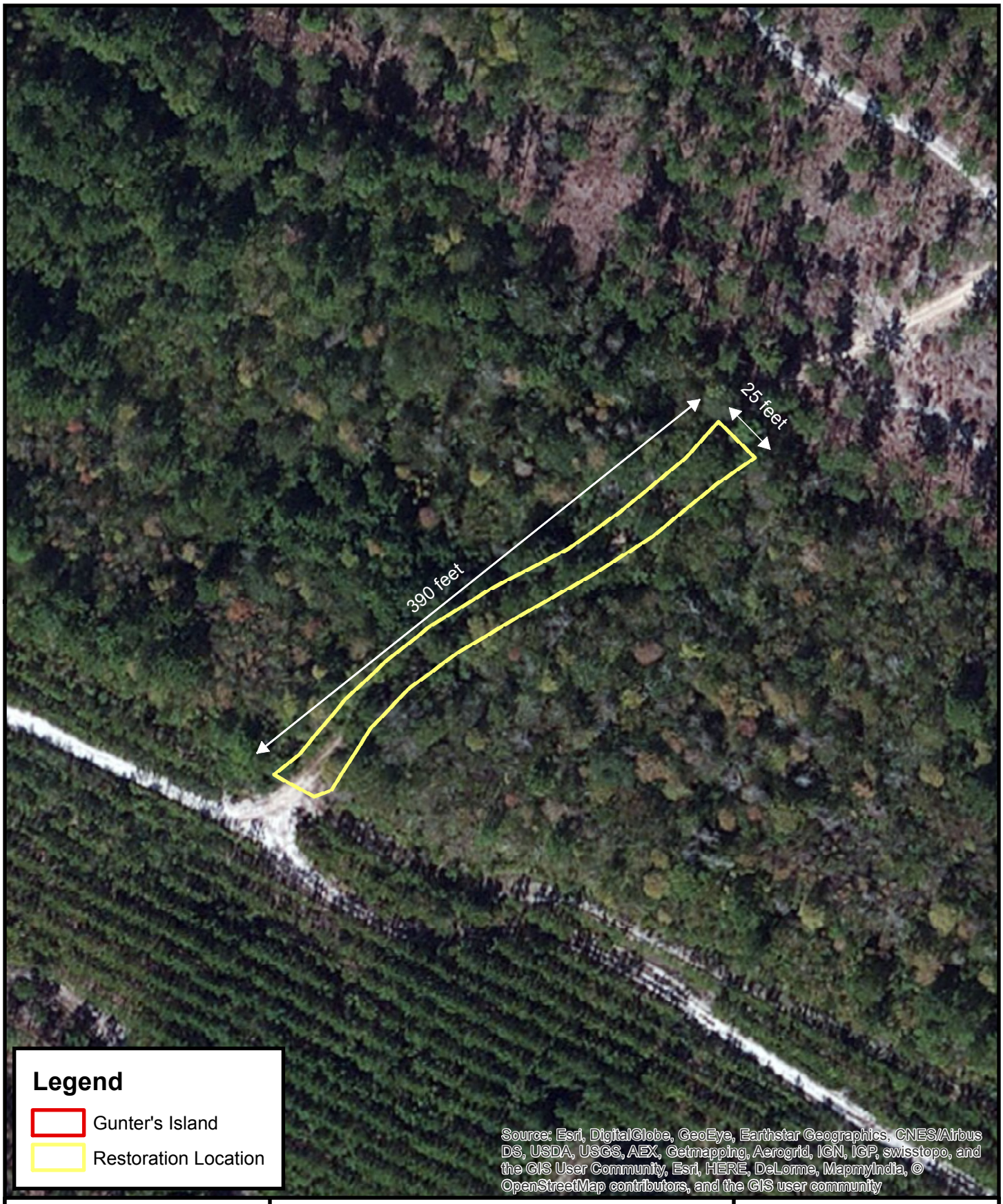
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**Figure 18:**
**Gunter's Island**
**Restoration Locations**
I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 0.5 1 Miles




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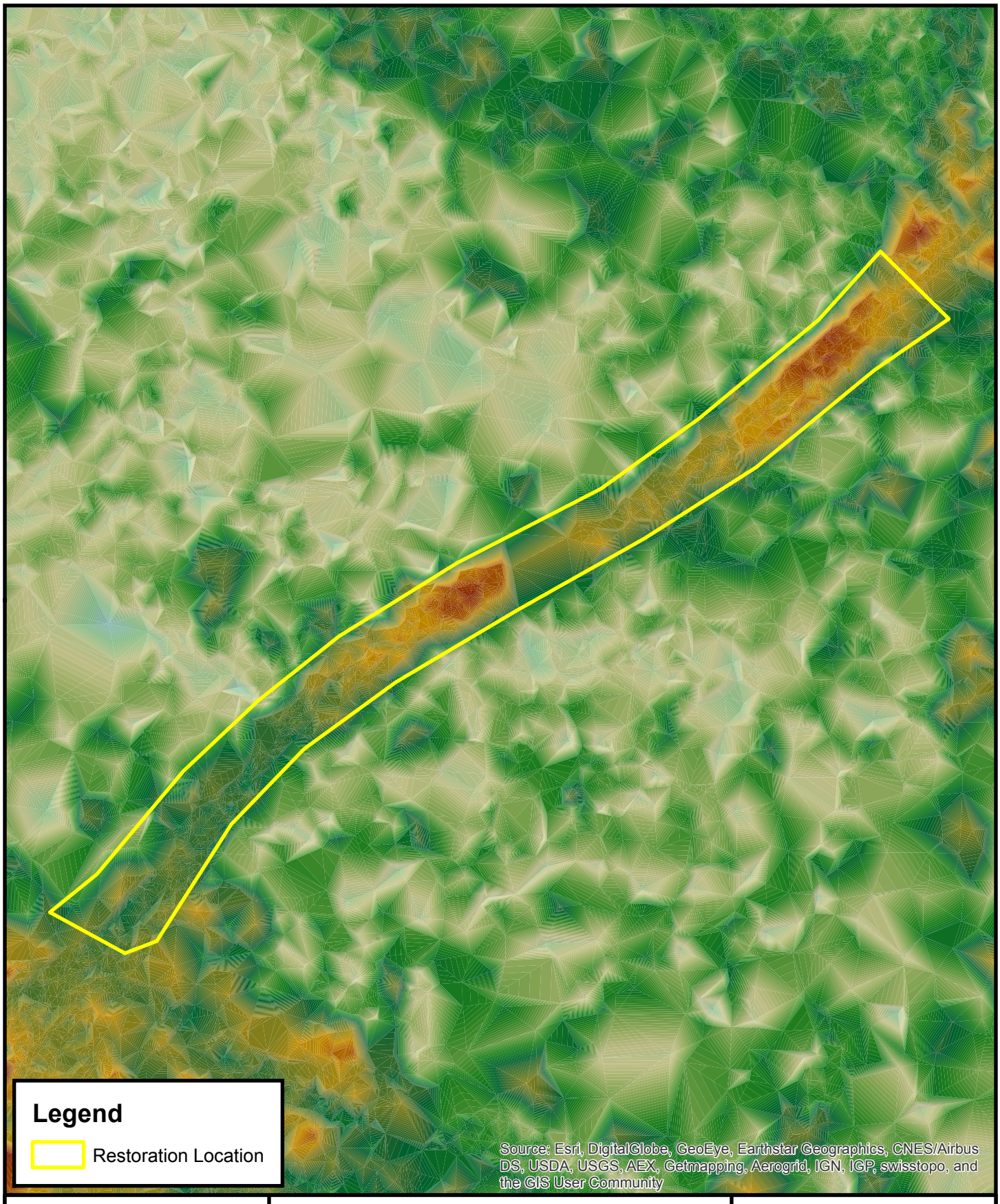
**Figure 19:**
**Gunter's Island**
**Restoration Location 1**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 50 100 Feet

N




South Carolina Department of Transportation

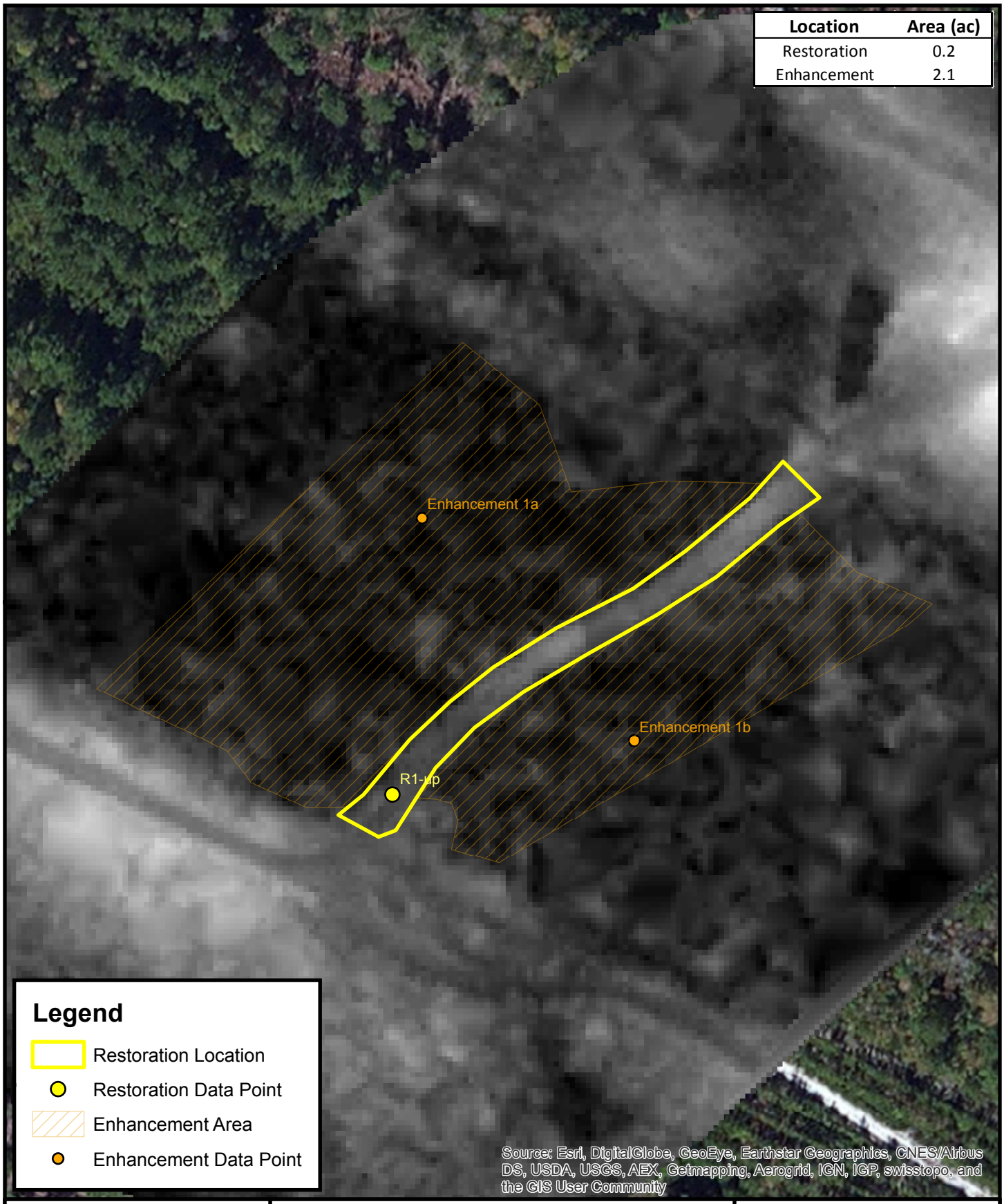
**Figure 20:**
**Gunter's Island**
**Restoration Location 1 - LiDAR**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 25 50 Feet

N




South Carolina Department of Transportation

**Figure 21:**
**Gunter's Island**
**Restoration Location 1-Enhancement**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 13, 2017

0 50 100 Feet

N




South Carolina Department of Transportation

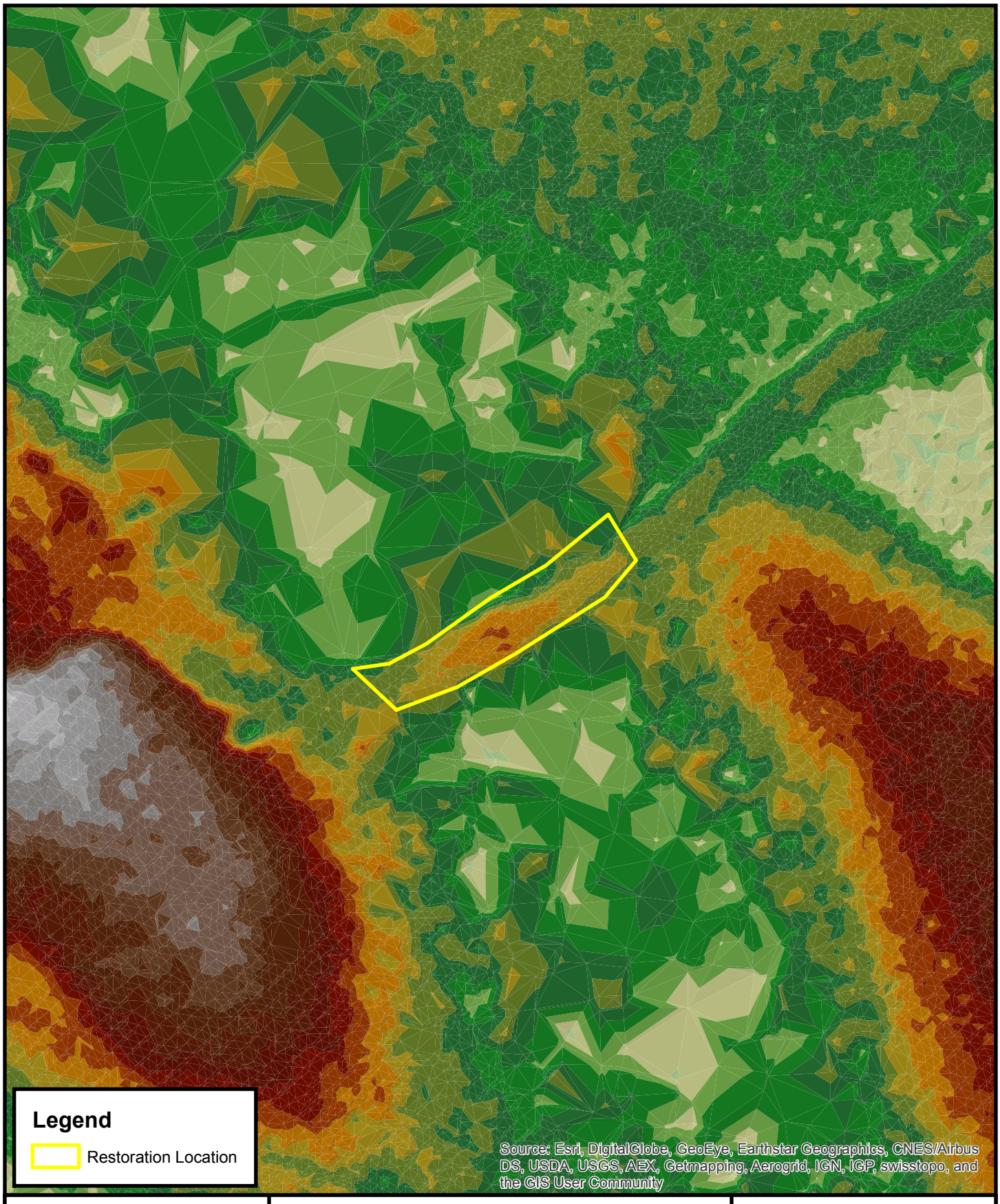
**Figure 22:**
**Gunter's Island**
**Restoration Location 2**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 25 50 Feet

N




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South Carolina Department of Transportation

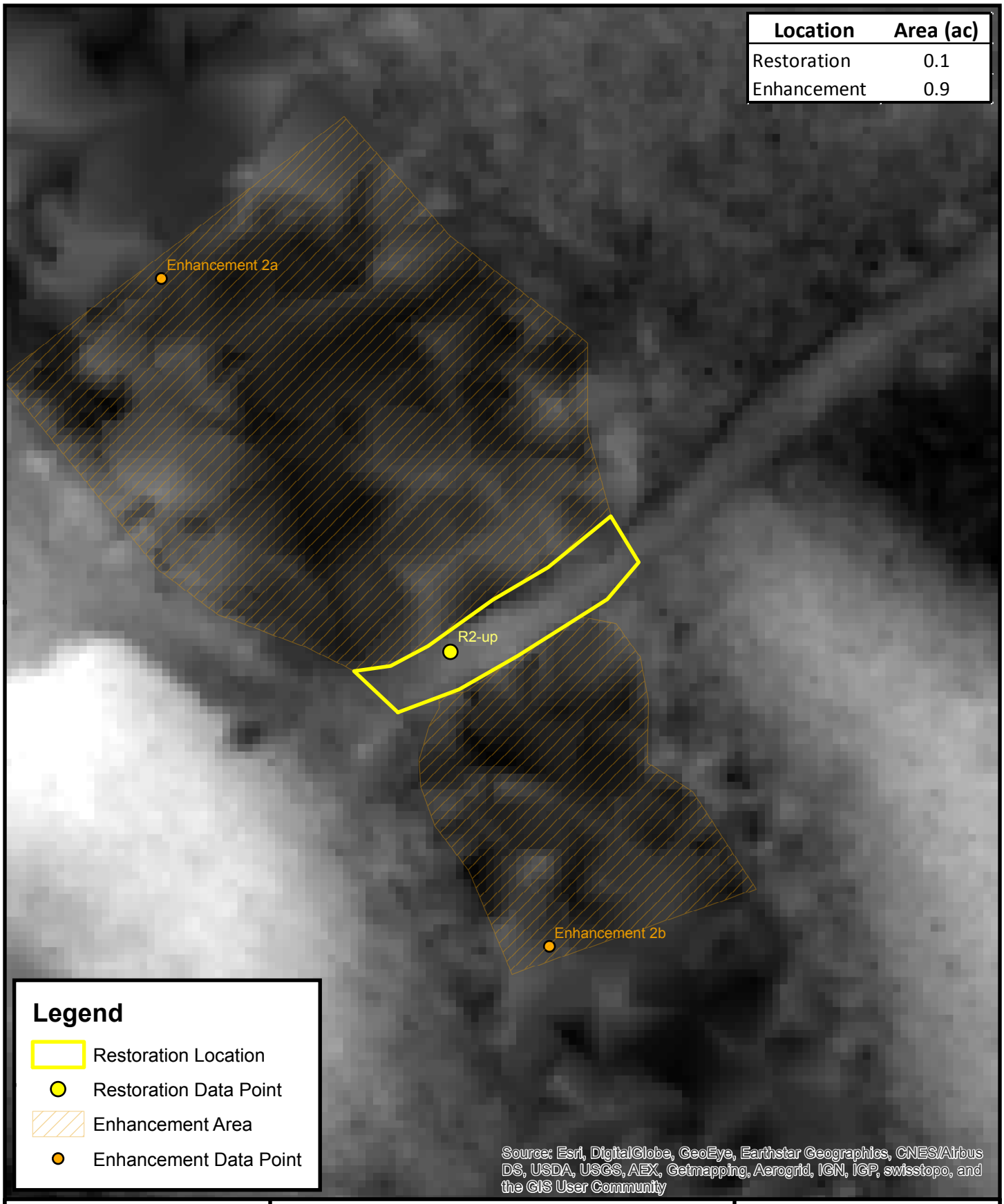
**Figure 23:**
**Gunter's Island**
**Restoration Location 2 - LiDAR**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 25 50 Feet




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**Figure 24:**
**Gunter's Island**
**Restoration Location 2 - Enhancement**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 25 50 Feet

N




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South Carolina Department of Transportation

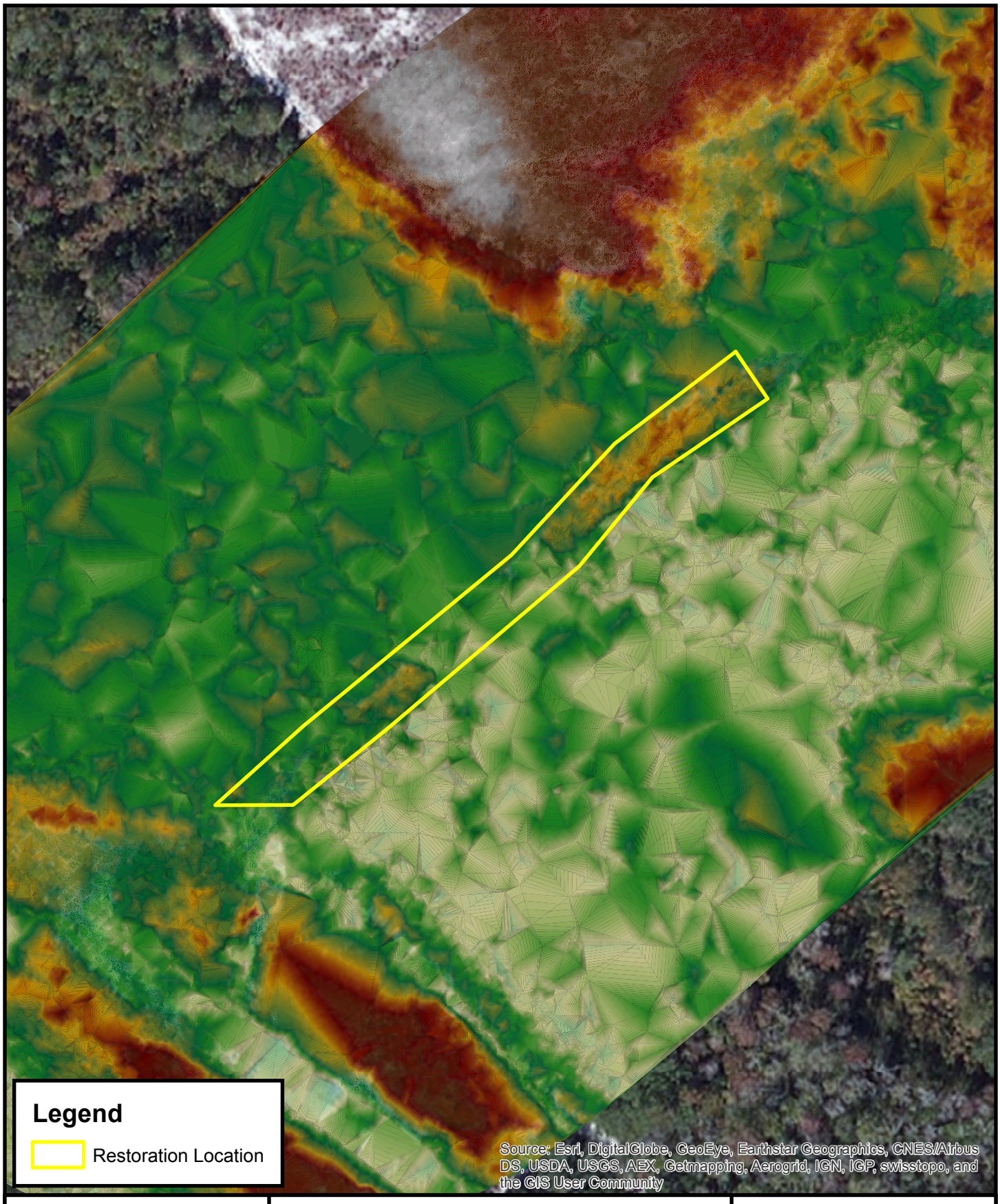
**Figure 25:**
**Gunter's Island**
**Restoration Location 3**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 50 100 Feet




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South Carolina Department of Transportation

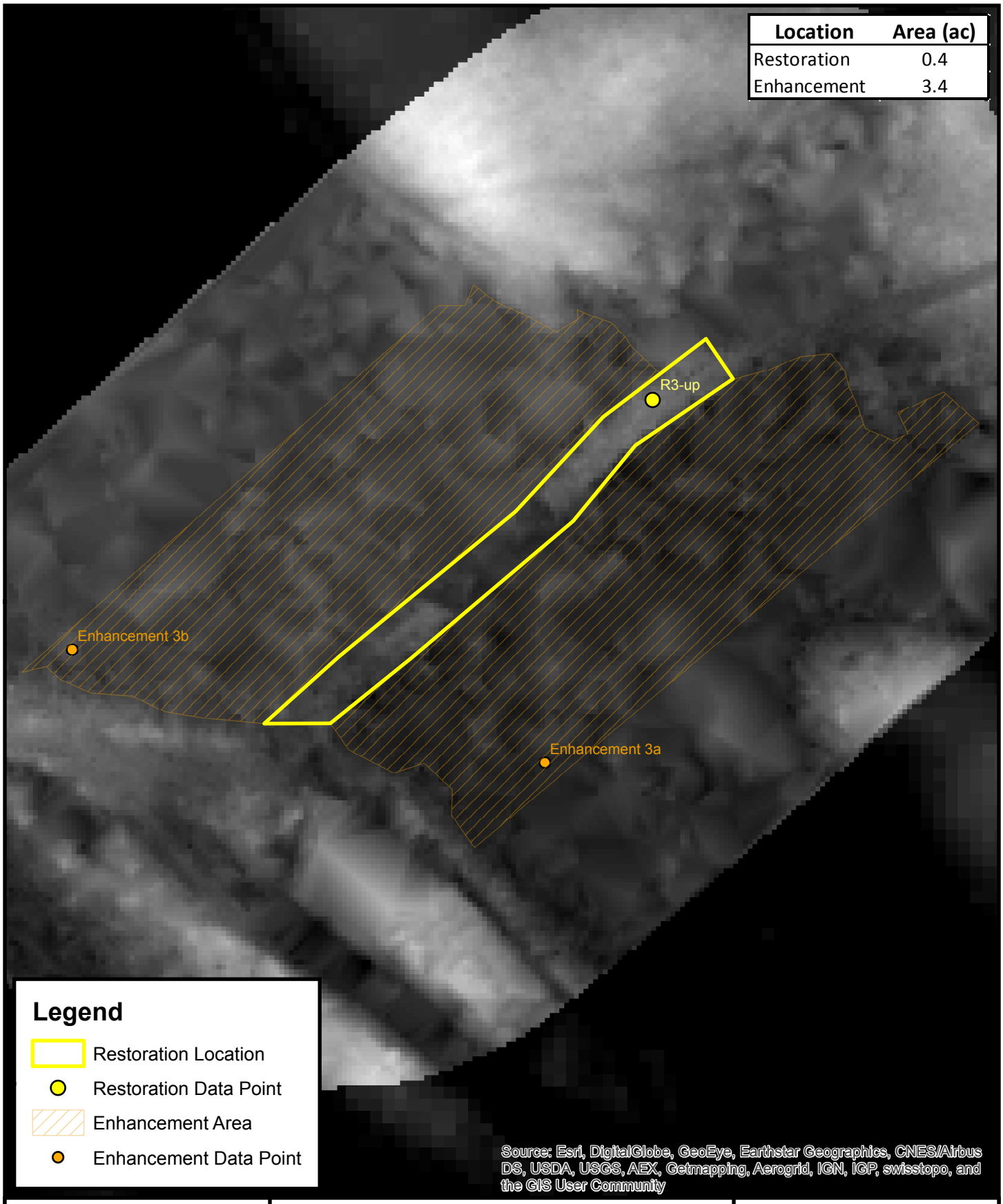
**Figure 26:**
**Gunter's Island**
**Restoration Location 3 - LiDAR**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 50 100 Feet




South Carolina Department of Transportation

**Figure 27:**
**Gunter's Island**
**Restoration Location 3 - Enhancement**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 55 110 Feet

N




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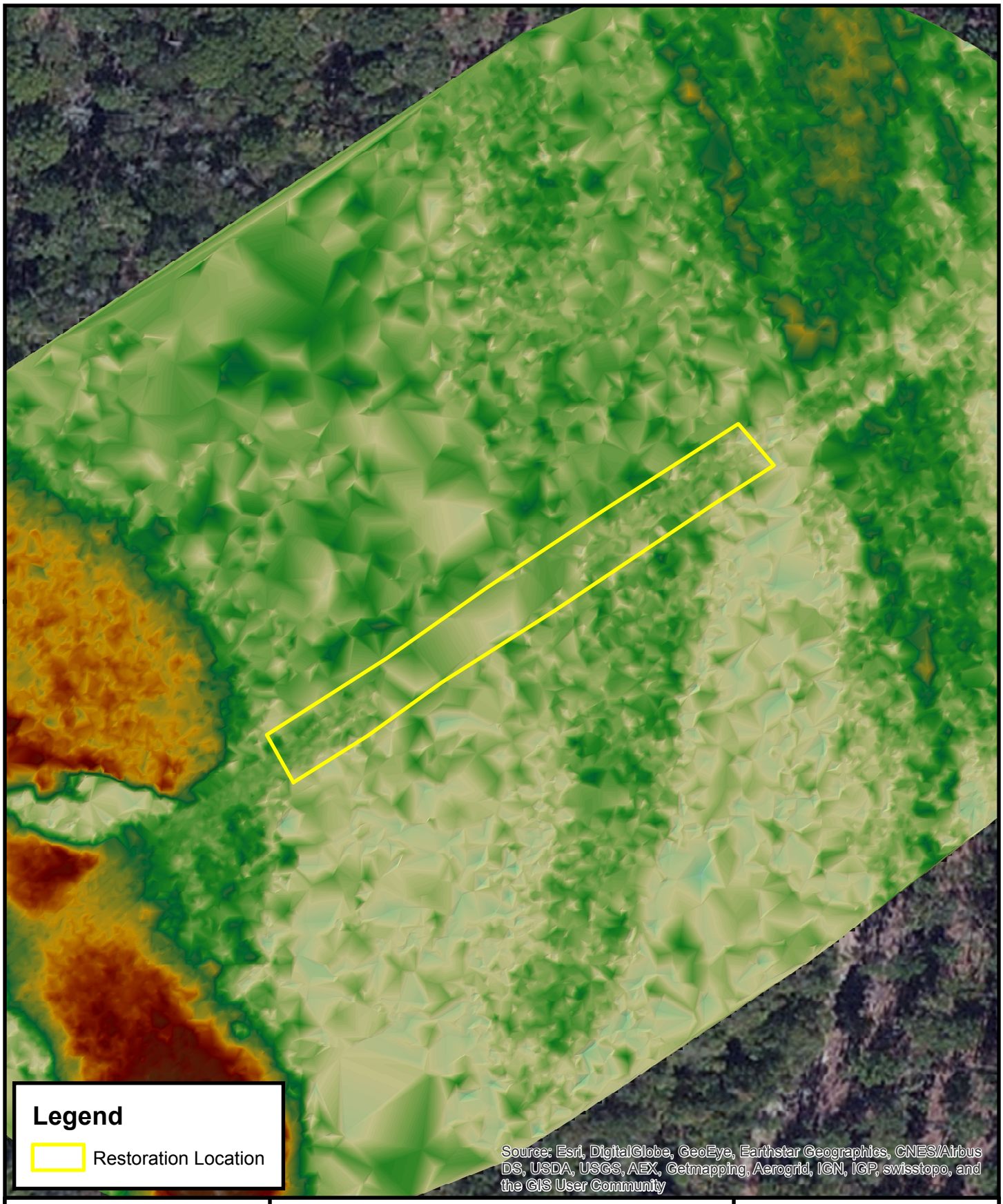
**Figure 28:**
**Gunter's Island**
**Restoration Location 4**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 15, 2017

0 50 100 Feet

N




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South Carolina Department of Transportation

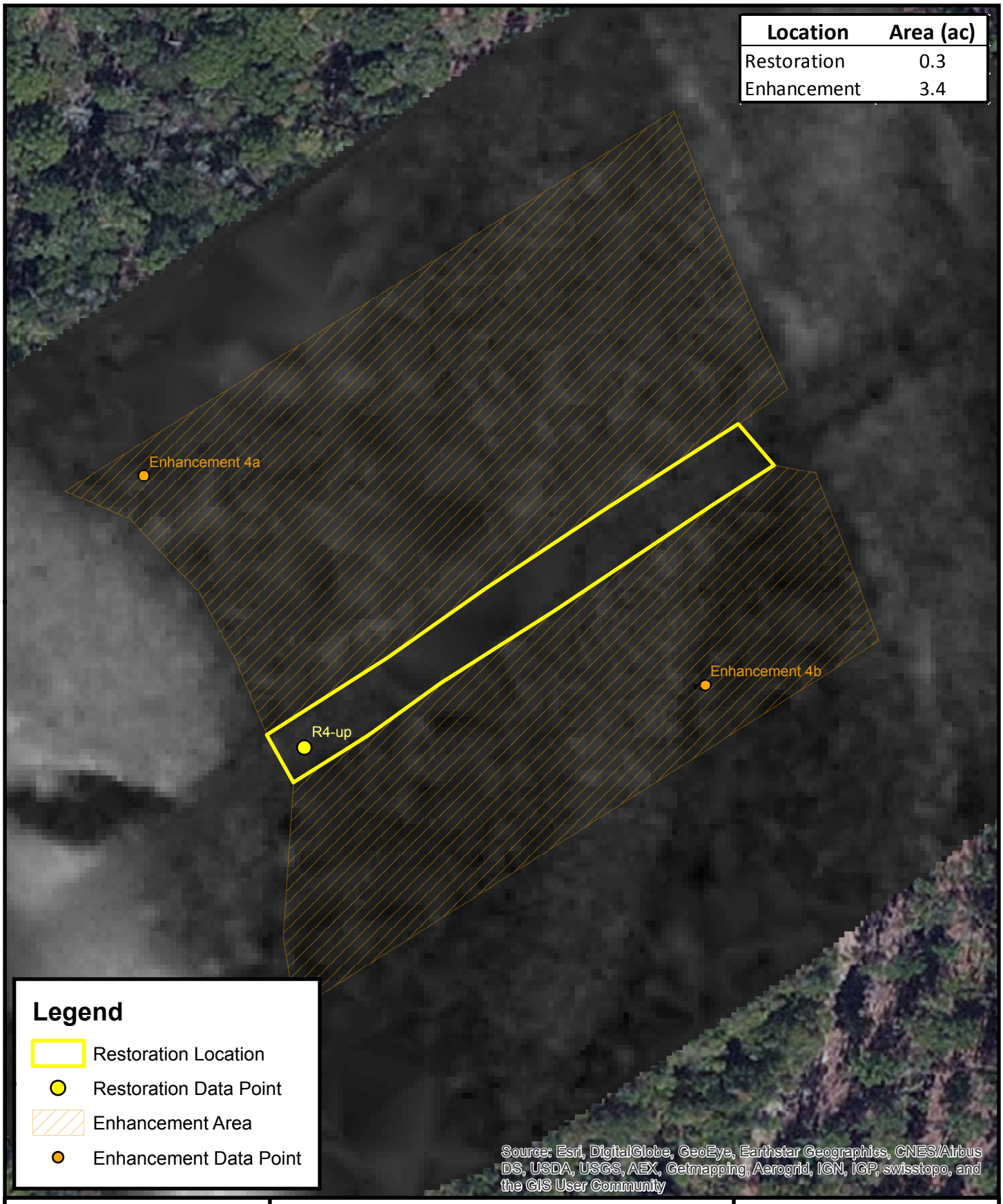
**Figure 29:**
**Gunter's Island**
**Restoration Location 4 - LiDAR**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 50 100 Feet




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**Figure 30:**
**Gunter's Island**
**Restoration Location 4 - Enhancement**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 50 100 Feet

N




South Carolina Department of Transportation

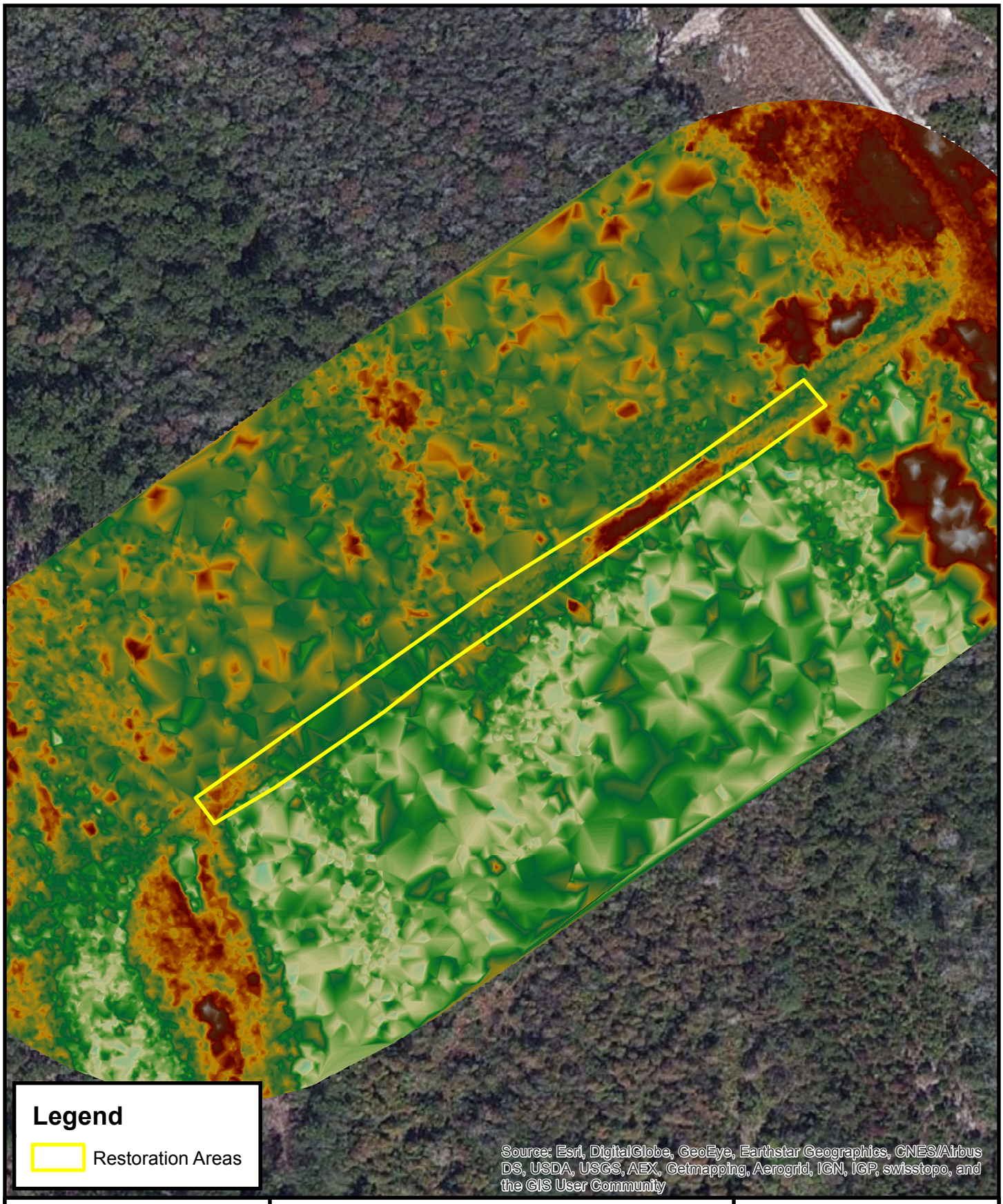
**Figure 31:**
**Gunter's Island**
**Restoration Location 5**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 70 140 Feet

N



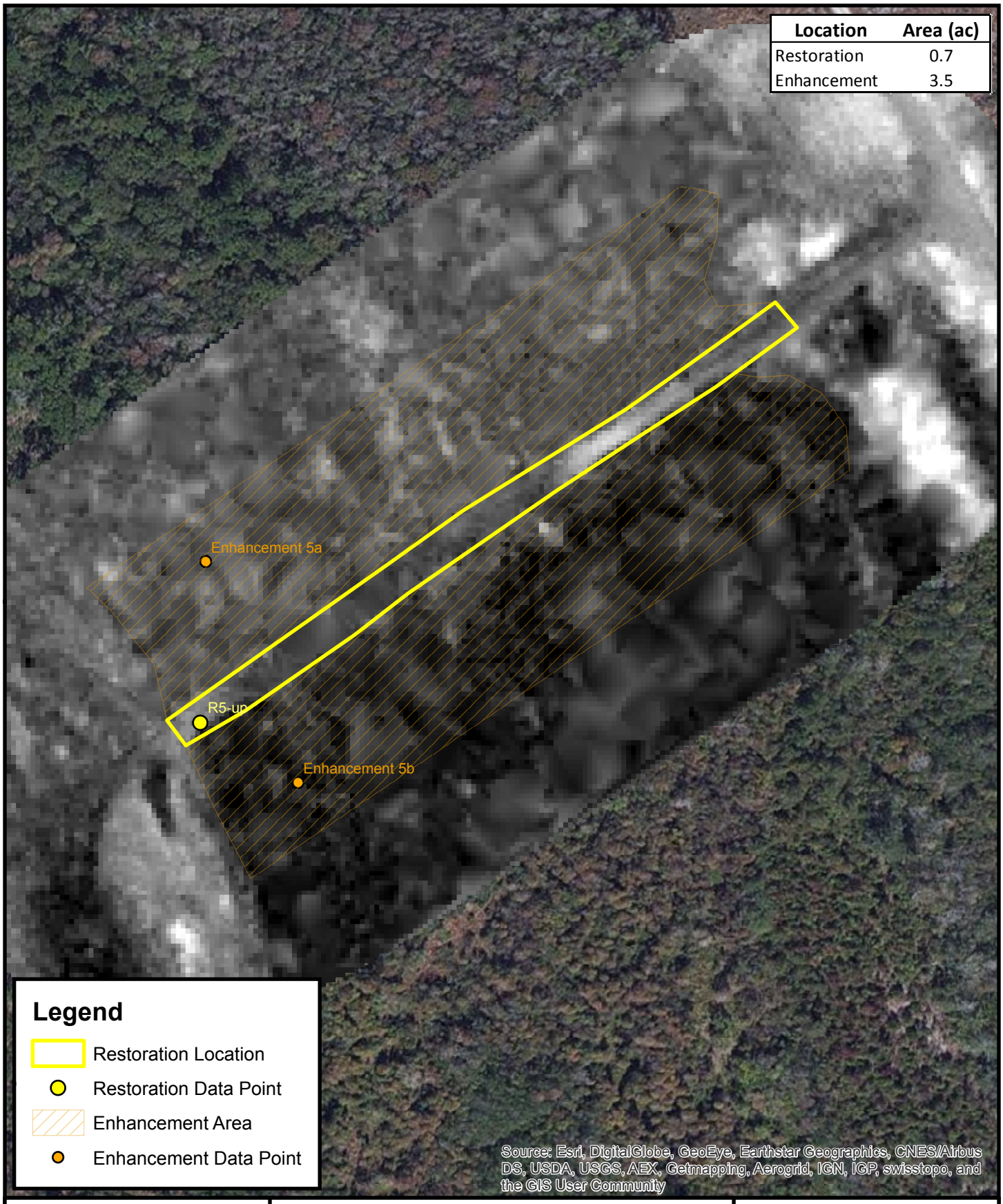

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**Figure 32:**
**Gunter's Island**
**Restoration Area 5-LiDAR**
I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 75 150 Feet



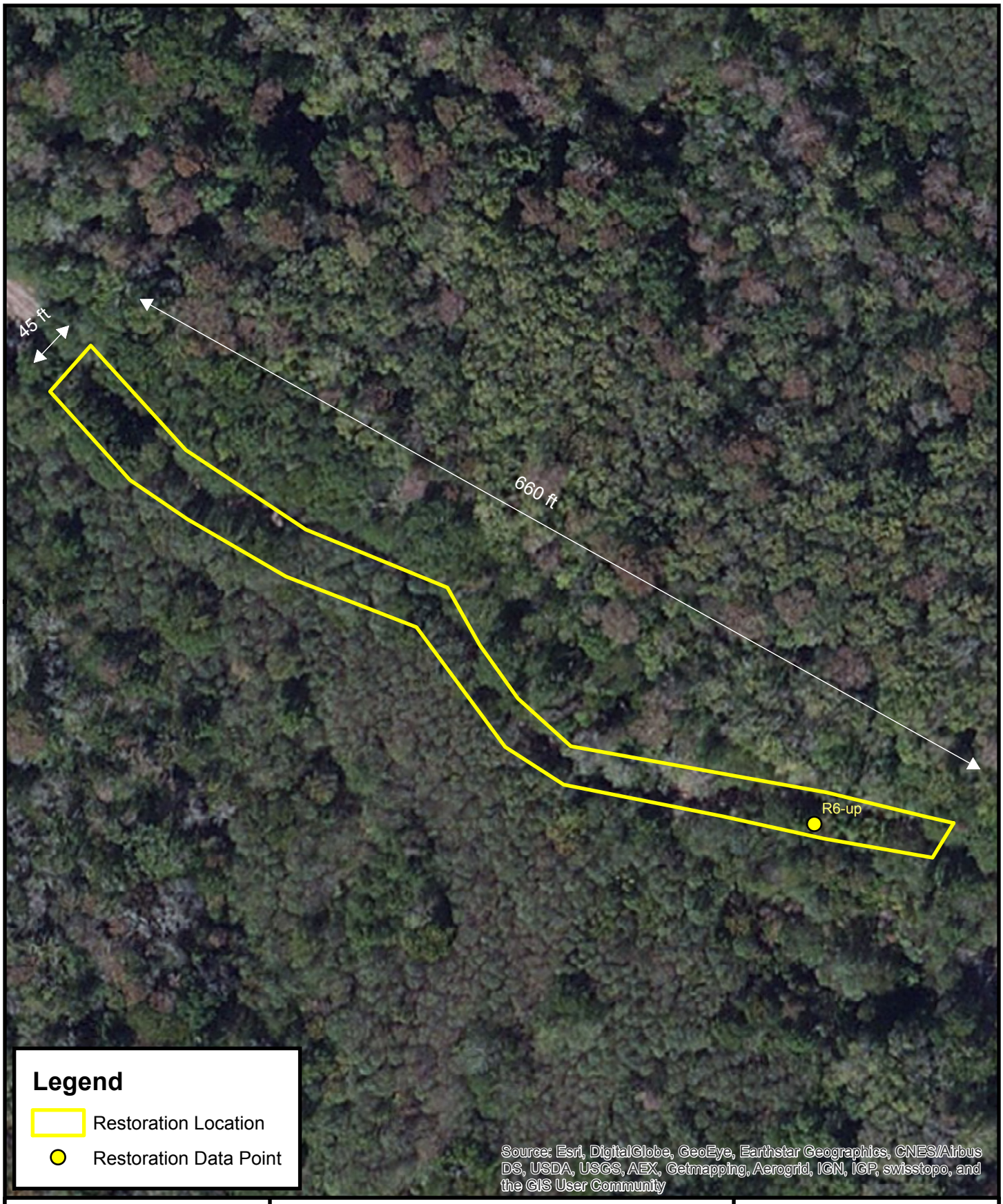

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**Figure 33:**
**Gunter's Island**
**Restoration Location 5 - Enhancement**
I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

0 75 150 Feet

N




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South Carolina Department of Transportation

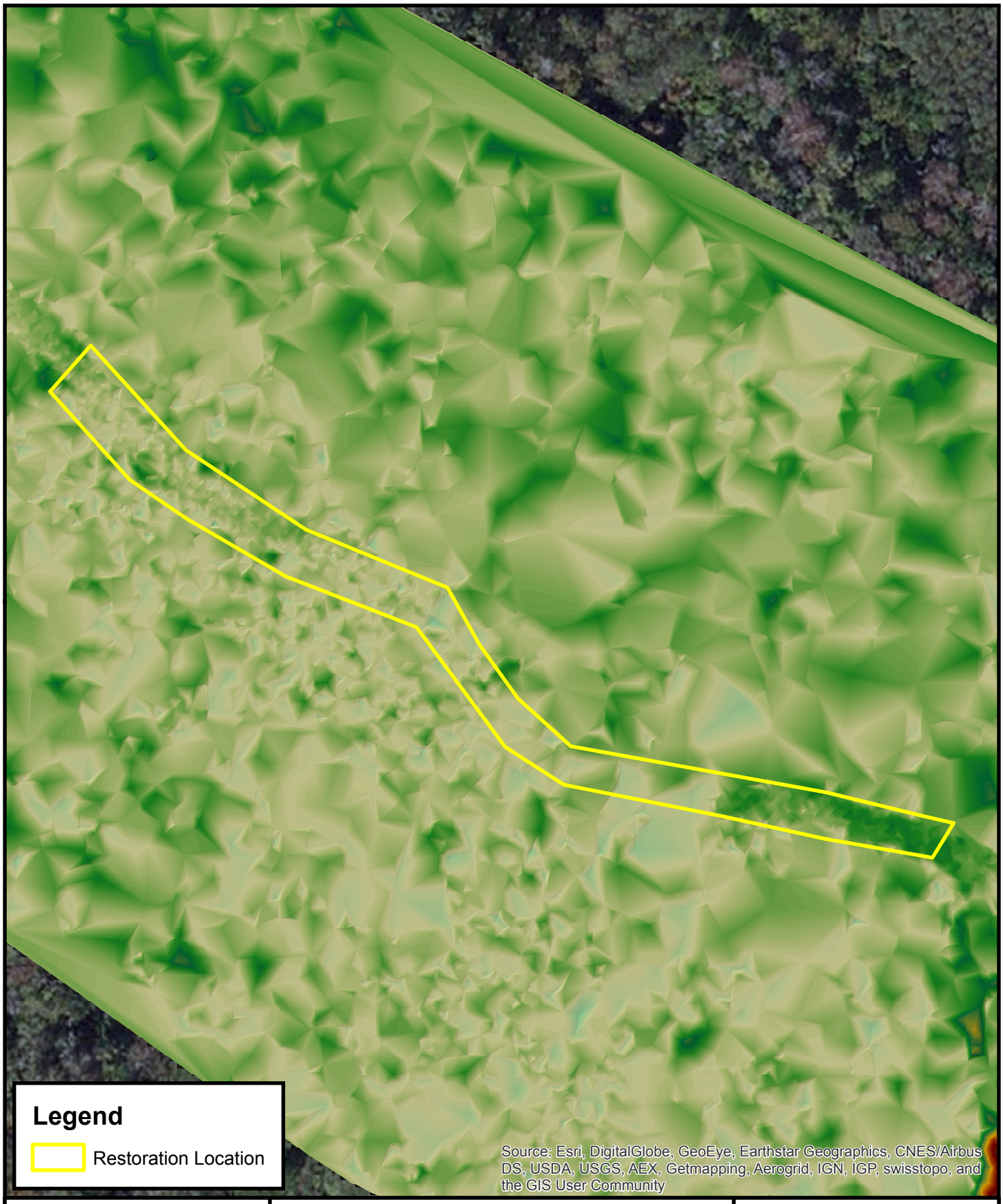
**Figure 34:**
**Gunter's Island**
**Restoration Location 6**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 50 100 Feet




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South Carolina Department of Transportation

**Figure 35:**
**Gunter's Island**
**Restoration Location 6 - LiDAR**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 50 100 Feet




South Carolina Department of Transportation

**Figure 36:**
**Gunter's Island**
**Restoration Location 6 - Enhancement**

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: February 22, 2017

N

0 50 100 Feet

# APPENDIX A

# Approved Categorical Exclusion

SCDOT

**NON-PROGRAMMATIC**
**CATEGORICAL EXCLUSION**

Project ID No. 036358

County: Horry
Date: February 21, 2017

To: Federal Highway Administration

From: Environmental Manager

Description: Acquisition of Gunter's Island Tract as part of Compensatory Mitigation for I-73

**(SEE ATTACHED SHEET)**

The Department's environmental assessment has determined the effects of this project are as described in the "Programmatic Agreement Between the Federal Highway Administration, South Carolina Division and the South Carolina Department of Transportation Regarding Approval of Actions Classified as Categorical Exclusions for Federal-Aid Highway Projects" dated May 23, 2016, and is in compliance with the required findings reflected below. The project has been assessed for possible effects on the human and natural environment with a determination that no significant environmental impact will occur. The class of action and impact determination documented by this statement would qualify this project as a categorical exclusion under 23 CFR 771, Section 115(b).

A determination has been made that the project will have no effect on any listed endangered or threatened species nor destroy or adversely modify critical habitat. Therefore, no further investigation under Section 7 of the Endangered Species Act is necessary.

A determination has been made that the project will require a United States Army Corps of Engineers Nationwide Permit 27. The Department will obtain the appropriate permits, as applicable, and will adhere to any conditions set forth therein.

In consultation with the SHPO, as appropriate, the Department has determined that no historic properties will be affected by the proposed undertaking in accordance with 36 CFR 800.

2-21-17
Date

Environmental Manager

2.22.2017
Date

MICHELLE L HERRELL

Digitally signed by MICHELLE L HERRELL
DN: c=US, o=U.S. Government, ou=DOT FHWAGlastonburyCT, ou=FHWA FHWAGlastonburyCT, cn=MICHELLE L HERRELL
Date: 2017.02.22 07:14:35 -05'00'

Federal Highway Administration

South Carolina Department of Transportation

February 21, 2017

# NON-PROGRAMMATIC CATEGORICAL EXCLUSION

PIN/Project ID: 036358

---

To: Federal Highway Administration

From: SCDOT, Chad Long, NEPA Division Manager

Project: Acquisition of Gunter's Island Tract, Horry County, SC

## Project Description

The South Carolina Department of Transportation (SCDOT) proposes to acquire the Gunter's Island tract (Figure 1) in Horry County, South Carolina. This acquisition is prompted by the need to provide compensatory mitigation for impacts to wetlands and streams that would be generated by the proposed construction of Interstate 73 (I-73) in Dillon, Horry, Marlboro, and Marion Counties. Proposed mitigation consists of the preservation of the Gunter's Island tract (6,258 acres) as well as a number of enhancement activities such as the removal of culverts, bridges, and roads that currently impede stream and wetland hydrology. A Compensatory Mitigation Plan that describes the proposed protection of the property is included in **Appendix A**.

## Purpose and Need

The purpose of the project is to provide compensatory mitigation on a landscape scale for wetland and stream impacts generated by the proposed construction of I-73 in Dillon, Horry, Marlboro, and Marion Counties.

## Site Acquisition and Protection

It is proposed that the Gunter's Island tract be held in the fee simple ownership of the South Carolina Department of Natural Resources and the Heritage Trust Program upon completion of all wetland and stream enhancement activities. SCDOT currently holds an option to purchase the property from the current landowner. SCDOT intends to exercise the option to purchase the Gunter's Island tract in fee simple from the current landowner upon receipt of the I-73 Section 404 permit.

Upon acquisition, SCDOT will transfer the Gunter's Island tract to SCDNR in fee simple for enhancement, long term management, and protection as a Heritage Preserve. A Draft Memorandum of Agreement (MOA) that outlines the terms and conditions of the transfer and long term management of the Gunter's Island tract is included in **Appendix B**.

## Agency Coordination

As part of the Section 404 permit application (SAC 2008-1333-DIS) to the United States Army Corps of Engineers (USACE) for the I-73 project, SCDOT developed a Conceptual Mitigation Plan that proposed the protection of the Gunter's Island tract as well as a number of wetland and stream enhancement opportunities. In response to agency comments on the Conceptual Mitigation Plan, SCDOT conducted an interagency site visit on November 17, 2016 to discuss issues of concern and to review areas of proposed wetland and stream enhancement. Agencies in attendance included representatives from the Environmental Protection Agency (EPA), United States Fish and Wildlife Service (USFWS), South Carolina Department of Natural Resources, South Carolina Department of Health and Environmental Control (SCDHEC) Bureau of Water, and SCDHEC-Office of Ocean and Coastal Resource Management. A copy of the field meeting notes that discusses agency comments and concerns is included in **Appendix C**.

## Reasonable Availability of Funding

On December 3, 2015 the SCDOT Commission unanimously approved the purchase and use of the Gunter's Island tract for mitigation of the environmental impacts associated with the construction of I-73[1]. The property will cost $18.25 million, of which $16.425 million will be paid for through existing I-73 federal funding and $1.825 million through SCDOT's match to the federal funding.

## Acquisitions/Displacements

After review of the proposed acquisition tract, it has been determined that the project would not result in the relocation/displacement of any commercial or residential establishments.

## Section 106 - Cultural Resources (Archaeological/Historic)

In accordance with 36 CFR 800.4, archaeological review and background research were conducted for the proposed project. To determine if any of the proposed enhancement activities would result in impacts to historic properties, SCDOT's archaeologist reviewed historic maps and aerial photos of the project area. A field visit was also made with the State Historic Preservation Office's

[1] SCDOT "Minutes SC Department of Transportation Commission Meeting of December 3, 2015," http://www.scdot.org/inside/pdfs/minutes/15December3.pdf (Last accessed on December 19, 2016)

Transportation Review Coordinator on January 4, 2017, to identify historic properties that could be affected by the proposed enhancement activities.

Based upon background research, a review of the acquisition area, the proposed enhancement activities, and the proposed management of the property as a Heritage Preserve by SCDNR, it has been determined that **no historic properties will be affected** by the proposed project. The Department's determination of effect letter and associated documentation was sent to the State Historic Preservation Office and the Catawba Indian National Tribal Historic Preservation Office (CIN-THPO) on January 10, 2017. The SHPO and CIN-THPO concurred with the Department's determination of effect on January 10, 2017 and January 20, 2017 respectively. A copy of the concurrence letters are included in **Appendix D**.

## Wetlands and Streams

The acquisition of the 6,258 acre Gunter's Island tract would result in the preservation of 89,836 linear feet of stream and 4637 acres of wetlands (see Figures 4-6 of Appendix A). The selection of the Gunter's Island tract is a large-scale mitigation opportunity with regional importance based on a watershed approach to protect water quality and aquatic resources in accordance with the 2008 Mitigation Rule (33 CFR Parts 325 and 332, 40 CFR Part 230). Gunter's Island is located in the Little Pee Dee watershed, and within the Middle Atlantic Coastal Plain Level III Ecoregion.

In addition to the entire preservation of the tract, including all wetlands and streams, SCDOT proposes restoration and enhancement through the removal of six (6) culverts and associated roadway fill through wetland areas. The purpose of the restoration and enhancement activities is to allow for more natural flow patterns and allow approximately 2.2 acres of previously filled wetlands to return to a functional wetland state Additional information regarding the proposed enhancement activities can be found in the Compensatory Mitigation Plan (**Appendix A**).

## Permitting

A Clean Water Act (CWA) Section 404 permit is required for impacts to jurisdictional waters of the U.S., including wetlands. In addition to the Section 404 permit, SCDHEC must grant, deny, or waive a Water Quality Certification (WQC), in accordance with Section 401 of the CWA. The Department would obtain a Nationwide Permit 27 for any proposed enhancement activities which require authorization from the United States Army Corps of Engineers (USACE).

## Floodplains

The proposed project is located within Zone A of Federal Emergency Management Agency (FEMA) floodplain map (Map Numbers 45051C03500H; 45051C0325H; 45051C0500H; 45067C0425E). Zone A includes areas subject to

inundation by the 1-percent-annual-chance flood generally determined using approximate methodologies. The project is not expected to have any increased potential for impact on those critical elements that would constitute a significant risk under 23 CFR 650A. There is also no anticipated increased flood risk due to the proposed site acquisition. Floodplain maps are included in **Appendix E**.

## Threatened and Endangered Species

A literature search was performed for the protected species listed for Horry County to determine habitat requirements and to obtain descriptions of the species that would facilitate identification of potentially suitable habitat during a review of aerial photography (true color and false-color infrared), the Horry County soil survey, and a limited field reconnaissance conducted on November 17th and 30th, 2016. Important sources of reference information included natural resource agency data and published reports, various botanical and faunal literature, and available U.S. Fish and Wildlife Service (USFWS) Species Recovery Plans. Prior to the limited site reconnaissance, SCDNR's Heritage Trust Database was reviewed to determine if there are any known occurrences of protected species onsite or in close proximity.

A review of SCDNR's Heritage Trust Database yielded two known occurrences within 4-6 miles of Gunter's Island (Figure 11). These are the ARS designated Rafinesque's big-eared bat and the federally protected bald eagle. Additionally, there are documented wading bird colonies within 3-8 miles of Gunter's Island, and a 2004 documented wood stork colony approximately 10 miles to the southwest, with 174 nests observed in the rookery. There are no known occurrences of protected species in Gunter's Island.

The results of the literature review and field reconnaissance investigations are described in the Compensatory Mitigation Plan (see **Appendix A**). The assessment concluded that the acquisition and protection of the Gunter's Island tract would complement larger conservation initiatives within the region and would have no effect upon federally-listed threatened and endangered species.

## Essential Fish Habitat

During the preparation of the I-73 South Environmental Impact Statement, the National Marine Fisheries Service (NMFS) identified all perennial streams within the study corridor as potential habitat for juvenile and adult fish maturation or nursery habitat for diadromous fish species, which are protected under the Magnuson-Stevens Fishery Conservation and Management Act. The proposed enhancement activities are intended to improve stream and wetland hydrology on the Gunter's Island Tract. The proposed protection and enhancement of Gunter's Island's streams and adjacent wetlands would therefore have no adverse effect on Essential Fish Habitat.

## Noise

In compliance with 23 USC Section 109(h) and (i), the Federal Highway Administration established guidelines for the assessment of highway traffic-generated noise. As the proposed undertaking does not involve construction of facilities that could generate traffic noise a noise analysis was not undertaken. No noise impacts will be generated by the proposed acquisition of this site.

## Hazardous Materials

A Phase I Environmental Site Assessment (ESA) of the Gunter's Island Tract was conducted in September 2016. The purpose of the Phase I ESA was to identify recognized environmental conditions (RECs) present on the property. The study consisted of a records review, historical background research, and a site reconnaissance. The assessment revealed no evidence of RECs in connection with the property. The Phase I ESA is included in **Appendix F**.

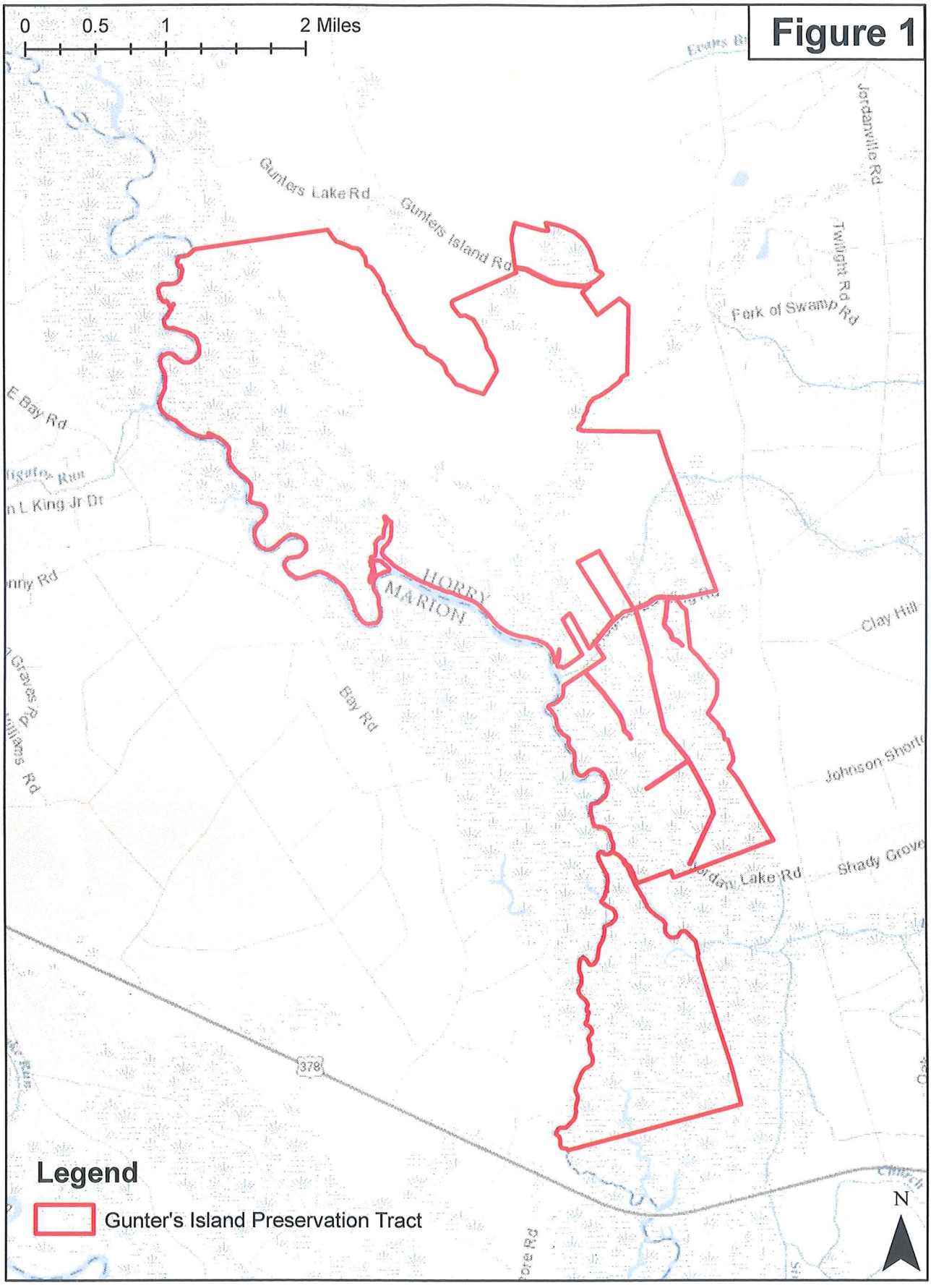
## Land Use

Land use practices on the Gunter's Island Tract have historically consisted of maintaining forested corridors for recreational hunting, wildlife and timber management activities. Under the management of SCDNR, the tract will be managed appropriately following best management practices for timber harvesting and resource conservation.

The project is not expected to modify existing land use or change the timing or density of development in the area, beyond the prohibition of development on the site itself. The project is not in conflict with any plan, existing land use, or zoning regulations.

## Community Impacts within the Project Corridor

Under the proposed project, there would be no adverse effect on any existing public facilities, businesses, or services as a result of the proposed project. The management of the property as a Heritage Preserve by SCDNR would enhance public recreation opportunities in the region and is not anticipated to cause adverse effects to the social environment.


Figure 1
0
0.5
1
2 Miles
Gunters Lake Rd
Gunters Island Rd
Jordanville Rd
Twilight Rd
Fork of Swamp Rd
E Bay Rd
HORRY
MARION
Bay Rd
Clay Hill
Johnson Shortc
Shady Grove
Jordan Lake Rd
378
Legend
Gunter's Island Preservation Tract
N

# APPENDIX B

# SCDOT/SCDNR  Draft Memorandum of Agreement

**STATE OF SOUTH CAROLINA )**
**)**
**COUNTY OF HORRY )**

**MEMORANDUM OF AGREEMENT**
**I-73 Mitigation Project**
**Gunter's Island**

THIS MEMORANDUM OF AGREEMENT associated with the I-73 mitigation project ("Agreement") is entered into on the ___ day of _____, 20___ by and between the South Carolina Department of Transportation (SCDOT) and the South Carolina Department of Natural Resources (SCDNR) (collectively, the "Parties").

**RECITALS:**

WHEREAS, SCDOT is undertaking the initial construction of Interstate 73 and such activities require certain regulatory approvals from the U.S. Army Corps of Engineers, Charleston District (Corps) and the South Carolina Department of Health and Environmental Control (SCDHEC);

WHEREAS, pursuant to Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1344), SCDOT submitted an application (P/N#SAC 2008-1333 Revised) to the Corps for a Department of the Army permit requesting authorization for activities in jurisdictional waters of the United States which resulted in the submission of a mitigation plan to offset the unavoidable impacts to waters of the United States, as used in the CWA and defined in 33 C.F.R. Part 328;

WHEREAS, companion authorizations required by SCDHEC are effectively incorporated into the Corps permit;

WHEREAS, the Corps and SCDHEC staff have approved SCDOT's permit (P/N#SAC 2008-1333 Revised issued _____ 2017, herein "Permit") and implementation of the I-73 Compensatory Mitigation Plan, dated _____, 2017 ("Mitigation Plan"), which proposed the acquisition of Gunters Island in Horry County by SCDOT;

WHEREAS, the Mitigation Plan also proposes that, following acquisition, SCDOT will convey Gunters Island to SCDNR by special warranty deed, including all appropriate rights consistent with the mitigation purposes, and SCDNR will undertake certain restoration activities as provided in the Mitigation Plan and will serve as the long-term steward of Gunters Island;

WHEREAS, Gunters Island which is the subject of this Agreement is more specifically shown on **Exhibit** ___ and described on **Exhibit** ___, attached hereto and incorporated herein by reference ("Gunters Island" as used in this Agreement);

WHEREAS, the Mitigation Plan also proposes and seeks to have SCDNR dedicate Gunters Island as a Heritage Preserve and, furthermore, to protect it in the corpus of the Heritage

Trust under the S.C. Heritage Trust Act (S.C. Code Ann. § 51-17-10 *et seq*. (1992 & Supp. 2016) following acquisition from SCDOT;

WHEREAS, acceptance of Gunters Island by SCDNR and dedication and commitment to the corpus of the Heritage Trust will require certain internal and external approvals and formal acceptance is contingent on the S.C. Department of Administration issuing a Certificate of Acceptance as required by S.C. Code Ann. § 1-11-65 (2005 & Supp. 2016);

WHEREAS, following SCDNR's receipt of all necessary approvals, SCDOT will transfer title to Gunters Island to SCDNR at such date and time as shall be mutually agreeable;

WHEREAS, after taking title to Gunters Island and completion of certain restoration activities, SCDNR becomes the long-term steward and acknowledges that it is responsible for managing the upland and aquatic resources of Gunters Island in a manner that is consistent with the purpose and terms of this Agreement and providing alternative compensatory mitigation that is reasonably acceptable to the Corps for any loss in functions resulting from a use or transfer of Gunters Island that is incompatible with the protection in perpetuity of Gunters Island; and

WHEREAS, this Agreement has been reviewed and approved by the Parties as an acceptable framework for implementing the Mitigation Plan and, through the recording of the Dedication and Declaration of Trust, an acceptable long-term management and protection of Gunters Island as referenced in 33 C.F.R. § 332.7(a), and is understood to be a formal, documented stewardship commitment from SCDNR once all necessary approvals are received by SCDNR, as described above.

NOW THEREFORE, in consideration of the above Recitals, the rights, obligations and restrictions described herein, and in the documents referenced and incorporated herein, and to support an overall plan of conservation and protection of Gunters Island, the Parties hereby agree to the following terms. This Agreement provides multiple functions in that it provides for the terms upon which a) SCDOT will transfer title of Gunters Island to SCDNR, b) SCDNR will undertake certain restoration activities at Gunters Island, and c) SCDNR will establish permanent protection of Gunters Island as a Heritage Trust property and undertake appropriate management activities.

**A. Transfer of Title**

1. SCDOT will acquire Gunters Island, including all hunting, fishing, trapping, timber, oil, gas, mineral, water and other rights necessary and consistent with the conservation and mitigation goals of the Mitigation Plan and public use of Gunters Island and shall maintain it without material alteration until such time as it is transferred to SCDNR.

2. SCDOT will obtain for Gunters Island a Phase I environmental assessment or update thereto that includes SCDNR as an additional intended user and provide a copy of the report to SCDNR.

3. SCDOT will provide SCDNR with the most recent recorded or recordable boundary survey plat for Gunters Island in both hardcopy and native electronic file formats.

4. SCDOT will provide SCDNR with a 40 or 60-year title abstract for review prior to closing.

5. SCDNR will diligently pursue all necessary internal and external approvals required for formal acquisition approval, including issuance of a Certificate of Acceptance pursuant to S.C. Code § 1-11-65.

6. SCDOT will transfer Gunters Island by good marketable and insurable title, including all rights described in item A(1) above plus physical legal access from one or more upland public roadways, to SCDNR at no cost to SCDNR. SCDOT will pay outstanding 2017 property taxes and closing costs, including recording fees, and execute such other documents as may be necessary to complete closing and the purpose of this Agreement. Furthermore, upon transfer to SCDNR, Gunters Island must first be free and clear of all liens, encumbrances and other exceptions unless approved by SCDNR.

7. Upon transfer of Gunters Island, all leases, licenses, or similar rights burdening the property must first be terminated and released and any fixtures or structures other than gates or fencing must be removed. Likewise, no actions, suits, proceedings, investigations against or affecting Gunters Island may be pending or threatened.

8. Upon closing, SCDOT will provide for an owners title insurance policy designating SCDNR as a named insured for Gunters Island.

9. Subject to necessary approvals, SCDNR will execute and record a Dedication and Declaration of Trust in accordance with the Mitigation Plan following acceptance of title to Gunters Island and said instrument will be in the form attached.

**B. Restoration Activities**

1. SCDNR will complete the restoration activities at Gunters Island as provided in the Mitigation Plan, subject to reasonable extensions for weather conditions or other circumstances outside of SCDNR's control

2. SCDOT will conduct all monitoring and reporting to the Corps and DHEC as provided in the Mitigation Plan and Permit. SCDOT will coordinate visits for monitoring with SCDNR prior to entering the site.

**C. Long-term Stewardship**

1. SCDNR acknowledges that it is assuming certain responsibilities for long-term stewardship of Gunters Island as provided in the Mitigation Plan and Permit and will accomplish these obligations consistent with the application of 33 C.F.R. Part 332 and the Heritage Trust Act.

2. SCDNR declares that in addition to the specified restoration activities provided in the Mitigation Plan, it intends to actively manage Gunters Island to provide further ecological enhancements, in coordination with the Corps and DHEC as needed.

3. The Parties acknowledge that SCDNR may harvest timber from Gunters Island consistent with applicable laws and the conservation and mitigation goals of the Mitigation Plan and Permit and may apply any proceeds towards further ecological enhancements or management of Gunters Island.

4. Upon final approval by the Corps of all restoration activities, monitoring, and reporting required by the Mitigation Plan and Permit, SCDNR assumes long-term stewardship responsibility for Gunters Island as established in the Dedication and Declaration of Trust and this Agreement shall terminate.

**D. General Provisions**

Except as otherwise provided herein, the following "General Provisions" shall be binding upon, and inure to the benefit of the Parties, and the successors, administrators, assigns, lessees, licensees and agents of each:

1. Rights of Access and Entry. SCDOT and SCDNR agree to the following rights of access and entry to Gunters Island to support the operation of this Agreement. Prior to transfer of Gunters Island to SCDOT, SCDNR may request access by SCDNR staff or agents and SCDOT will provide reasonable access. Following transfer of Gunters Island to SCDNR, SCDOT staff or agents will have reasonable access for monitoring activities following coordination with SCDNR. Both SCDOT and SCDNR will provide the Corps and/or SCDHEC access to Gunters Island in order to inspect and confirm compliance with the Permit, Mitigation Plan, and this Agreement. No right of access or entry to Gunters Island is conveyed to the general public by this Agreement; however, the Parties understand and agree that the public has an expectation of access subject to regulation by SCDNR under South Carolina law in accordance with compatible uses and SCDNR policies.

SCDOT Access Contact:

SCDNR Access contact:

Chief of Wildlife Management
1000 Assembly Street, Suite 255
P.O. Box 167

Columbia, South Carolina 29202
803-734-3887

2. **Enforcement**. If in the opinion of either party, the Corps or SCDHEC a breach or default under this Agreement has occurred and a remedy is desired, the non-defaulting party, the Corps or SCDHEC must provide written notice to the other party who shall then have 30 days after receipt of such notice to a) cure the breach or default or b) provide a plan to remedy the breach or default in a timely manner which is accepted by the non-defaulting party, the Corps and SCDHEC. If the defaulting party fails to take such corrective action within thirty (30) days, or fails to compel the necessary corrective action, the non-defaulting party, the Corps and/or DHEC may undertake such actions, including legal proceedings, as are necessary to effect such corrective action. Enforcement shall be at the discretion of the Corps and/or DHEC, and no omission or delay in acting shall constitute a waiver of any enforcement right. These enforcement rights are in addition to, and shall not limit, enforcement rights available to the parties under other provisions of law or equity, or under any applicable permit or certification. This Agreement may be enforced only by SCDOT, SCDNR, SCDHEC, or the Corps, including the U.S. Department of Justice (DOJ) on behalf of the Corps, and their respective successors and assigns, and no general third party beneficiary rights, including but not limited to third party rights of enforcement, are created hereby.

3. **Events Beyond SCDNR Control**. Nothing herein shall be construed to authorize SCDOT, the Corps and/or DHEC to institute any proceedings against SCDNR for any changes to Gunters Island caused by circumstances beyond SCDNR's control, including, without limitation, changes caused by acts of God, earthquake, fire, flood, storm, war, civil disturbance, strike, the unauthorized acts of third persons or similar causes, or from any prudent action taken in good faith by SCDNR under emergency conditions to prevent, abate or mitigate significant injury to life, damage to property or harm to Gunters Island resulting from such causes.

4. **Late Discoveries of Cultural Resources**. If unanticipated cultural materials (*e.g.*, large, intact artifacts, or animal bones; large clusters or artifacts or animal bones; patterns of soil stains; buried brick or stone structures; clusters of brick or stone) or human skeletal remains are discovered on Gunters Island and the cultural resources have not been addressed by previous studies and consultation, then SCDNR shall temporarily halt those activities and immediately notify the Corps and SHPO of the discoveries. Upon such occurrence, the following steps specified below will be implemented by SCDNR:

(a) A 50-foot buffer shall be immediately established around such cultural materials. The buffer must be flagged by appropriate personnel. All project personnel must be notified by SCDNR that no land altering activities will be allowed within the buffer zone until the course of action hereinafter described has been established. The halt

will afford the Corps and SHPO the opportunity to assess the situation and recommend a course of action within two (2) business days after such notification.

(b)If human remains are found, they should be left in place and protected until appropriate consultation is completed. SCDNR is responsible for notifying SHPO, the Corps, the local coroner or medical examiner, and other interested parties. The Parties recognize that human remains and burial grounds are subject to South Carolina law that addresses abandoned cemeteries, including, but not limited to, S.C. Code Ann. §§ 27-43-10 to 30; 16-17-600 and S.C. Code of Regulations R.61- 19 §900.

5. **SCDNR Obligations**. Nothing herein shall relieve SCDNR of the obligation to comply with federal, state or local laws, regulations and permits which may apply to the exercise of the acts that are subject to this Agreement.

6. **Notification**. Any notice, request for approval, or other communication required under this Agreement shall be sent by registered or certified mail, postage prepaid, to the following addresses (or such address as may be hereafter specified by notice pursuant to this paragraph):

To SCDOT:

To SCDNR: Chief of Wildlife Management
1000 Assembly Street, Suite 255
P.O. Box 167
Columbia, South Carolina 29202

To Corps: U.S. Army Corps of Engineers
Attn: Regulatory Division
69A Hagood Avenue
Charleston, South Carolina 29403

To DHEC: South Carolina Department of Health
and Environmental Control,
Bureau of Water
2600 Bull Street
Columbia, SC 29201

To SHPO: State Historic Preservation Officer
S.C. Department of Archives & History
State Historic Preservation Office
8301 Parklane Road

DRAFT

Columbia, South Carolina 29223

Notices shall be deemed received when the return receipt is signed by the recipient, or if the return receipt is not signed or delivery refused, three (3) business days after the sender has so deposited such notice in a U.S. post office or any branch thereof. Any Party may designate a substitute address from time to time, by notice sent in writing in accordance with the provisions of this section.

7. **Disposal**. In the event that all or part of the Protected Property becomes surplus government property or needs to be conveyed, disposed of, and/or transferred, SCDNR shall do so in conformity with the requirements of 33 C.F.R. § 332.7(a)(3) and (4), including but not limited to, the express requirement to provide and/or arrange for alternative compensatory mitigation that is acceptable to the Corps. In such event, SCDNR will use its best efforts to ensure that the Protected Property is protected by Corps-approved deed restrictive covenants or conservation easements that are consistent with this Agreement. A 60-day advance notification to the Corps and DHEC is required before any action is taken to amend, modify or terminate the Agreement, including transfer of title to, or establishment of any other legal claims over, the Protected Property. To the extent SCDNR is unable to execute Corps-approved deed restrictive covenants or conservation easements prior to conveyance, disposal, and/or transfer of the Protected Property, SCDNR shall provide and/or arrange for alternative compensatory mitigation that is acceptable to the Corps prior to taking such action.

8. **Eminent Domain**. Whenever all or part of Gunters Island is taken in the exercise of eminent domain so as to substantially abrogate the use restrictions and protections imposed by this Agreement, SCDNR 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 Corps and conforms with the requirements of 33 C.F.R. § 332.7(a)(3) and (4).

9. **Amendments**. This Agreement may only be amended by written agreement of all Parties. Where amendment is proposed, a 60-day advance notification of such amendments shall be provided to the Parties. Likewise, any assignment of this Agreement must be treated as an amendment.

10. **Termination**. This Agreement may be mutually terminated by written agreement of all Parties. Where termination is proposed in this manner, a 60-day advance notification of such termination shall be provided to the Parties. Additionally, the Agreement shall terminate upon the occurrence of both: a) SCDNR's recording of the Dedication and Declaration of Trust and b) final approval by the Corps of all restoration activities, monitoring, and reporting required by the Mitigation Plan and Permit.

11. **No Exchange of Financial Obligation**. This Agreement does not contemplate or provide for the exchange of money to, or at the direction of, the Corps. Further, this Agreement does not obligate any Corps funds. It is neither a fiscal nor a funds obligation

document and does not obligate the Corps to expend, advance, exchange, or reimburse funds, services, or supplies; transfer or receive anything of value; or enter into any contract, assistance agreement or other financial obligation.

12. **Severability**. Should any separable part of this Agreement be found void or unenforceable by a court of competent jurisdiction, the remainder shall continue in full force and effect.

13. **Counterparts.** This Agreement may be executed in counterparts, each of which shall be deemed to be an original, and taken together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have executed this Agreement. This Agreement shall be effective on the date of the last signatory thereto.

_____ _____

South Carolina Department of Transportation Date

_____

Name, Title

_____ _____

South Carolina Department of Natural Resources Date

_____

Alvin A. Taylor, Director

DRAFT

# APPENDIX C

# Draft Dedication and Declaration of Trust

**STATE OF SOUTH CAROLINA** **DEDICATION AND DECLARATION OF TRUST**

**COUNTY OF HORRY** (S.C. Heritage Trust Program)

## RECITALS:

The South Carolina General Assembly, with approval of the Governor, has provided for the establishment and enactment of the South Carolina Heritage Trust Program, Title 51, Chapter 17 of the South Carolina Code of Laws 1976, as amended (the "**Act**"), pursuant to which areas of natural and cultural diversity are set aside as Heritage Preserves and Heritage Sites, and protected for the benefit of present and future generations;

The Heritage Trust Advisory Board, on _____, 2017, recommended, and the South Carolina Department of Natural Resources Board of Trustees, on _____, 2017, approved, the establishment of the real property as more particularly described on Exhibit A, attached hereto and incorporated herein by reference (the "**Property**"), as a Heritage Preserve through the process of dedication and protection under the corpus of the South Carolina Heritage Trust;

In compliance with Section 51-17-140 of the Act, the majority of the Horry County legislative delegation did provide written approval of this acquisition in _____ 2017;

The Property is commonly referred to as "Gunters Island", which is located in close proximity to the Little Pee Dee River Heritage Preserve, and will hereafter be incorporated into and managed as part of the Little Pee Dee River Heritage Preserve. The Property contains and will protect rare plant communities including _____. The Property contains an extremely diverse ecology and outstanding scientific, educational, aesthetic and recreational characteristics;

The Property was donated to the South Carolina Department of Natural Resources as a requirement of the S.C. Department of Transportation's "I-73 Compensatory Mitigation Plan" (June 20, 2016) ("Mitigation Plan") in connection with that certain U.S. Army Corps of Engineers Permit Number P/N#SAC 2008-1333 (Revised and issued _____2017) ("Permit");

Furthermore, as a condition of the Permit certain mitigation activities, including restoration and monitoring of such activities provided for in the Mitigation Plan, must initially be undertaken on the Property;

To accomplish the requirements of the U.S. Army Corps of Engineers (the "**Corps**") and the South Carolina Department of Health and Environmental Control ("**SCDHEC**") associated with the Permit, this Dedication and Declaration of Trust incorporates additional provisions to provide for the undertaking of ecological restoration and management activities to ensure the protection of the Property in perpetuity;

The South Carolina Department of Natural Resources, as fee simple owner of the Property, desires to dedicate the Property as a Heritage Preserve, and protect the same by the restrictions, conditions, permissive and non-permissive uses hereinafter stated;

The South Carolina Department of Natural Resources Board of Trustees considers the Property to be of such outstanding and unique natural or cultural character so as to be significant and essential to carrying out the goals and purposes of the Act, and meriting a greater degree of preservation than that merely provided by dedication; and

The South Carolina Department of Natural Resources and the Board of Trustees of the South Carolina Department of Natural Resources jointly desire to declare the Property to be a component of the corpus of the South Carolina Heritage Trust, and said Property shall be so managed by the South Carolina Department of Natural Resources Board of Trustees as Trustee.

NOW, THEREFORE, LET ALL MEN KNOW BY THESE PRESENTS that the South Carolina Department of Natural Resources (the "**Department**"), as owner of fee simple title to the Property, does hereby establish and dedicate the Property as a Heritage Preserve pursuant to Section 51-17-80 of the Act, and the Department and the South Carolina Department of Natural Resources Board of Trustees (the "**Board**") hereby jointly declare the Property to be further protected by and forming a part of the trust property of the Heritage Trust pursuant to Section 51-17-90 of the Act and Section 62-7-401 of the South Carolina Trust Code, all as more particularly set forth herein.

**1.** The Department hereby dedicates the Property as a Heritage Preserve.

**2.** The Department and the Board do hereby jointly declare the Property to be trust property as a component of the corpus of the South Carolina Heritage Trust.

**3.** The Property will be managed by the Board as "**Trustee**." The Trustee shall hold, manage and preserve the Property, and the Trustee may adopt and modify rules and regulations

for the use and enjoyment of the Property by the public, and may employ or appoint agents to act on its behalf in the management of the Property. The Trustee shall appoint the Department and the divisions thereof, to act on its behalf in management of the Property. All action of the Department or its divisions hereunder shall be pursuant to said appointment.

**4.** The Property is declared to be at its highest, best and most important use for the public benefit, and the Trustee shall hold the Property subject to the following conditions, restrictions and terms of use:

a. The essential natural character of the property shall be maintained.

b. There shall be no erection of any improvements thereon except those minimal improvements necessary for the security, safety, or convenience of the public and those required for maintenance and management.

c. Cutting or burning of timber, wood or other destruction of flora or fauna shall be permitted only for restoration or preservation of a particular vegetation type or of an endangered species of flora, fauna or wildlife; or for the establishment and maintenance of nature and hiking trails, camping areas and the like where compatible and consistent with the character of the area and not seriously damaging or detrimental to the natural quality of the property.

d. Hunting may be permitted in accordance with all applicable state and federal laws, provided that all hunting related management activities shall be compatible and consistent with all other provisions herein.

e. No stream shall be dammed or have its course altered.

f. No motorized vehicles shall be permitted on the property other than those utilized by the Trustee or its agents in management and protection of the property or used by the general public for ingress and egress to the property in compliance with the management plan for the area or feature concerned.

g. No change shall be made in the general topography of the area or feature except for those minimal alterations which may be necessary to provide on-foot access to the public for visitation, or observation; and this shall be done only where wholly compatible and consistent with the character of the property and where no detrimental effect shall result.

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h. No activity shall be allowed or permitted which might pollute any stream, body of water, or the atmosphere.

i. No signs, billboards or other advertising of any kind shall be erected; however, informational and directional signs related to the designation of the area or feature as a Heritage Preserve and related to the public's enjoyment thereof shall be allowed when approved by the designated manager.

j. No other acts or uses which are detrimental to the retention of the property in its natural state shall be allowed, including those detrimental to flood control, drainage, water conservation, erosion control or soil conservation, or fish or wildlife habitat preservation.

k. The trust shall continue in perpetuity.

**5.** The terms of the Act and this Dedication and Declaration of Trust are intended to work in harmony, and to be read in conjunction with one another to better protect the Property. Subject to the Act and this Dedication and Declaration of Trust, the Property shall be managed in accordance with an overall management plan as established by the Department and approved by the Trustee.

**6.** The Recitals set forth above are true and correct, and form a part of the substance of this Dedication and Declaration of Trust.

**7.** All provisions of the Act are incorporated by reference, except where modified herein as allowed under S.C. Code Ann. §§ 51-17-80 & -90 (1976 & Supp. 2014). Any reference to the Act shall be deemed to include only those provisions at the time of the execution of this Dedication and Declaration of Trust; and no subsequent amendment, repeal, change or modifications shall be deemed applicable to the Property.

**8.** In furtherance of the authority of the Corps and SCDHEC under the Clean Water Act, 33 U.S.C. §1251 *et seq*., the following additional terms shall apply with respect to the Property.

a. Initial Mitigation Activities. Until such time as the Corps provides final approval of all restoration activities, monitoring, and reporting required by the Mitigation Plan and Permit, necessary activities to obtain such approval may be undertaken upon the Property notwithstanding the general restrictions of this instrument.

b. Rights of Access and Entry. The Corps and/or SCDHEC may access and enter the Property, in order to inspect and obtain compliance with the terms of this instrument.

c. Enforcement. In the event of a breach of the terms of this instrument, the Corps and/or SCDHEC will notify the Department in writing of the breach. The Department shall have thirty (30) days after receipt of such notice to undertake actions that are reasonably calculated to swiftly correct the conditions constituting the breach. If the Department fails to take such corrective action within thirty (30) days, or fails to compel the necessary corrective action, the Corps and SCDHEC may undertake such actions, including legal proceedings, as are necessary to effect such corrective action. Among other relief, the Corps and SCDHEC shall be entitled to a complete restoration for any breach. Enforcement shall be at the discretion of the Corps and/or SCDHEC, and no omission or delay in acting shall constitute a waiver of any enforcement right. These enforcement rights are in addition to, and shall not limit, enforcement rights available under other provisions of law or equity, or under any applicable permit or certification. This instrument may be enforced only by the parties, including the U.S. Department of Justice (DOJ) on behalf of the Corps, and their respective successors and assigns, and no general third party beneficiary rights, including but not limited to third party rights of enforcement, are created hereby.

d. Events Beyond SCDNR Control. Nothing herein shall be construed to authorize the Corps and/or SCDHEC to institute any proceedings against the Department or Board for any changes to the Property caused by circumstances beyond the Department or Board's control, including, without limitation, changes caused by natural disaster, civil disturbance, the unauthorized acts of third persons or similar causes, or from any prudent action taken in good faith by the Department or Board under emergency conditions to prevent, abate or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

e. Notification. Any notice or other communication necessary under this instrument shall be sent by registered or certified mail, postage prepaid, to the following addresses:

To Corps: U.S. Army Corps of Engineers
Attn: Regulatory Division
69A Hagood Avenue
Charleston, South Carolina 29403

To SCDHEC: S. C. Department of Health and Environmental Control

Bureau of Water
2600 Bull Street
Columbia, SC 29201

To SCDNR: SCDNR - Regional Wildlife Biologist
Heritage Trust Program
P.O. Box 167
Columbia, SC 29202

SCDNR – Office of Chief Counsel
P.O. Box 167
Columbia, SC 29202

Any Party may designate a substitute address from time to time, by notice sent in writing in accordance with the provisions of this section.

f. Disposal. In the event that all or part of the Property becomes surplus government property or needs to be conveyed, disposed of, and/or transferred, the Department and Board shall do so in conformity with the requirements of 33 C.F.R. § 332.7(a)(3) and (4), including, but not limited to, the express requirement to provide and/or arrange for alternative compensatory mitigation that is acceptable to the Corps.

g. Eminent Domain. Whenever all or part of the Property is taken in the exercise of eminent domain so as to substantially abrogate the use restrictions and protections imposed by this instrument, the Department and Board 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 Corps and conforms with the requirements of 33 C.F.R. § 332.7(a)(3) and (4).

h. Amendments. This instrument may only be amended after written consent is provided by the Corps and SCDHEC.

**[*Remainder of Page Intentionally Left Blank*]**

**[*Signature Pages Follow*]**

IN WITNESS WHEREOF, the Department, as owner of fee simple title to the land, does hereby declare, and the Board, pursuant to the Act, does hereby accept, the Property in trust forming a part of the corpus of the Heritage Trust, effective on this _____ day of _____, 2017.

Witnesses:

**South Carolina Department of Natural Resources**, a department of the State of South Carolina

_____
Witness #1 Signature

_____
By: Alvin A. Taylor, Director

_____
Witness #2/Notary Public Signature

**STATE OF SOUTH CAROLINA )**
**) ACKNOWLEDGMENT**
**COUNTY OF RICHLAND )**

Personally appeared before me on the _____ day of _____, 201__, Alvin A. Taylor, in his capacity as Director of the South Carolina Department of Natural Resources and he did acknowledge execution of the foregoing instrument for the purposes and intents set forth therein on behalf of the South Carolina Department of Natural Resources.

[Notarial Seal]

_____(SEAL)
Notary Public for South Carolina
My Commission Expires: _____

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Witnesses:

**South Carolina Department of Natural Resources Board of Trustees**

_____
Witness #1 Signature

_____
By: Cary L. Chastain, Chairman

_____
Witness #2/Notary Public Signature

**STATE OF SOUTH CAROLINA )**
**) ACKNOWLEDGMENT**
**COUNTY OF RICHLAND )**

Personally appeared before me on the _____ day of _____, 201__, Cary L. Chastain, in his capacity as Chairman of the South Carolina Department of Natural Resources Board of Trustees, and he did acknowledge execution of the foregoing instrument for the purposes and intents set forth therein on behalf of the South Carolina Department Natural Resources Board of Trustees.

_____(SEAL)
[Notarial Seal] Notary Public for South Carolina
My Commission Expires: _____

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**EXHIBIT A**

Legal Description

[INSERT LEGAL DESCRIPTION]

TMS No. _____

Derivation: This being the property conveyed to the South Carolina Department of Natural Resources by deed of the South Carolina Department of Transportation dated _____ and recorded on _____in Book _____ at Page _____ in the Office of the Register of Deeds for Horry County.

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# APPENDIX D

## Stream Worksheets and Photographs

## LOW GRADIENT STREAM ASSESSMENT DATA SHEET

| | | |
|---|---|---|
| Stream Name UT to L. Pee Dee R. | Basin/Watershed: Pee Dee | USGS Quad: |
| Latitude: 33.845137 | Longitude: -79.249863 | County: Horry |
| Date: 1/4/2017 | Time: | Investigator: J. Sieloff |
| Stream width: | Stream Depth: | Length of Stream Reach: |
| Has it rained within the past 48 hours? yes | Adjacent land use? (Industrial, agriculture, etc): | |

| Habitat | Condition Category | | | |
|---|---|---|---|---|
| Parameter | Fully Functional | Partially Impaired | Impaired | Very Impaired |
| **1.Epifaunal Substrate or Available Cover** | Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e.logs/snags that are not new fall and not transient). | 30-50% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization | 10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed. | Less than 10% stable habitat lack of habitat is obvious; substrate unstable or lacking. |
| **SCORE** | (2.0) | 1.5 | 1.0 | 0.5 |
| **2.Pool Substrate Characterization** | Mix of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common. | Mix of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present. | All mud or clay or sand bottom; little or no root mat; no submerged vegetation. | Hard-pan, clay, or bedrock; no root mat or vegetation. |
| **SCORE** | (2.0) | 1.5 | 1.0 | 0.5 |
| **3.Pool variability** | Even mix of large-shallow, large-deep, small-shallow, small-deep pools present. | Majority of pools large-deep; very few shallow. | Shallow pools much more prevalent than deep pools. | Majority of pools small-shallow or pools absent. |
| **SCORE** | 2.0 | (1.5) | 1.0 | 0.5 |
| **4.Sediment Deposition** | Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition. | Some new increase in bar formation, mostly from gravel, sand or fine sediment. 20-50% of the bottom affected; slight deposition in pools. | Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80%of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent. | Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition. |
| **SCORE** | 2.0 | 1.5 | (1.0) | 0.5 |
| **5.Channel Flow Status** | Water reaches base of both lower banks, and minimal amount of channel substrate is exposed. | Water fills > 75% of the available channel or < 25% of channel substrate is exposed. | Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed. | Very little water in channel and mostly present as standing pools. |
| **SCORE** | (2.0) | 1.5 | 1.0 | 0.5 |
| **6.Channel Alteration** | Channelization or dredging absent or minimal; stream with normal pattern | Some channelization present, usually in areas of bridge abutments; evidence of past channelization (greater than past 20 yr.) may be present, but recent channelization not present. | Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted. | Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely. |
| **SCORE** | (2.0) | 1.5 | 1.0 | 0.5 |
| **7.Channel Sinuosity** | The bends in the stream increase the stream length 3-4X longer than if it was in a straight line (If braided channel, this parameter is difficult to rate.) | The bends in the stream increase the stream length 2-3X longer than if it was in a straight line. | The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line. | Channel straight; waterway has been channelized for a long distance. |
| **SCORE** | 2.0 | 1.5 | (1.0) | 0.5 |
| **8.Bank Stability** | Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. < 5% of bank affected. | Moderately stable; infrequent, small areas of erosion mostly healed over; 5-30% of bank in reach has areas of erosion. | Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods. | Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosion scars. |
| **SCORE** | Left Bank (1.0) | 0.75 | 0.50 | 0.25 |
| **SCORE** | Right Bank (1.0) | 0.75 | 0.50 | 0.25 |
| **9.Vegetative Protection** | >90% of SB surfaces and adjacent riparian zone covered by native vegetation, including trees, understory shrubs, or non-woody macrophytes. minimal or no evidence of grazing or mowing; almost all plants allowed to grow naturally | 70-90% of the SB surfaces covered by native vegetation but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential more than ⅓ of potential plant stubble height remaining | 50-70% of SB covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than ½ potential plant stubble height remaining. | <50% of SB surfaces covered by vegetation; disruption of SB vegetation is very high; vegetation has been removed to 5 cm. or less in average stubble height. |
| **SCORE** | Left Bank (1.0) | 0.75 | 0.50 | 0.25 |
| **SCORE** | Right Bank (1.0) | 0.75 | 0.50 | 0.25 |
| **10.Riparian Veg Zone Width** | Width of riparian zone>18 meters; human activities (roads, clear-cuts, lawns, crops, parking lots) have not impacted zone. | Width of riparian zone 12-18 meters; human activities have impacted zone only minimally. | Width of riparian zone 6-12 meters; human activities have impacted zone a great deal. | Width of riparian zone < 6 meters; little or no riparian vegetation due to human activities. |
| **SCORE** | Left Bank (1.0) | 0.75 | 0.50 | 0.25 |
| **SCORE** | Right Bank (1.0) | 0.75 | 0.50 | 0.25 |

Total Score: 17.5 NOTES/COMMENTS: Assessment took plce during high flow making it difficult to assess bed and bank.

## LOW GRADIENT STREAM ASSESSMENT DATA SHEET

| | | |
|---|---|---|
| Stream Name: Evan's Branch | Basin/Watershed: Pee Dee | USGS Quad: |
| Latitude: 33.912717 | Longitude: -79.259388 | County: Horry |
| Date: 1/4/2017 | Time: | Investigator: J. Sieloff |
| Stream width: | Stream Depth: | Length of Stream Reach: |
| Has it rained within the past 48 hours? yes | Adjacent land use? (Industrial, agriculture, etc): | |

| Habitat | Condition Category | | | |
|---|---|---|---|---|
| Parameter | Fully Functional | Partially Impaired | Impaired | Very Impaired |
| 1.Epifaunal Substrate or Available Cover | Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e.logs/snags that are not new fall and not transient). | 30-50% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization | 10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed. | Less than 10% stable habitat lack of habitat is obvious; substrate unstable or lacking. |
| SCORE | (2.0) | 1.5 | 1.0 | 0.5 |
| 2.Pool Substrate Characterization | Mix of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common. | Mix of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present. | All mud or clay or sand bottom; little or no root mat; no submerged vegetation. | Hard-pan, clay, or bedrock; no root mat or vegetation. |
| SCORE | (2.0) | 1.5 | 1.0 | 0.5 |
| 3.Pool variability | Even mix of large-shallow, large-deep, small-shallow, small-deep pools present. | Majority of pools large-deep; very few shallow. | Shallow pools much more prevalent than deep pools. | Majority of pools small-shallow or pools absent. |
| SCORE | 2.0 | 1.5 | (1.0) | 0.5 |
| 4.Sediment Deposition | Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition. | Some new increase in bar formation, mostly from gravel, sand or fine sediment. 20-50% of the bottom affected; slight deposition in pools. | Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80%of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent. | Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition. |
| SCORE | (2.0) | 1.5 | 1.0 | 0.5 |
| 5.Channel Flow Status | Water reaches base of both lower banks, and minimal amount of channel substrate is exposed. | Water fills > 75% of the available channel or < 25% of channel substrate is exposed. | Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed. | Very little water in channel and mostly present as standing pools. |
| SCORE | (2.0) | 1.5 | 1.0 | 0.5 |
| 6.Channel Alteration | Channelization or dredging absent or minimal; stream with normal pattern | Some channelization present, usually in areas of bridge abutments; evidence of past channelization (greater than past 20 yr.) may be present, but recent channelization not present. | Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted. | Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely. |
| SCORE | (2.0) | 1.5 | 1.0 | 0.5 |
| 7.Channel Sinuosity | The bends in the stream increase the stream length 3-4X longer than if it was in a straight line (If braided channel, this parameter is difficult to rate.) | The bends in the stream increase the stream length 2-3X longer than if it was in a straight line. | The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line. | Channel straight; waterway has been channelized for a long distance. |
| SCORE | 2.0 | (1.5) | 1.0 | 0.5 |
| 8.Bank Stability | Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. < 5% of bank affected. | Moderately stable; infrequent, small areas of erosion mostly healed over; 5-30% of bank in reach has areas of erosion. | Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods. | Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosion scars. |
| SCORE | Left Bank (1.0) | 0.75 | 0.50 | 0.25 |
| SCORE | Right Bank (1.0) | 0.75 | 0.50 | 0.25 |
| 9.Vegetative Protection | >90% of SB surfaces and adjacent riparian zone covered by native vegetation, including trees, understory shrubs, or non-woody macrophytes. minimal or no evidence of grazing or mowing; almost all plants allowed to grow naturally | 70-90% of the SB surfaces covered by native vegetation but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential more than ½ of potential plant stubble height remaining | 50-70% of SB covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than ½ potential plant stubble height remaining. | <50% of SB surfaces covered by vegetation; disruption of SB vegetation is very high; vegetation has been removed to 5 cm. or less in average stubble height. |
| SCORE | Left Bank 1.0 | (0.75) | 0.50 | 0.25 |
| SCORE | Right Bank 1.0 | (0.75) | 0.50 | 0.25 |
| 10.Riparian Veg Zone Width | Width of riparian zone>18 meters; human activities (roads, clear-cuts, lawns, crops, parking lots) have not impacted zone. | Width of riparian zone 12-18 meters; human activities have impacted zone only minimally. | Width of riparian zone 6-12 meters; human activities have impacted zone a great deal. | Width of riparian zone < 6 meters; little or no riparian vegetation due to human activities. |
| SCORE | Left Bank 1.0 | (0.75) | 0.50 | 0.25 |
| SCORE | Right Bank 1.0 | (0.75) | 0.50 | 0.25 |

Total Score: 17.5 NOTES/COMMENTS: Assessment took place during high flow making it difficult to assess bed and bank.



Photo 1:

Evan's Branch



Photo 2:

Unnamed Tributary to Little Pee Dee River



Photo 3:

Little Pee Dee River

Photo 4:

Little Pee Dee River





Photo 5:

Little Pee Dee River

Photo 6:

Little Pee Dee River





Photo 7:

Little Pee Dee River

Photo 8:

Little Pee Dee River





Photo 9:

Little Pee Dee River

# APPENDIX E

# Wetland Preservation Data and Photographs

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Preservation 1 (WP1) **Date** 11/29/16

**Wetland Type** Non-Riverine Swamp Forest **Assessor Name/Organization** C. Beckham & D. Dunn

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Little Pee Dee River

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

○ Yes ◉ No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.930822, -79. 260643

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** ○ Yes ◉ No

**Regulatory Considerations (select all that apply to the assessment area)**

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

○ Blackwater
○ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ○ Lunar ○ Wind ○ Both

**Is the assessment area on a coastal island?** ○ Yes ◉ No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ○ Yes ◉ No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ○ Yes ◉ No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ◉ A | ◉ A | Not severely altered |
| ○ B | ○ B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ◉ A | ◉ A | Water storage capacity and duration are not altered. |
| ○ B | ○ B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| ○ C | ○ C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ○ A | ○ A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ◉ B | ◉ B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ○ C | ○ C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | ○ D | ○ D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | ○ A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ◉ B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ○ A Sandy soil
- ○ B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ○ C Loamy or clayey soils not exhibiting redoximorphic features
- ○ D Loamy or clayey gleyed soil
- ◉ E Histosol or histic epipedon

4b.
- ◉ A Soil ribbon < 1 inch
- ○ B Soil ribbon ≥ 1 inch

4c.
- ○ A No peat or muck presence
- ◉ B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| ◉ A | ◉ A | Little or no evidence of pollutants or discharges entering the assessment area |
| ○ B | ○ B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ○ C | ○ C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| ☐ A | ☐ A | ☐ A | ≥ 10% impervious surfaces |
| ☑ B | ☑ B | ☑ B | < 10% impervious surfaces |
| ☐ C | ☐ C | ☐ C | Confined animal operations (or other local, concentrated source of pollutants) |
| ☐ D | ☐ D | ☐ D | ≥ 20% coverage of pasture |
| ☑ E | ☑ E | ☐ E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| ☐ F | ☐ F | ☐ F | ≥ 20% coverage of maintained grass/herb |
| ☐ G | ☐ G | ☐ G | ≥ 20% coverage of clear-cut land |
| ☐ H | ☐ H | ☐ H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

○ Yes ◉ No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ○ A ≥ 50 feet
- ○ B From 30 to < 50 feet
- ○ C From 15 to < 30 feet
- ○ D From 5 to < 15 feet
- ○ E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

○ ≤ 15-feet wide ○ > 15-feet wide ○ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

○ Yes ○ No

7e. Is tributary or other open water sheltered or exposed?
- ○ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ○ Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| ◉ A | ◉ A | ≥ 100 feet |
| ○ B | ○ B | From 80 to < 100 feet |
| ○ C | ○ C | From 50 to < 80 feet |
| ○ D | ○ D | From 40 to < 50 feet |
| ○ E | ○ E | From 30 to < 40 feet |
| ○ F | ○ F | From 15 to < 30 feet |
| ○ G | ○ G | From 5 to < 15 feet |
| ○ H | ○ H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (○) A Evidence of short-duration inundation (< 7 consecutive days)
- (○) B Evidence of saturation, without evidence of inundation
- (●) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (●) A Sediment deposition is not excessive, but at approximately natural levels.
- (○) B Sediment deposition is excessive, but not overwhelming the wetland.
- (○) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| (○) A | (○) A | (○) A | ≥ 500 acres |
| (○) B | (○) B | (○) B | From 100 to < 500 acres |
| (●) C | (●) C | (●) C | From 50 to < 100 acres |
| (○) D | (○) D | (○) D | From 25 to < 50 acres |
| (○) E | (○) E | (○) E | From 10 to < 25 acres |
| (○) F | (○) F | (○) F | From 5 to < 10 acres |
| (○) G | (○) G | (○) G | From 1 to < 5 acres |
| (○) H | (○) H | (○) H | From 0.5 to < 1 acre |
| (○) I | (○) I | (○) I | From 0.1 to < 0.5 acre |
| (○) J | (○) J | (○) J | From 0.01 to < 0.1 acre |
| (○) K | (○) K | (○) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- (●) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- (○) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (●) A | (○) A | ≥ 500 acres |
| (○) B | (○) B | From 100 to < 500 acres |
| (○) C | (○) C | From 50 to < 100 acres |
| (○) D | (○) D | From 10 to < 50 acres |
| (○) E | (○) E | < 10 acres |
| (○) F | (○) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

(○) Yes (○) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- (●) A No artificial edge within 150 feet in all directions
- (○) B No artificial edge within 150 feet in four (4) to seven (7) directions
- (○) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- (●) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- (○) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- (○) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- (○) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- (○) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- (○) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation

( ) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | (•) A | (•) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ( ) B | ( ) B | Canopy present, but opened more than natural gaps |
| | ( ) C | ( ) C | Canopy sparse or absent |
| Mid-Story | (•) A | (•) A | Dense mid-story/sapling layer |
| | ( ) B | ( ) B | Moderate density mid-story/sapling layer |
| | ( ) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | (•) A | (•) A | Dense shrub layer |
| | ( ) B | ( ) B | Moderate density shrub layer |
| | ( ) C | ( ) C | Shrub layer sparse or absent |
| Herb | ( ) A | ( ) A | Dense herb layer |
| | ( ) B | ( ) B | Moderate density herb layer |
| | (•) C | (•) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

( ) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).

(•) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

( ) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.

(•) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.

( ) C Majority of canopy trees are < 6 inches DBH or no trees.

**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

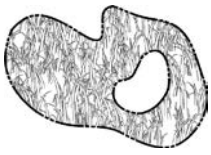
( ) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

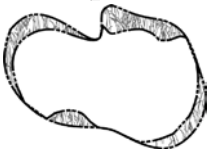
(•) B Not A

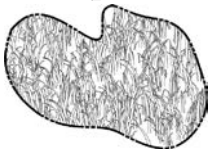
**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 

( ) B 

( ) C 

( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

( ) A Overbank and overland flow are not severely altered in the assessment area.

( ) B Overbank flow is severely altered in the assessment area.

( ) C Overland flow is severely altered in the assessment area.

( ) D Both overbank and overland flow are severely altered in the assessment area.

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Notes

Photo Direction: North-East

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Preservation 1 (WP1) | Date | 11/29/16 |
| Wetland Type | Non-Riverine Swamp Forest | Assessor Name/Organization | C. Beckham & D. Dunn |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | YES |
| Presence of regulatory considerations (Y/N) | NO |
| Wetland is intensively managed (Y/N) | NO |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | NO |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **HIGH** |
| | Sub-Surface Storage and Retention | Condition | **HIGH** |
| Water Quality | Pathogen Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Particulate Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Soluble Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Physical Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Pollution Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Physical Structure | Condition | **HIGH** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **HIGH** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **HIGH** |
| Water Quality | Condition | **HIGH** |
| | Condition/Opportunity | **HIGH** |
| | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Conditon | **HIGH** |

**Overall Wetland Rating** **HIGH**

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 11/29/16

Applicant/Owner: SCDOT State: SC Sampling Point: WP1

Investigator(s): C. Beckham and D.Dunn Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR or MLRA): LRR T Lat: 33.930822 Long: -79.260643 Datum: GCS_NAD

Soil Map Unit Name: Lynn Haven Sand NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✓] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | | |
|---|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✓] | No [ ] | **Is the Sampled Area within a Wetland?** | Yes [✓] | No [ ] |
| Hydric Soil Present? | Yes [✓] | No [ ] | | | |
| Wetland Hydrology Present? | Yes [✓] | No [ ] | | | |

Remarks:
Carolina Bay

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [✓] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) (LRR U)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) (LRR T, U)

**Field Observations:**

| | | | | |
|---|---|---|---|---|
| Surface Water Present? | Yes [✓] | No [ ] | Depth (inches): 10 in. | |
| Water Table Present? | Yes [ ] | No [ ] | Depth (inches): _____ | |
| Saturation Present? (includes capillary fringe) | Yes [ ] | No [ ] | Depth (inches): _____ | **Wetland Hydrology Present?** Yes [✓] No [ ] |

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata)** – Use scientific names of plants. Sampling Point: WP1

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Acer rubrum | 25 | Y | FAC |
| 2. Liquidambar styraciflua | 20 | Y | FAC |
| 3. Taxodium distichum | 15 | Y | OBL |
| 4. Pinus taeda | 15 | Y | FAC |
| 5. | | | |
| 6. | | | |
| | 75 = Total Cover | | |
| 50% of total cover: 37.5 | 20% of total cover: 15 | | |
| Sapling Stratum (Plot size: 30) | | | |
| 1. Acer rubrum | 15 | Y | FAC |
| 2. Liquidambar styraciflua | 15 | Y | FAC |
| 3. Pinus taeda | 10 | Y | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 40 = Total Cover | | |
| 50% of total cover: 20 | 20% of total cover: 8 | | |
| Shrub Stratum (Plot size: 30) | | | |
| 1. Lyonia lucida | 60 | Y | FACW |
| 2. Persea borbonia | 25 | Y | FACW |
| 3. Morella cerifera | 20 | Y | FAC |
| 4. Gordonia lasianthus | 15 | Y | FACW |
| 5. Ilex myrtifolia | 5 | N | FACW |
| 6. | | | |
| | 125 = Total Cover | | |
| 50% of total cover: 62.5 | 20% of total cover: 25 | | |
| Herb Stratum (Plot size: 30) | | | |
| 1. Woodwardia areolata | 10 | N | OBL |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 10 = Total Cover | | |
| 50% of total cover: 5 | 20% of total cover: 2 | | |
| Woody Vine Stratum (Plot size: 30) | | | |
| 1. Smilax glauca | 15 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 15 = Total Cover | | |
| 50% of total cover: 7.5 | 20% of total cover: 3 | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 250 (A)

Total Number of Dominant Species Across All Strata: 250 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species | x 1 = |
| FACW species | x 2 = |
| FAC species | x 3 = |
| FACU species | x 4 = |
| UPL species | x 5 = |
| Column Totals: (A) | (B) |

Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators:**

- [ ] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes [x] No [ ]

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: WP1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 10YR 2/1 | 100 | | | | | loamy sa | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Organic Bodies (A6) **(LRR P, T, U)**
- [ ] 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- [x] Muck Presence (A8) **(LRR U)**
- [ ] 1 cm Muck (A9) **(LRR P, T)**
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Coast Prairie Redox (A16) **(MLRA 150A)**
- [ ] Sandy Mucky Mineral (S1) **(LRR O, S)**
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR P, S, T, U)**
- [ ] Polyvalue Below Surface (S8) **(LRR S, T, U)**
- [ ] Thin Dark Surface (S9) **(LRR S, T, U)**
- [ ] Loamy Mucky Mineral (F1) **(LRR O)**
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Marl (F10) **(LRR U)**
- [ ] Depleted Ochric (F11) **(MLRA 151)**
- [ ] Iron-Manganese Masses (F12) **(LRR O, P, T)**
- [ ] Umbric Surface (F13) **(LRR P, T, U)**
- [ ] Delta Ochric (F17) **(MLRA 151)**
- [ ] Reduced Vertic (F18) **(MLRA 150A, 150B)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- [ ] 1 cm Muck (A9) **(LRR O)**
- [ ] 2 cm Muck (A10) **(LRR S)**
- [ ] Reduced Vertic (F18) **(outside MLRA 150A,B)**
- [ ] Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes [x] No [ ]

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Preservation 2 (WP2) **Date** 11/29/16

**Wetland Type** Riverine Swamp Forest **Assessor Name/Organization** C. Beckham & D. Dunn

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Canoe Lake

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

○ Yes ◉ No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.918133, -79.295491

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** ○ Yes ◉ No

**Regulatory Considerations (select all that apply to the assessment area)**

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

◉ Blackwater
○ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ○ Lunar ○ Wind ○ Both

**Is the assessment area on a coastal island?** ○ Yes ◉ No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ○ Yes ◉ No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ○ Yes ◉ No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ◉ A | ◉ A | Not severely altered |
| ○ B | ○ B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ◉ A | ◉ A | Water storage capacity and duration are not altered. |
| ○ B | ○ B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| ○ C | ○ C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ○ A | ○ A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ○ B | ○ B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ◉ C | ◉ C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | ○ D | ○ D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | ○ A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ○ B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- (•) A No peat or muck presence
- ( ) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

(•) Yes ( ) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- (•) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide ( ) > 15-feet wide (•) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

(•) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- (•) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| (•) A | (•) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (•) A Evidence of short-duration inundation (< 7 consecutive days)
- ( ) B Evidence of saturation, without evidence of inundation
- ( ) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (•) A Sediment deposition is not excessive, but at approximately natural levels.
- ( ) B Sediment deposition is excessive, but not overwhelming the wetland.
- ( ) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| (•) A | (•) A | (•) A | ≥ 500 acres |
| ( ) B | ( ) B | ( ) B | From 100 to < 500 acres |
| ( ) C | ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | ( ) D | From 25 to < 50 acres |
| ( ) E | ( ) E | ( ) E | From 10 to < 25 acres |
| ( ) F | ( ) F | ( ) F | From 5 to < 10 acres |
| ( ) G | ( ) G | ( ) G | From 1 to < 5 acres |
| ( ) H | ( ) H | ( ) H | From 0.5 to < 1 acre |
| ( ) I | ( ) I | ( ) I | From 0.1 to < 0.5 acre |
| ( ) J | ( ) J | ( ) J | From 0.01 to < 0.1 acre |
| ( ) K | ( ) K | ( ) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- ( ) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ( ) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (•) A | ( ) A | ≥ 500 acres |
| ( ) B | ( ) B | From 100 to < 500 acres |
| ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | From 10 to < 50 acres |
| ( ) E | ( ) E | < 10 acres |
| ( ) F | ( ) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

( ) Yes ( ) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- (•) A No artificial edge within 150 feet in all directions
- ( ) B No artificial edge within 150 feet in four (4) to seven (7) directions
- ( ) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- (•) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ( ) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- ( ) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- ( ) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ( ) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ( ) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation

( ) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | ( ) A | ( ) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | (•) B | (•) B | Canopy present, but opened more than natural gaps |
| | ( ) C | ( ) C | Canopy sparse or absent |
| Mid-Story | ( ) A | ( ) A | Dense mid-story/sapling layer |
| | (•) B | (•) B | Moderate density mid-story/sapling layer |
| | ( ) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | ( ) A | ( ) A | Dense shrub layer |
| | ( ) B | ( ) B | Moderate density shrub layer |
| | (•) C | (•) C | Shrub layer sparse or absent |
| Herb | ( ) A | ( ) A | Dense herb layer |
| | ( ) B | ( ) B | Moderate density herb layer |
| | (•) C | (•) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

(•) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).

( ) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

( ) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.

(•) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.

( ) C Majority of canopy trees are < 6 inches DBH or no trees.

**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

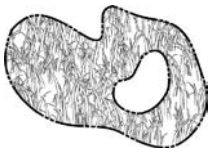
(•) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

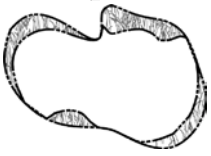
( ) B Not A

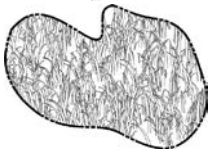
**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 

( ) B 

( ) C 

( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

(•) A Overbank and overland flow are not severely altered in the assessment area.

( ) B Overbank flow is severely altered in the assessment area.

( ) C Overland flow is severely altered in the assessment area.

( ) D Both overbank and overland flow are severely altered in the assessment area.

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Notes

Photo Direction: West

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Preservation 2 (WP2) | Date | 11/29/16 |
| Wetland Type | Riverine Swamp Forest | Assessor Name/Organization | C. Beckham & D. Dunn |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | YES |
| Presence of regulatory considerations (Y/N) | NO |
| Wetland is intensively managed (Y/N) | NO |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | YES |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **HIGH** |
| | Sub-Surface Storage and Retention | Condition | **HIGH** |
| Water Quality | Pathogen Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **NO** |
| | Particulate Change | Condition | **MEDIUM** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Soluble Change | Condition | **MEDIUM** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Physical Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Pollution Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| Habitat | Physical Structure | Condition | **MEDIUM** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **HIGH** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **HIGH** |
| Water Quality | Condition | **HIGH** |
| | Condition/Opportunity | **HIGH** |
| | Opportunity Presence? (Y/N) | **YES** |
| Habitat | Conditon | **HIGH** |

**Overall Wetland Rating** **HIGH**

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 11/29/16

Applicant/Owner: SCDOT State: SC Sampling Point: WP2

Investigator(s): C. Beckham and D.Dunn Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR T Lat: 33.918133 Long: -79.295491 Datum: GCS_NAD

Soil Map Unit Name: Johnston Loam NWI classification: PFO1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✓] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | | |
|---|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✓] | No [ ] | Is the Sampled Area within a Wetland? | Yes [✓] | No [ ] |
| Hydric Soil Present? | Yes [✓] | No [ ] | | | |
| Wetland Hydrology Present? | Yes [✓] | No [ ] | | | |

Remarks:

Carolina Bay

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✓] High Water Table (A2)
- [✓] Saturation (A3)
- [✓] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✓] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) (LRR U)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✓] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) (LRR T, U)

**Field Observations:**

Surface Water Present? Yes [ ] No [✓] Depth (inches):

Water Table Present? Yes [✓] No [ ] Depth (inches): 4 in.

Saturation Present? (includes capillary fringe) Yes [✓] No [ ] Depth (inches): 0 in.

**Wetland Hydrology Present?** Yes [✓] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata)** – Use scientific names of plants.

Sampling Point: WP2

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Betula nigra | 40 | Y | FACW |
| 2. Quercus laurifolia | 30 | Y | FACW |
| 3. Nyysa aquatica | 20 | Y | OBL |
| 4. Taxodium distichum | 20 | Y | OBL |
| 5. Liquidamber styraciflua | 15 | Y | FAC |
| 6. | | | |
| | 125 = Total Cover | | |
| 50% of total cover: 62.5 | 20% of total cover: 25 | | |
| Sapling Stratum (Plot size: 30) | | | |
| 1. Betula nigra | 30 | Y | FACW |
| 2. Acer rubrum | 20 | Y | FAC |
| 3. Taxodium distichum | 20 | Y | OBL |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 70 = Total Cover | | |
| 50% of total cover: 35 | 20% of total cover: 14 | | |
| Shrub Stratum (Plot size: 30) | | | |
| 1. Arundinaria tecta | 30 | Y | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 30 = Total Cover | | |
| 50% of total cover: 15 | 20% of total cover: 6 | | |
| Herb Stratum (Plot size: 30) | | | |
| 1. Hydrocotyle americana | 5 | N | OBL |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 5 = Total Cover | | |
| 50% of total cover: 2.5 | 20% of total cover: 1 | | |
| Woody Vine Stratum (Plot size: 30) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 225 (A)

Total Number of Dominant Species Across All Strata: 225 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species | x 1 = |
| FACW species | x 2 = |
| FAC species | x 3 = |
| FACU species | x 4 = |
| UPL species | x 5 = |
| Column Totals: (A) | (B) |

Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators:**

- [ ] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes [x] No [ ]

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: WP2

**Profile Description: (Describe to the depth needed to document the Indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-4 | 10YR 3/1 | 100 | | | | | sandy | |
| 4-18 | 10YR 4/1 | 100 | | | | | sandy | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☑ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☑ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Preservation 3 (WP3) **Date** 11/29/16

**Wetland Type** Riverine Swamp Forest **Assessor Name/Organization** C. Beckham & D. Dunn

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Little Pee Dee River

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

○ Yes ◉ No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.910957, -79.285341

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** ○ Yes ◉ No

**Regulatory Considerations (select all that apply to the assessment area)**

- ☐ Anadromous fish
- ☐ Federally protected species or State endangered or threatened species
- ☐ NCDWQ riparian buffer rule in effect
- ☐ Abuts a Primary Nursery Area (PNA)
- ☐ Publicly owned property
- ☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- ☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- ☐ Designated NCNHP reference community
- ☑ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- ◉ Blackwater
- ○ Brownwater
- ☐ Tidal (if tidal, check one of the following boxes) ○ Lunar ○ Wind ○ Both

**Is the assessment area on a coastal island?** ○ Yes ◉ No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ○ Yes ◉ No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ○ Yes ◉ No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ◉ A | ◉ A | Not severely altered |
| ○ B | ○ B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ◉ A | ◉ A | Water storage capacity and duration are not altered. |
| ○ B | ○ B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| ○ C | ○ C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ○ A | ○ A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ◉ B | ◉ B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ○ C | ○ C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | ○ D | ○ D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | ○ A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ◉ B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- (•) A No peat or muck presence
- ( ) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

(•) Yes ( ) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- (•) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide (•) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

(•) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- (•) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| (•) A | (•) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (○) A Evidence of short-duration inundation (< 7 consecutive days)
- (○) B Evidence of saturation, without evidence of inundation
- (●) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (●) A Sediment deposition is not excessive, but at approximately natural levels.
- (○) B Sediment deposition is excessive, but not overwhelming the wetland.
- (○) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| (●) A | (●) A | (●) A | ≥ 500 acres |
| (○) B | (○) B | (○) B | From 100 to < 500 acres |
| (○) C | (○) C | (○) C | From 50 to < 100 acres |
| (○) D | (○) D | (○) D | From 25 to < 50 acres |
| (○) E | (○) E | (○) E | From 10 to < 25 acres |
| (○) F | (○) F | (○) F | From 5 to < 10 acres |
| (○) G | (○) G | (○) G | From 1 to < 5 acres |
| (○) H | (○) H | (○) H | From 0.5 to < 1 acre |
| (○) I | (○) I | (○) I | From 0.1 to < 0.5 acre |
| (○) J | (○) J | (○) J | From 0.01 to < 0.1 acre |
| (○) K | (○) K | (○) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- (○) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- (○) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (●) A | (○) A | ≥ 500 acres |
| (○) B | (○) B | From 100 to < 500 acres |
| (○) C | (○) C | From 50 to < 100 acres |
| (○) D | (○) D | From 10 to < 50 acres |
| (○) E | (○) E | < 10 acres |
| (○) F | (○) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

(○) Yes (○) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- (●) A No artificial edge within 150 feet in all directions
- (○) B No artificial edge within 150 feet in four (4) to seven (7) directions
- (○) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- (●) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- (○) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- (○) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- (○) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- (○) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- (○) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation

( ) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | (•) A | (•) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ( ) B | ( ) B | Canopy present, but opened more than natural gaps |
| | ( ) C | ( ) C | Canopy sparse or absent |
| Mid-Story | (•) A | (•) A | Dense mid-story/sapling layer |
| | ( ) B | ( ) B | Moderate density mid-story/sapling layer |
| | ( ) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | ( ) A | ( ) A | Dense shrub layer |
| | (•) B | (•) B | Moderate density shrub layer |
| | ( ) C | ( ) C | Shrub layer sparse or absent |
| Herb | ( ) A | ( ) A | Dense herb layer |
| | (•) B | (•) B | Moderate density herb layer |
| | ( ) C | ( ) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

(•) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).

( ) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

(•) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.

( ) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.

( ) C Majority of canopy trees are < 6 inches DBH or no trees.

**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

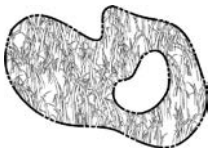
(•) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

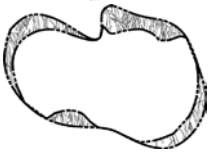
( ) B Not A

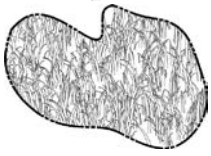
**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 

( ) B 

( ) C 

( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

(•) A Overbank and overland flow are not severely altered in the assessment area.

( ) B Overbank flow is severely altered in the assessment area.

( ) C Overland flow is severely altered in the assessment area.

( ) D Both overbank and overland flow are severely altered in the assessment area.

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Notes

Photo Direction: South-West

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Preservation 3 (WP3) | Date | 11/29/16 |
| Wetland Type | Riverine Swamp Forest | Assessor Name/Organization | C. Beckham & D. Dunn |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | YES |
| Presence of regulatory considerations (Y/N) | YES |
| Wetland is intensively managed (Y/N) | NO |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | YES |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **HIGH** |
| | Sub-Surface Storage and Retention | Condition | **HIGH** |
| Water Quality | Pathogen Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **NO** |
| | Particulate Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Soluble Change | Condition | **MEDIUM** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Physical Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Pollution Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| Habitat | Physical Structure | Condition | **HIGH** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **HIGH** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **HIGH** |
| Water Quality | Condition | **HIGH** |
| | Condition/Opportunity | **HIGH** |
| | Opportunity Presence? (Y/N) | **YES** |
| Habitat | Conditon | **HIGH** |

**Overall Wetland Rating** **HIGH**

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 11/29/16

Applicant/Owner: SCDOT State: SC Sampling Point: WP3

Investigator(s): C. Beckham and D.Dunn Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR T Lat: 33.910957 Long: -79.285341 Datum: GCS_NAD

Soil Map Unit Name: Johnston Loam NWI classification: PFO1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✓] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | | |
|---|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✓] | No [ ] | Is the Sampled Area within a Wetland? | Yes [✓] | No [ ] |
| Hydric Soil Present? | Yes [✓] | No [ ] | | | |
| Wetland Hydrology Present? | Yes [✓] | No [ ] | | | |

Remarks:

Carolina Bay

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✓] High Water Table (A2)
- [✓] Saturation (A3)
- [✓] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✓] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) (LRR U)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✓] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) (LRR T, U)

**Field Observations:**

| | | | | |
|---|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches): | |
| Water Table Present? | Yes [✓] | No [ ] | Depth (inches): | 4 in. |
| Saturation Present? (includes capillary fringe) | Yes [✓] | No [ ] | Depth (inches): | 0 in. |

**Wetland Hydrology Present?** Yes [✓] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata)** – Use scientific names of plants.

Sampling Point: WP3

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa biflora | 30 | Y | FACW |
| 2. Taxodium distichum | 25 | Y | OBL |
| 3. Betula nigra | 15 | Y | FACW |
| 4. Quercus laurifolia | 15 | Y | FACW |
| 5. | | | |
| 6. | | | |
| | 85 = Total Cover | | |
| 50% of total cover: 42.5 | 20% of total cover: 17 | | |
| Sapling Stratum (Plot size: 30) | | | |
| 1. Taxodium distichum | 15 | Y | OBL |
| 2. Acer rubrum | 10 | Y | FAC |
| 3. Nyssa biflora | 10 | Y | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 35 = Total Cover | | |
| 50% of total cover: 17.5 | 20% of total cover: 7 | | |
| Shrub Stratum (Plot size: 30) | | | |
| 1. Morella cerifera | 20 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 20 = Total Cover | | |
| 50% of total cover: 10 | 20% of total cover: 4 | | |
| Herb Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| Woody Vine Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 140 (A)

Total Number of Dominant Species Across All Strata: 140 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species | x 1 = |
| FACW species | x 2 = |
| FAC species | x 3 = |
| FACU species | x 4 = |
| UPL species | x 5 = |
| Column Totals: (A) | (B) |

Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: WP3

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 10YR 3/1 | 100 | | | | | sandy | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Preservation 4 (WP4) **Date** 11/29/16

**Wetland Type** Riverine Swamp Forest **Assessor Name/Organization** C. Beckham & D. Dunn

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Little Pee Dee River

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

○ Yes ◉ No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.898768, -79.274782

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** ○ Yes ◉ No

**Regulatory Considerations (select all that apply to the assessment area)**

- ☐ Anadromous fish
- ☐ Federally protected species or State endangered or threatened species
- ☐ NCDWQ riparian buffer rule in effect
- ☐ Abuts a Primary Nursery Area (PNA)
- ☐ Publicly owned property
- ☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- ☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- ☐ Designated NCNHP reference community
- ☑ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- ◉ Blackwater
- ○ Brownwater
- ☐ Tidal (if tidal, check one of the following boxes) ○ Lunar ○ Wind ○ Both

**Is the assessment area on a coastal island?** ○ Yes ◉ No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ○ Yes ◉ No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ◉ Yes ○ No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ◉ A | ◉ A | Not severely altered |
| ○ B | ○ B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ◉ A | ◉ A | Water storage capacity and duration are not altered. |
| ○ B | ○ B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| ○ C | ○ C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ○ A | ○ A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ○ B | ○ B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ○ C | ○ C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | ◉ D | ◉ D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | ◉ A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ○ B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- ( ) A No peat or muck presence
- (•) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

(•) Yes ( ) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- (•) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide (•) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

(•) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- ( ) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- (•) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| (•) A | (•) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (○) A Evidence of short-duration inundation (< 7 consecutive days)
- (○) B Evidence of saturation, without evidence of inundation
- (●) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (●) A Sediment deposition is not excessive, but at approximately natural levels.
- (○) B Sediment deposition is excessive, but not overwhelming the wetland.
- (○) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| (●) A | (●) A | (●) A | ≥ 500 acres |
| (○) B | (○) B | (○) B | From 100 to < 500 acres |
| (○) C | (○) C | (○) C | From 50 to < 100 acres |
| (○) D | (○) D | (○) D | From 25 to < 50 acres |
| (○) E | (○) E | (○) E | From 10 to < 25 acres |
| (○) F | (○) F | (○) F | From 5 to < 10 acres |
| (○) G | (○) G | (○) G | From 1 to < 5 acres |
| (○) H | (○) H | (○) H | From 0.5 to < 1 acre |
| (○) I | (○) I | (○) I | From 0.1 to < 0.5 acre |
| (○) J | (○) J | (○) J | From 0.01 to < 0.1 acre |
| (○) K | (○) K | (○) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- (○) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- (○) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (●) A | (○) A | ≥ 500 acres |
| (○) B | (○) B | From 100 to < 500 acres |
| (○) C | (○) C | From 50 to < 100 acres |
| (○) D | (○) D | From 10 to < 50 acres |
| (○) E | (○) E | < 10 acres |
| (○) F | (○) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

(○) Yes (○) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- (●) A No artificial edge within 150 feet in all directions
- (○) B No artificial edge within 150 feet in four (4) to seven (7) directions
- (○) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- (●) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- (○) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- (○) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- (○) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- (○) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- (○) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation
( ) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | (•) A | (•) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ( ) B | ( ) B | Canopy present, but opened more than natural gaps |
| | ( ) C | ( ) C | Canopy sparse or absent |
| Mid-Story | (•) A | (•) A | Dense mid-story/sapling layer |
| | ( ) B | ( ) B | Moderate density mid-story/sapling layer |
| | ( ) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | (•) A | (•) A | Dense shrub layer |
| | ( ) B | ( ) B | Moderate density shrub layer |
| | ( ) C | ( ) C | Shrub layer sparse or absent |
| Herb | ( ) A | ( ) A | Dense herb layer |
| | (•) B | (•) B | Moderate density herb layer |
| | ( ) C | ( ) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

(•) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
( ) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

(•) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
( ) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
( ) C Majority of canopy trees are < 6 inches DBH or no trees.

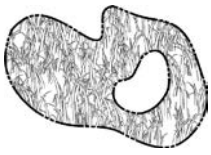
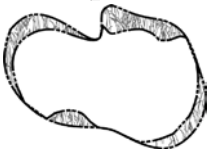
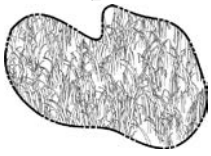
**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

(•) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
( ) B Not A

**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 
( ) B 
( ) C 
( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

(•) A Overbank and overland flow are not severely altered in the assessment area.
( ) B Overbank flow is severely altered in the assessment area.
( ) C Overland flow is severely altered in the assessment area.
( ) D Both overbank and overland flow are severely altered in the assessment area.

Notes

Photo Direction: South

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Preservation 4 (WP4) | Date | 11/29/16 |
| Wetland Type | Riverine Swamp Forest | Assessor Name/Organization | C. Beckham & D. Dunn |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | YES |
| Presence of regulatory considerations (Y/N) | YES |
| Wetland is intensively managed (Y/N) | NO |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | YES |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | YES |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **HIGH** |
| | Sub-Surface Storage and Retention | Condition | **HIGH** |
| Water Quality | Pathogen Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **NO** |
| | Particulate Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Soluble Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Physical Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Pollution Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| Habitat | Physical Structure | Condition | **HIGH** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **HIGH** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **HIGH** |
| Water Quality | Condition | **HIGH** |
| | Condition/Opportunity | **HIGH** |
| | Opportunity Presence? (Y/N) | **YES** |
| Habitat | Conditon | **HIGH** |

**Overall Wetland Rating** **HIGH**

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 11/29/16

Applicant/Owner: SCDOT State: SC Sampling Point: WP4

Investigator(s): C. Beckham and D.Dunn Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR or MLRA): LRR T Lat: 33.898768 Long: -79.274782 Datum: GCS_NAD

Soil Map Unit Name: Johnston Loam NWI classification: PFO1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✓] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | | |
|---|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✓] | No [ ] | **Is the Sampled Area within a Wetland?** | Yes [✓] | No [ ] |
| Hydric Soil Present? | Yes [✓] | No [ ] | | | |
| Wetland Hydrology Present? | Yes [✓] | No [ ] | | | |

Remarks:

Carolina Bay

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✓] High Water Table (A2)
- [✓] Saturation (A3)
- [✓] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✓] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) (LRR U)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✓] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) (LRR T, U)

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches): _____ |
| Water Table Present? | Yes [✓] | No [ ] | Depth (inches): 8 in. |
| Saturation Present? (includes capillary fringe) | Yes [✓] | No [ ] | Depth (inches): 0 in. |

**Wetland Hydrology Present?** Yes [✓] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata)** – Use scientific names of plants.

Sampling Point: WP4

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa aquatica | 30 | Y | OBL |
| 2. Betula nigra | 25 | Y | FACW |
| 3. Quercus laurifolia | 25 | Y | FACW |
| 4. Liquidambar styraciflua | 20 | Y | FAC |
| 5. Acer rubrum | 15 | Y | FAC |
| 6. | | | |
| | 115 = Total Cover | | |
| 50% of total cover: 57.5 | 20% of total cover: 23 | | |
| Sapling Stratum (Plot size: 30) | | | |
| 1. Nyssa aquatica | 25 | Y | OBL |
| 2. Quercus laurifolia | 15 | Y | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 40 = Total Cover | | |
| 50% of total cover: 20 | 20% of total cover: 8 | | |
| Shrub Stratum (Plot size: 30) | | | |
| 1. Vaccinium arboreum | 50 | Y | FACU |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 50 = Total Cover | | |
| 50% of total cover: 25 | 20% of total cover: 10 | | |
| Herb Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| Woody Vine Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 155 (A)

Total Number of Dominant Species Across All Strata: 205 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.76 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species | x 1 = |
| FACW species | x 2 = |
| FAC species | x 3 = |
| FACU species | x 4 = |
| UPL species | x 5 = |
| Column Totals: (A) | (B) |

Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators:**

- [ ] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes [x] No [ ]

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: WP4

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 7.5YR 2/0 | 100 | | | | | sandy lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☑ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Preservation 5 (WP5) **Date** 11/29/16

**Wetland Type** Non-Tidal Freshwater Marsh **Assessor Name/Organization** C. Beckham & D. Dunn

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Little Pee Dee River

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

( ) Yes (•) No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.902149, -79.267602

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** ( ) Yes (•) No

**Regulatory Considerations (select all that apply to the assessment area)**

- [ ] Anadromous fish
- [ ] Federally protected species or State endangered or threatened species
- [ ] NCDWQ riparian buffer rule in effect
- [ ] Abuts a Primary Nursery Area (PNA)
- [ ] Publicly owned property
- [ ] N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- [ ] Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- [ ] Designated NCNHP reference community
- [x] Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- (•) Blackwater
- ( ) Brownwater
- [ ] Tidal (if tidal, check one of the following boxes) ( ) Lunar ( ) Wind ( ) Both

**Is the assessment area on a coastal island?** ( ) Yes (•) No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ( ) Yes (•) No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ( ) Yes (•) No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| (•) A | ( ) A | Not severely altered |
| ( ) B | (•) B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Water storage capacity and duration are not altered. |
| ( ) B | ( ) B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| ( ) C | ( ) C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ( ) A | ( ) A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | (•) B | (•) B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ( ) C | ( ) C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | ( ) D | ( ) D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | (•) A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ( ) B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- ( ) A No peat or muck presence
- (•) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

( ) Yes (•) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ( ) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide ( ) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

( ) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- ( ) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| ( ) A | ( ) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (○) A Evidence of short-duration inundation (< 7 consecutive days)
- ( ) B Evidence of saturation, without evidence of inundation
- (●) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (●) A Sediment deposition is not excessive, but at approximately natural levels.
- ( ) B Sediment deposition is excessive, but not overwhelming the wetland.
- ( ) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| ○ A | ○ A | ● A | ≥ 500 acres |
| ○ B | ● B | ○ B | From 100 to < 500 acres |
| ○ C | ○ C | ○ C | From 50 to < 100 acres |
| ○ D | ○ D | ○ D | From 25 to < 50 acres |
| ● E | ○ E | ○ E | From 10 to < 25 acres |
| ○ F | ○ F | ○ F | From 5 to < 10 acres |
| ○ G | ○ G | ○ G | From 1 to < 5 acres |
| ○ H | ○ H | ○ H | From 0.5 to < 1 acre |
| ○ I | ○ I | ○ I | From 0.1 to < 0.5 acre |
| ○ J | ○ J | ○ J | From 0.01 to < 0.1 acre |
| ○ K | ○ K | ○ K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- ( ) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ( ) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| ● A | ○ A | ≥ 500 acres |
| ○ B | ○ B | From 100 to < 500 acres |
| ○ C | ○ C | From 50 to < 100 acres |
| ○ D | ○ D | From 10 to < 50 acres |
| ○ E | ○ E | < 10 acres |
| ○ F | ○ F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

- (●) Yes ( ) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ( ) A No artificial edge within 150 feet in all directions
- ( ) B No artificial edge within 150 feet in four (4) to seven (7) directions
- ( ) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- ( ) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ( ) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- ( ) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- (●) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ( ) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ( ) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

(•) A ≥ 25% coverage of vegetation
( ) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | ( ) A | ( ) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ( ) B | ( ) B | Canopy present, but opened more than natural gaps |
| | (•) C | (•) C | Canopy sparse or absent |
| Mid-Story | ( ) A | ( ) A | Dense mid-story/sapling layer |
| | ( ) B | ( ) B | Moderate density mid-story/sapling layer |
| | (•) C | (•) C | Mid-story/sapling layer sparse or absent |
| Shrub | (•) A | (•) A | Dense shrub layer |
| | ( ) B | ( ) B | Moderate density shrub layer |
| | ( ) C | ( ) C | Shrub layer sparse or absent |
| Herb | (•) A | (•) A | Dense herb layer |
| | ( ) B | ( ) B | Moderate density herb layer |
| | ( ) C | ( ) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

( ) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
(•) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

( ) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
( ) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
(•) C Majority of canopy trees are < 6 inches DBH or no trees.

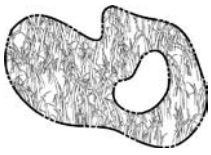
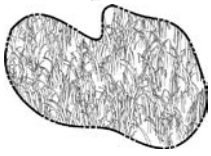
**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

( ) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
(•) B Not A

**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

(•) A 
( ) B 
( ) C 
( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

( ) A Overbank and overland flow are not severely altered in the assessment area.
( ) B Overbank flow is severely altered in the assessment area.
( ) C Overland flow is severely altered in the assessment area.
( ) D Both overbank and overland flow are severely altered in the assessment area.

Notes

Photo Direction: South-East

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Preservation 5 (WP5) | Date | 11/29/16 |
| Wetland Type | Non-Tidal Freshwater Marsh | Assessor Name/Organization | C. Beckham & D. Dunn |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | YES |
| Presence of regulatory considerations (Y/N) | YES |
| Wetland is intensively managed (Y/N) | NO |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | NO |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | NA |
| | Sub-Surface Storage and Retention | Condition | NA |
| Water Quality | Pathogen Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Particulate Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Soluble Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Physical Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Pollution Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| Habitat | Physical Structure | Condition | **LOW** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **HIGH** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **HIGH** |
| Water Quality | Condition | **HIGH** |
| | Condition/Opportunity | **HIGH** |
| | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Conditon | **LOW** |

**Overall Wetland Rating** **HIGH**

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 11/29/16

Applicant/Owner: SCDOT State: SC Sampling Point: WP5

Investigator(s): C. Beckham and D.Dunn Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR or MLRA): LRR T Lat: 33.902149 Long: -79.267602 Datum: GCS_NAD

Soil Map Unit Name: Johnston Loam NWI classification: PFO1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✓] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | | |
|---|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✓] | No [ ] | **Is the Sampled Area within a Wetland?** | Yes [✓] | No [ ] |
| Hydric Soil Present? | Yes [✓] | No [ ] | | | |
| Wetland Hydrology Present? | Yes [✓] | No [ ] | | | |

Remarks:

Carolina Bay

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✓] High Water Table (A2)
- [✓] Saturation (A3)
- [✓] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✓] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✓] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | | |
|---|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches): | |
| Water Table Present? | Yes [✓] | No [ ] | Depth (inches): | 2 in. |
| Saturation Present? (includes capillary fringe) | Yes [✓] | No [ ] | Depth (inches): | 0 in. |

**Wetland Hydrology Present?** Yes [✓] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata)** – Use scientific names of plants. Sampling Point: WP5

| Tree Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling Stratum** (Plot size: 30 ) | | | |
| 1. Liquidamber styraciflua | 20 | Y | FAC |
| 2. Morella cerifera | 20 | Y | FAC |
| 3. Salix nigra | 5 | N | OBL |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 45 = Total Cover | | |
| 50% of total cover: 22.5 | 20% of total cover: 9 | | |
| **Shrub Stratum** (Plot size: 30 ) | | | |
| 1. Hypericum brachyphyllum | 75 | Y | FACW |
| 2. Cephalanthus occidentalis | 40 | Y | OBL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 115 = Total Cover | | |
| 50% of total cover: 57.5 | 20% of total cover: 23 | | |
| **Herb Stratum** (Plot size: 30 ) | | | |
| 1. Scirpus cyperinus | 75 | Y | OBL |
| 2. Polygonum pensylvanicum | 30 | Y | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 105 = Total Cover | | |
| 50% of total cover: 52.5 | 20% of total cover: 21 | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 265 (A)

Total Number of Dominant Species Across All Strata: 265 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | | x 2 = | |
| FAC species | | x 3 = | |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | (A) | | (B) |

Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: WP5

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-14 | 10YR 2/1 | 100 | | | | | sandy loam | |
| 14-18 | 10YR 5/1 | 100 | | | | | sandy loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Preservation 6 (WP6) **Date** 11/30/16

**Wetland Type** Riverine Swamp Forest **Assessor Name/Organization** C. Beckham & D. Dunn

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Little Pee Dee River

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

○ Yes ◉ No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.882637, -79.253227

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** ○ Yes ◉ No

**Regulatory Considerations (select all that apply to the assessment area)**

- ☐ Anadromous fish
- ☐ Federally protected species or State endangered or threatened species
- ☐ NCDWQ riparian buffer rule in effect
- ☐ Abuts a Primary Nursery Area (PNA)
- ☐ Publicly owned property
- ☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- ☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- ☐ Designated NCNHP reference community
- ☑ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- ◉ Blackwater
- ○ Brownwater
- ☐ Tidal (if tidal, check one of the following boxes) ○ Lunar ○ Wind ○ Both

**Is the assessment area on a coastal island?** ○ Yes ◉ No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ○ Yes ◉ No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ○ Yes ◉ No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ◉ A | ◉ A | Not severely altered |
| ○ B | ○ B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ◉ A | ◉ A | Water storage capacity and duration are not altered. |
| ○ B | ○ B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| ○ C | ○ C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ○ A | ○ A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ◉ B | ◉ B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ○ C | ○ C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | ○ D | ○ D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | ◉ A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ○ B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- ( ) A No peat or muck presence
- (•) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

( ) Yes (•) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ( ) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide ( ) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

( ) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- ( ) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| (•) A | (•) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (○) A Evidence of short-duration inundation (< 7 consecutive days)
- (○) B Evidence of saturation, without evidence of inundation
- (●) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (●) A Sediment deposition is not excessive, but at approximately natural levels.
- (○) B Sediment deposition is excessive, but not overwhelming the wetland.
- (○) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| (●) A | (●) A | (●) A | ≥ 500 acres |
| (○) B | (○) B | (○) B | From 100 to < 500 acres |
| (○) C | (○) C | (○) C | From 50 to < 100 acres |
| (○) D | (○) D | (○) D | From 25 to < 50 acres |
| (○) E | (○) E | (○) E | From 10 to < 25 acres |
| (○) F | (○) F | (○) F | From 5 to < 10 acres |
| (○) G | (○) G | (○) G | From 1 to < 5 acres |
| (○) H | (○) H | (○) H | From 0.5 to < 1 acre |
| (○) I | (○) I | (○) I | From 0.1 to < 0.5 acre |
| (○) J | (○) J | (○) J | From 0.01 to < 0.1 acre |
| (○) K | (○) K | (○) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- (○) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- (○) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (●) A | (○) A | ≥ 500 acres |
| (○) B | (○) B | From 100 to < 500 acres |
| (○) C | (○) C | From 50 to < 100 acres |
| (○) D | (○) D | From 10 to < 50 acres |
| (○) E | (○) E | < 10 acres |
| (○) F | (○) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

(○) Yes (○) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- (●) A No artificial edge within 150 feet in all directions
- (○) B No artificial edge within 150 feet in four (4) to seven (7) directions
- (○) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- (●) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- (○) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- (○) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- (○) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- (○) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- (○) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation

( ) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | (•) A | (•) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ( ) B | ( ) B | Canopy present, but opened more than natural gaps |
| | ( ) C | ( ) C | Canopy sparse or absent |
| Mid-Story | (•) A | (•) A | Dense mid-story/sapling layer |
| | ( ) B | ( ) B | Moderate density mid-story/sapling layer |
| | ( ) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | ( ) A | ( ) A | Dense shrub layer |
| | (•) B | (•) B | Moderate density shrub layer |
| | ( ) C | ( ) C | Shrub layer sparse or absent |
| Herb | ( ) A | ( ) A | Dense herb layer |
| | ( ) B | ( ) B | Moderate density herb layer |
| | (•) C | (•) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

(•) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).

( ) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

(•) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.

( ) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.

( ) C Majority of canopy trees are < 6 inches DBH or no trees.

**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

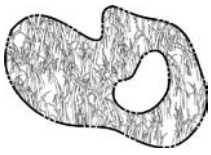
(•) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

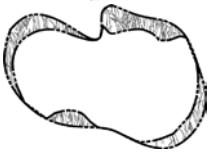
( ) B Not A

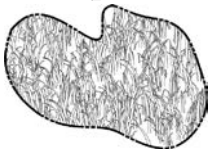
**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 

( ) B 

( ) C 

( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

(•) A Overbank and overland flow are not severely altered in the assessment area.

( ) B Overbank flow is severely altered in the assessment area.

( ) C Overland flow is severely altered in the assessment area.

( ) D Both overbank and overland flow are severely altered in the assessment area.

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Notes

Photo Direction: South-East

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Preservation 6 (WP6) | Date | 11/30/16 |
| Wetland Type | Riverine Swamp Forest | Assessor Name/Organization | C. Beckham & D. Dunn |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | YES |
| Presence of regulatory considerations (Y/N) | YES |
| Wetland is intensively managed (Y/N) | NO |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | NO |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **HIGH** |
| | Sub-Surface Storage and Retention | Condition | **HIGH** |
| Water Quality | Pathogen Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **NO** |
| | Particulate Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Soluble Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Physical Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Pollution Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| Habitat | Physical Structure | Condition | **HIGH** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **HIGH** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **HIGH** |
| Water Quality | Condition | **HIGH** |
| | Condition/Opportunity | **HIGH** |
| | Opportunity Presence? (Y/N) | **YES** |
| Habitat | Conditon | **HIGH** |

**Overall Wetland Rating** **HIGH**

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 11/30/16

Applicant/Owner: SCDOT State: SC Sampling Point: WP6

Investigator(s): C. Beckham and D.Dunn Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR T Lat: 33.882637 Long: -79.253227 Datum: GCS_NAD

Soil Map Unit Name: Johnston Loam NWI classification: PFO1/2T

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✓] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | | |
|---|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✓] | No [ ] | **Is the Sampled Area within a Wetland?** | Yes [✓] | No [ ] |
| Hydric Soil Present? | Yes [✓] | No [ ] | | | |
| Wetland Hydrology Present? | Yes [✓] | No [ ] | | | |

Remarks:

Carolina Bay

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✓] High Water Table (A2)
- [✓] Saturation (A3)
- [✓] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✓] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) (LRR U)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✓] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) (LRR T, U)

**Field Observations:**

| | | | | | |
|---|---|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches): | | |
| Water Table Present? | Yes [✓] | No [ ] | Depth (inches): | 0 in. | |
| Saturation Present? (includes capillary fringe) | Yes [✓] | No [ ] | Depth (inches): | 0 in. | |

**Wetland Hydrology Present?** Yes [✓] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata)** – Use scientific names of plants. Sampling Point: WP6

| Tree Stratum (Plot size: 30) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa biflora | 50 | Y | OBL |
| 2. Nyssa aquatica | 30 | Y | OBL |
| 3. Quercus laurifolia | 25 | Y | FACW |
| 4. Taxodium distichum | 25 | Y | OBL |
| 5. Acer rubrum | 20 | Y | FAC |
| 6. | | | |
| | 150 = Total Cover | | |
| 50% of total cover: 75 | 20% of total cover: 30 | | |
| Sapling Stratum (Plot size: 30) | | | |
| 1. Nyssa biflora | 20 | Y | OBL |
| 2. Nyssa aquatica | 20 | Y | OBL |
| 3. Acer rubrum | 20 | Y | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 60 = Total Cover | | |
| 50% of total cover: 30 | 20% of total cover: 12 | | |
| Shrub Stratum (Plot size: 30) | | | |
| 1. Pieris phillyreifolia | 40 | Y | FACW |
| 2. Gordonia lasianthus | 30 | Y | FACW |
| 3. Morella cerifera | 20 | Y | FAC |
| 4. Persea palustris | 20 | Y | OBL |
| 5. | | | |
| 6. | | | |
| | 110 = Total Cover | | |
| 50% of total cover: 55 | 20% of total cover: 22 | | |
| Herb Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| Woody Vine Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 320 (A)

Total Number of Dominant Species Across All Strata: 320 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species | x 1 = |
| FACW species | x 2 = |
| FAC species | x 3 = |
| FACU species | x 4 = |
| UPL species | x 5 = |
| Column Totals: (A) | (B) |

Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators:**

- [ ] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes [x] No [ ]

Remarks: (If observed, list morphological adaptations below).

**SOIL** Sampling Point: WP6

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 10YR 2/1 | 100 | | | | | sandy lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Organic Bodies (A6) **(LRR P, T, U)**
- [ ] 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- [x] Muck Presence (A8) **(LRR U)**
- [ ] 1 cm Muck (A9) **(LRR P, T)**
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Coast Prairie Redox (A16) **(MLRA 150A)**
- [ ] Sandy Mucky Mineral (S1) **(LRR O, S)**
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR P, S, T, U)**
- [ ] Polyvalue Below Surface (S8) **(LRR S, T, U)**
- [ ] Thin Dark Surface (S9) **(LRR S, T, U)**
- [ ] Loamy Mucky Mineral (F1) **(LRR O)**
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Marl (F10) **(LRR U)**
- [ ] Depleted Ochric (F11) **(MLRA 151)**
- [ ] Iron-Manganese Masses (F12) **(LRR O, P, T)**
- [ ] Umbric Surface (F13) **(LRR P, T, U)**
- [ ] Delta Ochric (F17) **(MLRA 151)**
- [ ] Reduced Vertic (F18) **(MLRA 150A, 150B)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- [ ] 1 cm Muck (A9) **(LRR O)**
- [ ] 2 cm Muck (A10) **(LRR S)**
- [ ] Reduced Vertic (F18) **(outside MLRA 150A,B)**
- [ ] Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes [x] No [ ]

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Preservation 7 (WP7) **Date** 11/30/16

**Wetland Type** Riverine Swamp Forest **Assessor Name/Organization** C. Beckham & D. Dunn

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Little Pee Dee River

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

○ Yes ◉ No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.877893, -79.252438

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** ○ Yes ◉ No

**Regulatory Considerations (select all that apply to the assessment area)**

- ☐ Anadromous fish
- ☐ Federally protected species or State endangered or threatened species
- ☐ NCDWQ riparian buffer rule in effect
- ☐ Abuts a Primary Nursery Area (PNA)
- ☐ Publicly owned property
- ☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- ☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- ☐ Designated NCNHP reference community
- ☑ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- ◉ Blackwater
- ○ Brownwater
- ☐ Tidal (if tidal, check one of the following boxes) ○ Lunar ○ Wind ○ Both

**Is the assessment area on a coastal island?** ○ Yes ◉ No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ○ Yes ◉ No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ○ Yes ◉ No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ◉ A | ◉ A | Not severely altered |
| ○ B | ○ B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ◉ A | ◉ A | Water storage capacity and duration are not altered. |
| ○ B | ○ B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| ○ C | ○ C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ◉ A | ◉ A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ○ B | ○ B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ○ C | ○ C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | ○ D | ○ D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | ◉ A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ○ B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- ( ) A No peat or muck presence
- (•) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

( ) Yes (•) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ( ) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide ( ) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

( ) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- ( ) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| (•) A | (•) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (○) A Evidence of short-duration inundation (< 7 consecutive days)
- (○) B Evidence of saturation, without evidence of inundation
- (●) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (●) A Sediment deposition is not excessive, but at approximately natural levels.
- (○) B Sediment deposition is excessive, but not overwhelming the wetland.
- (○) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| (●) A | (●) A | (●) A | ≥ 500 acres |
| (○) B | (○) B | (○) B | From 100 to < 500 acres |
| (○) C | (○) C | (○) C | From 50 to < 100 acres |
| (○) D | (○) D | (○) D | From 25 to < 50 acres |
| (○) E | (○) E | (○) E | From 10 to < 25 acres |
| (○) F | (○) F | (○) F | From 5 to < 10 acres |
| (○) G | (○) G | (○) G | From 1 to < 5 acres |
| (○) H | (○) H | (○) H | From 0.5 to < 1 acre |
| (○) I | (○) I | (○) I | From 0.1 to < 0.5 acre |
| (○) J | (○) J | (○) J | From 0.01 to < 0.1 acre |
| (○) K | (○) K | (○) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- (○) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- (○) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (●) A | (○) A | ≥ 500 acres |
| (○) B | (○) B | From 100 to < 500 acres |
| (○) C | (○) C | From 50 to < 100 acres |
| (○) D | (○) D | From 10 to < 50 acres |
| (○) E | (○) E | < 10 acres |
| (○) F | (○) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

(○) Yes (○) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- (●) A No artificial edge within 150 feet in all directions
- (○) B No artificial edge within 150 feet in four (4) to seven (7) directions
- (○) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- (●) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- (○) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- (○) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- (○) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- (○) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- (○) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation

( ) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | (•) A | (•) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ( ) B | ( ) B | Canopy present, but opened more than natural gaps |
| | ( ) C | ( ) C | Canopy sparse or absent |
| Mid-Story | (•) A | (•) A | Dense mid-story/sapling layer |
| | ( ) B | ( ) B | Moderate density mid-story/sapling layer |
| | ( ) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | ( ) A | ( ) A | Dense shrub layer |
| | (•) B | (•) B | Moderate density shrub layer |
| | ( ) C | ( ) C | Shrub layer sparse or absent |
| Herb | ( ) A | ( ) A | Dense herb layer |
| | ( ) B | ( ) B | Moderate density herb layer |
| | (•) C | (•) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

(•) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).

( ) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

(•) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.

( ) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.

( ) C Majority of canopy trees are < 6 inches DBH or no trees.

**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

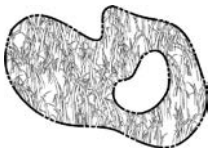
(•) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

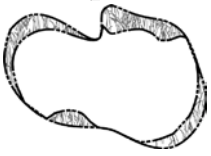
( ) B Not A

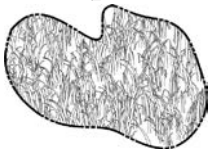
**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 

( ) B 

( ) C 

( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

(•) A Overbank and overland flow are not severely altered in the assessment area.

( ) B Overbank flow is severely altered in the assessment area.

( ) C Overland flow is severely altered in the assessment area.

( ) D Both overbank and overland flow are severely altered in the assessment area.

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Notes

Photo Direction: South-West

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Preservation 7 (WP7) | Date | 11/30/16 |
| Wetland Type | Riverine Swamp Forest | Assessor Name/Organization | C. Beckham & D. Dunn |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | YES |
| Presence of regulatory considerations (Y/N) | YES |
| Wetland is intensively managed (Y/N) | NO |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | NO |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **HIGH** |
| | Sub-Surface Storage and Retention | Condition | **HIGH** |
| Water Quality | Pathogen Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **NO** |
| | Particulate Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Soluble Change | Condition | **HIGH** |
| | | Condition/Opportunity | **HIGH** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Physical Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **YES** |
| | Pollution Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| Habitat | Physical Structure | Condition | **HIGH** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **HIGH** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **HIGH** |
| Water Quality | Condition | **HIGH** |
| | Condition/Opportunity | **HIGH** |
| | Opportunity Presence? (Y/N) | **YES** |
| Habitat | Conditon | **HIGH** |

**Overall Wetland Rating** **HIGH**

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 11/30/16

Applicant/Owner: SCDOT State: SC Sampling Point: WP7

Investigator(s): C. Beckham and D.Dunn Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR T Lat: 33.877893 Long: -79.252438 Datum: GCS_NAD

Soil Map Unit Name: Johnston Loam NWI classification: PFO1/2T

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✓] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | | |
|---|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✓] | No [ ] | **Is the Sampled Area within a Wetland?** | Yes [✓] | No [ ] |
| Hydric Soil Present? | Yes [✓] | No [ ] | | | |
| Wetland Hydrology Present? | Yes [✓] | No [ ] | | | |

Remarks:

Carolina Bay

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [✓] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [✓] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✓] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) (LRR U)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✓] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) (LRR T, U)

**Field Observations:**

Surface Water Present? Yes [✓] No [ ] Depth (inches): 2 in.

Water Table Present? Yes [ ] No [✓] Depth (inches):

Saturation Present? (includes capillary fringe) Yes [ ] No [✓] Depth (inches):

**Wetland Hydrology Present?** Yes [✓] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata)** – Use scientific names of plants. Sampling Point: WP7

| Tree Stratum (Plot size: 30) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Quercus laurifolia | 40 | Y | FACW |
| 2. Nyssa biflora | 40 | Y | OBL |
| 3. Quercus nigra | 25 | Y | FAC |
| 4. Taxodium distichum | 20 | Y | OBL |
| 5. Acer rubrum | 20 | Y | FAC |
| 6. Liquidambar styraciflua | 15 | Y | FAC |
| | 160 | = Total Cover | |
| 50% of total cover: 80 | 20% of total cover: 32 | | |
| Sapling Stratum (Plot size: 30) | | | |
| 1. Taxodium distichum | 30 | Y | OBL |
| 2. Gordonia lasianthus | 25 | Y | FACW |
| 3. Acer rubrum | 20 | Y | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 75 | = Total Cover | |
| 50% of total cover: 37.5 | 20% of total cover: 15 | | |
| Shrub Stratum (Plot size: 30) | | | |
| 1. Gordonia lasianthus | 30 | Y | FACW |
| 2. Morella cerifera | 25 | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 55 | = Total Cover | |
| 50% of total cover: 27.5 | 20% of total cover: 11 | | |
| Herb Stratum (Plot size: 30) | | | |
| 1. Smilax bona nox | 10 | N | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 10 | = Total Cover | |
| 50% of total cover: 5 | 20% of total cover: 2 | | |
| Woody Vine Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 290 (A)

Total Number of Dominant Species Across All Strata: 290 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species | x 1 = |
| FACW species | x 2 = |
| FAC species | x 3 = |
| FACU species | x 4 = |
| UPL species | x 5 = |
| Column Totals: (A) | (B) |

Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators:**

- [ ] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes [x] No [ ]

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: WP7

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-10 | 10YR 2/1 | 100 | | | | | sandy loam | |
| 10-18 | 10YR 5/1 | 100 | | | | | sandy loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Organic Bodies (A6) **(LRR P, T, U)**
- [ ] 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- [x] Muck Presence (A8) **(LRR U)**
- [ ] 1 cm Muck (A9) **(LRR P, T)**
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Coast Prairie Redox (A16) **(MLRA 150A)**
- [ ] Sandy Mucky Mineral (S1) **(LRR O, S)**
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR P, S, T, U)**
- [ ] Polyvalue Below Surface (S8) **(LRR S, T, U)**
- [ ] Thin Dark Surface (S9) **(LRR S, T, U)**
- [ ] Loamy Mucky Mineral (F1) **(LRR O)**
- [ ] Loamy Gleyed Matrix (F2)
- [x] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Marl (F10) **(LRR U)**
- [ ] Depleted Ochric (F11) **(MLRA 151)**
- [ ] Iron-Manganese Masses (F12) **(LRR O, P, T)**
- [ ] Umbric Surface (F13) **(LRR P, T, U)**
- [ ] Delta Ochric (F17) **(MLRA 151)**
- [ ] Reduced Vertic (F18) **(MLRA 150A, 150B)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- [ ] 1 cm Muck (A9) **(LRR O)**
- [ ] 2 cm Muck (A10) **(LRR S)**
- [ ] Reduced Vertic (F18) **(outside MLRA 150A,B)**
- [ ] Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes [x] No [ ]

Remarks:



Photo 1:

Wetland Preservation Site 1 facing north-east



Photo 2:

Wetland Preservation Site 2 facing west



Photo 3:

Wetland Preservation Site 3 facing south-west



Photo 4:

Wetland Preservation Site 4 facing south



Photo 5:

Wetland Preservation Site 5 facing south-east



Photo 6:

Wetland Preservation Site 6 facing south-east



Photo 7:

Wetland Preservation Site 7 facing south-west

# APPENDIX F

# Wetland Restoration and Enhancement Data and Photographs

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Restoration 1 **Date** 11/29/16

**Wetland Type** Non-Riverine Swamp Forest **Assessor Name/Organization** SCDOT JS/LW

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Little Pee Dee River

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

( ) Yes (•) No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.928309, -79.291661

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** (•) Yes ( ) No

**Regulatory Considerations (select all that apply to the assessment area)**

- [ ] Anadromous fish
- [ ] Federally protected species or State endangered or threatened species
- [ ] NCDWQ riparian buffer rule in effect
- [ ] Abuts a Primary Nursery Area (PNA)
- [ ] Publicly owned property
- [ ] N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- [ ] Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- [ ] Designated NCNHP reference community
- [ ] Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- ( ) Blackwater
- ( ) Brownwater
- [ ] Tidal (if tidal, check one of the following boxes) ( ) Lunar ( ) Wind ( ) Both

**Is the assessment area on a coastal island?** ( ) Yes (•) No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ( ) Yes (•) No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ( ) Yes (•) No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ( ) A | ( ) A | Not severely altered |
| (•) B | (•) B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ( ) A | ( ) A | Water storage capacity and duration are not altered. |
| ( ) B | ( ) B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| (•) C | (•) C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ( ) A | ( ) A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ( ) B | ( ) B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ( ) C | (•) C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | (•) D | ( ) D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | ( ) A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ( ) B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- (•) A No peat or muck presence
- ( ) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

( ) Yes (•) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ( ) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide ( ) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

( ) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- ( ) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| ( ) A | ( ) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (•) A Evidence of short-duration inundation (< 7 consecutive days)
- ( ) B Evidence of saturation, without evidence of inundation
- ( ) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (•) A Sediment deposition is not excessive, but at approximately natural levels.
- ( ) B Sediment deposition is excessive, but not overwhelming the wetland.
- ( ) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| ( ) A | ( ) A | (•) A | ≥ 500 acres |
| ( ) B | ( ) B | ( ) B | From 100 to < 500 acres |
| ( ) C | ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | (•) D | ( ) D | From 25 to < 50 acres |
| (•) E | ( ) E | ( ) E | From 10 to < 25 acres |
| ( ) F | ( ) F | ( ) F | From 5 to < 10 acres |
| ( ) G | ( ) G | ( ) G | From 1 to < 5 acres |
| ( ) H | ( ) H | ( ) H | From 0.5 to < 1 acre |
| ( ) I | ( ) I | ( ) I | From 0.1 to < 0.5 acre |
| ( ) J | ( ) J | ( ) J | From 0.01 to < 0.1 acre |
| ( ) K | ( ) K | ( ) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- ( ) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ( ) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (•) A | ( ) A | ≥ 500 acres |
| ( ) B | ( ) B | From 100 to < 500 acres |
| ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | From 10 to < 50 acres |
| ( ) E | ( ) E | < 10 acres |
| ( ) F | ( ) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

( ) Yes ( ) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ( ) A No artificial edge within 150 feet in all directions
- (•) B No artificial edge within 150 feet in four (4) to seven (7) directions
- ( ) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- ( ) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ( ) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- (•) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- ( ) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ( ) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ( ) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation

( ) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | ( ) A | (•) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | (•) B | ( ) B | Canopy present, but opened more than natural gaps |
| | ( ) C | ( ) C | Canopy sparse or absent |
| Mid-Story | ( ) A | (•) A | Dense mid-story/sapling layer |
| | ( ) B | ( ) B | Moderate density mid-story/sapling layer |
| | (•) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | ( ) A | ( ) A | Dense shrub layer |
| | ( ) B | (•) B | Moderate density shrub layer |
| | (•) C | ( ) C | Shrub layer sparse or absent |
| Herb | ( ) A | (•) A | Dense herb layer |
| | ( ) B | ( ) B | Moderate density herb layer |
| | (•) C | ( ) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

( ) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).

(•) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

( ) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.

(•) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.

( ) C Majority of canopy trees are < 6 inches DBH or no trees.

**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

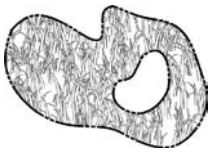
(•) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

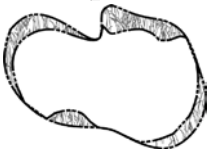
( ) B Not A

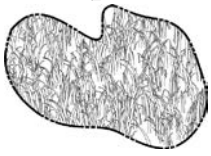
**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 

( ) B 

( ) C 

( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

( ) A Overbank and overland flow are not severely altered in the assessment area.

( ) B Overbank flow is severely altered in the assessment area.

( ) C Overland flow is severely altered in the assessment area.

( ) D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Restoration 1 | Date | 11/29/16 |
| Wetland Type | Non-Riverine Swamp Forest | Assessor Name/Organization | SCDOT |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | NO |
| Presence of regulatory considerations (Y/N) | NO |
| Wetland is intensively managed (Y/N) | YES |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | NO |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **LOW** |
| | Sub-Surface Storage and Retention | Condition | **LOW** |
| Water Quality | Pathogen Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Particulate Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Soluble Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Physical Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Pollution Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Physical Structure | Condition | **MEDIUM** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **LOW** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **LOW** |
| Water Quality | Condition | **LOW** |
| | Condition/Opportunity | **LOW** |
| | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Conditon | **MEDIUM** |

**Overall Wetland Rating** **LOW**

## WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island | City/County: Horry | Sampling Date: 11/29/2016
Applicant/Owner: SCDOT | State: SC | Sampling Point: R1 - Upland DP
Investigator(s): Lee Williams (Michael Baker Intl.) | Section, Township, Range:
Landform (hillslope, terrace, etc.): roadbed | Local Relief (concave, convex, none): none | Slope (%) <5%
Subregion (LRR or MLRA): LRR T | Lat: 33.928318 | Long -79.291665 | Datum: NAD 83
Soil Map Unit Name: Pocomoke fine sandy loam | NWI classification: none
Are climatic/hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation x, Soil x, or Hydrology ___, significantly disturbed? Yes Are "Normal Circumstances" present? Yes ___ No **x**
Are Vegetation ___, Soil ___, or Hydrology ___, naturally problematic? No (If needed, explain answers in Remarks.)

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes **x** | No | **Is the Sampled Area within a Wetland?** **Yes** | **No X** |
| Hydric Soil Present? | Yes | No **x** | |
| Wetland Hydrology Present? | Yes | No **x** | |

Remarks:
This datapoint was recorded on an existing dirt roadbed that was constructed by placing fill material through a wetland.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposit (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) (**LRR U**)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes ___ | No x | Depth (inches): ___ |
| Water Table Present? | Yes ___ | No x | Depth (inches): ___ |
| Saturation Present? (includes capillary fringe) | Yes ___ | No x | Depth (inches): ___ |

**Wetland Hydrology Present?** **Yes** ___ **No x**

Describe Recorded Data (stream gauge, monitoing well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION** - Use scientific names of plants

Sampling Point: R1 - Upland DP

| Tree Stratum (Plot size: 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

| Sapling Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Liquidambar styraciflua* | 2 | | FAC |
| 2. *Magnolia virginiana* | 5 | yes | FACW |
| 3. *Pinus taeda* | 2 | | FAC |
| 4. *Persea borbonia* | 5 | yes | FACW |
| 5. | | | |
| 6. | | | |
| | 14 = Total Cover | | |
| 50% of total cover: 7 | 20% of total cover: 2.8 | | |

| Shrub Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Morella cerifera* | 5 | yes | FAC |
| 2. *Lyonia lucida* | 5 | yes | FACW |
| 3. *Ilex glabra* | 2 | | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 12 = Total Cover | | |
| 50% of total cover: 6 | 20% of total cover: 2.4 | | |

| Herb Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Andropogon virginicus* | 5 | yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 5 = Total Cover | | |
| 50% of total cover: 2.5 | 20% of total cover: 1 | | |

| Woody Vine Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test Worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That ARE OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index Worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | | x 2 = | |
| FAC species | | x 3 = | |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | (A) | | (B) |

Prevelance Index = B/A =

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- **x** 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤ 3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling** – Woody plants, excluding vines, less approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** **x** **No** ___

Remarks: (Include photo numbers here or on a separate sheet).

**Soil** Sampling Point: R1 - Upland DP

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-3 | 10YR 5/5 | 100 | | | | | loamy sand | |
| 3-10 | 10YR 3/2 | 90 | 10YR 6/2 | 10 | RM | M | loamy sand | <50% masked soil particles |
| 10-20 | 10YR 3/2 | 100 | | | | | loamy sand | <50% masked soil particles |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration; D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) (LRR P, T, U)
- ___ 5cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coastal Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Minerals (S1) **(LRR O,S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Maganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MRLA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MRLA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MRLA 149A, 153C, 253D)**

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present? Yes** ___ **No** x

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 1A

Investigator(s): J. Siceloff Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): _____

Subregion (LRR or MLRA): LRR T Lat: 33.92884 Long: -79.291586 Datum: GCS NAD

Soil Map Unit Name: Pocomoke fine sandy loam NWI classification: PFO 1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [✔] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✔] | Depth (inches): _____ |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 0 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 0 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants.

Sampling Point: Enh. 1A

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Taxodium distichum | 30 | Y | OBL |
| 2. Pinus taeda | 20 | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 50 | = Total Cover | |

50% of total cover: 25 20% of total cover: 10

| Sapling Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

| Shrub Stratum (Plot size: 30 ft) | | | |
|---|---|---|---|
| 1. Lyonia lucida | 50 | Y | FACW |
| 2. Morella cerifera | 30 | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 80 | = Total Cover | |

50% of total cover: 40 20% of total cover: 16

| Herb Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 30 | x 1 = | 30 |
| FACW species | 50 | x 2 = | 100 |
| FAC species | 50 | x 3 = | 150 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 130 (A) | | 280 (B) |

Prevalence Index = B/A = 2.15

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 1A

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-10 | 10YR 2/1 | 100 | | | | | loam | |
| 10-18 | 10YR 4/1 | 100 | | | | | loamy sa | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 1B

Investigator(s): D. Dunn Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): _____

Subregion (LRR or MLRA): LRR T Lat: 33.928411 Long: -79.291112 Datum: GCS NAD

Soil Map Unit Name: Pocomoke fine sandy loam NWI classification: PFO 1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [✔] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✔] | Depth (inches): _____ |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 6 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 4 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants.

Sampling Point: Enh. 1B

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa biflora | 30 | Y | OBL |
| 2. Taxodium distichum | 20 | Y | OBL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 50 | = Total Cover | |

50% of total cover: 25 20% of total cover: 10

| Sapling Stratum (Plot size: 30 ft) | | | |
|---|---|---|---|
| 1. Nyssa biflora | 40 | Y | OBL |
| 2. Ilex opaca | 5 | N | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 45 | = Total Cover | |

50% of total cover: 22.5 20% of total cover: 9

| Shrub Stratum (Plot size: 30 ft) | | | |
|---|---|---|---|
| 1. Lyonia lucida | 50 | Y | FACW |
| 2. Morella cerifera | 30 | Y | FAC |
| 3. Persea borbonia | 20 | Y | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 100 | = Total Cover | |

50% of total cover: 50 20% of total cover: 20

| Herb Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 90 | x 1 = | 90 |
| FACW species | 70 | x 2 = | 140 |
| FAC species | 35 | x 3 = | 105 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 195 (A) | | 335 (B) |

Prevalence Index = B/A = 1.72

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 1B

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-10 | 10YR 2/1 | 100 | | | | | loam | |
| 10-18 | 7.5YR 2/0 | 100 | | | | | loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Restoration 2 **Date** 11/29/16

**Wetland Type** Non-Riverine Swamp Forest **Assessor Name/Organization** SCDOT JS/LW

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Little Pee Dee River

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

( ) Yes (•) No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.929161, -79.289584

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** (•) Yes ( ) No

**Regulatory Considerations (select all that apply to the assessment area)**

- [ ] Anadromous fish
- [ ] Federally protected species or State endangered or threatened species
- [ ] NCDWQ riparian buffer rule in effect
- [ ] Abuts a Primary Nursery Area (PNA)
- [ ] Publicly owned property
- [ ] N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- [ ] Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- [ ] Designated NCNHP reference community
- [ ] Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- ( ) Blackwater
- ( ) Brownwater
- [ ] Tidal (if tidal, check one of the following boxes) ( ) Lunar ( ) Wind ( ) Both

**Is the assessment area on a coastal island?** ( ) Yes (•) No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ( ) Yes (•) No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ( ) Yes (•) No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ( ) A | ( ) A | Not severely altered |
| (•) B | (•) B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ( ) A | ( ) A | Water storage capacity and duration are not altered. |
| ( ) B | ( ) B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| (•) C | (•) C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ( ) A | ( ) A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ( ) B | ( ) B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ( ) C | ( ) C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | (•) D | (•) D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | ( ) A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ( ) B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- (•) A No peat or muck presence
- ( ) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

( ) Yes (•) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ( ) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide ( ) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

( ) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- ( ) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| ( ) A | ( ) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (•) A Evidence of short-duration inundation (< 7 consecutive days)
- ( ) B Evidence of saturation, without evidence of inundation
- ( ) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (•) A Sediment deposition is not excessive, but at approximately natural levels.
- ( ) B Sediment deposition is excessive, but not overwhelming the wetland.
- ( ) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| ( ) A | ( ) A | (•) A | ≥ 500 acres |
| ( ) B | ( ) B | ( ) B | From 100 to < 500 acres |
| ( ) C | ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | (•) D | ( ) D | From 25 to < 50 acres |
| ( ) E | ( ) E | ( ) E | From 10 to < 25 acres |
| (•) F | ( ) F | ( ) F | From 5 to < 10 acres |
| ( ) G | ( ) G | ( ) G | From 1 to < 5 acres |
| ( ) H | ( ) H | ( ) H | From 0.5 to < 1 acre |
| ( ) I | ( ) I | ( ) I | From 0.1 to < 0.5 acre |
| ( ) J | ( ) J | ( ) J | From 0.01 to < 0.1 acre |
| ( ) K | ( ) K | ( ) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- ( ) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ( ) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (•) A | ( ) A | ≥ 500 acres |
| ( ) B | ( ) B | From 100 to < 500 acres |
| ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | From 10 to < 50 acres |
| ( ) E | ( ) E | < 10 acres |
| ( ) F | ( ) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

( ) Yes ( ) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ( ) A No artificial edge within 150 feet in all directions
- (•) B No artificial edge within 150 feet in four (4) to seven (7) directions
- ( ) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- ( ) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ( ) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- (•) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- ( ) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ( ) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ( ) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

○ Yes ◉ No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

○ A ≥ 25% coverage of vegetation
○ B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | ○ A | ◉ A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ○ B | ○ B | Canopy present, but opened more than natural gaps |
| | ◉ C | ○ C | Canopy sparse or absent |
| Mid-Story | ○ A | ○ A | Dense mid-story/sapling layer |
| | ○ B | ◉ B | Moderate density mid-story/sapling layer |
| | ◉ C | ○ C | Mid-story/sapling layer sparse or absent |
| Shrub | ○ A | ○ A | Dense shrub layer |
| | ○ B | ◉ B | Moderate density shrub layer |
| | ◉ C | ○ C | Shrub layer sparse or absent |
| Herb | ○ A | ○ A | Dense herb layer |
| | ○ B | ◉ B | Moderate density herb layer |
| | ◉ C | ○ C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

○ A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
◉ B Not A

**19. Diameter Class Distribution – wetland type condition metric**

○ A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
○ B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
◉ C Majority of canopy trees are < 6 inches DBH or no trees.

**20. Large Woody Debris – wetland type condition metric**

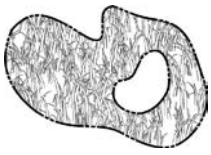
Include both natural debris and man-placed natural debris.

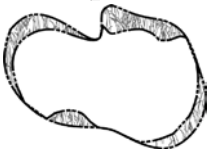
○ A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
◉ B Not A

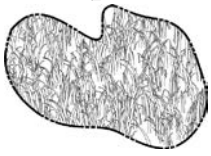
**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

○ A 

○ B 

○ C 

○ D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

○ A Overbank and overland flow are not severely altered in the assessment area.
○ B Overbank flow is severely altered in the assessment area.
○ C Overland flow is severely altered in the assessment area.
○ D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Restoration 2 | Date | 11/29/16 |
| Wetland Type | Non-Riverine Swamp Forest | Assessor Name/Organization | SCDOT JS/LW |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | NO |
| Presence of regulatory considerations (Y/N) | NO |
| Wetland is intensively managed (Y/N) | YES |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | NO |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **LOW** |
| | Sub-Surface Storage and Retention | Condition | **LOW** |
| Water Quality | Pathogen Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Particulate Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Soluble Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Physical Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Pollution Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Physical Structure | Condition | **LOW** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **LOW** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **LOW** |
| Water Quality | Condition | **LOW** |
| | Condition/Opportunity | **LOW** |
| | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Conditon | **LOW** |

**Overall Wetland Rating** **LOW**

## WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island | City/County: Horry | Sampling Date: 11/29/2016
Applicant/Owner: SCDOT | State: SC | Sampling Point: R2 - Upland DP
Investigator(s): Lee Williams (Michael Baker Intl.) | Section, Township, Range:
Landform (hillslope, terrace, etc.): roadbed | Local Relief (concave, convex, none): none | Slope (%) <5%
Subregion (LRR or MLRA): LRR T | Lat: 33.929169 | Long -79.289589 | Datum: NAD 83
Soil Map Unit Name: Leon fine sand | NWI classification: none
Are climatic/hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation x, Soil x, or Hydrology ___, significantly disturbed? Yes Are "Normal Circumstances" present? Yes ___ No **x**
Are Vegetation ___, Soil ___, or Hydrology ___, naturally problematic? No (If needed, explain answers in Remarks.)

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes **x** | No | **Is the Sampled Area within a Wetland?** **Yes** | **No X** |
| Hydric Soil Present? | Yes | No **x** | |
| Wetland Hydrology Present? | Yes | No **x** | |

Remarks:
This datapoint was recorded on an existing dirt roadbed that was constructed by placing fill material through a wetland.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposit (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) (**LRR U**)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes ___ | No x | Depth (inches): ___ |
| Water Table Present? | Yes ___ | No x | Depth (inches): ___ |
| Saturation Present? (includes capillary fringe) | Yes ___ | No x | Depth (inches): ___ |

**Wetland Hydrology Present?** **Yes** ___ **No x**

Describe Recorded Data (stream gauge, monitoing well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION** - Use scientific names of plants

Sampling Point: R2 - Upland DP

| Tree Stratum (Plot size: 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Pinus taeda* | 2 | | FAC |
| 2. *Quercus nigra* | 5 | yes | FAC |
| 3. *Acer rubrum* | 5 | yes | FAC |
| 4. *Taxodium distichum* | 5 | yes | OBL |
| 5. | | | |
| 6. | | | |
| | 17 = Total Cover | | |
| 50% of total cover: 8.5 | 20% of total cover: 3.4 | | |

| Sapling Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Magnolia virginiana* | 5 | yes | FACW |
| 2. *Pinus taeda* | 2 | | FAC |
| 3. *Acer rubrum* | 5 | yes | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 12 = Total Cover | | |
| 50% of total cover: 6 | 20% of total cover: 2.4 | | |

| Shrub Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Lyonia lucida* | 20 | yes | FACW |
| 2. *Ilex glabra* | 10 | yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 30 = Total Cover | | |
| 50% of total cover: 15 | 20% of total cover: 6 | | |

| Herb Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Andropogon virginicus* | 10 | yes | FAC |
| 2. *Andropogon glaucopsis* | 5 | yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 15 = Total Cover | | |
| 50% of total cover: 7.5 | 20% of total cover: 3 | | |

| Woody Vine Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test Worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That ARE OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index Worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | | x 2 = | |
| FAC species | | x 3 = | |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | (A) | | (B) |

Prevelance Index = B/A =

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- **x** 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤ 3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling** – Woody plants, excluding vines, less approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** **x** **No** ___

Remarks: (Include photo numbers here or on a separate sheet).

**Soil** Sampling Point: R2 - Upland DP

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-20 | 10YR 5/4 | 70 | 10YR 6/3 | 30 | | M | sand | mixed topsoil |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration; D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) (LRR P, T, U)
- ___ 5cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coastal Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Minerals (S1) **(LRR O,S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Maganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MRLA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MRLA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MRLA 149A, 153C, 253D)**

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present? Yes** ___ **No** x

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 2A

Investigator(s): J. Siceloff Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR T Lat: 33.92955868 Long: -79.28994318 Datum: GCS NAD

Soil Map Unit Name: Leon fine sand NWI classification: PFO 1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [✔] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [✔] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [✔] | No [ ] | Depth (inches): 2 |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 0 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 0 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants.

Sampling Point: Enh. 2A

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Taxodium distichum | 30 | Y | OBL |
| 2. Pinus taeda | 20 | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 50 | = Total Cover | |

50% of total cover: 25 20% of total cover: 10

| Sapling Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

| Shrub Stratum (Plot size: 30 ft) | | | |
|---|---|---|---|
| 1. Lyonia lucida | 50 | Y | FACW |
| 2. Morella cerifera | 30 | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 80 | = Total Cover | |

50% of total cover: 40 20% of total cover: 16

| Herb Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 30 | x 1 = | 30 |
| FACW species | 50 | x 2 = | 100 |
| FAC species | 50 | x 3 = | 150 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 130 (A) | | 280 (B) |

Prevalence Index = B/A = 2.15

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 2A

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-14 | 10YR 2/1 | 100 | | | | | sandy m | |
| 14-18 | 10YR 3/2 | 100 | | | | | sand | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 2B

Investigator(s): D. Dunn Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR T Lat: 33.928861 Long: -79.28947 Datum: GCS NAD

Soil Map Unit Name: Leon fine sand NWI classification: PFO 1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [✔] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [✔] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [✔] | No [ ] | Depth (inches): 1 |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 4 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 1 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants.

Sampling Point: Enh. 2B

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa biflora | 40 | Y | OBL |
| 2. Taxodium distichum | 35 | Y | OBL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 75 = Total Cover | | |
| 50% of total cover: 37.5 | 20% of total cover: 15 | | |
| **Sapling Stratum** (Plot size: 30 ft) | | | |
| 1. Nyssa biflora | 50 | Y | OBL |
| 2. Liquidambar styraciflua | 30 | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 80 = Total Cover | | |
| 50% of total cover: 40 | 20% of total cover: 16 | | |
| **Shrub Stratum** (Plot size: 30 ft) | | | |
| 1. Lyonia lucida | 50 | Y | FACW |
| 2. Morella cerifera | 30 | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 80 = Total Cover | | |
| 50% of total cover: 40 | 20% of total cover: 16 | | |
| **Herb Stratum** (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 125 | x 1 = | 125 |
| FACW species | 50 | x 2 = | 100 |
| FAC species | 60 | x 3 = | 180 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 235 (A) | | 405 (B) |

Prevalence Index = B/A = 1.72

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 2B

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-8 | 10YR 2/1 | 100 | | | | | loam | |
| 8-18 | 7.5YR 2/0 | 100 | | | | | loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Restoration 3 **Date** 11/30/16

**Wetland Type** Non-Riverine Swamp Forest **Assessor Name/Organization** SCDOT JS/LW

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Canoe Lake

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

( ) Yes (•) No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.916546, -79.290839

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** (•) Yes ( ) No

**Regulatory Considerations (select all that apply to the assessment area)**

- [ ] Anadromous fish
- [ ] Federally protected species or State endangered or threatened species
- [ ] NCDWQ riparian buffer rule in effect
- [ ] Abuts a Primary Nursery Area (PNA)
- [ ] Publicly owned property
- [ ] N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- [ ] Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- [ ] Designated NCNHP reference community
- [ ] Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- (•) Blackwater
- ( ) Brownwater
- [ ] Tidal (if tidal, check one of the following boxes) ( ) Lunar ( ) Wind ( ) Both

**Is the assessment area on a coastal island?** ( ) Yes (•) No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ( ) Yes (•) No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ( ) Yes (•) No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ( ) A | ( ) A | Not severely altered |
| (•) B | (•) B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ( ) A | ( ) A | Water storage capacity and duration are not altered. |
| ( ) B | ( ) B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| (•) C | (•) C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ( ) A | ( ) A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ( ) B | (•) B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ( ) C | ( ) C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | (•) D | ( ) D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | ( ) A | Evidence that maximum depth of inundation is greater than 2 feet |
| | (•) B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- (•) A No peat or muck presence
- ( ) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

( ) Yes (•) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ( ) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide ( ) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

( ) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- ( ) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| ( ) A | ( ) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (•) A Evidence of short-duration inundation (< 7 consecutive days)
- ( ) B Evidence of saturation, without evidence of inundation
- ( ) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- ( ) A Sediment deposition is not excessive, but at approximately natural levels.
- (•) B Sediment deposition is excessive, but not overwhelming the wetland.
- ( ) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| ( ) A | ( ) A | (•) A | ≥ 500 acres |
| ( ) B | (•) B | ( ) B | From 100 to < 500 acres |
| (•) C | ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | ( ) D | From 25 to < 50 acres |
| ( ) E | ( ) E | ( ) E | From 10 to < 25 acres |
| ( ) F | ( ) F | ( ) F | From 5 to < 10 acres |
| ( ) G | ( ) G | ( ) G | From 1 to < 5 acres |
| ( ) H | ( ) H | ( ) H | From 0.5 to < 1 acre |
| ( ) I | ( ) I | ( ) I | From 0.1 to < 0.5 acre |
| ( ) J | ( ) J | ( ) J | From 0.01 to < 0.1 acre |
| ( ) K | ( ) K | ( ) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- ( ) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ( ) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (•) A | ( ) A | ≥ 500 acres |
| ( ) B | ( ) B | From 100 to < 500 acres |
| ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | From 10 to < 50 acres |
| ( ) E | ( ) E | < 10 acres |
| ( ) F | ( ) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

( ) Yes ( ) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ( ) A No artificial edge within 150 feet in all directions
- (•) B No artificial edge within 150 feet in four (4) to seven (7) directions
- ( ) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- ( ) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ( ) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- (•) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- ( ) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ( ) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ( ) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation
( ) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | ( ) A | (•) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ( ) B | ( ) B | Canopy present, but opened more than natural gaps |
| | (•) C | ( ) C | Canopy sparse or absent |
| Mid-Story | ( ) A | (•) A | Dense mid-story/sapling layer |
| | ( ) B | ( ) B | Moderate density mid-story/sapling layer |
| | (•) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | ( ) A | ( ) A | Dense shrub layer |
| | ( ) B | (•) B | Moderate density shrub layer |
| | (•) C | ( ) C | Shrub layer sparse or absent |
| Herb | ( ) A | ( ) A | Dense herb layer |
| | ( ) B | (•) B | Moderate density herb layer |
| | (•) C | ( ) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

( ) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
(•) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

( ) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
(•) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
( ) C Majority of canopy trees are < 6 inches DBH or no trees.

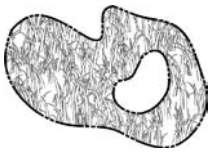
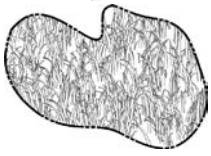
**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

( ) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
(•) B Not A

**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 
( ) B 
( ) C 
( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

( ) A Overbank and overland flow are not severely altered in the assessment area.
( ) B Overbank flow is severely altered in the assessment area.
(•) C Overland flow is severely altered in the assessment area.
( ) D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Restoration 3 | Date | 11/30/16 |
| Wetland Type | Non-Riverine Swamp Forest | Assessor Name/Organization | SCDOT JS/LW |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | NO |
| Presence of regulatory considerations (Y/N) | YES |
| Wetland is intensively managed (Y/N) | YES |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | NO |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **LOW** |
| | Sub-Surface Storage and Retention | Condition | **LOW** |
| Water Quality | Pathogen Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Particulate Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Soluble Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Physical Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Pollution Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Physical Structure | Condition | **MEDIUM** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **LOW** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **LOW** |
| Water Quality | Condition | **LOW** |
| | Condition/Opportunity | **LOW** |
| | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Conditon | **MEDIUM** |

**Overall Wetland Rating** **LOW**

## WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island | City/County: Horry | Sampling Date: 11/30/2016
Applicant/Owner: SCDOT | State: SC | Sampling Point: R3 - Upland DP
Investigator(s): Lee Williams (Michael Baker Intl.) | Section, Township, Range:
Landform (hillslope, terrace, etc.): roadbed | Local Relief (concave, convex, none): none | Slope (%) <5%
Subregion (LRR or MLRA): LRR T | Lat: 33.916554 | Long -79.290841 | Datum: NAD 83
Soil Map Unit Name: Johnston loam | NWI classification: none
Are climatic/hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation x, Soil x, or Hydrology ___, significantly disturbed? Yes Are "Normal Circumstances" present? Yes ___ No **x**
Are Vegetation ___, Soil ___, or Hydrology ___, naturally problematic? No (If needed, explain answers in Remarks.)

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes **x** | No | **Is the Sampled Area within a Wetland?** **Yes** ___ **No** **X** |
| Hydric Soil Present? | Yes | No **x** | |
| Wetland Hydrology Present? | Yes | No **x** | |

Remarks:
This datapoint was recorded on an existing dirt roadbed that was constructed by placing fill material through a wetland.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposit (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) (**LRR U**)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes ___ | No x | Depth (inches): ___ |
| Water Table Present? | Yes ___ | No x | Depth (inches): ___ |
| Saturation Present? (includes capillary fringe) | Yes x | No ___ | Depth (inches): 16 |

**Wetland Hydrology Present?** **Yes** ___ **No** **x**

Describe Recorded Data (stream gauge, monitoing well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION** - Use scientific names of plants

Sampling Point: R3 - Upland DP

| Tree Stratum (Plot size: 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Quercus nigra* | 5 | yes | FAC |
| 2. *Acer rubrum* | 5 | yes | FAC |
| 3. *Quercus laurifolia* | 10 | yes | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 20 = Total Cover | | |
| 50% of total cover: 10 | 20% of total cover: 4 | | |

| Sapling Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. *Quercus nigra* | 5 | yes | FAC |
| 2. *Quercus laurifolia* | 5 | yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 10 = Total Cover | | |
| 50% of total cover: 5 | 20% of total cover: 2 | | |

| Shrub Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. *Morella cerifera* | 10 | yes | FAC |
| 2. *Lyonia lucida* | 5 | yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 15 = Total Cover | | |
| 50% of total cover: 7.5 | 20% of total cover: 3 | | |

| Herb Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. *Arundinaria gigantea* | 20 | yes | FACW |
| 2. *Andropogon virginicus* | 5 | yes | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 25 = Total Cover | | |
| 50% of total cover: 12.5 | 20% of total cover: 5 | | |

| Woody Vine Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test Worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That ARE OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index Worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | | x 2 = | |
| FAC species | | x 3 = | |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | (A) | | (B) |

Prevelance Index = B/A =

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- **x** 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤ 3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling** – Woody plants, excluding vines, less approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** **x** **No** ___

Remarks: (Include photo numbers here or on a separate sheet).

**Soil** Sampling Point: R3 - Upland DP

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-3 | 10YR 7/1 | 100 | | | | | loamy sand | |
| 3-7 | 10YR 3/2 | 100 | | | | | loamy sand | <50% masked soil particles |
| 7-20 | 10YR 5/2 | 100 | | | | | loamy sand | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration; D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) (LRR P, T, U)
- ___ 5cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coastal Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Minerals (S1) **(LRR O,S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Maganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MRLA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MRLA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MRLA 149A, 153C, 253D)**

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present? Yes** ___ **No** x

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 3A

Investigator(s): J. Siceloff Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): _____

Subregion (LRR or MLRA): LRR T Lat: 33.914131 Long: -79.289021 Datum: GCS NAD

Soil Map Unit Name: Johnston loam NWI classification: PFO 1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [✔] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✔] | Depth (inches): _____ |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 0 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 0 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants. Sampling Point: Enh. 3A

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Taxodium distichum | 30 | Y | OBL |
| 2. Nyssa sylvatica | 30 | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 60 | = Total Cover | |

50% of total cover: 30 20% of total cover: 12

| Sapling Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

| Shrub Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

| Herb Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 30 | x 1 = | 30 |
| FACW species | | x 2 = | |
| FAC species | 30 | x 3 = | 90 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 60 (A) | | 120 (B) |

Prevalence Index = B/A = 2

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 3A

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-8 | 10YR 5/2 | 100 | | | | | sandy | |
| 8-18 | 10YR 3/1 | 100 | | | | | sand | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 3B

Investigator(s): D. Dunn Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR T Lat: 33.914402 Long: -79.290289 Datum: GCS NAD

Soil Map Unit Name: Johnston loam NWI classification: PFO 1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [✔] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [✔] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [✔] | No [ ] | Depth (inches): 3 |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 3 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 0 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants. Sampling Point: Enh. 3B

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa biflora | 40 | Y | OBL |
| 2. Taxodium distichum | 20 | Y | OBL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 60 | = Total Cover | |

50% of total cover: 30 20% of total cover: 12

| Sapling Stratum (Plot size: 30 ft) | | | |
|---|---|---|---|
| 1. Nyssa biflora | 40 | Y | OBL |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 40 | = Total Cover | |

50% of total cover: 20 20% of total cover: 8

| Shrub Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | | = Total Cover | |

50% of total cover: 20% of total cover:

| Herb Stratum (Plot size: 30 ft) | | | |
|---|---|---|---|
| 1. Arundinaria tecta | 20 | Y | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 20 | = Total Cover | |

50% of total cover: 10 20% of total cover: 4

| Woody Vine Stratum (Plot size: 30 ft) | | | |
|---|---|---|---|
| 1. Vitis rotundifolia | 10 | N | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 10 | = Total Cover | |

50% of total cover: 5 20% of total cover: 2

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 100 | x 1 = | 100 |
| FACW species | 20 | x 2 = | 40 |
| FAC species | 10 | x 3 = | 30 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 130 (A) | | 170 (B) |

Prevalence Index = B/A = 1.3

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 3B

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-8 | 10YR 2/1 | 100 | | | | | loam | |
| 8-18 | 10YR 3/1 | 100 | | | | | loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Restoration 4 **Date** 11/30/16

**Wetland Type** Non-Riverine Swamp Forest **Assessor Name/Organization** SCDOT JS/LW

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Little Pee Dee River

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

( ) Yes (•) No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.914935, -79.28871

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** (•) Yes ( ) No

**Regulatory Considerations (select all that apply to the assessment area)**

- [ ] Anadromous fish
- [ ] Federally protected species or State endangered or threatened species
- [ ] NCDWQ riparian buffer rule in effect
- [ ] Abuts a Primary Nursery Area (PNA)
- [ ] Publicly owned property
- [ ] N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- [ ] Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- [ ] Designated NCNHP reference community
- [ ] Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- (•) Blackwater
- ( ) Brownwater
- [ ] Tidal (if tidal, check one of the following boxes) ( ) Lunar ( ) Wind ( ) Both

**Is the assessment area on a coastal island?** ( ) Yes (•) No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ( ) Yes (•) No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ( ) Yes (•) No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ( ) A | ( ) A | Not severely altered |
| (•) B | (•) B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ( ) A | ( ) A | Water storage capacity and duration are not altered. |
| ( ) B | ( ) B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| (•) C | (•) C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ( ) A | (•) A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ( ) B | ( ) B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ( ) C | ( ) C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | (•) D | ( ) D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | (•) A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ( ) B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- (•) A No peat or muck presence
- ( ) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| ( ) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| (•) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

( ) Yes (•) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ( ) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide ( ) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

( ) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- ( ) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| ( ) A | ( ) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (•) A Evidence of short-duration inundation (< 7 consecutive days)
- ( ) B Evidence of saturation, without evidence of inundation
- ( ) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- ( ) A Sediment deposition is not excessive, but at approximately natural levels.
- (•) B Sediment deposition is excessive, but not overwhelming the wetland.
- ( ) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| ( ) A | ( ) A | (•) A | ≥ 500 acres |
| ( ) B | (•) B | ( ) B | From 100 to < 500 acres |
| (•) C | ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | ( ) D | From 25 to < 50 acres |
| ( ) E | ( ) E | ( ) E | From 10 to < 25 acres |
| ( ) F | ( ) F | ( ) F | From 5 to < 10 acres |
| ( ) G | ( ) G | ( ) G | From 1 to < 5 acres |
| ( ) H | ( ) H | ( ) H | From 0.5 to < 1 acre |
| ( ) I | ( ) I | ( ) I | From 0.1 to < 0.5 acre |
| ( ) J | ( ) J | ( ) J | From 0.01 to < 0.1 acre |
| ( ) K | ( ) K | ( ) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- ( ) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ( ) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (•) A | ( ) A | ≥ 500 acres |
| ( ) B | ( ) B | From 100 to < 500 acres |
| ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | From 10 to < 50 acres |
| ( ) E | ( ) E | < 10 acres |
| ( ) F | ( ) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

( ) Yes ( ) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ( ) A No artificial edge within 150 feet in all directions
- (•) B No artificial edge within 150 feet in four (4) to seven (7) directions
- ( ) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- ( ) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- (•) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- ( ) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- ( ) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ( ) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ( ) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation

(•) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | ( ) A | (•) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ( ) B | ( ) B | Canopy present, but opened more than natural gaps |
| | (•) C | ( ) C | Canopy sparse or absent |
| Mid-Story | ( ) A | ( ) A | Dense mid-story/sapling layer |
| | ( ) B | (•) B | Moderate density mid-story/sapling layer |
| | (•) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | ( ) A | ( ) A | Dense shrub layer |
| | ( ) B | (•) B | Moderate density shrub layer |
| | (•) C | ( ) C | Shrub layer sparse or absent |
| Herb | ( ) A | ( ) A | Dense herb layer |
| | ( ) B | (•) B | Moderate density herb layer |
| | (•) C | ( ) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

( ) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).

(•) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

( ) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.

(•) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.

( ) C Majority of canopy trees are < 6 inches DBH or no trees.

**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

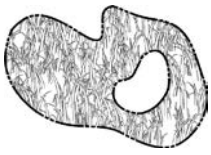
( ) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

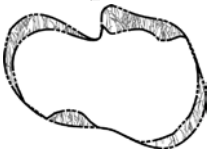
(•) B Not A

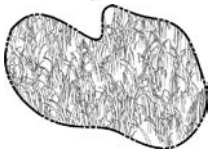
**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 

( ) B 

( ) C 

( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

( ) A Overbank and overland flow are not severely altered in the assessment area.

( ) B Overbank flow is severely altered in the assessment area.

(•) C Overland flow is severely altered in the assessment area.

( ) D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Restoration 4 | Date | 11/30/16 |
| Wetland Type | Non-Riverine Swamp Forest | Assessor Name/Organization | SCDOT JS/LW |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | NO |
| Presence of regulatory considerations (Y/N) | NO |
| Wetland is intensively managed (Y/N) | YES |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | NO |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **LOW** |
| | Sub-Surface Storage and Retention | Condition | **LOW** |
| Water Quality | Pathogen Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Particulate Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Soluble Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Physical Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Pollution Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **YES** |
| Habitat | Physical Structure | Condition | **MEDIUM** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **MEDIUM** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **LOW** |
| Water Quality | Condition | **LOW** |
| | Condition/Opportunity | **LOW** |
| | Opportunity Presence? (Y/N) | **YES** |
| Habitat | Conditon | **HIGH** |

**Overall Wetland Rating** **LOW**

## WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island | City/County: Horry | Sampling Date: 11/30/2016
Applicant/Owner: SCDOT | State: SC | Sampling Point: R4 - Upland DP
Investigator(s): Lee Williams (Michael Baker Intl.) | Section, Township, Range:
Landform (hillslope, terrace, etc.): roadbed | Local Relief (concave, convex, none): none | Slope (%) <5%
Subregion (LRR or MLRA): LRR T | Lat: 33.914933 | Long -79.288706 | Datum: NAD 83
Soil Map Unit Name: Johnston loam | NWI classification: PFO1
Are climatic/hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation x, Soil x, or Hydrology ___, significantly disturbed? Yes Are "Normal Circumstances" present? Yes ___ No **x**
Are Vegetation ___, Soil ___, or Hydrology ___, naturally problematic? No (If needed, explain answers in Remarks.)

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes **x** | No | **Is the Sampled Area within a Wetland?** **Yes** | **No X** |
| Hydric Soil Present? | Yes | No **x** | |
| Wetland Hydrology Present? | Yes | No **x** | |

Remarks:
This datapoint was recorded on an existing dirt roadbed that was constructed by placing fill material through a wetland.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposit (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) (**LRR U**)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes ___ | No x | Depth (inches): ___ |
| Water Table Present? | Yes ___ | No x | Depth (inches): ___ |
| Saturation Present? (includes capillary fringe) | Yes ___ | No x | Depth (inches): ___ |

**Wetland Hydrology Present?** **Yes** ___ **No x**

Describe Recorded Data (stream gauge, monitoing well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION** - Use scientific names of plants

Sampling Point: R4 - Upland DP

| Tree Stratum (Plot size: 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Quercus nigra* | 10 | yes | FAC |
| 2. *Pinus taeda* | 20 | yes | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 30 = Total Cover | | |
| 50% of total cover: 15 | 20% of total cover: 6 | | |

| Sapling Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Quercus nigra* | 15 | yes | FAC |
| 2. *Pinus taeda* | 5 | yes | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 20 = Total Cover | | |
| 50% of total cover: 10 | 20% of total cover: 4 | | |

| Shrub Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Morella cerifera* | 10 | yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 10 = Total Cover | | |
| 50% of total cover: 5 | 20% of total cover: 2 | | |

| Herb Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Arundinaria gigantea* | 20 | yes | FACW |
| 2. *Andropogon virginicus* | 10 | yes | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 30 = Total Cover | | |
| 50% of total cover: 15 | 20% of total cover: 6 | | |

| Woody Vine Stratum (Plot size 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Smilax rotundifolia* | 2 | yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 2 = Total Cover | | |
| 50% of total cover: 1 | 20% of total cover: 0.4 | | |

**Dominance Test Worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That ARE OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index Worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | | x 2 = | |
| FAC species | | x 3 = | |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | (A) | | (B) |

Prevelance Index = B/A =

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- **x** 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤ 3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling** – Woody plants, excluding vines, less approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** **x** **No** ___

Remarks: (Include photo numbers here or on a separate sheet).

**Soil** Sampling Point: R4 - Upland DP

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-4 | 10YR 8/2 | 100 | | | | | sand | |
| 4-8 | 10YR 4/1 | 100 | | | | | loamy sand | <50% masked soil particles |
| 8-20 | 10YR 3/3 | 100 | | | | | loamy sand | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration; D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) (LRR P, T, U)
- ___ 5cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coastal Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Minerals (S1) **(LRR O,S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Maganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MRLA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MRLA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MRLA 149A, 153C, 253D)**

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present? Yes** ___ **No** x

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 4A

Investigator(s): J. Siceloff Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR T Lat: 33.878667 Long: -79.251571 Datum: GCS NAD

Soil Map Unit Name: Ogeechee loamy fine sand NWI classification: PFO 1R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [✔] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [✔] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [✔] No [ ] | Depth (inches): | 8 |
| Water Table Present? | Yes [✔] No [ ] | Depth (inches): | 0 |
| Saturation Present? (includes capillary fringe) | Yes [✔] No [ ] | Depth (inches): | 0 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants.

Sampling Point: Enh. 4A

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa sylvatica | 30 | Y | FAC |
| 2. Quercus laurifolia | 30 | Y | FACW |
| 3. Quercus nigra | 20 | Y | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 80 | = Total Cover | |
| 50% of total cover: 40 | 20% of total cover: 16 | | |
| Sapling Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |
| Shrub Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |
| Herb Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |
| Woody Vine Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | 30 | x 2 = | 60 |
| FAC species | 50 | x 3 = | 150 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 80 (A) | | 210 (B) |

Prevalence Index = B/A = 2.6

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 4A

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 10YR 2/2 | 100 | | | | | sandy loa | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- [✔] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Organic Bodies (A6) **(LRR P, T, U)**
- [ ] 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- [ ] Muck Presence (A8) **(LRR U)**
- [ ] 1 cm Muck (A9) **(LRR P, T)**
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Coast Prairie Redox (A16) **(MLRA 150A)**
- [ ] Sandy Mucky Mineral (S1) **(LRR O, S)**
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR P, S, T, U)**
- [ ] Polyvalue Below Surface (S8) **(LRR S, T, U)**
- [ ] Thin Dark Surface (S9) **(LRR S, T, U)**
- [ ] Loamy Mucky Mineral (F1) **(LRR O)**
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Marl (F10) **(LRR U)**
- [ ] Depleted Ochric (F11) **(MLRA 151)**
- [ ] Iron-Manganese Masses (F12) **(LRR O, P, T)**
- [ ] Umbric Surface (F13) **(LRR P, T, U)**
- [ ] Delta Ochric (F17) **(MLRA 151)**
- [ ] Reduced Vertic (F18) **(MLRA 150A, 150B)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- [ ] 1 cm Muck (A9) **(LRR O)**
- [ ] 2 cm Muck (A10) **(LRR S)**
- [ ] Reduced Vertic (F18) **(outside MLRA 150A,B)**
- [ ] Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes [✔] No [ ]

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 4B

Investigator(s): D. Dunn Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): _____

Subregion (LRR or MLRA): LRR T Lat: 33.878251 Long: -79.250301 Datum: GCS NAD

Soil Map Unit Name: Ogeechee loamy fine sand NWI classification: PFO 1R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✔] | Depth (inches): _____ |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 6 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 5 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants.

Sampling Point: Enh. 4B

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa biflora | 25 | Y | OBL |
| 2. Taxodium distichum | 20 | Y | OBL |
| 3. Liquidambar styraciflua | 15 | Y | FAC |
| 4. Betula nigra | 15 | Y | FACW |
| 5. | | | |
| 6. | | | |
| | 75 | = Total Cover | |
| 50% of total cover: 37.5 | 20% of total cover: 15 | | |
| Sapling Stratum (Plot size: 30 ft) | | | |
| 1. Nyssa biflora | 40 | Y | OBL |
| 2. Taxodium distichum | 20 | Y | OBL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 60 | = Total Cover | |
| 50% of total cover: 30 | 20% of total cover: 12 | | |
| Shrub Stratum (Plot size: 30 ft) | | | |
| 1. Lyonia Lucida | 20 | Y | FACW |
| 2. Morella cerifera | 20 | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 40 | = Total Cover | |
| 50% of total cover: 20 | 20% of total cover: 8 | | |
| Herb Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |
| Woody Vine Stratum (Plot size: 30 ft) | | | |
| 1. Smilax bona nox | 15 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 15 | = Total Cover | |
| 50% of total cover: 7.5 | 20% of total cover: 3 | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 105 | x 1 = | 105 |
| FACW species | 35 | x 2 = | 70 |
| FAC species | 50 | x 3 = | 150 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 190 (A) | | 325 (B) |

Prevalence Index = B/A = 1.71

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 4B

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-8 | 10YR 2/1 | 100 | | | | | loamy sa | |
| 8-18 | 10YR 3/1 | 100 | | | | | loamy sa | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Restoration 5 **Date** 11/30/16

**Wetland Type** Non-Riverine Swamp Forest **Assessor Name/Organization** SCDOT JS/LW

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Palmetto Swamp

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

( ) Yes (•) No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.878138, -79.251213

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** (•) Yes ( ) No

**Regulatory Considerations (select all that apply to the assessment area)**

- [ ] Anadromous fish
- [ ] Federally protected species or State endangered or threatened species
- [ ] NCDWQ riparian buffer rule in effect
- [ ] Abuts a Primary Nursery Area (PNA)
- [ ] Publicly owned property
- [ ] N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- [ ] Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- [ ] Designated NCNHP reference community
- [ ] Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- ( ) Blackwater
- ( ) Brownwater
- [ ] Tidal (if tidal, check one of the following boxes) ( ) Lunar ( ) Wind ( ) Both

**Is the assessment area on a coastal island?** ( ) Yes (•) No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ( ) Yes (•) No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ( ) Yes (•) No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ( ) A | ( ) A | Not severely altered |
| (•) B | (•) B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ( ) A | ( ) A | Water storage capacity and duration are not altered. |
| ( ) B | ( ) B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| (•) C | (•) C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ( ) A | ( ) A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ( ) B | (•) B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ( ) C | ( ) C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | (•) D | ( ) D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | (•) A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ( ) B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- (•) A No peat or muck presence
- ( ) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

( ) Yes (•) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ( ) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide ( ) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

( ) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- ( ) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| ( ) A | ( ) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (•) A Evidence of short-duration inundation (< 7 consecutive days)
- ( ) B Evidence of saturation, without evidence of inundation
- ( ) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (•) A Sediment deposition is not excessive, but at approximately natural levels.
- ( ) B Sediment deposition is excessive, but not overwhelming the wetland.
- ( ) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| ( ) A | ( ) A | (•) A | ≥ 500 acres |
| ( ) B | (•) B | ( ) B | From 100 to < 500 acres |
| (•) C | ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | ( ) D | From 25 to < 50 acres |
| ( ) E | ( ) E | ( ) E | From 10 to < 25 acres |
| ( ) F | ( ) F | ( ) F | From 5 to < 10 acres |
| ( ) G | ( ) G | ( ) G | From 1 to < 5 acres |
| ( ) H | ( ) H | ( ) H | From 0.5 to < 1 acre |
| ( ) I | ( ) I | ( ) I | From 0.1 to < 0.5 acre |
| ( ) J | ( ) J | ( ) J | From 0.01 to < 0.1 acre |
| ( ) K | ( ) K | ( ) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- ( ) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ( ) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (•) A | ( ) A | ≥ 500 acres |
| ( ) B | ( ) B | From 100 to < 500 acres |
| ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | From 10 to < 50 acres |
| ( ) E | ( ) E | < 10 acres |
| ( ) F | ( ) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

( ) Yes ( ) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ( ) A No artificial edge within 150 feet in all directions
- (•) B No artificial edge within 150 feet in four (4) to seven (7) directions
- ( ) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- ( ) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ( ) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- (•) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- ( ) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ( ) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ( ) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation

(•) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | ( ) A | (•) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ( ) B | ( ) B | Canopy present, but opened more than natural gaps |
| | (•) C | ( ) C | Canopy sparse or absent |
| Mid-Story | ( ) A | ( ) A | Dense mid-story/sapling layer |
| | ( ) B | (•) B | Moderate density mid-story/sapling layer |
| | (•) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | ( ) A | ( ) A | Dense shrub layer |
| | ( ) B | (•) B | Moderate density shrub layer |
| | (•) C | ( ) C | Shrub layer sparse or absent |
| Herb | ( ) A | ( ) A | Dense herb layer |
| | ( ) B | (•) B | Moderate density herb layer |
| | (•) C | ( ) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

( ) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).

(•) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

( ) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.

(•) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.

( ) C Majority of canopy trees are < 6 inches DBH or no trees.

**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

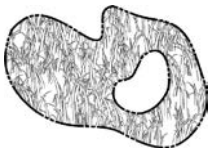
( ) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

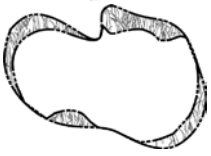
(•) B Not A

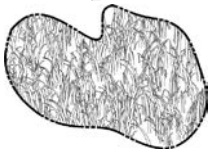
**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 

( ) B 

( ) C 

( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

( ) A Overbank and overland flow are not severely altered in the assessment area.

( ) B Overbank flow is severely altered in the assessment area.

(•) C Overland flow is severely altered in the assessment area.

( ) D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Restoration 5 | Date | 11/30/16 |
| Wetland Type | Non-Riverine Swamp Forest | Assessor Name/Organization | SCDOT JS/LW |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | NO |
| Presence of regulatory considerations (Y/N) | NO |
| Wetland is intensively managed (Y/N) | YES |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | NO |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **LOW** |
| | Sub-Surface Storage and Retention | Condition | **LOW** |
| Water Quality | Pathogen Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Particulate Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Soluble Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Physical Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Pollution Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Physical Structure | Condition | **MEDIUM** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **LOW** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **LOW** |
| Water Quality | Condition | **LOW** |
| | Condition/Opportunity | **LOW** |
| | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Conditon | **MEDIUM** |

**Overall Wetland Rating** **LOW**

## WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island | City/County: Horry | Sampling Date: 11/30/2016
Applicant/Owner: SCDOT | State: SC | Sampling Point: R5 - Upland DP
Investigator(s): Lee Williams (Michael Baker Intl.) | Section, Township, Range:
Landform (hillslope, terrace, etc.): roadbed | Local Relief (concave, convex, none): none | Slope (%) <5%
Subregion (LRR or MLRA): LRR T | Lat: 33.878148 | Long -79.251216 | Datum: NAD 83
Soil Map Unit Name: Ogeechee loamy fine sand | NWI classification: PFO1
Are climatic/hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation x, Soil x, or Hydrology ___, significantly disturbed? Yes Are "Normal Circumstances" present? Yes ___ No **x**
Are Vegetation ___, Soil ___, or Hydrology ___, naturally problematic? No (If needed, explain answers in Remarks.)

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes **x** | No | **Is the Sampled Area within a Wetland?** **Yes** ___ **No** **X** |
| Hydric Soil Present? | Yes | No **x** | |
| Wetland Hydrology Present? | Yes | No **x** | |

Remarks:
This datapoint was recorded on an existing dirt roadbed that was constructed by placing fill material through a wetland.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposit (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) (**LRR U**)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes ___ | No x | Depth (inches): ___ |
| Water Table Present? | Yes ___ | No x | Depth (inches): ___ |
| Saturation Present? (includes capillary fringe) | Yes ___ | No x | Depth (inches): ___ |

**Wetland Hydrology Present?** **Yes** ___ **No** **x**

Describe Recorded Data (stream gauge, monitoing well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION** - Use scientific names of plants

Sampling Point: R5 - Upland DP

| Tree Stratum (Plot size: 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Pinus taeda* | 10 | yes | FAC |
| 2. *Quercus laurifolia* | 10 | yes | FACW |
| 3. *Betula nigra* | 5 | yes | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 25 = Total Cover | | |
| 50% of total cover: 12.5 | 20% of total cover: 5 | | |

| Sapling Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. *Pinus taeda* | 5 | yes | FAC |
| 2. *Quercus laurifolia* | 5 | yes | FACW |
| 3. *Acer rubrum* | 10 | yes | FAC |
| 4. *Betula nigra* | 5 | yes | FACW |
| 5. | | | |
| 6. | | | |
| | 25 = Total Cover | | |
| 50% of total cover: 12.5 | 20% of total cover: 5 | | |

| Shrub Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. *Morella cerifera* | 25 | yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 25 = Total Cover | | |
| 50% of total cover: 12.5 | 20% of total cover: 5 | | |

| Herb Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. *Andropogon virginicus* | 30 | yes | FAC |
| 2. *Eupatorium compositifolium* | 10 | | FAC |
| 3. *Lespedeza cuneata* | 15 | yes | FACU |
| 4. *Rubus trivialis* | 20 | yes | FACU |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 75 = Total Cover | | |
| 50% of total cover: 37.5 | 20% of total cover: 15 | | |

| Woody Vine Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| 6. | | | |
| | 25 = Total Cover | | |
| 50% of total cover: | 20% of total cover: 5 | | |

| Sapling Stratum (Plot size) | | | |
|---|---|---|---|
| 1. *Pinus taeda* | 5 | yes | FAC |
| 2. *Quercus laurifolia* | 5 | yes | FACW |
| 3. *Acer rubrum* | 10 | yes | FAC |

**Dominance Test Worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 11 (B)

Percent of Dominant Species That ARE OBL, FACW, or FAC: 82% (A/B)

**Prevalence Index Worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | | x 2 = | |
| FAC species | | x 3 = | |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | (A) | | (B) |

Prevelance Index = B/A =

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- **x** 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤ 3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling** – Woody plants, excluding vines, less approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Pre** **Yes** **x** **No** ___

Percent of Dominant Species That ARE OBL, FACW, or FAC: 82% (A/B)

**Prevalence Index Worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species | x 1 = |
| FACW species | x 2 = |

**Soil** Sampling Point: R5 - Upland DP

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-6 | 10YR 4/3 | 100 | | | | | loamy sand | |
| 6-10 | 10YR 5/2 | 100 | | | | | loamy sand | |
| 8-20 | 10YR 4/2 | 95 | 7.5YR 5/8 | 5 | C | PL | loamy sand | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration; D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) (LRR P, T, U)
- ___ 5cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coastal Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Minerals (S1) **(LRR O,S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Maganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MRLA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MRLA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MRLA 149A, 153C, 253D)**

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present? Yes** ___ **No** x

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 5A

Investigator(s): J. Siceloff Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR T Lat: 33.879752 Long: -79.249049 Datum: GCS NAD

Soil Map Unit Name: Ogeechee loamy fine sand NWI classification: PFO 1R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [✔] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✔] | Depth (inches): |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 0 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 0 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants.

Sampling Point: Enh. 5A

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa sylvatica | 30 | Y | FAC |
| 2. Quercus laurifolia | 30 | Y | FACW |
| 3. Acer rubrum | 20 | Y | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 80 | = Total Cover | |
| 50% of total cover: 40 | 20% of total cover: 16 | | |
| Sapling Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |
| Shrub Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |
| Herb Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |
| Woody Vine Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | 30 | x 2 = | 60 |
| FAC species | 50 | x 3 = | 150 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 80 (A) | | 210 (B) |

Prevalence Index = B/A = 2.6

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 5A

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-5 | 10YR 2/2 | 100 | | | | | sandy loa | |
| 5-18 | 10YR 4/2 | 100 | | | | | loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 5B

Investigator(s): D. Dunn Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): _____

Subregion (LRR or MLRA): LRR T Lat: 33.878251 Long: -79.250301 Datum: GCS NAD

Soil Map Unit Name: Ogeechee loamy fine sand NWI classification: PFO 1R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✔] | Depth (inches): _____ |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 10 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 8 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants.

Sampling Point: Enh. 5B

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa biflora | 30 | Y | OBL |
| 2. Liquidambar styraciflua | 15 | Y | FAC |
| 3. Betula nigra | 15 | Y | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 60 | = Total Cover | |

50% of total cover: 30 20% of total cover: 12

| Sapling Stratum (Plot size: 30 ft) | | | |
|---|---|---|---|
| 1. Nyssa biflora | 40 | Y | OBL |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 40 | = Total Cover | |

50% of total cover: 20 20% of total cover: 8

| Shrub Stratum (Plot size: 30 ft) | | | |
|---|---|---|---|
| 1. Morella cerifera | 40 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 40 | = Total Cover | |

50% of total cover: 20 20% of total cover: 8

| Herb Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | | = Total Cover | |

50% of total cover: 20 20% of total cover: 8

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |

50% of total cover: 20 20% of total cover: 8

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 70 | x 1 = | 70 |
| FACW species | 15 | x 2 = | 30 |
| FAC species | 55 | x 3 = | 165 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 140 (A) | | 265 (B) |

Prevalence Index = B/A = 1.89

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 5B

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-6 | 10YR 2/1 | 100 | | | | | loamy sa | |
| 6-18 | 10YR 3/1 | 100 | | | | | loamy sa | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

**NC WAM WETLAND ASSESSMENT FORM**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

**Wetland Site Name** Wetland Restoration 6 **Date** 11/30/16

**Wetland Type** Non-Riverine Swamp Forest **Assessor Name/Organization** SCDOT JS/LW

**Level III Ecoregion** Middle Atlantic Coastal Plain **Nearest Named Water Body** Palmetto Swamp

**River Basin** Yadkin-PeeDee **USGS 8-Digit Catalogue Unit** 03040204

( ) Yes (•) No **Precipitation within 48 hrs?** **Latitude/Longitude (deci-degrees)** 33.879271, -79.249074

**Evidence of stressors affecting the assessment area (may not be within the assessment area)**
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

**Is the assessment area intensively managed?** (•) Yes ( ) No

**Regulatory Considerations (select all that apply to the assessment area)**

- [ ] Anadromous fish
- [ ] Federally protected species or State endangered or threatened species
- [ ] NCDWQ riparian buffer rule in effect
- [ ] Abuts a Primary Nursery Area (PNA)
- [ ] Publicly owned property
- [ ] N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- [ ] Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- [ ] Designated NCNHP reference community
- [ ] Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

**What type of natural stream is associated with the wetland, if any? (check all that apply)**

- ( ) Blackwater
- ( ) Brownwater
- [ ] Tidal (if tidal, check one of the following boxes) ( ) Lunar ( ) Wind ( ) Both

**Is the assessment area on a coastal island?** ( ) Yes (•) No

**Is the assessment area's surface water storage capacity or duration substantially altered by beaver?** ( ) Yes (•) No

**Does the assessment area experience overbank flooding during normal rainfall conditions?** ( ) Yes (•) No

**1. Ground Surface Condition/Vegetation Condition – assessment area condition metric**
**Check a box in each column.** Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

| GS | VS | |
|---|---|---|
| ( ) A | ( ) A | Not severely altered |
| (•) B | (•) B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

**2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
**Check a box in each column.** Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

| Surf | Sub | |
|---|---|---|
| ( ) A | ( ) A | Water storage capacity and duration are not altered. |
| ( ) B | ( ) B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| (•) C | (•) C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

**3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)**
**Check a box in each column for each group below**. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

| | AA | WT | |
|---|---|---|---|
| 3a. | ( ) A | ( ) A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | ( ) B | (•) B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | ( ) C | ( ) C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | (•) D | ( ) D | Depressions able to pond water < 3 inches deep |

| | | |
|---|---|---|
| 3b. | (•) A | Evidence that maximum depth of inundation is greater than 2 feet |
| | ( ) B | Evidence that maximum depth of inundation is between 1 and 2 feet |

C Evidence that maximum depth of inundation is less than 1 foot

**4. Soil Texture/Structure – assessment area condition metric**

**Check a box from each of the three soil property groups below.** Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- (•) A Sandy soil
- ( ) B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ( ) C Loamy or clayey soils not exhibiting redoximorphic features
- ( ) D Loamy or clayey gleyed soil
- ( ) E Histosol or histic epipedon

4b.
- (•) A Soil ribbon < 1 inch
- ( ) B Soil ribbon ≥ 1 inch

4c.
- (•) A No peat or muck presence
- ( ) B A peat or muck presence

**5. Discharge into Wetland – opportunity metric**

**Check a box in each column.** Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

| Surf | Sub | |
|---|---|---|
| (•) A | (•) A | Little or no evidence of pollutants or discharges entering the assessment area |
| ( ) B | ( ) B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| ( ) C | ( ) C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

**6. Land Use – opportunity metric**

**Check all that apply (at least one box in each column).** Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

| WS | 5M | 2M | |
|---|---|---|---|
| [ ] A | [ ] A | [ ] A | ≥ 10% impervious surfaces |
| [x] B | [x] B | [x] B | < 10% impervious surfaces |
| [ ] C | [ ] C | [ ] C | Confined animal operations (or other local, concentrated source of pollutants) |
| [ ] D | [ ] D | [ ] D | ≥ 20% coverage of pasture |
| [x] E | [x] E | [ ] E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| [ ] F | [ ] F | [ ] F | ≥ 20% coverage of maintained grass/herb |
| [ ] G | [ ] G | [ ] G | ≥ 20% coverage of clear-cut land |
| [ ] H | [ ] H | [ ] H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

**7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric**

7a. Is assessment area within 50 feet of a tributary or other open water?

( ) Yes (•) No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ( ) A ≥ 50 feet
- ( ) B From 30 to < 50 feet
- ( ) C From 15 to < 30 feet
- ( ) D From 5 to < 15 feet
- ( ) E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

( ) ≤ 15-feet wide ( ) > 15-feet wide ( ) Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

( ) Yes ( ) No

7e. Is tributary or other open water sheltered or exposed?
- ( ) Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ( ) Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

**8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)**

**Check a box in each column.** Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

| WT | WC | |
|---|---|---|
| ( ) A | ( ) A | ≥ 100 feet |
| ( ) B | ( ) B | From 80 to < 100 feet |
| ( ) C | ( ) C | From 50 to < 80 feet |
| ( ) D | ( ) D | From 40 to < 50 feet |
| ( ) E | ( ) E | From 30 to < 40 feet |
| ( ) F | ( ) F | From 15 to < 30 feet |
| ( ) G | ( ) G | From 5 to < 15 feet |
| ( ) H | ( ) H | < 5 feet |

**9. Inundation Duration – assessment area condition metric**

Answer for assessment area dominant landform.

- (•) A Evidence of short-duration inundation (< 7 consecutive days)
- ( ) B Evidence of saturation, without evidence of inundation
- ( ) C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

**10. Indicators of Deposition – assessment area condition metric**

Consider recent deposition only (no plant growth since deposition).

- (•) A Sediment deposition is not excessive, but at approximately natural levels.
- ( ) B Sediment deposition is excessive, but not overwhelming the wetland.
- ( ) C Sediment deposition is excessive and is overwhelming the wetland.

**11. Wetland Size – wetland type/wetland complex condition metric**

**Check a box in each column.** Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

| WT | WC | FW (if applicable) | |
|---|---|---|---|
| ( ) A | ( ) A | (•) A | ≥ 500 acres |
| ( ) B | (•) B | ( ) B | From 100 to < 500 acres |
| (•) C | ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | ( ) D | From 25 to < 50 acres |
| ( ) E | ( ) E | ( ) E | From 10 to < 25 acres |
| ( ) F | ( ) F | ( ) F | From 5 to < 10 acres |
| ( ) G | ( ) G | ( ) G | From 1 to < 5 acres |
| ( ) H | ( ) H | ( ) H | From 0.5 to < 1 acre |
| ( ) I | ( ) I | ( ) I | From 0.1 to < 0.5 acre |
| ( ) J | ( ) J | ( ) J | From 0.01 to < 0.1 acre |
| ( ) K | ( ) K | ( ) K | < 0.01 acre or assessment area is clear-cut |

**12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- ( ) A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ( ) B Pocosin is < 90% of the full extent of its natural landscape size.

**13. Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

| Well | Loosely | |
|---|---|---|
| (•) A | ( ) A | ≥ 500 acres |
| ( ) B | ( ) B | From 100 to < 500 acres |
| ( ) C | ( ) C | From 50 to < 100 acres |
| ( ) D | ( ) D | From 10 to < 50 acres |
| ( ) E | ( ) E | < 10 acres |
| ( ) F | ( ) F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only**.

( ) Yes ( ) No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

**14. Edge Effect – wetland type condition metric (skip for all marshes)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ( ) A No artificial edge within 150 feet in all directions
- (•) B No artificial edge within 150 feet in four (4) to seven (7) directions
- ( ) C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

**15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- ( ) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ( ) B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- (•) C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

**16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- ( ) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ( ) B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ( ) C Vegetation is dominated by exotic species (>50% cover of exotics).

**17. Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

(•) Yes ( ) No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

( ) A ≥ 25% coverage of vegetation

(•) B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

| | AA | WT | |
|---|---|---|---|
| Canopy | ( ) A | (•) A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | ( ) B | ( ) B | Canopy present, but opened more than natural gaps |
| | (•) C | ( ) C | Canopy sparse or absent |
| Mid-Story | ( ) A | ( ) A | Dense mid-story/sapling layer |
| | ( ) B | (•) B | Moderate density mid-story/sapling layer |
| | (•) C | ( ) C | Mid-story/sapling layer sparse or absent |
| Shrub | ( ) A | ( ) A | Dense shrub layer |
| | ( ) B | (•) B | Moderate density shrub layer |
| | (•) C | ( ) C | Shrub layer sparse or absent |
| Herb | ( ) A | ( ) A | Dense herb layer |
| | ( ) B | (•) B | Moderate density herb layer |
| | (•) C | ( ) C | Herb layer sparse or absent |

**18. Snags – wetland type condition metric**

( ) A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).

(•) B Not A

**19. Diameter Class Distribution – wetland type condition metric**

( ) A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.

(•) B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.

( ) C Majority of canopy trees are < 6 inches DBH or no trees.

**20. Large Woody Debris – wetland type condition metric**

Include both natural debris and man-placed natural debris.

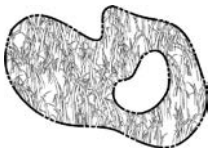
( ) A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

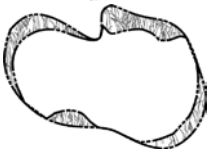
(•) B Not A

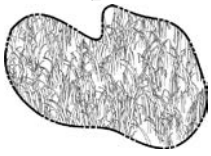
**21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

( ) A 

( ) B 

( ) C 

( ) D 

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

( ) A Overbank and overland flow are not severely altered in the assessment area.

( ) B Overbank flow is severely altered in the assessment area.

(•) C Overland flow is severely altered in the assessment area.

( ) D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet**
**Accompanies User Manual Version 4.1**
**Rating Calculator Version 4.1**

| | | | |
|---|---|---|---|
| Wetland Site Name | Wetland Restoration 6 | Date | 11/30/16 |
| Wetland Type | Non-Riverine Swamp Forest | Assessor Name/Organization | SCDOT JS/LW |

| | |
|---|---|
| Notes on Field Assessment Form (Y/N) | NO |
| Presence of regulatory considerations (Y/N) | NO |
| Wetland is intensively managed (Y/N) | YES |
| Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) | NO |
| Assessment area is substantially altered by beaver (Y/N) | NO |
| Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) | NO |
| Assessment area is on a coastal island (Y/N) | NO |

**Sub-function Rating Summary**

| Function | Sub-function | Metrics | Rating |
|---|---|---|---|
| Hydrology | Surface Storage and Retention | Condition | **LOW** |
| | Sub-Surface Storage and Retention | Condition | **LOW** |
| Water Quality | Pathogen Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Particulate Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Soluble Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Physical Change | Condition | NA |
| | | Condition/Opportunity | NA |
| | | Opportunity Presence? (Y/N) | NA |
| | Pollution Change | Condition | **LOW** |
| | | Condition/Opportunity | **LOW** |
| | | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Physical Structure | Condition | **MEDIUM** |
| | Landscape Patch Structure | Condition | **HIGH** |
| | Vegetation Composition | Condition | **LOW** |

**Function Rating Summary**

| Function | Metrics/Notes | Rating |
|---|---|---|
| Hydrology | Condition | **LOW** |
| Water Quality | Condition | **LOW** |
| | Condition/Opportunity | **LOW** |
| | Opportunity Presence? (Y/N) | **NO** |
| Habitat | Conditon | **MEDIUM** |

**Overall Wetland Rating** **LOW**

## WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island | City/County: Horry | Sampling Date: 11/30/2016
Applicant/Owner: SCDOT | State: SC | Sampling Point: R6 - Upland DP
Investigator(s): Lee Williams (Michael Baker Intl.) | Section, Township, Range:
Landform (hillslope, terrace, etc.): roadbed | Local Relief (concave, convex, none): none | Slope (%) <5%
Subregion (LRR or MLRA): LRR T | Lat: 33.879276 | Long -79.249073 | Datum: NAD 83
Soil Map Unit Name: Blanton sand | NWI classification: PFO1
Are climatic/hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)
Are Vegetation x, Soil x, or Hydrology ___, significantly disturbed? Yes Are "Normal Circumstances" present? Yes ___ No **x**
Are Vegetation ___, Soil ___, or Hydrology ___, naturally problematic? No (If needed, explain answers in Remarks.)

### SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes **x** | No | **Is the Sampled Area within a Wetland?** **Yes** ___ **No** **X** |
| Hydric Soil Present? | Yes | No **x** | |
| Wetland Hydrology Present? | Yes | No **x** | |

Remarks:
This datapoint was recorded on an existing dirt roadbed that was constructed by placing fill material through a wetland.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposit (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) (**LRR U**)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes ___ | No x | Depth (inches): ___ |
| Water Table Present? | Yes ___ | No x | Depth (inches): ___ |
| Saturation Present? (includes capillary fringe) | Yes ___ | No x | Depth (inches): ___ |

**Wetland Hydrology Present?** **Yes** ___ **No** **x**

Describe Recorded Data (stream gauge, monitoing well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION** - Use scientific names of plants

Sampling Point: R6 - Upland DP

| Tree Stratum (Plot size: 2827 sq ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Pinus taeda* | 15 | yes | FAC |
| 2. *Quercus nigra* | 10 | yes | FAC |
| 3. *Acer rubrum* | 10 | yes | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 35 | = Total Cover | |
| 50% of total cover: 17.5 | 20% of total cover: | 7 | |

| Sapling Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. *Pinus taeda* | 5 | yes | FAC |
| 2. *Betula nigra* | 5 | yes | FACW |
| 3. *Quercus nigra* | 10 | yes | FAC |
| 4. *Magnolia virginiana* | 5 | yes | FACW |
| 5. | | | |
| 6. | | | |
| | 25 | = Total Cover | |
| 50% of total cover: 12.5 | 20% of total cover: | 5 | |

| Shrub Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. *Morella cerifera* | 20 | yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 20 | = Total Cover | |
| 50% of total cover: 10 | 20% of total cover: | 4 | |

| Herb Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. *Andropogon virginicus* | 5 | yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 5 | = Total Cover | |
| 50% of total cover: 2.5 | 20% of total cover: | 1 | |

| Woody Vine Stratum (Plot size 2827 sq ft) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test Worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That ARE OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index Worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | | x 2 = | |
| FAC species | | x 3 = | |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | (A) | | (B) |

Prevelance Index = B/A =

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- **x** 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤ 3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

**Sapling** – Woody plants, excluding vines, less approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** **x** **No** ___

Remarks: (Include photo numbers here or on a separate sheet).

**Soil** Sampling Point: R6 - Upland DP

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-10 | 10YR 5/4 | 100 | | | | | loamy sand | |
| 10-20 | 10YR 4/1 | 100 | | | | | loamy sand | <50% masked soil particles |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration; D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) (LRR P, T, U)
- ___ 5cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coastal Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Minerals (S1) **(LRR O,S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Maganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MRLA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MRLA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MRLA 149A, 153C, 253D)**

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present? Yes** ___ **No** x

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 6A

Investigator(s): J. Siceloff Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): _____

Subregion (LRR or MLRA): LRR T Lat: 33.914298 Long: -79.292508 Datum: GCS NAD

Soil Map Unit Name: Johnston loam NWI classification: PFO 1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [✔] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✔] | Depth (inches): _____ |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 0 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 0 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants.

Sampling Point: Enh. 6A

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa sylvatica | 30 | Y | FAC |
| 2. Fraxinus pennsyvanica | 30 | Y | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 60 = Total Cover | | |
| 50% of total cover: 30 | 20% of total cover: 12 | | |
| Sapling Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| Shrub Stratum (Plot size: 30 ft) | | | |
| 1. Morella cerifera | 40 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 40 = Total Cover | | |
| 50% of total cover: 20 | 20% of total cover: 8 | | |
| Herb Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| Woody Vine Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | 30 | x 2 = | 60 |
| FAC species | 70 | x 3 = | 210 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 100 (A) | | 270 (B) |

Prevalence Index = B/A = 2.7

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 6A

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-5 | 10YR 2/2 | 100 | | | | | sandy loa | |
| 5-18 | 10YR 4/2 | 100 | | | | | loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Gunter's Island City/County: Horry Sampling Date: 2/8/17

Applicant/Owner: S.C. Department of Transportation State: SC Sampling Point: Enh. 6B

Investigator(s): D. Dunn Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): _____

Subregion (LRR or MLRA): LRR T Lat: 33.91523 Long: -79.293419 Datum: GCS NAD

Soil Map Unit Name: Johnston loam NWI classification: PFO 1/2F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? [ ] Are "Normal Circumstances" present? Yes [✔] No [ ]

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? [ ] (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [✔] Surface Water (A1)
- [✔] High Water Table (A2)
- [✔] Saturation (A3)
- [✔] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [✔] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes [✔] | No [ ] | Depth (inches): 3 |
| Water Table Present? | Yes [✔] | No [ ] | Depth (inches): 2 |
| Saturation Present? (includes capillary fringe) | Yes [✔] | No [ ] | Depth (inches): 0 |

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Five Strata) –** Use scientific names of plants. Sampling Point: Enh. 6B

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Nyssa biflora | 30 | Y | OBL |
| 2. Taxodium distichum | 30 | Y | OBL |
| 3. Nyssa aquatica | 25 | Y | OBL |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 60 = Total Cover | | |
| 50% of total cover: 30 | 20% of total cover: 12 | | |
| Sapling Stratum (Plot size: 30 ft) | | | |
| 1. Nyssa biflora | 40 | Y | OBL |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | = Total Cover | | |
| 50% of total cover: 20 | 20% of total cover: 8 | | |
| Shrub Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| Herb Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| Woody Vine Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species _____ | x 1 = _____ |
| FACW species _____ | x 2 = _____ |
| FAC species _____ | x 3 = _____ |
| FACU species _____ | x 4 = _____ |
| UPL species _____ | x 5 = _____ |
| Column Totals: _____ (A) | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

- [✔] 1 - Rapid Test for Hydrophytic Vegetation
- [ ] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes [✔] No [ ]

Remarks: (If observed, list morphological adaptations below).

**SOIL**

Sampling Point: Enh. 6B

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-6 | 10YR 2/1 | 100 | | | | | loam | |
| 6-18 | 10YR 3/1 | 100 | | | | | loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:



Photo 1:

Wetland Restoration Site 1 facing south-west



Photo 2:

Wetland Restoration Site 2 facing east



Photo 3:

Wetland Restoration Site 2 facing south



Photo 4:

Wetland Restoration Site 4 facing north-east



Photo 5:

Wetland Restoration Site 5 facing south-west



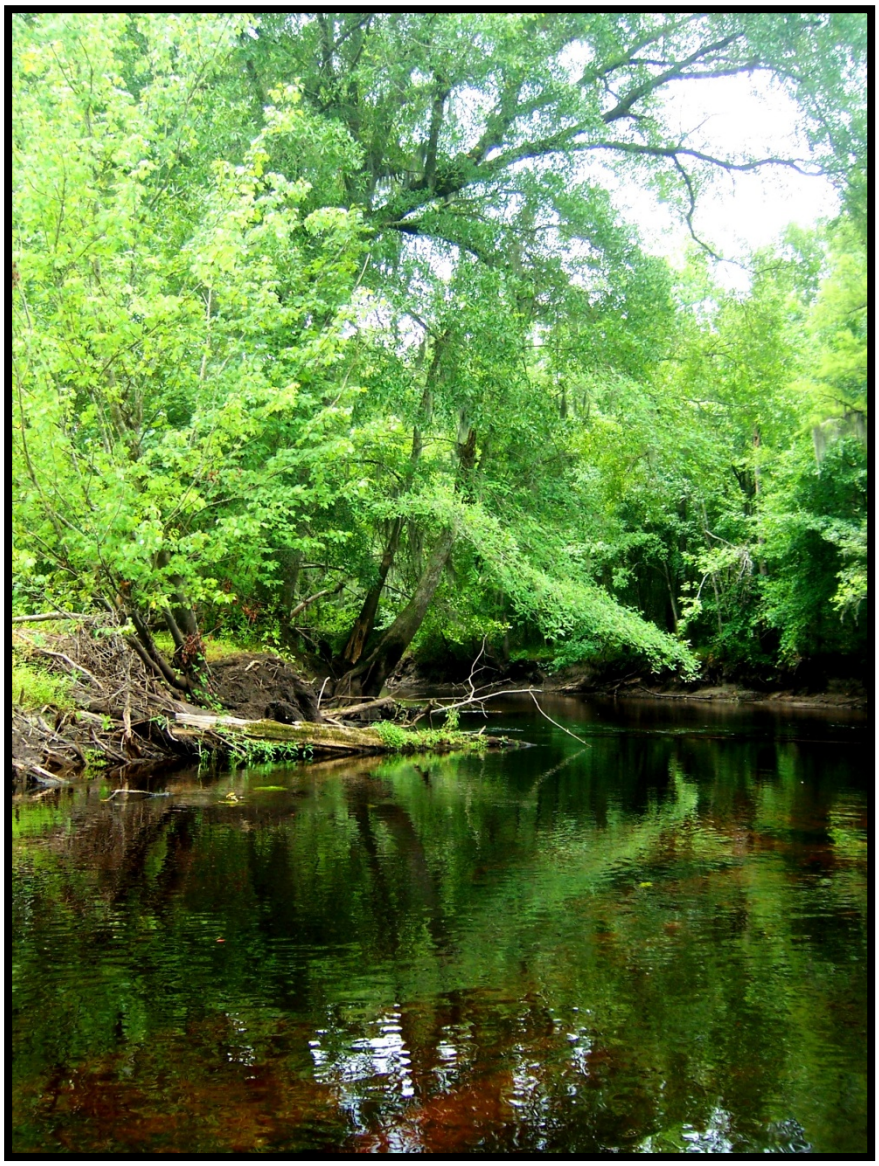
Photo 6:

Wetland Restoration Site 6 facing north-east

# APPENDIX G

# Little Pee Dee - Lumber Focus Area Plan

# Little Pee Dee-Lumber Focus Area Conservation Plan



**South Carolina Department of Natural Resources**

**March 2016**

# Little Pee Dee-Lumber Focus Area

# Conservation Plan

**Prepared by**

**Lorianne Riggin and Bob Perry[1], and Dr. Scott Howard[2]**

**March 2016**

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[1] South Carolina Department of Natural Resources, Office of Environmental Programs.

[2] South Carolina Department of Natural Resources, Geological Survey.

# Little Pee Dee-Lumber Focus Area Conservation Plan

*The goal of this conservation plan is to provide science-based guidance for future decisions to protect natural resource, riparian corridors and traditional landscape uses such as fish and wildlife management, hunting, fishing, agriculture and forestry. Such planning is valuable in the context of protecting Waters of the United States in accordance with the Clean Water Act particularly when the interests of economic development and protection of natural and cultural resources collide. Such planning is vital in the absence of specific watershed planning. As additional information is gathered by the focus area partners, and as further landscape-scale conservation goals are achieved, this plan will be updated accordingly.*

**This document is available at http:www.dnr.sc.gov/**


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# Little Pee Dee-Lumber Task Force Partners[3]

Ducks Unlimited

Natural Resources Conservation Service

Pee Dee Land Trust

Private Landowners

South Carolina Department of Natural Resources

The Nature Conservancy

United State Fish & Wildlife Service

Wildlife Action, Inc.

Winyah Rivers Foundation, Inc.

[3] These conservation partners are listed as potential since the Little Pee Dee-Lumber Focus Area Task Force has not been formalized and does not yet meet as an active task force; however these potential task force partners are aware of and/or work actively on other focus area task force efforts in other areas of the state. The potential task force partners have reviewed this document and support its conclusions as noted in Appendix VII.

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# 1. Introduction



The Little Pee Dee, Lumber, Lynches, Black, Waccamaw and the Great Pee Dee rivers together form the Pee Dee River basin, the largest river basin in the state with 7,860 square miles or 25.3% of South Carolina's land area including 14 counties (Chesterfield, Clarendon, Darlington, Dillon, Florence, Georgetown, Horry, Kershaw, Lancaster, Lee, Marlboro, Marion, Sumter and Williamsburg). Beginning in the southeastern plains of North Carolina, the Little Pee Dee River flows approximately 74 miles through the Pee Dee-Southeastern Plains ecobasin before entering the Pee Dee Coastal plain ecobasin of South Carolina where the Little Pee Dee flows for 65 more miles receiving input from the Lumber River, before merging with the Great Pee Dee River.

The Little Pee Dee-Lumber Focus Area begins in the most southeastern corner of Dillon County following the Lumber River to the confluence of the Little Pee Dee River down to US Highway 378 encompassing the blackwater system down the county line between Marion and Horry counties.

The Little Pee Dee-Lumber focus area boundaries are defined from the North Carolina-South Carolina state line surrounding the Little Pee Dee River southwest down US Highway 15 to the Town of McColl to the intersection of SC Highway 381, thence south to the Town of Clio to the intersection of SC Highway 9 south, thence southeast along Dunbar Highway to the intersection of SC Highway 38, then southeast to the intersection of SC Highway 917, thence to the second intersection with SC Highway 41, thence south on Highway 41 past Mullins to the intersection of US Highway 378, then east on US Highway 378 to SC Highway 49 to the end of Woodberry Road. The southern edge is defined from the end of Woodberry Road east across the Little Pee Dee and picks up along Gilbert Road to begin the eastern border at US Highway 701, thence north to the North Carolina-South Carolina state line and following the line back northwest to US Highway 15 at the Town of McColl (Appendix 1).

Protected lands in the Little Pee Dee-Lumber Basin include the Cartwheel Bay Heritage Preserve (591 acres), Little Pee Dee Heritage Preserve/Wildlife Management Area (10,406 acres), Woodbury Wildlife Management Area (25,924 acres). Additionally, the Little Pee Dee-Lumber Focus Area contains numerous private properties protected under conservation easements (7,857).

# 2. Recognized Conservation Plans

In 1990, the South Carolina General Assembly designated 14 miles of the Little Pee Dee River from US Highway 378 to the confluence with the Great Pee Dee River as a State Scenic River. An additional 64 miles extending upstream from US Highway 378 were determined eligible for scenic river status in 1997 but have not yet been formally designated. The upper portion of the Little Pee Dee, a 46-mile segment in Dillon County from Parish Mill Bridge on County Road 363 (County Line Road) near the Marlboro County line southeasterly to the crossing of Allen Bridge Road near Marion County line, was designated as a State Scenic River in 2005. The South Carolina Department of Natural Resources (SCDNR) described and mapped this portion of the river to develop the Little Pee Dee Scenic River Trail.

The SCDNR Heritage Trust Program identified the Little Pee Dee River corridor as a high priority area for conservation, and as such, approximately 10,000 acres of the Little Pee Dee Heritage Preserve extends roughly 17 miles of the Little Pee Dee and Lumber rivers. Protected river corridors provide a travel byway for wildlife, filtration system for pollutants and sediments and habitat for the endangered Sarvis holly (*Ilex amelanchier*). The natural communities of concern include cypress-gum swamps, bottomland hardwood forests and fluvial sand ridge communities.

The Little Pee Dee Basin is home to important migrating, wintering and breeding waterfowl habitat, shore and wading bird habitat, as well as habitat critical to neotropical migrant songbirds and a diverse group of bottomland forest bird species. Because of its importance to a broad group of bird species, the Little Pee Dee-Lumber Basin Focus Area is a step-down project under the umbrella of a number of national and regional conservation initiatives to include the North American Waterfowl Management Plan (NAWMP) and its Atlantic Coast Joint Venture (ACJV), the North American Bird Conservation Initiative, Partners in Flight (PIF), the United States Shorebird Conservation Plan (USSCP) and the National Bobwhite Conservation Initiative (NBCI).

The NAWMP was initiated in 1985 in response to plummeting numbers of migratory waterfowl across the continent. The central premise of the NAWMP is protection and enhancement of existing nesting, migrating and wintering waterfowl habitat. The ACJV is the implementation program of NAWMP in the Atlantic states.

PIF was launched in 1990 in response to growing concerns about declines in the populations of many land bird species that were not covered under other conservation initiatives, particularly neotropical migrant species. The focus of PIF is to combine, coordinate and increase resources in order to achieve the highest order of success in bird and habitat conservation in the Northern Hemisphere. The USSCP was originated in the mid-1990s and its goals were formalized in 2000 in order to provide a scientific framework to determine species, sites and habitats that most urgently need conservation action. The NBCI is the unified strategic effort of 25 state fish and wildlife agencies and various conservation organizations to restore wild populations of bobwhite quail in this country to levels comparable to 1980 through restoration and

maintenance of native grassland habitats to the benefit of a diverse assemblage of grassland dependent species.

The forested wetlands provide important nesting and migration habitat for a large assemblage of passerines. SCDNR documented breeding of 15 species of neotropical migratory songbirds and 35 species of other land birds on the Little Pee Dee River Heritage Preserve. These areas also provide nesting and foraging habitat for bald eagles, swallow-tailed kites and wood storks. Several wading bird rookeries also occur in the vicinity of the Little Pee Dee River.

# 3. Threats

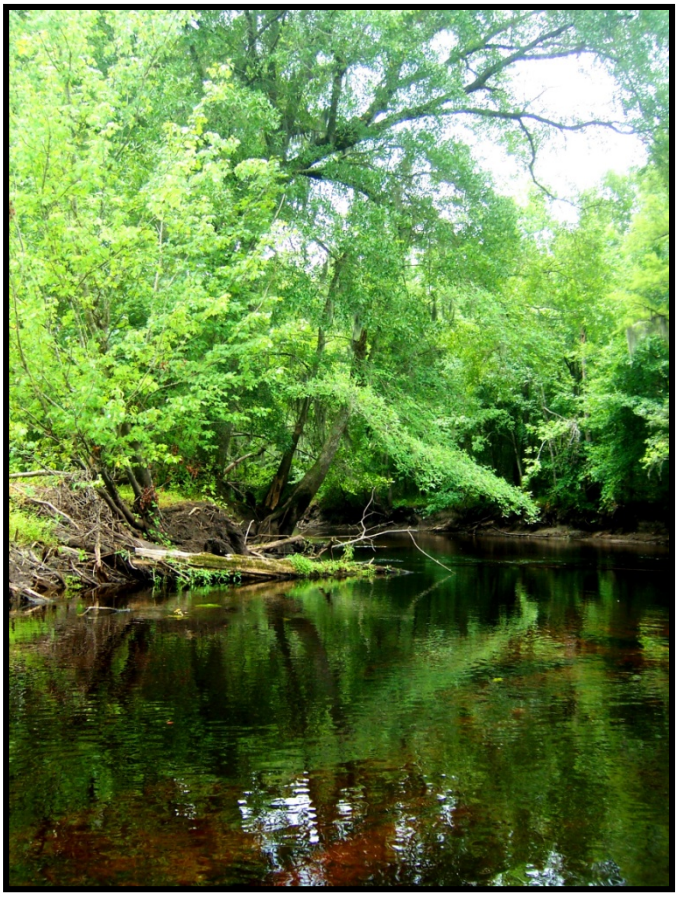
The abundant, unique and diverse resources of the Little Pee Dee-Lumber Focus Area are under threat from a variety of contemporary land use practices and changes including development, agriculture, sand mining, and other conversions of land to non-traditional uses and poor land use practices. Continued development along the US 378 and US 501 corridors typifies the types of land use changes that threaten fish and wildlife populations and water quality within the Basin. These land use changes and practices impact aquatic habitats by increasing silt and sediment loads, introducing excessive nutrients and chemical contaminants, altering water availability due to irrigation and instream habitat due to sand mining.



*2015 Aerial photography from USDA National Agriculture Imagery Program of Dillon County and the Little Pee Dee River.*

A notable threat to the Little Pee Dee-Lumber Focus Area includes the development of the Interstate-73 (I-73) corridor, which will impact and take an estimated 30 acres of the Little Pee Dee Heritage Preserve known as the Vaughn Tract at the crossing of the Little Pee Dee River

parallel to SC Highway 917 south of Mullins. Although this will impact the area near the heritage preserve directly, this chosen route will reduce the overall amount of floodplain encroachment and wetland impacts of the overall I-73 project. Large scale road development can cause an array of problems including an increase in various pollution types, such as litter and runoff, and habitat fragmentation.



Habitat fragmentation negatively impacts wildlife population viability by reducing the amount or quality of available habitat, removing native vegetation and increasing opportunities for invasive species to become established. Fragmented habitats may not be large enough nor adequately connected to support species that need more territory in which to reproduce, rear young, forage for food resources and store healthy body reserves. The loss and fragmentation of habitat make it difficult for migratory species to utilize places to rest and feed along their migration routes. Smaller and disjoint patches of habitat support more tenuous populations of wildlife increasing their vulnerabilities to disease and predation. Habitat fragmentation along with urbanization also renders it difficult to continue traditional habitat management efforts such maintenance of fire-based ecosystems due to concerns over smoke management. Along with reducing habitat fragmentation, the importance of maintaining riparian corridors and wetland buffers for aquatic organisms and herpetofauna also is critical. Negative impacts to riparian corridors and wetland buffers can degrade aquatic communities and decrease diversity with an increase in sedimentation and contaminated runoff from nearby urban areas. Efforts clearly are needed in the Little Pee Dee Basin to support and maintain large, well-connected corridors of specialized habitat needed for threatened and endangered species and those that are rare or of conservation concern.

The management of whole ecosystems represents an ideal in conservation that is often impractical or difficult to achieve. However, the Little Pee Dee-Lumber Basin Focus Area presents a unique opportunity to enhance landscape-scale conservation. The Basin contains the Little Pee Dee Heritage Preserve and is immediately upstream of the Winyah Bay Focus Area. The focus area concept encourages conservation of private land through voluntary conservation easements. The addition of privately owned conservation areas, particularly those adjacent to or in close proximity to larger or ecologically sensitive areas, serves

to protect and enhance the existing outstanding natural, cultural and recreational resources of the Little Pee Dee-Lumber Focus Area.

# 4. Objectives

The initial objective is to establish a network of partners comprised of private landowners, conservation organizations, land trusts and government agencies to oversee and maintain a landscape scale conservation initiative to protect and enhance the important lands, waters, rare and sensitive habitats, cultural sites and diverse natural resources of the Little Pee Dee-Lumber Basin while maintaining in perpetuity, the long-honored traditional uses of hunting, fishing, forest management and agriculture.

Since large public ownership within the Little Pee Dee-Lumber River focus area is limited through scarce agency funding and governmental appropriations, the partnership aims to primarily work with willing private landowners to promote stewardship using a variety of tools ranging from technical and financial assistance to conservation easements. The key for this initiative is to encourage the continuation of private ownership while ensuring long-term protection and enhancement of resource stewardship. Currently there are 36,921 acres of state protected property in the Little Pee Dee-Lumber River Basin and 7,856 acres of private land conservation which comprise approximately 4% of the entire focus area (estimated acreage 161,226) (Table 1).

The overarching objectives of the Little Pee Dee–Lumber River Focus Area Project are to protect and enhance important lands, waters, rare and sensitive habitats, cultural sites and diverse natural resources of the midlands while maintaining in perpetuity, for the benefit of Palmetto State citizens, the long-honored traditional uses of hunting, fishing, forest management and agriculture.

Table 1. Protected Lands in the Little Pee Dee-Lumber Focus Area.*

| **State** | | **Property Manager** |
|---|---|---|
| Cartwheel Bay Heritage Preserve | 591 | S.C. Department of Natural Resources |
| Little Pee Dee Heritage Preserve | 10,406 | S.C. Department of Natural Resources |
| Woodbury Wildlife Management Area | 25,924 | S.C. Department of Natural Resources |
| **Private** | | **Private Landowners** |
| Pee Dee Land Trust | 3,169 | |
| The Nature Conservancy | 2,890 | |
| U.S. Natural Resources Conservation Service | 1,797 | |
| **Total Protected Lands in Acres** | **44,777** | |

**November 2015 GIS data*

# 5. Natural Resources

The Little Pee Dee and Lumber rivers are bounded by classic blackwater river floodplain forest with canopies of bald cypress (*Taxodium distichum)*, swamp tupelo (*Nyssa biflora*) and red maple (*Acer rubrum*). Other species commonly associated include tulip poplar (*Liriodendron tulipfera*), sweet gum (*Liquidambar styraciflua)*, pond pine (*Pinus serotina)*, loblolly pine (*Pinus taeda)* and laurel oak (*Quercus laurifolia)*. Floodplain forests are seasonally inundated by the river and represent the most deeply flooded of all southeastern United States forest types. The shrub layer in areas subjected to frequent flooding is open, whereas areas with infrequent flooding may be fairly dense and pocosin-like.



*Banded water snake*

Bottomland hardwood forests of the Little Pee Dee and Lumber rivers typically occur between the floodplain forest and drier upland sites. Unlike floodplain forests and longleaf pine (*Pinus palustris*) uplands, bottomland hardwoods are quite diverse in terms of the number of overstory species. This ecotype is dominated by a well-developed canopy of water oak (*Quercus nigra*), overcup oak (*Q. lyrata*), willow oak (*Q. phellos*), sweetgum, water hickory (*Carya aquatica*) and loblolly pine. Bottomland hardwood forests are inundated regularly by the river, but do not typically contain standing water for extended periods of time. The drier conditions result in a better developed herbaceous layer. Loose spangle grass (*Uniola laxa*) often develops thick stands in open areas. Some of the most significant resources are the geomorphic features, the oxbow lakes, sloughs, braided streams, sand ridges and other fluvial formations that have been created by the river within the floodplain. These type features are not unusual on Coastal Plain blackwater rivers; however, the Little Pee Dee and Lumber rivers have an unusually numerous and well developed array of fluvial formations. Many of these features can be directly accessed from the main river channel. Oxbow lakes are often associated with floodplain forests. Oxbow lakes are former sections of river channel that became isolated when the river changed course. There are several excellent examples of oxbow lakes along the Little Pee Dee River. Xeric, elevated sand ridges run parallel to the rivers throughout the floodplain. This ecosystem is associated with fluvial sand deposited by river currents. The soils are sandy and well drained. Longleaf (*Pinus palustris*) and sparse loblolly pines dominate the canopy. The mid-story consists primarily of turkey oak (*Quercus laevis*), sand live oak (*Q. virginiana* var. *germinata*) and persimmon (*Diospyros virginiana*). Common understory plants include wiregrass (*Aristida stricta*), dropseed (*Sporobolus* spp.), and prickly-pear (*Opuntia compressa*). The protection of these ridges is essential to the health of the overall aquatic system.

Isolated wetlands are also important habitats for a variety of species. Not only do they serve as potential water sources for wildlife, but they are also a critical habitat component for a number of reptile and

amphibian species. Some of the most imperiled herpetological species rely on isolated ephemeral wetlands for breeding, timing their reproduction to coincide with the filling of the ponds that provide fish-free environments for tadpoles and larvae to mature. Amphibians, an important component to overall biodiversity, serve as indicator species for water quality due to their reliance on water for portions of their life cycle. Healthy and diverse populations of amphibians are indicative of high quality habitat both terrestrial and aquatic. Isolated wetlands, especially those that are ephemeral or seasonally wet, are often overlooked as an integral landscape feature worthy of protection. However, these areas are essential to maintain amphibian biodiversity and ecosystem function.



*American Alligator*

When exploring the splendor of these blackwater river systems, visitors may encounter river otters (*Lontra canadensis*); beavers (*Castor canadensis*); American alligators (*Alligator mississippiensis*); rat snakes (*Elaphe [Pantherophis] obsoleta*); banded (*Nerodia fasciata*), brown (*N. taxispilota*) and red-bellied (*N. erythrogaster*) water snakes; Florida (*Pseudemys floridana*) and river (*P. concinna*) cooters; wood ducks (*Aix sponsa*); mink (*Neovison vison*); raccoons (*Procyon lotor*); gray foxes (*Urocyon littoralis*) and the elusive bobcat (*Lynx rufus*).

Looking to the sky following the towering trees, some of which are 80-100 years old, visitors may catch a glimpse and at the least hear the sounds of yellow-billed cuckoos (*Coccyzus americanus*), prothonotary warblers (*Protonotaria citrea*), Acadian flycatchers (*Empidonax virescens*), northern parulas (*Setophaga americana*); red (*Vireo olivaceus*) and white eyed vireos (*V. griseus*), bald eagles (*Haliaeetus leucocephalus*), swallow tailed kites (*Elanoides forficatus*) and wood storks (*Mycteria americana*). White-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*) and bobwhite quail (*Colinus virginianus*) are frequent inhabitants along the floodplain with the occasional black bear (*Ursus americanus*) making its appearance as it travels the river corridor. Venturing out after dark, one could spot several bat species including the Seminole bats (*Lasiurus seminolus*), Southeastern myotis (*Myotis austroriparius*), big brown bats (*Eptesicus fuscus*) and Eastern pipistrelles (*Perimyotis subflavus*) in search of moths and mosquitoes. The Little Pee Dee and Lumber river drainages contain several species of state or regional concern. Rare plant species include Sarvis holly (*Ilex amelanchier*), Well's pixie moss (*Pyxidanthera barbulata* var. *barbulata*), riverbank quillwort (*Isoetes riparia*) and Pickering's morning-glory (*Stylisma pickeringii* var. *pickeringii*). Other rare species that may occur in these habitats are listed in Appendix 2 from the SCDNR State Wildlife Action Plan.

# 6. Aquatic Resources

The Little Pee Dee River meanders through a flat broad flood plain composed largely of forests and swamplands, interspersed with farms and pastures. Adjacent land use is predominately forestry and agriculture. Population centers nearby are Marion and Mullins in Marion County to the west, and Conway in Horry County to the east. Florence, approximately 35 miles west of the river, is the major market center in the Pee Dee area.





*Top right: Flat bullhead; Bottom left: Blackbanded sunfish;*

South Carolina's waterways contain 137 native fish species and 22 introduced species, 12 of which are sport fish in large impoundments. The Pee Dee River drainage contains 8,075 miles of stream, 15,984 acres of lake area, 102 native fish species and 10 introduced fish species. The Pee Dee drainage supports among the highest species diversity on the Atlantic slope, relative to other drainages.

SCDNR Freshwater Fisheries staff sampled the Little Pee Dee River by electrofishing in the Spring (April-June) and Fall (October-November) of 2011, from Floydale Landing (34.33405, -79.32427) on the Little Pee Dee River downstream to Punch Bowl Landing (33.75683, -79.21903) just above the confluence of the Great Pee Dee River. Prior to this study, the site had not been sampled by SCDNR since 1993. A total of 3,375 fish representing 15 families and 39 species were collected from the entire study area during spring 2011. Bluegill (*Lepomis macrochirus*), coastal shiner (*Notropis petersoni*) and spotted sunfish (*L. punctatus*) were the most abundant species accounting for 15.7%, 15.4%, and 8% of the total number of fish sampled, respectively. The percent contribution by weight showed that bowfin (*Amia calva*) account for 34.6% of the biomass sampled followed by longnose gar (*Lepisosteus osseus*) at 11.75% and flathead catfish (*Pylodictes olivaris*) *at* 8%. Redbreast sunfish (*L. auritus*) accounted for a mere 4.92 % of the species composition during the 2011 Spring sample. Ictalurid species collected during spring 2011 accounted for 1.57% of the total species composition by number, and only included blue catfish (*Ictalurus furcatus*), channel catfish (*I. punctatus*), flathead catfish and yellow bullhead (*Ameiurus natalis*).

In the Fall of 2011, 3,678 fish were collected representing 14 families and 33 species. The most abundant species were coastal shiner (33.3%), redbreast sunfish (15.6%), brook silverside (*Labidesthes sicculus*) (11.2%), largemouth bass (*Mircopterus salmoides*) (6.5%) and bluegill (6.3%). However, the top five species by biomass included bowfin (28.1%), flathead catfish (28.0%), largemouth bass (9.7%), channel catfish (5.7%) and longnose gar (4.7%). Results show that bowfins and flathead catfish comprise the majority of biomass in the Little Pee Dee system.

Compared to the 1990-1993 study, the 2011 study demonstrated that relative abundance of most centrachid (sunfish) species declined, while cyprinid (carp and minnow) species increased. It is also worth noting the complete absence of native bullhead species (brown [*A. nebulosus*], flat [*A. platycephalus*] and snail [*A. brunneus*]), madtoms (tadpole [*Notorus gyrinus*] and margined [*N. insignus*]) and the white catfish (*A. catus*); all of which were present in the 1990-1993 study (Appendix 3). Two flathead catfish were collected in the 1990-1993 study, while 63 were collected in the 2011 studies. As the flathead catfish became more established in the system they preyed upon and outcompeted these smaller ictalurids (catfish). The white catfish, snail bullhead and flat bulhead are all listed as Conservation Priority Species in the SCDNR Wildlife Action Plan. Recent studies including the South Carolina Stream Assessment also documented American eel (*Anguilla rostrata*) and banded sunfish (*Enneacanthus obesus*) within the focus area, both of which are also priority species in the SCDNR Wildlife Action Plan. The absence of major dams and other barriers on the Pee Dee River system in South Carolina provides critical connectivity for migratory fishes including American eel. Data from the SCSA show that the Little Pee Dee Focus Area supports among the highest densities of American eels in South Carolina.





*Top: Redbreast sunfish; Bottom: American eel*

The Southeastern United States sustains the greatest diversity in freshwater crayfish and mussels, approximately 375 and 300 species respectively, in the world. Crayfish serve as a keystone species in the aquatic community as an important prey items and scavengers, whereas mussels function not only as a prey base, but also as a facilitator to improve water quality by filtering large volumes of water to reduce excessive quantities of algae, nutrients, bacteria and organic material. There are 37 native mussel species in South Carolina, 24 of which are listed as priority conservation species.

The variation in aquatic habitats from the main river to tributaries, sloughs, oxbow lakes and swamps provides a high diversity of aquatic life.

# 7. Hydrologic Resources

The Little Pee Dee and Lumber rivers are encompassed in the Little Pee Dee River Sub-basin as a part of the South Carolina State Water Assessment produced by SCDNR. This Sub-basin area includes Dillon, Marion, Horry and Marlboro counties, totaling approximately 1,100 square miles and 3.5% of the state's land area. Headwaters for the major rivers within the Sub-basin, the Little Pee Dee and Lumber, originate in the Sandhills ecoregion of North Carolina. Several small to moderately sized tributary streams also drain the Sub-basin including Buck, Bear and Lake swamps. Typical of many Coastal Plain streams, extensive swamplands are associated with much of the main stem and tributary streams, resulting in meandering and often poorly-defined stream channels.

Data from the two gaging stations on the Little Pee Dee River suggest variable and potentially limited surface water availability. Flows are dependent predominantly on rainfall and direct runoff with lower streamflows partially supplemented by base flow from ground-water storage. Average flow of the Little Pee Dee River is almost 600 cubic feet per second (cfs) near Dillon and more than 3,000 cfs at Galivants Ferry. The lowest flows of record were 24 cfs near Dillon in 1954 and 73 cfs at Galivants Ferry in 2002. The flood flow of record occurred in 1964 at Galivants Ferry (27,600 cfs) due to runoff from tropical storm Hilda that produced localized flooding. Streamflow in the Little Pee Dee River is fairly reliable; however, surface-water storage would be needed to ensure adequate water supplies during periodic low-flow conditions. Surface-water development in the Little Pee Dee River subbasin is not extensive. Pages Mill Pond, near Lake View in Dillon County, is the largest body of water, with a surface area of 200 acres and a volume of 640 acre-ft. The aggregate surface area of all lakes of 10 acres or more is 1,310 acres, and the total volume is about 4,300 acre-ft.



The waters of the Little Pee Dee Sub-basin provide water suitable for aquatic life, recreation, drinking water, fishing, industry and agriculture and are designated by the South Carolina Department of Health and Environmental Control (SCDHEC) as "Freshwater." Portions of the Little Pee Dee River and Cedar Creek boast the SCDHEC designation of an "Outstanding Resource Water," meaning these freshwater streams constitute outstanding recreational or ecological resources and are suitable as a drinking-water source with minimal treatment. As a part of SCDHEC's Watershed Water-Quality Assessment program, 29 surface-water sites were sampled in the Little Pee Dee River Sub-basin in 2003 in order to assess suitability for aquatic life and recreational use. Aquatic-life uses were fully supported at 21 sites, or 72% of the water bodies sampled in this Sub-basin; most of the impaired water exhibited dissolved oxygen levels below the concentrations needed to support aquatic life. Recreational use was fully supported in 78% of the sampled water bodies; the water bodies that did not support recreational use exhibited high levels of fecal-coliform bacteria (Table 2).

Table 2. Water quality impairments in the Little Pee Dee River Sub-basin from the SCDNR State Water Assessment.

| Water Body Name | Station Number | Use | Status | Water Quality Indicator |
|---|---|---|---|---|
| Bear Swamp | PD-368 | Aquatic Life | Nonsupporting | Dissolved oxygen |
| Little Pee Dee River | PD-365 | Aquatic Life | Nonsupporting | pH |
| Buck Swamp | PD-031 | Recreation | Partially supporting | Fecal coliform |
| Little Pee Dee River | PD-029E | Recreation | Partially supporting | Fecal coliform |
| | PD-030A | Aquatic Life | Nonsupporting | Dissolved oxygen |
| | | Recreation | Partially supporting | Fecal coliform |
| | PD-348 | Aquatic Life | Nonsupporting | pH |
| | PD-052 | Aquatic Life | Partially supporting | Copper |
| Maple Swamp | PD-030 | Recreation | Partially supporting | Fecal coliform |
| Loosing Swamp | RS-03513 | Aquatic Life | Nonsupporting | Dissolved oxygen |
| Chinners Swamp | PD-352 | Recreation | Partially supporting | Fecal coliform |
| White Oak Creek | PD-037 | Aquatic Life | Partially supporting | Dissolved oxygen |
| | | Recreation | Partially supporting | Fecal coliform |
| Little Pee Dee River | PD042 | Aquatic Life | Nonsupporting | Dissolved oxygen and pH |

According to SCDHEC's online Watershed Atlas tool, there are 20 NDPES permits and five approved TMDLs within the boundaries of the Little Pee Dee-Lumber Focus Area (Table 3). The five TMDLs, all due to fecal coliform, are located at the Little Pee Dee River at S-17-23, at Maple Swamp at SC Highway 57, at the Little Pee Dee River below the junction with Maple Swamp, at White Oak Creek at S-34-31 and at Chinners Swamp at Gunters Island Road off S-26-99 all due to fecal coliform. SCDHEC has assigned fish consumption advisories on the Little Pee Dee and Lumber Rivers due to high mercury levels. There should be no consumption of blue catfish, flathead catfish, bowfin, chain pickerel (*Esox niger*) or largemouth bass in the Little Pee Dee from the NC-SC State Line to its confluence with the Great Pee Dee River and all other fish species should only be eaten once a week. On the Lumber River from the NC-SC State Line to the confluence with the Little Pee Dee, bowfin, channel catfish, flathead catfish or largemouth bass should

not be eaten. Chain pickerel and redear sunfish should be eaten only once a week and bluegill once a month from the Lumber River. For more detail on the sites listed as a part of SCDHEC's Watershed-Water Quality Assessment, visit http://gis.dhec.sc.gov/watersheds/

Table 3. NPDES permits within the Little Pee Dee-Lumber Focus Area boundaries.

| Permit # | Type | Name |
|---|---|---|
| SC0021776 | Municipal | Dillon/Little Pee Dee |
| SC0022284 | Municipal | Lake View Wastewater Treatment Facility |
| SC0025348 | Municipal | GSW&SA/Loris Wastewater Treatment Facility |
| SC0025402 | Municipal | Town of Latta |
| SC0029408 | Municipal | Mullins/White Oak Creek Wastewater Treatment Facility |
| SC0031801 | Domestic | South of the Border Motel |
| SC0041963 | Municipal | McColl Waste Water Treatment Facility |
| SCG250256 | Industrial | Baldor Electric Company |
| SCG570006 | Municipal | GSW&SA/Town of Nichols |
| SCG646037 | Industrial | Trico/Tanner Water Treatment Plant |
| SCG646038 | Municipal | Trico/Bobby Byrd Water Treatment Plant |
| SCG646045 | Municipal | Trico/Hamer Water Treatment Plant |
| SCG646056 | Industrial | Trico Water Company Fairfield Plant |
| SCG646075 | Municipal | Bucksport Water System Pauley Swamp |
| SCG731136 | Industrial | GSWSA/Highway 917 Pit Mine |
| SCG730635 | Industrial | Superior Sand/Black Creek Mine |
| SCG731235 | Industrial | Inland Sand Mine |
| ND0080721 | Domestic | Locust Tree Development |
| SCG730043 | Industrial | Carolina Sand/Britton's Neck |
| SCG731082 | Industrial | D&L/Pee Dee Crossroads Mine |

The Little Pee Dee River Sub-basin is entirely in the Coastal Plain. The northwestern part of the Sub-basin obtains much of its ground-water supply from the Middendorf and Black Creek aquifers. The Black Creek is used almost exclusively as the ground-water source for large-capacity wells. In the upper reach of the Sub-basin, both aquifers are used, and the water of both is of good quality. Ground-water levels are continuously monitored by SCDNR in six wells within the Little Pee Dee River Sub-basin, in Dillon County located in Little Pee Dee State Park. Although there are no known site-specific water-level problems in this Sub-basin, years of pumping from wells in this Sub-basin and in neighboring Sub-basins have resulted in a regional lowering of water levels in the Black Creek Aquifer throughout the southern half of the Sub-basin.

Water use in the Little Pee Dee River Sub-basin is summarized in Table 4. Offstream water use totaled 2,487 million gallons in 2006, ranking it fourteenth among the 15 Sub-basins. Groundwater sources contributed to 98% of water used with the remaining from surface water. Water-supply use accounted for almost 95 % of the total water use, followed by industry (3%), golf course use (2%), and irrigation (1%). Consumptive use in this Sub-basin is estimated to be 349 million gallons, or approximately 14% of the total offstream use.

Table 4. Reported water use in the Little Pee Dee River Sub-basin for the year 2006 from the SCDNR State Water Assessment.

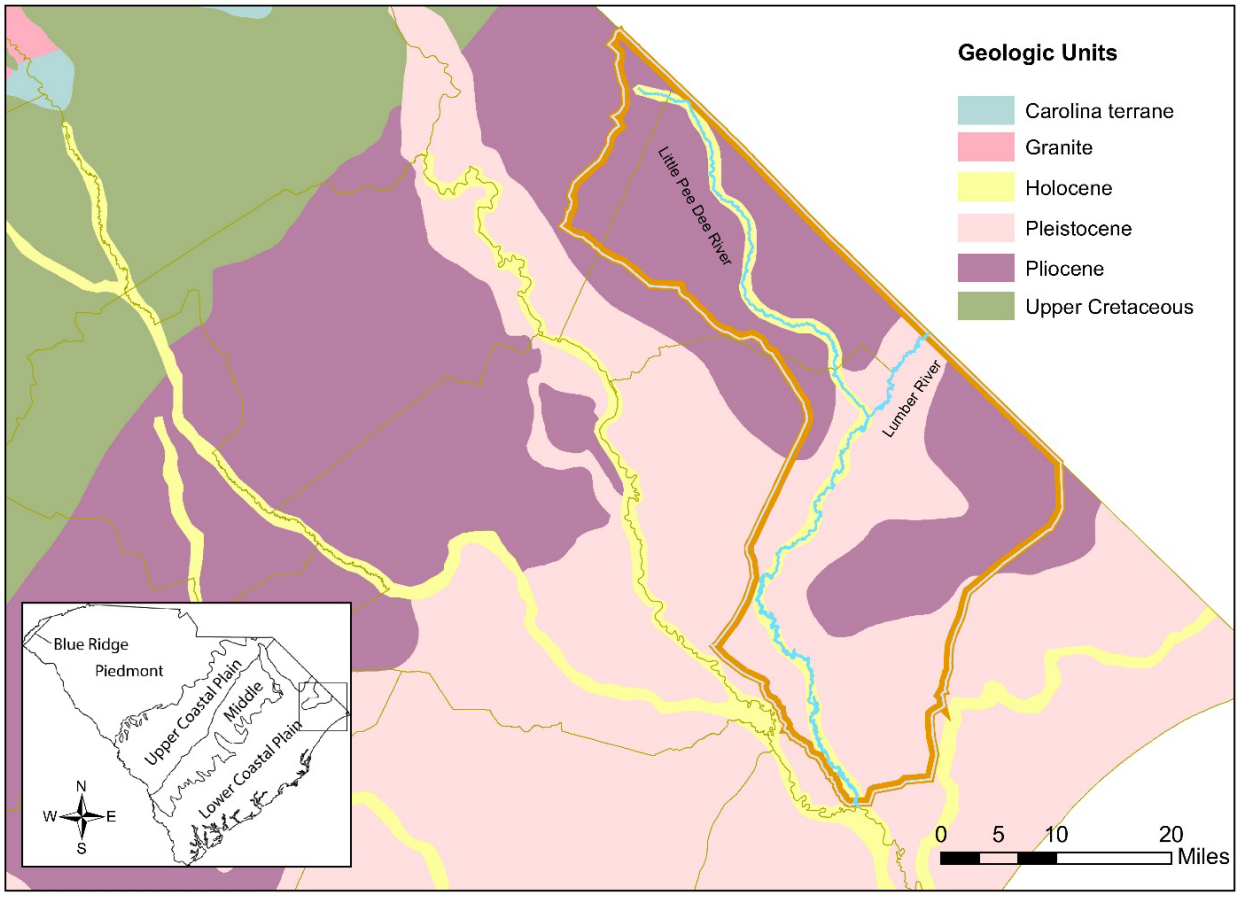
| Water-use Category | Surface Water | | Ground Water | | Total Water | |
|---|---|---|---|---|---|---|
| | Million gallons | % of total surface water use | Million gallons | % of total ground water use | Million gallons | % of total water use |
| **Aquaculture** | 0 | 0 | 0 | 0 | 0 | 0 |
| **Golf Course** | 37 | 75.1 | 0 | 0 | 37 | 1.5 |
| **Industry** | 0 | 0 | 69 | 2.8 | 69 | 2.8 |
| **Irrigation** | 12 | 24.9 | 16 | 0.7 | 29 | 1.2 |
| **Mining** | 0 | 0 | 0 | 0 | 0 | 0 |
| **Other** | 0 | 0 | 0 | 0 | 0 | 0 |
| **Thermoelectric Power** | 0 | 0 | 0 | 0 | 0 | 0 |
| **Water Supply** | 0 | 0 | 2,352 | 96.5 | 2,352 | 94.6 |
| **Total** | 49 | | 2,437 | | 2,487 | |

# 8. Geologic Resources

## 8.1 Basin location

The Little Pee Dee-Lumber Basin covers 252 square miles and is located east of Florence and north-northwest of Myrtle Beach. The Basin is almost entirely in the Lower Coastal Plain (Figure 1). Some of the higher elevations reach into the Middle Coastal Plain. These coastal plain areas trend roughly parallel to the modern coastline (southwest to northeast), and the Little Pee Dee-Lumber Basin also trends nearly parallel to the coastline.

Figure 1: Regional geologic map covering the Little Pee Dee-Lumber basin. Unit colors: Pliocene (purple), Pleistocene (pink), recent (yellow).




## 8.2 Topographic Relief

The Middle and Lower Coastal Plain are both geologically young, less than 5 million years old. Therefore, the surficial sediments are not heavily dissected by erosion except directly adjacent to the rivers. A majority of the topographic features result from earlier depositional processes, such as fluvial and coastal sediment transport or later shoreline erosion during sea-level rise.

## 8.3 Fluvial Systems

Both the Little Pee Dee and Lumber rivers have head waters in the Coastal Plain. Because the rivers flow slowly through forested swamps and wetlands, they generate tannin compounds from decaying plant material. The tannins impart a dark color to the water, hence the name blackwater rivers. These rivers originate on the south flank of the Cape Fear Arch, a bulge in the upper crust extending from the coast to the northwest along the Cape Fear River in North Carolina. The arch has slowly tilted the area downward

to the south-southwest, which is the general direction of river flow, and fairly symmetrical valleys are formed with bluffs on both sides and wide floodplains. At the south end of the basin, near the confluence with the Great Pee Dee River, the Great Pee Dee River floodplain and its sediments dominate the western portion of the Little Pee Dee River.

### 8.4 Younger Features

On level surfaces of Middle and Lower Coastal Plain, there are several much younger features. The first are Carolina Bays. These are elliptical features recognizable on aerial photographs and LiDAR. They tend to be elongated northwest to southeast and are more common on Middle Coastal Plain surfaces. Many Carolina Bays pond water because of clayey layers just beneath the surface, and because of this effect they have been drained for agriculture or other development. Other younger features are Eolian sand sheets and dunes in area of Britton Neck. These produce a rippled land surface with very poor agricultural value owing to the very well-drained soils and low organic content.

### 8.5 Geology

The Lower Coastal Plain consists of Pleistocene and younger sediments at the surface that are less than 2.6 million years. The Middle Coastal Plain consists of Pliocene sediment at the surface 5.3-2.6 million years old. No detailed geological mapping (e.g. 1:24,000-scale) is available for the basin. There are several regional-scale maps (1:250,000-scale) that were published in the 1970s and 1980s, but advances in geological knowledge since then have brought the interpretation of those maps into question.

### 8.6 Scarps

The entire Pee Dee-Lumber basin is below 200 feet above mean sea level. The Surry Scarp at 90 feet above mean sea level separates the Middle and Lower Coastal Plain.

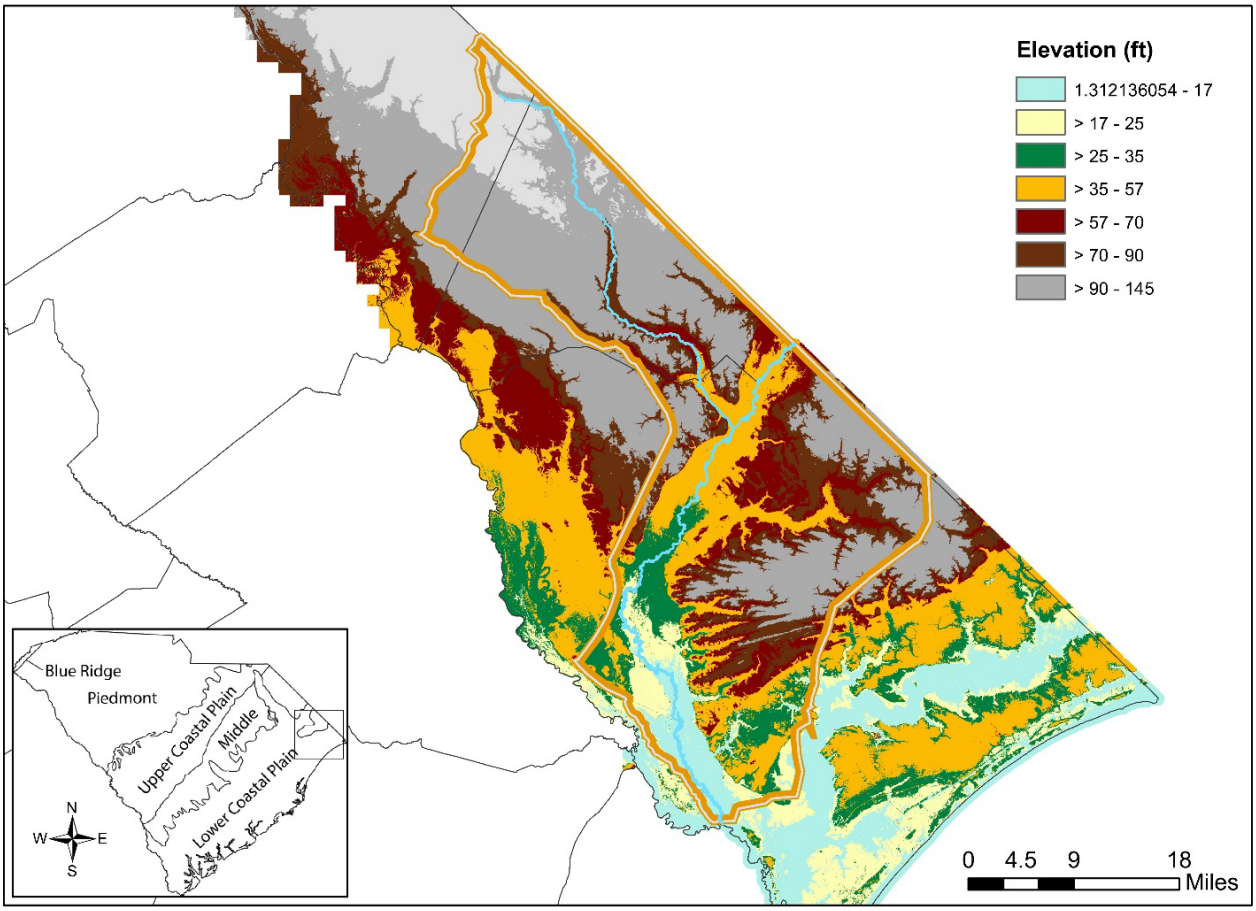
### 8.7 Sediments

Both the Middle and Lower Coastal Plain are underlain by siliceous and carbonate sediments of Cretaceous deposits. Not shown on Figure 1 are the exposures of the Cretaceous Pee Dee Formation along parts of the Little Pee Dee River. These are low banks exposed during typical or low water conditions. The Pee Dee Formation is composed of sand, silt and numerous fossils. One fossil to note is the belemnite, *Belemnitella americana,* a squid-like fossil.

At the surface, the Middle Coastal Plain is composed of gravel, sand, silt, clay, lime and limestone, and peat of Pliocene to Pleistocene age (5.3 million-12 thousand years). These deposits are mostly marine sediments with fluvial sediment along modern rivers. Subsequent changes in sea level often removed much of the previous sediments as far down as the Cretaceous. The sea-level events also reoccupied rivers valleys forming estuaries. Fluvial sediments are often preserved along the valley edges forming stepped terraces over time.

The Lower Coastal Plain sediments are Pleistocene to Recent (<2.6 million years). They are mostly fluvial-estuarine sediments consisting of fossil material, sand, silt and clay with recent fluvial sediments along modern rivers. Stream deposits occur in terraces along river valleys (Figure 2).

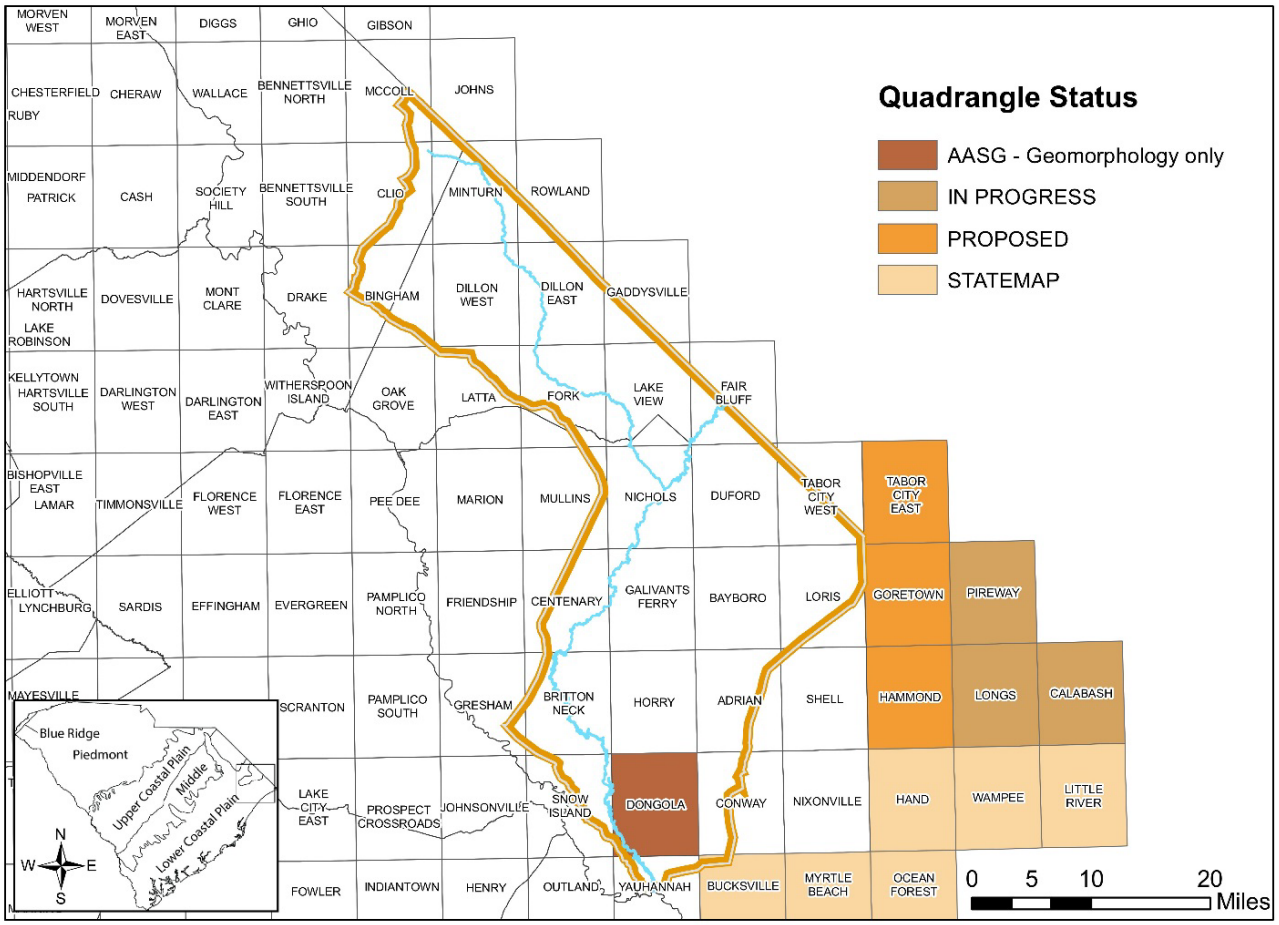
Figure 2: Topographic map of area surrounding Little Pee Dee-Lumber basin.



## 8.8 Geologic Resources

The various size and shape (texture) of the coastal plain sand is the source of large deposits useful for many industries from fill sand to industrial silica. Deposits of Fuller's earth have agricultural and industrial uses. If the clay content is high enough then it can be used as pond linings or local confining units. Some of the cemented or chemically altered rocks have been useful as dimension stone.

Figure 3: Available geologic maps in Little Pee Dee-Lumber basin. Color key: light red, mapping in progress, to be completed September 2015; dark red, mapping to commence October 2015; light brown, maps available in digital or paper format; dark brown, map available, paper format only. For quadrangle abbreviations see SCDNR GIS Data Clearinghouse.



# 9. Cultural Resources

Native Americans, primarily the Pee Dee Indians, made their living along the landscape of the Little Pee Dee-Lumber Focus Area. Early on, these Native American villages were located near the river, usually on a higher elevation bluff or river terrace. The rivers provided food and a means of transportation via canoes dug out of cypress logs. In 1685, the Little Pee Dee River became a part of Craven County in the province of Carolina, one of four counties ordered by the Lords' Proprietors to be used as election districts for the Assembly. At the time, most of the county was populated by Native Americans. To better settle the backcounty, in the 1730s, Governor Robert Johnson and Colonel John Barnwell proposed the township plan for orderly settlement along the major rivers of South Carolina, one of which was the Queensbourgh township located on the Pee Dee River. This township was settled by the Welsh Baptists from Wales, Great Britain and from Delaware and Pennsylvania. Later, the land adjacent to Queensbourgh along the Pee Dee River, Little Pee Dee River and Lynches Creek was known as the Welsh Tract or Neck. Settlers began moving into the Welsh Neck between the Great and Little Pee Dee Rivers. As the landscape filled, subsequent settlers moved into the Little Pee Dee River basin with the river serving in the capacity of today's interstates to move goods and allow for travel to neighboring towns. Cultural and historic resources of the Little Pee Dee-Lumber Focus Area are exemplary, worthy of protection and additional documentation.

# 10. Recreation



The wetlands and waterways of the Little Pee Dee-Lumber Focus Area long have been known to sportsmen as providing unparalleled hunting, fishing and boating opportunities, but naturalists, birders, photographers, hikers and canoeists also have discovered the many scenic attributes of rivers, marshes and swamps. The area has a strong and enduring hunting and fishing culture. The extensive bottomland forests are a significant wood duck production and wintering ground, and the Focus Area is now a priority waterfowl restoration area where many partners are implementing research and management to improve waterfowl habitat and populations.

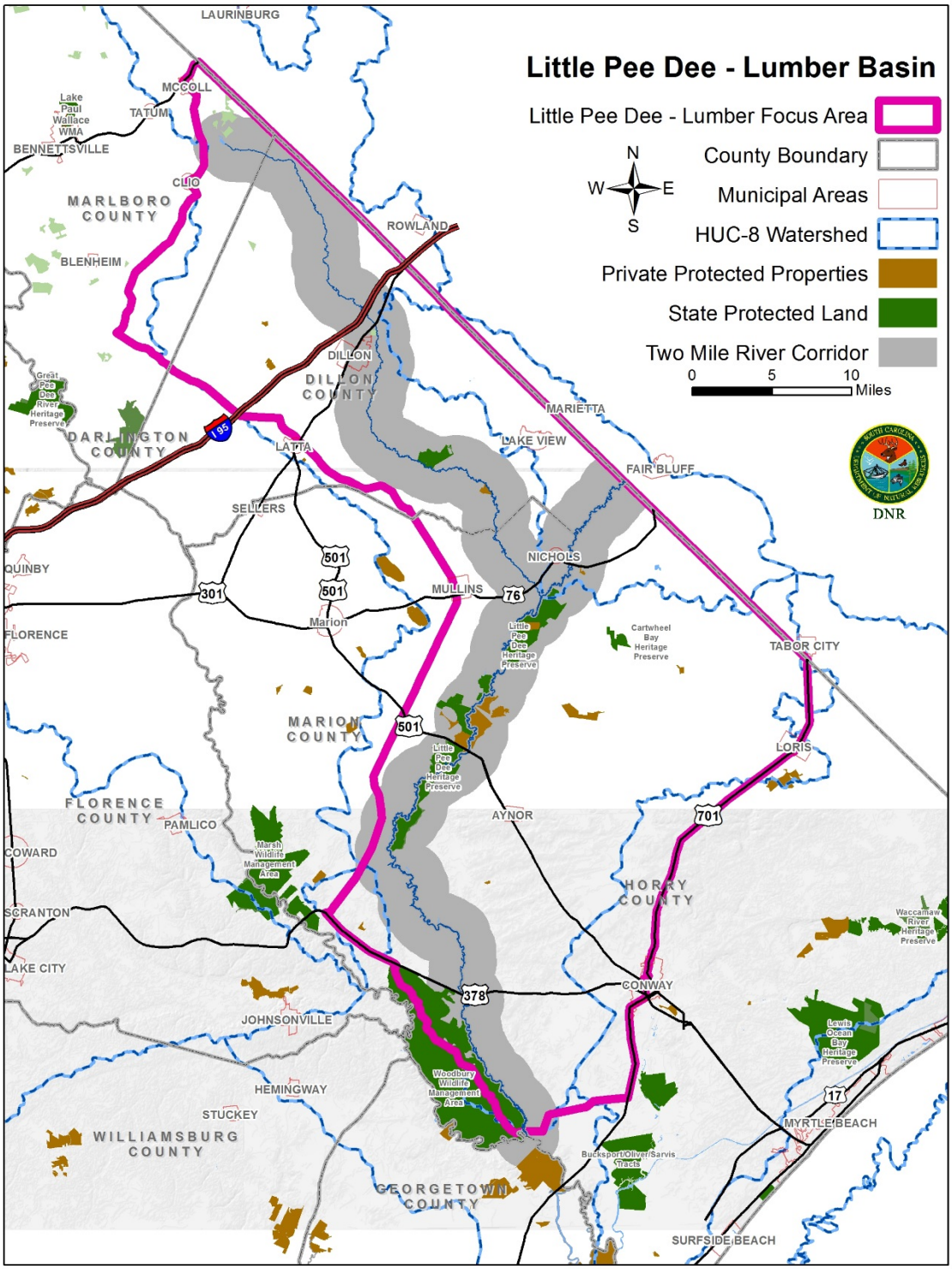
Abundant waters and wetlands provide for some of the finest freshwater fishing in the state. The rich waters of the Little Pee Dee are an outstanding fishery resource for catfish, sunfish and largemouth bass. From the most recent SCDNR creel survey data, anglers seek out bream the most and specifically target the redbreast sunfish. Recreational boating in canoes and small power boats is also popular year round and many camping spots are found along sand beaches and ridges along the river. Outside enthusiasts no matter their means of exploring the outdoors can access the Little Pee Dee River via 13 boat ramps or through the Little Pee Dee Heritage Preserve within the Focus Area. The Lumber River can be accessed via 2 boat ramps (Table 5).

Table 5: Public boat ramps in the Little Pee Dee-Lumber Focus Area

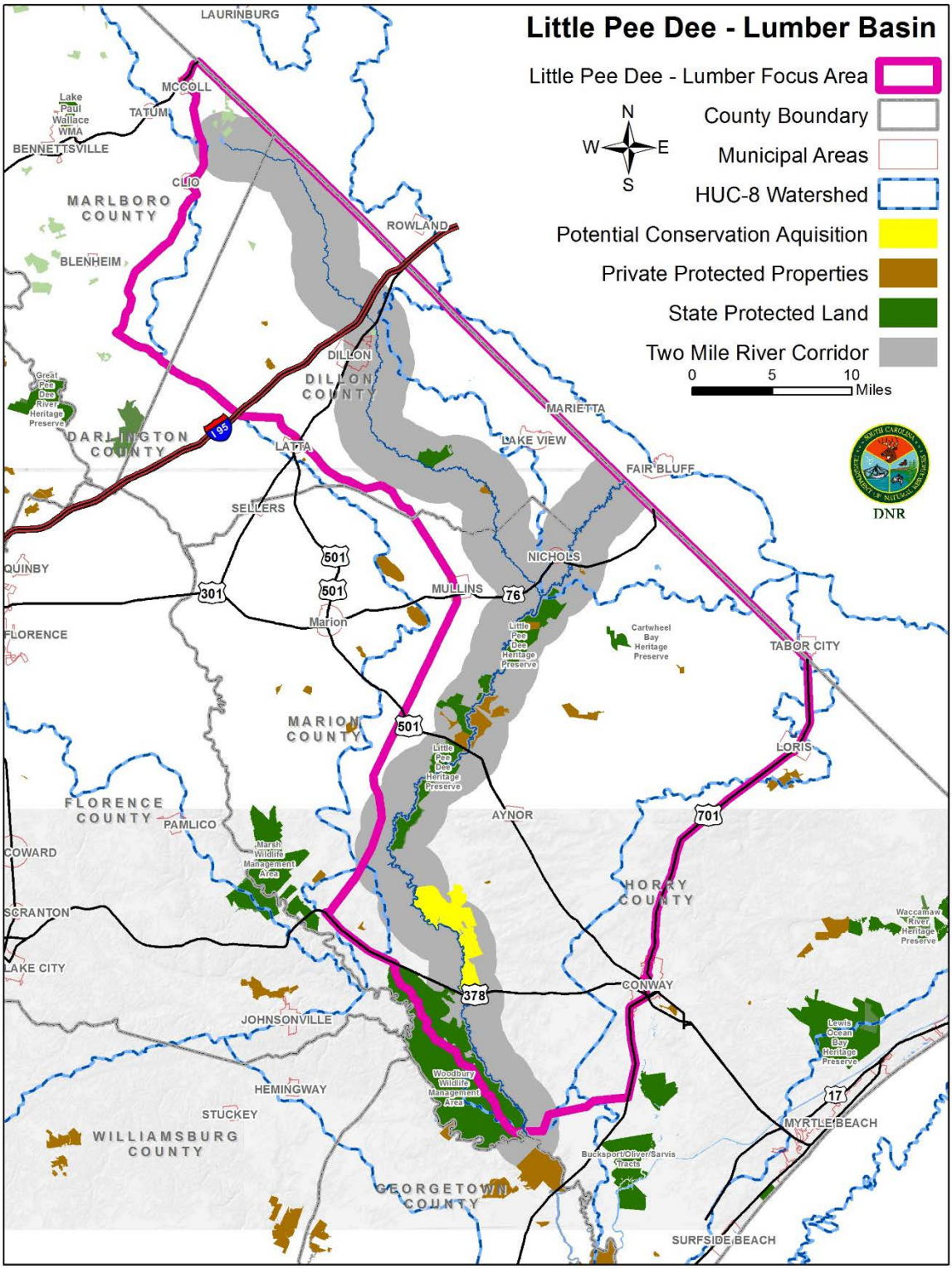
| Name | Waterbody | Latitude/Longitude |
|---|---|---|
| Causey | Lumber River | 34.29273, -79.07422 |
| Davis | Little Pee Dee River | 34.02797, -79.30802 |
| Fort Retch | Little Pee Dee River | 34.18607, -79.17065 |
| Gilcrest | Russ Creek | 34.19885, -79.16842 |
| Gunters Lake | Gunters Lake | 33.9496, -79.31492 |
| Huggins | Little Pee Dee River | 34.04353, -79.27115 |
| Hughes | Little Pee Dee River | 33.89022, -79.26215 |
| Joseph Holiday | Little Pee Dee River | 34.05682, -79.2485 |
| Knife Island | Little Pee Dee River | 34.0357, -79.2949 |
| Locust Tree | Little Pee Dee River | 33.95667, -79.33373 |
| Pitts | Little Pee Dee River | 33.83175, -79.24908 |
| Red Bluff | Little Pee Dee River | 34.16993, -79.19715 |
| Ricefield Cove | Lumber River | 34.2222, -79.13 |
| Sandy Bluff | Little Pee Dee River | 34.14062, -79.20567 |

# Appendices

# Appendix 1. Little Pee Dee-Lumber Focus Area Map.



# Little Pee Dee Lumber Focus Area with the Potential Acquisition of Gunter's Island



# Appendix 2. Little Pee Dee-Lumber Focus Area Species of Concern.

Table 1. Terrestrial priority species and their ecosystems: mammals.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Condylura cristata* | Star-nosed Mole | G5 | S3? | Of concern, State | High | swamps, marshes, bogs, streamsides; dense leaf litter |
| *Corynorhinus rafinesquii* | Rafinesque's Big-eared Bat | G3/G4 | S2? | State Endangered | Highest | T-beam and I-beam bridges, abandoned buildings, old bunkers and tunnels, cavity trees, rock outcrops, mines, caves |
| *Eptesicus fuscus* | Big Brown Bat | G5 | SNR | | Highest | buildings, cavity trees, under bridges and in bat boxes; forage in open fields or forest gaps |
| *Lasiurus borealis* | Red Bat | G5 | SNR | | Highest | thinned stands; roost on smaller branches or twigs, often in the hardwood tree canopy; may roost in leaf litter |
| *Lasiurus cinereus* | Hoary Bat | G5 | S? | | Highest | tree cavities, trunks, tree foliage, squirrel nests, and Spanish moss |
| *Lasiurus intermedius* | Northern Yellow Bat | G4/G5 | S? | Of concern, State | Highest | forage over open areas such as fields, pastures, golf courses, marshes, and along lake and forest edges; roost in clumps of Spanish moss or under old palm fronds |
| *Lasiurus seminolus* | Seminole Bat | G5 | SNR | | Highest | roost in large pines located near forested corridors; may roost in leaf litter |
| *Mustela vison* | Mink | G5 | SNR | | High | near swamps, streams, rivers, ponds, and saltwater marshes |
| *Myotis austroriparius* | Southeastern Bat | G3/G4 | S1 | State Threatened | Highest | caves (including limestone sinks), mines, abandoned buildings, and large hollow trees; prefers to feed and roost over water |
| *Neotoma floridana* | Eastern Woodrat | G5 | S3/S4 | Of concern, State | Moderate | wide variety of habitats |
| *Perimyotis subflavus* | Tri-colored Bat | G5 | SNR | | Highest | abandoned mines and caves, bridges, buildings |
| *Sciurus niger* | Southern Fox Squirrel | G5 | S4 | Of concern, State | Moderate | cavity trees |
| *Ursus americanus* | Black Bear | G5 | S3? | Of concern, State | Moderate | early successional habitat and forest interior; den sites |

Table 2. Terrestrial priority species and their ecosystems: reptiles & amphibians.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Alligator mississippiensis* | American Alligator | G5 | S5 | Federal Threatened | Moderate | large river swamps, lakes, ponds, coastal impoundments, abandoned rice fields, brackish water marshes, and estuarine tidal creeks; juveniles will use Carolina bays and other seasonal wetlands; shallow waters preferred |
| *Ambystoma tigrinum* | Tiger Salamander | G5 | S2/S3 | Of Concern, State | Highest | isolated, temporary wetlands with no fish that have open canopy above and abundant grasses and sedges |
| *Apalone ferox* | Florida Softshell Turtle | G5 | SNR | State Threatened | High | wetlands like rivers, ponds, and lakes with sandy banks and bars; soft substrate for burrowing |
| *Apalone spinifera* | Spiny Softshell Turtle | G5 | SNR | State Threatened | Moderate | restricted to reservoirs and associated rivers with sandbars and sandy/soft substrates |
| *Chelydra serpentina* | Snapping Turtle (Common) | G5 | SNR | State Threatened | Moderate | soft -bottomed wetlands like rivers, ponds, and lakes that have abundant aquatic vegetation |
| *Clemmys guttata* | Spotted Turtle | G5 | S5 | State Threatened | High | small ponds, streams, swamps, flooded bottomland hardwood forests, and other shallow water bodies with soft substrate for burrowing; aquatic vegetation |
| *Crotalus horridus* | Timber Rattlesnake | G4 | SNR | Of Concern, State | High | dry, south-facing slopes at high elevations; rock outcrops or logs for den sites with south face exposed to sun |
| *Deirochelys recticularia* | Chicken Turtle | G5 | SNR | State Threatened | Moderate | freshwater and wetland systems with still water; surrounding upland habitat of live oak/pine |
| *Eurycea chamberlainii* | Chamberlain's Dwarf Salamander | G4 | SNR | | Highest | wetland types like seepages near small streams; leaf litter and small debris |
| *Hyla avivoca* | Bird-voiced Treefrog | G5 | S5 | Of Concern, State | Moderate | large river bottom swamps |
| *Kinosternon baurii* | Striped Mud Turtle | G5 | S? | Of Concern, State | Moderate | in and around the floodplain swamps of rivers; shallow water; soft substrates |

Table 2. Continued.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Pseudacris feriarum* | Upland Chorus Frog | G5 | S3/S4 | Of Concern, State | Moderate | isolated, temporary wetlands with no fish |
| *Pseudemys concinna* | River Cooter | G5 | SNR | State Threatened | Moderate | Restricted to reservoirs and associated rivers with aquatic vegetation |
| *Pseudemys floridana* | Florida Cooter | G5 | SNR | State Threatened | Moderate | slow-moving rivers and non-flowing wetlands like ponds and small lakes with soft bottoms, basking sites, and aquatic vegetation |
| *Pseudotriton montanus flavissimus* | Mud Salamander (Gulf Coast) | G5 | S3/S4 | Of Concern, State | High | fossorial; wetland areas such as cypress-tupelo ponds, floodplain forests, and seepage slopes |
| *Rana palustris* | Pickerel Frog | G5 | SNR | Of Concern, State | High | standing water in late winter; moist habitat usually within hardwood forests; sphagnum bogs, meadows, and grassy fields near shaded streams |
| *Seminatrix pygaea* | Black Swamp Snake | G5 | S? | Of Concern, State | High | wetlands with abundant aquatic vegetation; leaf litter; *Sphagnum* moss |
| *Terrapene carolina* | Eastern Box Turtle | G5 | SNR | | Moderate | moist woodlands; sandy or loamy soils in open for egg laying; loose soils and leaf litter for burrowing |
| *Trachemys scripta* | Yellow-bellied Slider | G5 | SNR | State Threatened | High | non-flowing wetlands like ponds and small lakes with soft bottoms and abundant vegetation |

Table 3. Terrestrial priority species and their ecosystems: birds.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Actitis macularia* | Spotted Sandpiper | G5 | SNA | | Moderate | tidal to freshwater systems; primarily coastal but occurs inland |
| *Aix sponsa* | Wood Duck | G5 | SNRB,SNRN ,SNRM | | High | nest cavities near fresh water; emergent vegetation; ponds, lakes, rivers, swamps, BEAVER PONDS |
| *Anas platyrhynchos* | Mallard | G5 | SNRB,SNRN | | Highest | freshwater bodies for foraging; shallow water with accessible plants and invertebrates |
| *Anas rubripes* | American Black Duck | G5 | SNRN | | Highest | shallow open water with accessible plants and invertebrates |
| *Anhinga anhinga* | Anhinga | G5 | SNRB,SNRN | | Moderate | fresh or brackish water for foraging; trees over or surrounded by water for nesting |
| *Ardea alba* | Great Egret | G5 | SNRB,SNRN | | High | shallow water bodies or shorelines for foraging; trees over or surrounded by water for nesting |
| *Ardea herodias* | Great Blue Heron | G5 | SNRB,SNRN | | Moderate | shallow water bodies or shorelines for foraging; trees over or surrounded by water for nesting |
| *Aythya collaris* | Ring-necked Duck | G5 | SNRN | | Moderate | submerged aquatic vegetation and invertebrates such as mollusks |
| *Botaurus lentiginosus* | American Bittern | G4 | SNRN | Of Concern, State | Highest | extensive freshwater marshes with grasses>3ft. Tall |
| *Buteo lineatus* | Red-shouldered Hawk | G5 | SNR | | Moderate | wet or moist hardwood forests for nesting and foraging |
| *Buteo platypterus* | Broad-winged Hawk | G5 | S4 | | Moderate | upland hardwood or mixed forests; forage within woodlands; nests in tree crotches in canopy |
| *Butorides virescens* | Green Heron | G5 | SNRB,SNRN | | Highest | shallow water bodies and shorelines for foraging; dense shrubs and thickets near water for nesting |
| *Calidris fuscicollis* | White-rumped Sandpiper | G5 | SNA | | Moderate | most frequent in managed impoundments |
| *Calidris himantopus* | Stilt Sandpiper | G5 | SNA | | High | most frequent in fresh to brackish ponds/impoundments |
| *Calidris melanotos* | Pectoral Sandpiper | G5 | SNA | | Moderate | more common away from coast |

Table 3. Continued.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Calidris minutilla* | Least Sandpiper | G5 | SNRN | | High | forages in clumps of marine vegetation; common on coast |
| *Caprimulgus carolinensis* | Chuck-will's-widow | G5 | S4 | | High | openings for nocturnal feeding; mixed forests with light to moderate understory |
| *Ceryle alcyon* | Belted Kingfisher | G5 | SNR | | High | sandy vertical banks for nesting burrows; perches near water for foraging |
| *Cistothorus platensis* | Sedge Wren | G5 | SUB | | Highest | favor brackish marshes |
| *Coccyzus americanus* | Yellow-billed Cuckoo | G5 | S4 | | High | closed canopy deciduous forests with thick tangles |
| *Contopus virens* | Eastern Wood-Pewee | G5 | S5 | | High | open forests with sparse midstory |
| *Dryocopus pileatus* | Pileated Woodpecker | G5 | SNR | | Moderate | extensive mature forests with dead snags for nest cavities; probably prefer riverbottom hardwoods |
| *Egretta caerulea* | Little Blue Heron | G5 | SNRB,SNRN | Of Concern, State | Highest | shorelines, shallow water, or mudflats for foraging; shrubs or trees over or surrounded by water for colonial nesting |
| *Egretta thula* | Snowy Egret | G5 | SNRB,SNRN | | Moderate | shorelines, shallow water, or mudflats for foraging; shrubs or trees over or surrounded by water for colonial nesting |
| *Egretta tricolor* | Tricolored Heron | G5 | SNRB,SNRN | | High | shorelines, shallow water, or mudflats for foraging; shrubs or trees over or surrounded by water for colonial nesting |
| *Elanoides forficatus* | Swallow-tailed Kite | G5 | S2 | State Endangered | Highest | open savannahs for foraging; mature trees for nesting near swamps and marshes |
| *Empidonax virescens* | Acadian Flycatcher | G5 | S4B | | High | Riverbanks, streams, banks, alder zones |
| *Eudocimus albus* | White Ibis | G5 | SNR | | Highest | shallow water or mudflats for foraging on crustaceans; wet meadows or mudflats for probing; thickets or trees over or surrounded by fresh water for colonial nesting |
| *Euphagus carolinus* | Rusty Blackbird | G4 | SNRN | | Highest | swamps and margins; wet thickets near hardwoods |

Table 3. Continued.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Fulica americana* | American Coot | G5 | SHB,SNRN | | Moderate | open shallow fresh water such as lakes, ponds, and bays for foraging |
| *Gallinago gallinagodelicata* | Wilson's Snipe | G5 | SNRN | | High | boggy areas; wet meadows with short grass; along pond and marsh margins for probe foraging |
| *Gallinula galeata* | Common Gallinule | G5 | SNR | | Moderate | open freshwater with marsh vegetation for foraging and nesting |
| *Haliaeetus leucocephalus* | Bald Eagle | G5 | S2 | State Endangered | High | tall living trees, especially pines for nesting; perches near large open water where foraging occurs |
| *Hylocichla mustelina* | Wood Thrush | G5 | S3? | | High | moist understory of shrubs or saplings in deciduous woodlands; leaf litter |
| *Ixobrychus exilis* | Least Bittern | G5 | SNRB,SNRN | | Highest | shallow water bodies for foraging; marsh vegetation |
| *Limnodromus scolopaceus* | Long-billed Dowitcher | G5 | SNRN | | Moderate | most common in fresh coastal wetlands |
| *Limnothlypis swainsonii* | Swainson's Warbler | G4T4 | S4 | | High | in mountains: deciduous or mixed forest ravines with thick understory of rhododendron or mountain laurel; at coast: cane stands in hardwoods |
| *Melanerpes carolinus* | Red-bellied Woodpecker | G5 | SNR | | Moderate | open, mature woods with dead snags for nest cavities; man-made poles with cavities |
| *Melanerpes erythrocephalus* | Red-headed Woodpecker | G5 | SNR | | Moderate | open, mature woods with dead snags for nest cavities; man-made poles with cavities |
| *Mniotilta varia* | Black-and-white Warbler | G5 | SNRB,SNRN | | High | mature hardwood forests; coves |
| *Mycteria americana* | Wood Stork | G4 | S1S2 | Federally Threatened and State Endangered | Highest | shallow water with concentrated prey (6-10 in. deep) for foraging; trees over or surrounded by water for colonial nesting, particularly cypress swamps and trees on small islands |
| *Nyctanassa violacea* | Yellow-crowned Night Heron | G5 | SNRB,SNRN | | Highest | shorelines of water bodies for foraging, especially for crustaceans; trees or thickets near water for colonial nesting, will nest in trees that are on dry lands |

Table 3. Continued.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Nycticorax nycticorax* | Black-crowned Night Heron | G5 | SNRB,SNRN | | Highest | shorelines of water bodies for foraging; shrubs or trees over or surrounded by water for colonial nesting |
| *Oporornis formosus* | Kentucky Warbler | G5 | S4 | | High | moist hardwood forests with rich understory |
| *Parula americana* | Northern Parula | G5 | SNRB | | Moderate | mature, moist forests; hemlock forests in mountains and swamps or bottomlands with Spanish moss near coast |
| *Picoides pubescens* | Downy Woodpecker | G5 | SNR | | Moderate | middle-aged to mature woodlands; prefer hardwoods; dead snags for nest cavities |
| *Pipilo erythrophthalmus* | Eastern Towhee | G5 | SNR | | High | brushy areas; woodland margins and understory |
| *Piranga olivacea* | Scarlet Tanager | G5 | SNRB | | Moderate | mature deciduous forests |
| *Piranga rubra* | Summer Tanager | G5 | S? | | Moderate | dry, mixed woodlands |
| *Platalea ajaja* | Roseate Spoonbill | G5 | SNR | | Moderate | shallow water for tactile feeding; shrubs or trees over or surrounded by water for colonial nesting, particularly thickets of small trees on coastal islands |
| *Plegadis falcinellus* | Glossy Ibis | G5 | SHB,SNRN | | Moderate | shallow water, mudflats, or wet meadows for probing and foraging; shrubs or trees over or surrounded by water for colonial nesting, particularly dense thickets on coastal islands |
| *Pluvialis dominica* | American Golden Plover | G5 | SNA | | Highest | rare migrant |
| *Pluvialis squatarola* | Black-bellied Plover | G5 | SNRN | | High | common coastal migrant |
| *Podiceps auritus* | Horned Grebe | G5 | SNRN,SNRM | | Highest | small fish as prey |
| *Podilymbus podiceps* | Pied-billed Grebe | G5 | SNRB,SNRN | | Highest | fresh or slightly brackish water with emergent vegetation within used for nesting; open water in winter for foraging |
| *Poecile carolinensis* | Carolina Chickadee | G5 | SNR | | Moderate | mature woodlands with dead snags for nest cavities; will use bird boxes |

Table 3. Continued.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Porphyrio martinica* | Purple Gallinule | G5 | S4 | Of Concern, State | Highest | freshwater marshes with emergent and floating vegetation for foraging and nesting |
| *Porzana carolina* | Sora | G5 | SNRN | | High | freshwater marshes for foraging and nesting |
| *Protonotaria citrea* | Prothonotary Warbler | G5 | S3B | | Moderate | near standing water; open swamps with cavities for nesting; willow thickets near lakes and ponds; old stumps and other rotting logs |
| *Rallus elegans* | King Rail | G4 | SNR | | Highest | mudflats and shallow fresh or brackish water for foraging |
| *Regulus satrapa* | American Avocet | G5 | SNRN | | High | most frequent in managed impoundments |
| *Scolopax minor* | Golden-crowned Kinglet | G5 | S4 | | Moderate | winter in coniferous or mixed woodlands |
| *Seiurus motacilla* | American Woodcock | G5 | S4 | | Moderate | moist soils and leaf litter for probe foraging; woodlands for nesting; openings for mating displays |
| *Setophaga dominica* | Louisiana Waterthrush | G5 | S4 | | High | deciduous or mixed forests with rocky streams |
| *Setophaga virens waynei* | Yellow-throated Warbler | G5 | S3? | | Moderate | moderately open, mature, moist forests; pines, mixed forests; Spanish moss |
| *Thryothorus ludovicianus* | Black-throated Green Warbler (Wayne's) | G5TU | SNR | | Highest | coastal moist forests like swamps and bottomlands with cypress and white cedar |
| *Toxostoma rufum* | Carolina Wren | G5 | SNR | | Moderate | woodland thickets; leaf litter; cavities or ledges for nesting; will use bird boxes and many other human material |
| *Tryngites subruficollis* | Brown Thrasher | G5 | SNR | | High | moderate to dense brush and saplings |
| *Vireo flavifrons* | Buff-breasted Sandpiper | G4 | SNA | | Highest | may be seen in pastures and golf courses; rare migrant; most common in interior |
| *Vireo griseus* | Yellow-throated Vireo | G5 | S3?B | | Moderate | open, moist, mature, deciduous woodlands with tall trees; near water |
| *Wilsonia citrina* | White-eyed Vireo | G5 | S4?B | | Moderate | dense, moist thickets |

Table 3. Continued.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Regulus satrapa* | Hooded Warbler | G5 | S4?B | | Moderate | mature, moist deciduous forests; some mixed forests; rich understory layer |

Table 4: Terrestrial priority species and their ecosystems: insects & leeches.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Acanthametropus pecatonica* | "A Mayfly" | | | | | mesic forests near water |
| *Dolania americana* | American Sand Burrowing Mayfly | G4 | S3 | | | mesic forests near water |
| *Homoeoneuria dolani* | "A Mayfly" | | | | | mesic forests near water |
| *Rhadinoceraea zigadenusae* | Zigadenus Sawfly | | | | | dependent upon host plant: Death Camas (*Zigadenus densus*) |
| *Siphlonurus decorus* | "A Mayfly" | | | | | mesic forests near water |
| *Somatochlora calverti* | Calvert's Emerald | G3 | SNR | | | boggy forest seepages for breeding; forest openings for foraging |
| *Taeniopteryx robinae* | Savannah Willowfly | G1 | SNR | | | mesic forests near water |
| *Toxorhynchites rutilus rutilus* | "An Elephant (Tree Hole Mosquito)" | | | | | tree holes and artificial basins for breeding; nectar producing plants for foraging |
| *Toxorhynchites rutilus septentionalis* | "An Elephant (Tree Hole Mosquito)" | | | | | tree holes and artificial basins for breeding; nectar producing plants for foraging |
| *Haemopis septagon* | "A terrestrial leech" | | | | High | moist areas near water sources; feeds on earthworms; only known from Georgetown County but probably more widespread in Pee Dee region of Coastal Plain |

Table 5. Aquatic priority species and their ecosystems: freshwater & diadromous fishes.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Acipenser brevirostrum* | Shortnose Sturgeon | G3 | S3 | Federal and State Endangered | Highest | Moderate flows; sand or gravel substrates for spawning |
| *Acipenser oxyrinchus* | Atlantic Sturgeon | G3 | S3 | Federal and State Endangered | Highest | Moderate flows; sand or gravel substrates for spawning |
| *Alosa aestivalis* | Blueback Herring | G3 | S3 | Of Concern, State | Highest | |
| *Alosa mediocris* | Hickory Shad | G5 | S4 | Of Concern, State | Highest | |
| *Alosa sapidissima* | American Shad | G5 | S5 | Of Concern, State | Highest | |
| *Ameiurus brunneus* | Snail Bullhead | | | | | Rocky riffles, runs, shoals, and pools in streams and rivers |
| *Anguilla rostrata* | American Eel | G5 | SNR | Of Concern, State | Highest | |
| *Ameiurus catus* | White Catfish | | | | | Warm ponds, reservoirs, and medium to large rivers in freshwater and brackish habitats |
| *Ameriurus platycephalus* | Flat Bullhead | | | | | Streams, rivers, and impoundments; slow-flowing water along banks and in pools; mud, sand, or rock substrates |
| *Chologaster cornuta* | Swampfish | | | | | Calm, acidic blackwater streams; organic matter and aquatic vegetation and woody debris |
| *Cyprinella analostana* | Satinfin Shiner | | | | | Pools and runs of creeks and small to medium weed-free rivers; sand to gravel/rubble substrates; branches, stumps, rock crevices, roots for spawning sites |
| *Cyprinella pyrrhomelas* | Fieryblack Shiner | | | | | Cool, clear creeks and small to moderately-sized rivers; rocky runs and pools below riffles; coarse substrate; logs and rocks for crevice spawning |
| *Cyprinella sp.(c.f. zanema)* | "Thinlip" Chub | | | | | Possibly small to medium-sized streams with sand and rocky runs or current-swept pools |

Table 5. Continued.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Elassoma boehlkei* | Carolina Pygmy Sunfish | | | | | Shallow, slow-moving, acidic water of ponds, ditches, and streams; abundant aquatic vegetation |
| *Enneacanthus chaetodon* | Blackbanded Sunfish | | | | | Shallow and densely vegetated margins of lakes, ponds, swamps, roadside ditches, streams; sand or mud substrate; stained, acidic water of 4-5pH; beaver ponds for spawning |
| *Ennaecanthus obesus* | Banded Sunfish | | | | | Sluggish streams and vegetated backwaters of lakes and ponds, often over silt or sand; very low current velocities |
| *Etheostoma serrifer* | Sawcheek Darter | | | | | Mud, sand, or organic substrate; aquatic vegetation; moderate current velocity |
| *Fundulus diaphanus* | Banded Killfish | | | | | Fresh water to estuaries over a wide range of salinities up to 20ppt; lakes, ponds, slow velocity streams; sand, gravel, or detritus-covered bottom with submerged aquatic plants |
| *Morone saxatilis* | Striped Bass | | | | | Medium to large rivers; clean, sandy substrate with fine gravel and rock; shallow rocky and gravely areas with strong current for spawning sites; 17-18 C optimal for egg development |
| *Moxostoma collapsum* | Notchlip Redhorse | | | | | Medium to large rivers of moderate gradient; pool-dweller in streams; also in natural and artificial lakes |
| *Moxostoma robustum* | Robust Redhorse | | | | | Riffles, runs, and pools of mainstream rivers; tree snags; deep water near shore; course gravel substrate for spawning; cooler waters preferred during summer; lenthic habitat during part of life cycle |
| *Notropis chalybaeus* | Ironcolor Shiner | | | | | Low-velocity blackwater streams and swamps; woody debris |
| *Noturus spp. (c.f. insignis)* | "Broadtail" Madtom | | | | | Middle of narrow and deep rivers; sand and gravel substrates with woody debris |

Table 5. Continued.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Percina crassa* | Piedmont Darter | | | | | Clean, moderate to large stream riffles; sand to cobble substrate; moderate currents |
| *Pteronotropis stonei* | Lowland Shiner | | | | | Small to medium-clear and blackwater streams; moderate flow-like slow riffles, runs, and flowing pools; clean sand substrate; aquatic vegetation |

Table 6. Aquatic priority species and their ecosystems: mussels.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Anodonta couperiana* | Barrel Floater | G4 | S1 | Of Concern, State | Highest | Ponds or slow-flowing streams; sand or deep, soft, unstable, mud substrates |
| *Anodonta implicata* | Alewife Floater | G5 | S1 recom. | | High | Streams, rivers, pools; silt, sand, gravel substrates; requires host fish, alewife (*Alosa pseudoharengus)*and possibly other clupeids |
| *Elliptio angustata* | Carolina Lance | G4 | S3 | | Moderate | Sand and sandy gravel substrates; often at edge of aquatic vegetation |
| *Elliptio complanata* complex | Eastern Elliptio | G5 | S5 | | Moderate | Large rivers, canals, reservoirs, and headwater streams; variety of fish hosts; no specific flow volume or substrate requirements |
| *Elliptio congaraea* | Carolina Elephantear | G3 | S3 | Of Concern, State | Moderate | Rivers and small streams with sandy substrates |
| *Elliptio fisheriana/nasutilus* | Northern Lance | G4 | SNR | | High | Soft sediments in shallow water near stream and river banks; stable banks with intact riparian zone |
| *Elliptio folliculata* | Pod Lance | G2/G3Q | S2/S3 | | High | Rapidly flowing rivers but also slow areas; depths greater than 1m sand or clay substrates |
| *Elliptio icterina* complex | Variable Spike | G5Q | S4 | | Moderate | Slow-flowing streams and swamps to faster flowing streams and rivers; clear or tannic water; sand, gravel, bedrock, mud, and detritus substrates |
| *Elliptio producta* | Atlantic Spike | G3Q | S3 | | High | Streams or rivers in mild current; sand, rock, and mud substrate |
| *Elliptio roanokensis* | Roanoke Slabshell | G3 | S2 | | High | Large rivers or small creeks; variable flow rates and temperatures; host fish unknown |
| *Elliptio waccamawensis* | Waccamaw Spike | G2/G3Q | S1 | | Highest | Main channel of rivers; highly sensitive to acidification and turbidity; compact sand substrate |
| *Fusconaia masoni* | Atlantic Pigtoe | G2 | SH | State Endangered | Highest | Course sand and gravel at downstream edge of riffles; fast-flowing, well-oxygenated, pristine streams |
| *Lampsilis cariosa* | Yellow Lampmussel | G3/G4 | S2 | | Highest | Gravel bars, margins of the flowing portions of water bodies, and cracks in bedrock of large rivers and small streams |

Table 6. Continued.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Lampsilis radiata* | Eastern Lampmussel | G5 | S2 | Of Concern, State | High | Streams, rivers, and blackwater swamps; mud or sand substrates |
| *Lampsilis splendida/radiata* | Rayed Pink Fatmucket | G3 | S2 | Of Concern, State | High | Streams, rivers, and blackwater swamps; mud or sand substrates; Laregmouth Bass host fish |
| *Leptodea ochracea* | Tidewater Mucket | G3/G4 | S2 | | High | Pristine freshwater rivers with tidal influence |
| *Ligumia nasuta* | Eastern Pondmussel | G4 | S2 | | High | Lakes, ponds, streams, and rivers; muddy, sandy, or gravely substrates; very shallow water near river banks |
| *Toxolasma pullus* | Savannah Lilliput | G2 | S1 | Of Concern, State | Highest | Shallow water and the edges of streams, rivers, and lakes but also backwaters; mud or silty sand substrates; host fish sunfish *(Lepomis)* species |
| *Villosa delumbis* | Eastern Creekshell | G4 | S4 | Of Concern, State | Moderate | Deep muddy flock or in sand and boulder fields; near streambanks often among tree roots; Largemouth Bass host fish |
| *Villosa modioliformis* | Eastern Rainbow | G5Q | S2 | Of Concern, State | Highest | Sandy runs of small to medium creeks and small rivers; moderate current; depths of less than 1m |

| Table 7: Aquatic priority species and their ecosystems: crayfish, shrimp & snails. | | | | | | |
|---|---|---|---|---|---|---|
| **SCIENTIFIC NAME** | **COMMON NAME** | **G-RANK** | **S-RANK** | **LEGAL STATUS** | **PRIORITY** | **SPECIFIC HABITAT REQUIREMENTS** |
| *Procambarus ancylus* | Coastal Plain Crayfish | G4/G5 | S4/S5 | | Moderate | Lentic and lotic waters and burrows |
| *Procambarus braswelli* | Waccamaw Crayfish | G2/G3 | SNR | | High | Clear streams with sand substrate flowing through swampy areas |
| *Procambarus chacei* | Cedar Creek Crayfish | G4 | S4 | | Moderate | lentic and lotic habitats; swamps, ponds, lakes, roadside ditches, springs, and streams; primary burrower |
| *Procambarus lepidodactylus* | Pee Dee Lotic Crayfish | G4 | S4 | | Moderate | Clear creeks of moderate gradient flowing through swampy areas often among tree roots; sandy substrate |
| *Procambarus pearsei* | Carolina Sandhills Crayfish | G4 | S3 | | Moderate | Lentic waters and subterranean burrows; may be in streams too; secondary burrower |
| *Macrobrachium ohione* | Ohio River Shrimp | G4 | SNR | | Moderate | Low-velocity water but also open side channels; suspended particulate matter; saline for larval development |
| *Gillia altilis* | Buffalo Pebblesnail | G5 | S1 | | High | Cold, clear lakes, streams, and rivers |
| *Lioplax subcarinata* | Ridged Lioplax | G5 | S1 | | High | Burrower that prefers sandy substrates in rivers |

Table 8. Aquatic priority species and their ecosystems: reptiles & amphibians.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Alligator mississippiensis* | American Alligator | G5 | S5 | Federal Threatened | Moderate | large river swamps, lakes, ponds, coastal impoundments, abandoned rice fields, brackish water marshes, and estuarine tidal creeks; juveniles will use Carolina bays and other seasonal wetlands |
| *Ambystoma cingulatum* | Flatwoods Salamander | G2/G3 | S1 | Federal Threatened; State Endangered | Highest | isolated, temporary wetlands with no fish that have open canopy above and abundant grasses and sedges |
| *Ambystoma tigrinum* | Tiger Salamander | G5 | S2/S3 | Of Concern, State | Highest | isolated, temporary wetlands with no fish that have open canopy above and abundant grasses and sedges |
| *Aneides aeneus* | Green Salamander | G3/G4 | S1 | Of Concern, State | Highest | moist rocky cliffs with abundant crevices; arboreal so use trees adjacent to rock outcrops |
| *Apalone ferox* | Florida Softshell Turtle | G5 | SNR | State Threatened | High | wetlands like rivers, ponds, and lakes |
| *Apalone spinifera* | Spiny Softshell Turtle | G5 | SNR | State Threatened | Moderate | restricted to reservoirs and associated rivers with sandbars and sandy substrates |
| *Chelydra serpentina* | Snapping Turtle (Common) | G5 | SNR | State Threatened | Moderate | wetlands like rivers, ponds, and lakes |
| *Chrysemys picta picta* | Painted Turtle (Eastern) | G5 | S? | State Threatened | Moderate | water bodies with muddy substrates, abundant vegetation, and basking sites |
| *Clemmys guttata* | Spotted Turtle | G5 | S5 | State Threatened | High | small ponds, streams, swamps, flooded forests, and other shallow water bodies |
| *Deirochelys recticularia* | Chicken Turtle | G5 | SNR | State Threatened | Moderate | and surrounding upland habitat of live oak/pine |
| *Kinosternon baurii* | Striped Mud Turtle | G5 | S? | Of Concern, State | Moderate | in and around the floodplain swamps of rivers |
| *Nerodia floridana* | Florida Green Watersnake | G5 | S2 | Of Concern, State | Highest | open water Carolina bays, lakes, old rice fields, and reservoirs with "pad plants" |
| *Pseudacris feriarum* | Upland Chorus Frog | G5 | S3/S4 | Of Concern, State | Moderate | isolated, temporary wetlands with no fish |
| *Pseudemys concinna* | River Cooter | G5 | SNR | State Threatened | Moderate | Restricted to reservoirs and associated rivers |
| *Pseudemys floridana* | Florida Cooter | G5 | SNR | State Threatened | Moderate | Slow-flowing rivers and non-flowing wetlands like ponds and small lakes with soft bottoms, basking sites, and aquatic vegetation |

Table 8. Continued.

| SCIENTIFIC NAME | COMMON NAME | G-RANK | S-RANK | LEGAL STATUS | PRIORITY | SPECIFIC HABITAT REQUIREMENTS |
|---|---|---|---|---|---|---|
| *Pseudobranchus striatus striatus* | Broad-striped Dwarf Siren | G5 | S2 | State Threatened | Highest | isolated, temporary wetlands with no fish that have open canopy above and abundant grasses and sedges; small streams with no flow and muck bottoms sometimes |
| *Rana capito capito* | Gopher Frog (Carolina) | G3/G4 | S1 | Federal Threatened; State Endangered | Highest | isolated, temporary wetlands with no fish that have open canopy above and abundant grasses and sedges |
| *Rana palustris* | Pickerel Frog | G5 | SNR | Of Concern, State | High | hardwood areas with sphagnum bogs, meadows, and grassy fields near shaded streams or standing water |
| *Seminatrix pygaea* | Black Swamp Snake | G5 | S? | Of Concern, State | High | wetlands with abundant aquatic vegetation |
| *Trachemys scripta* | Yellow-bellied Slider | G5 | SNR | State Threatened | High | non-flowing wetlands like ponds and small lakes |

# Appendix 3. SCDNR Freshwater Fisheries Little Pee Dee River Data.

Table 1: Fish species collected during electrofishing on the Little Pee Dee River, May and June 2011, presented by abundance, biomass, length and weight.

| Species | Number | %Composition | Total Weight (g) | % Biomass |
|---|---|---|---|---|
| American Eel | 69 | 2.04 | 16,102 | 2.23 |
| Blue Catfish | 19 | .56 | 55,581 | 7.70 |
| Bowfin | 112 | 3.32 | 249,416 | 34.58 |
| Black Crappie | 3 | .09 | 673 | .09 |
| Bluegill | 531 | 15.73 | 33,529 | 4.65 |
| Bluespotted Sunfish | 7 | .21 | 35 | .05 |
| Brook Silverside | 102 | 3.02 | 146 | .02 |
| Channel Catfish | 20 | .59 | 19,863 | 2.75 |
| Creek Chubsucker | 19 | .56 | 2103 | .29 |
| Chain Pickerel | 55 | 1.63 | 5580 | .77 |
| Carp | 4 | .12 | 28,550 | 3.96 |
| Coastal Shiner | 519 | 15.38 | 1,258 | .17 |
| Dusky Shiner | 3 | .09 | 6 | 0.0 |
| Dollar Sunfish | 247 | 7.32 | 2,806 | .39 |
| Flathead Catfish | 12 | .36 | 57,747 | 8.01 |
| Grass Carp | 2 | .06 | 22,100 | 3.06 |
| Golden Shiner | 12 | .36 | 101 | .01 |
| Hogchoker | 11 | .33 | 57 | .01 |
| Ironcolor Shiner | 70 | 2.07 | 78 | .01 |
| Largemouth Bass | 138 | 4.09 | 51,796 | 7.18 |
| Longnose Gar | 225 | 6.67 | 84,784 | 11.75 |
| Mosquitofish | 4 | .12 | 2.5 | 0.0 |

| Species | Number | %Composition | Total Weight (g) | % Biomass |
|---|---|---|---|---|
| Pirate Perch | 64 | 1.90 | 347.5 | 0.05 |
| Pumpkinseed | 1 | .03 | 15 | 0.0 |
| Redbreast Sunfish | 166 | 4.92 | 4,434 | .61 |
| Redear Sunfish | 247 | 7.32 | 30,886.5 | 4.28 |
| Redfin Pickerel | 28 | .83 | 777 | .11 |
| Sawcheek Darter | 1 | .03 | 1 | 0.0 |
| Smallmouth Buffalo | 1 | .03 | 3,150 | .44 |
| Spotted Sunfish | 270 | 8.0 | 10,584 | 1.47 |
| Spotted Sucker | 29 | .86 | 20,299 | 2.81 |
| Striped Bass | 1 | .03 | 2,206 | .31 |
| Swampfish | 3 | .09 | 4 | 0.0 |
| Taillight Shiner | 178 | 5.27 | 306.5 | .04 |
| Tessellated Darter | 2 | .06 | 6 | 0.0 |
| Thinlip Chub | 3 | .09 | 8.8 | 0.0 |
| Warmouth | 191 | 5.66 | 15,665 | 2.17 |
| Yellow Bullhead | 2 | .06 | 118 | .02 |
| Yellow Perch | 4 | .12 | 248 | .03 |

Table 2: Species composition collected during the fall 2011 on the Little Pee Dee River

| Species | Number | % Species Composition | CPUE (#/Hr) | Mean Weight (Kg) | Catch per Unit Effort (Kg/Hr) | Biomass% Total Weight |
|---|---|---|---|---|---|---|
| American Eel | 92 | 2.50 | 9.20 | .1529 | 1.41 | 1.87 |
| Blue Catfish | 3 | .08 | .30 | 3.8933 | 1.17 | 1.49 |
| Bowfin | 117 | 3.18 | 11.70 | 1.8794 | 21.99 | 28.12 |
| Black Crappie | 12 | .33 | 1.20 | .3253 | .39 | .50 |
| Bluegill | 231 | 6.28 | 23.10 | .0541 | 1.25 | 1.60 |
| Banded Pygmy Sunfish | 2 | .05 | .20 | .0008 | .00 | .00 |
| Brook Silverside | 413 | 11.23 | 41.30 | .0010 | .04 | .05 |
| Channel Catfish | 61 | 1.66 | 6.10 | .7343 | 4.48 | 5.73 |
| Creek Chubsucker | 11 | .30 | 1.1 | .0527 | .06 | .07 |
| Chain Pickerel | 12 | .33 | 1.2 | .2693 | .32 | .41 |
| Carp | 4 | .11 | .40 | 7.5375 | 3.02 | 3.86 |
| Coastal Shiner | 1225 | 33.31 | 122.50 | .0017 | .21 | .27 |
| Dusky Shiner | 1 | .03 | .10 | .0010 | .00 | .00 |
| Dollar Sunfish | 64 | 1.74 | 6.40 | .0061 | .39 | .04 |
| Eastern Silvery Minnow | 22 | .60 | 2.20 | .0035 | .01 | .01 |
| Flathead Catfish | 51 | 1.39 | 5.10 | 4.2975 | 21.92 | 28.03 |
| Grass Carp | 3 | .08 | .30 | 9.4333 | 2.83 | 3.62 |
| Golden Shiner | 10 | .27 | 1.00 | .0044 | .00 | .01 |
| Hogchoker | 1 | .03 | .10 | .0060 | .00 | .00 |
| Ironcolor Shiner | 2 | .05 | .20 | .0010 | .00 | .00 |

| Species | Number | % Species Composition | CPUE (#/Hr) | Mean Weight (Kg) | Catch per Unit Effort (Kg/Hr) | Biomass% Total Weight |
|---|---|---|---|---|---|---|
| Largemouth Bass | 239 | 6.49 | 23.90 | .3175 | 7.59 | 9.71 |
| Longnose Gar | 84 | 2.28 | 8.40 | .4408 | 3.70 | 4.74 |
| Pirate Perch | 5 | .14 | .50 | .0014 | .00 | .00 |
| Redbreast Sunfish | 573 | 15.58 | 57.30 | .0140 | .81 | 1.03 |
| Redear Sunfish | 156 | 4.24 | 15.60 | .1352 | 2.11 | 2.70 |
| Sawcheek Darter | 1 | .03 | .10 | .0001 | .00 | .00 |
| Shorthead Redhorse | 8 | .22 | .80 | 1.1774 | .94 | 1.20 |
| Spotted Sunfish | 132 | 3.59 | 13.20 | .0236 | .31 | .40 |
| Spotted Sucker | 39 | 1.06 | 3.90 | .8557 | 3.34 | 4.27 |
| Taillight Shiner | 1 | .03 | .10 | .0010 | .00 | .00 |
| Thinlip Chub | 2 | .89 | 3.30 | .0014 | .00 | .01 |
| Tessellated Darter | 33 | 1.85 | 6.80 | .0378 | .26 | .33 |
| Warmouth | 68 | .05 | .20 | .0010 | .00 | .00 |
| **Total #** | 3,678 | | | | | 100 |

# Appendix 4. SCDNR Freshwater Fisheries Lumber River Data.

Table 1: Lumber River fish sampling summary table from the SCDNR fisheries investigations in lakes and streams study completion report, July 1, 1990 to June 30, 1993,on stream reach 2(portion of the Lumber River from the NC-SC State Line to the confluence with the Little Pee Dee River)

| Species | Number | % Species Composition | CPUE (#/Hr) | Mean Weight (Kg) | Catch per Unit Effort (Kg/Hr) | Biomass% Total Weight |
|---|---|---|---|---|---|---|
| American Eel | 20 | 1.80 | 2.86 | 0.1236 | 0.35 | 2.42 |
| Blue Catfish | 1 | 0.09 | 0.14 | 0.0120 | 0.00 | 0.01 |
| Bowfin | 31 | 2.79 | 4.43 | 1.4048 | 6.22 | 42.66 |
| Bluegill | 85 | 7.64 | 12.14 | 0.0233 | 0.28 | 1.94 |
| Channel Catfish | 3 | 0.27 | 0.43 | 0.4953 | 0.21 | 1.46 |
| Creek Chubsucker | 9 | 0.81 | 1.29 | 0.1375 | 0.18 | 1.21 |
| Chain Pickerel | 5 | 0.45 | 0.71 | 0.0042 | 0.00 | 0.02 |
| Coastal Shiner | 361 | 32.46 | 51.57 | 0.0012 | 0.06 | 0.44 |
| Dollar Sunfish | 12 | 1.08 | 1.71 | 0.0057 | 0.01 | 0.07 |
| Flat Bullhead | 3 | 0.27 | 0.43 | 0.0570 | 0.02 | 0.17 |
| Flathead Catfish | 2 | 0.18 | 0.29 | 1.1455 | 0.33 | 2.24 |
| Flier | 2 | 0.18 | 0.29 | 0.05000 | 0.01 | 0.10 |
| Golden Shiner | 1 | 0.09 | 0.14 | 0.0070 | 0.00 | 0.01 |
| Hogchoker | 2 | 0.18 | 0.29 | 0.0055 | 0.00 | 0.01 |
| Largemouth Bass | 53 | 4.77 | 7.57 | 0.4219 | 3.19 | 21.90 |
| Longnose Gar | 10 | 0.90 | 1.43 | 0.4329 | 0.62 | 4.24 |
| Mosquitofish | 3 | 0.27 | 0.43 | 0.0007 | 0.00 | 0.00 |
| Pirate Perch | 9 | 0.81 | 1.29 | 0.0043 | 0.01 | 0.04 |
| Pumpkinseed | 1 | 0.09 | 0.14 | 0.0270 | 0.00 | 0.03 |

| Species | Number | % Species Composition | CPUE (#/Hr) | Mean Weight (Kg) | Catch per Unit Effort (Kg/Hr) | Biomass% Total Weight |
|---|---|---|---|---|---|---|
| Redbreast Sunfish | 303 | 27.25 | 43.29 | 0.0262 | 1.13 | 7.76 |
| Redear Sunfish | 41 | 3.69 | 5.86 | 0.0480 | 0.28 | 1.93 |
| Redfin Pickerel | 2 | 0.18 | 0.29 | 0.0100 | 0.00 | 0.02 |
| Spotted Sunfish | 110 | 9.89 | 15.71 | 0.0257 | 0.40 | 2.77 |
| Spotted Sucker | 6 | 0.54 | 0.86 | 0.6332 | 0.54 | 3.72 |
| Santee Chub | 1 | 0.09 | 0.14 | 0.0030 | 0.00 | 0.00 |
| Tessellated Darter | 6 | 0.54 | 0.86 | 0.0024 | 0.00 | 0.01 |
| Warmouth | 23 | 2.07 | 3.29 | 0.0319 | 0.10 | 0.72 |
| White Catfish | 7 | 0.63 | 1.00 | 0.5987 | 0.60 | 4.11 |
| **Total** | 1,112 | 100 | | | 14.58 | 100.00 |

# Appendix 5. Potential Little Pee Dee-Lumber Focus Area Partners.

**Ducks Unlimited** Conserves, restores and manages wetlands and associated habitats for North America's waterfowl through working with landowners and partners to acquire land and establish conservation easements and management agreements.

The **Natural Resources Conservation Service** provides financial and technical assistance to farmers, ranchers and forest landowners wanting to make conservation improvements to their land. NRCS also provides incentives for these landowners wanting to put wetlands, agricultural land, grasslands and forests under long-term conservation easements.

The **Pee Dee Land Trust** works with landowners to conserve and promote the appreciation of significant natural, agricultural and historical resources within the Pee Dee Region of South Carolina.

**Private landowners** adopting ecological ethics and applying natural management principles within the Focus Area benefits the conservation of the landscape as a whole. Some landowners choose to place their properties in conservation easements to maintain and conserve the natural integrity of their property in perpetuity.

The **South Carolina Department of Natural Resources** (SCDNR) serves as the principal advocate for and steward of South Carolina's natural resources. SCDNR serves in this capacity on many fronts including wildlife and fish management, habitat protection through land acquisition, natural resources law enforcement and research.

The **Nature Conservancy** utilizes science to target lands and waters in need of conservation for acquisition or conservation easement.

The **United States Fish & Wildlife Service** works to develop and apply environmental stewardship based on ecological principles and scientific knowledge of fish and wildlife. Utilizing this information and basic principles, the Service helps guide the conservation, development and management of the Nation's fish and wildlife resources.

**Wildlife Action** is a private, non-profit organization that serves to promote public awareness about wildlife habitat and the conservation, preservation and restoration of natural resources.

The **Winyah Rivers Foundation** works to protect, preserve, monitor and revitalize the health of the lands and water of the greater Winyah Bay watershed, which includes the Waccamaw, Lumber-Little Pee Dee, Lower Pee Dee, Lynches and Black River watersheds.

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