

Appendix B: Habitat and Wetland Descriptions

CAMP HALL RAIL PROJECT



**540 East Bay Street
Charleston, South Carolina**

25 July 2017

HABITAT AND WETLAND DESCRIPTIONS

The proposed 22.7-mile railroad corridor connecting the Camp Hall Commerce Park to the existing rail line at the Cross generating station has been evaluated with respect to habitat and wetland types. The proposed rail line corridor review area is approximately 200 feet wide, plus some expanded areas where minor alternatives to the original alignment may be considered. The entire proposed rail line corridor, including all expanded areas, totals approximately 866 acres. Of the original proposed rail line corridor (623 acres), 368.6 acres have been confirmed as wetlands based on a Preliminary Jurisdictional Determination issued by the U.S. Army Corps of Engineers (USACE) identified by SAC # 2016-01395. The most recent areas added to the potential route have not been verified by the USACE and include approximately 242 acres of which an estimated 157 acres are wetlands. Assuming the USACE confirms the 157 additional acres as wetlands, 526 acres of wetlands occur in the entire proposed project corridor being considered for the proposed rail line.

The evaluation occurred between April 20, 2016 and June 1, 2017. The inspection has identified 11 types of habitat and 14 types of wetlands. These habitat types include: **upland mixed hardwood and pine forests, upland hardwood forests, upland plantation pine forests, wetland plantation pine forests, Carolina bays, plantation pine converted Carolina bays, depressional ponds, bottomland hardwood forested wetlands, open water, agricultural fields, roads and utilities**. The wetland types follow the Cowardin code (National Wetland Index) referenced in Table 1. The habitat types are based on observations in the field. The habitat and wetland types are shown on attached Maps, pages 1-17, and discussed below.

Habitat Types

A description of each habitat type is provided below and is representative of conditions at the time of evaluation. Table 2 provides the approximate acreage of each habitat type in the corridor.

The **upland mixed hardwood and pine forest (U43)** comprised 25.8 acres of the corridor and is characterized by an overstory composed primarily of loblolly pine (*Pinus taeda*) with some interspersed longleaf pine (*Pinus palustris*), southern red oak (*Quercus falcata*), pignut hickory (*Carya glabra*), and some interspersed live oaks (*Quercus virginiana*). Cover ranged from 40-70% in the overstory. The upland pine forest habitat found within and immediately adjacent to the corridor appeared to be approximately 30-50 years old; however, nothing within this habitat type was considered to be old growth. The midstory is composed of loblolly pine, southern red oak, pignut hickory, longleaf pine, and sweetgum (*Liquidambar styraciflua*) with a cover ranging from 10-30%. The shrub layer is sparse, with 10-20% cover consisting of wax myrtle (*Morella cerifera*), farkleberry (*Vaccinium arboreum*), redbay (*Persea borbonia*), and deerberry

(*Vaccinium stamineum*). The herbaceous layer is healthy, at approximately 30-50% cover, and was composed primarily of bracken fern (*Pteridium aquilinum*), broomstraw (*Andropogon virginicus*), longleaf woodoats (*Chasmanthium sessiliflorum*), dogfennel (*Eupatorium capillifolium*), panic grass (*Panicum sp.*), and slender lespedeza (*Lespedeza virginica*). Vine species include muscadine (*Vitis rotundifolia*), greenbriar (*Smilax sp.*), and sawtooth blackberry (*Rubus argutus*) making up approximately 10% of the cover.

The **upland hardwood forest (U43)** is similar to the mixed hardwood and pine forest and comprised 8.5 acres of the corridor; however, it is generally present only within ecotones between upland and wetland areas. The age classes found within this habitat type ranged from new growth to approximately 50 years old. No old growth was found within or adjacent to the corridor. While there is an occasional loblolly or longleaf pine in these areas, the overstory composition is primarily composed of hardwoods including: white oak (*Quercus alba*), post oak (*Quercus stellata*), live oak, southern red oak, and pignut hickory, with water oak (*Quercus nigra*) found on the lower slopes leading to the wetlands. Overstory closure ranges from 40-60%. The midstory (10-25% cover) consists of pignut hickory, sweetgum, red oak, red maple (*Acer rubrum*), American hornbeam (*Carpinus caroliniana*), and American holly (*Ilex opaca*). Shrub layers are sparse (0-10% cover), and consist of redbay and wax myrtle. The herbaceous layer is sparse, approximately 0-10% cover, and is composed primarily of bracken fern, cinnamon fern (*Osmunda cinnamomea*), broomstraw, and longleaf woodoats.

The **upland and wetland plantation pine forests (U42P, PFO4B)** comprised approximately 544.4 acres of the corridor and is characterized by an overstory composed primarily of loblolly pine. Plantation pine forests span both upland and wetland areas, as well as some former Carolina bay features that were converted to pine monoculture. These areas are intensively managed for silviculture with a first thinning typically at ages 12-15 years old, followed by a clear cut at 25-30 years old. Age classes along the corridor spanned from new growth to approximately 30 years old. These areas are bedded and extensively ditched. The planted pine forest habitat covers 61% of the corridor. The corridor spans multiple stands of pines, ranging from open thinned (70-80 Basal Area) stands to dense, pre-merchantable stands (140 Basal Area). As a result of recent clear cuts there are areas with no overstory or midstory. In thinned pine areas (70-80 BA), there is a midstory of sweet gum and red maple with approximately 10-20% cover. In denser pine areas (140 BA) there is no midstory or shrub layer due to 90-100% overstory cover. In open thinned pine stands the shrub layer consists of wax myrtle, redbay, fetterbush (*Lyonia lucida*), and deerberry, with 10-30% cover. The herbaceous layer is also somewhat sparse, approximately 0-10% cover, and is composed primarily of dwarf palmetto (*Sabal minor*), longleaf woodoats, plumegrass (*Saccharum giganteum*), giant cane (*Arundinaria gigantea*), Virginia chain fern (*Woodwardia virginiana*), cinnamon

fern, and netted chain fern (*Woodwardia areolata*). Sphagnum moss (*Sphagnum sp.*) is also present within some of the wetland areas.

Five **Carolina bay (PFO2C, PFO1H)** depressional wetlands are located within the project corridor comprising approximately 10.5 acres. These wetlands are seasonally to perennially inundated based upon their size. The genesis of this depressional habitat has been debated, although Piovan and Hodgeson¹ found nine distinct qualities are common to all Carolina bays: 1) oval shaped; 2) oriented northwest to southeast; 3) parallelism of the long axis; 4) sand rims above general elevation; 5) interior surface below the general elevation; 6) different soils within sand rim and outside of sand rim; 7) shallow; 8) flat sandy bottom; 9) naturally isolated features. Within the corridor there are five Carolina bays, four of which are named, including Bulltown Bay, Skeleton Bay, Todd Bay, and Beech Island Bay shown on Habitat Descriptions map pages 1, 5, 6, 7, 8, & 9, respectively. A large portion of these bays are ditched and either partially or entirely planted in loblolly pine. Within the remnant habitat, red maple, swamp tupelo (*Nyssa biflora*), and pond cypress (*Taxodium ascendens*) dominate the overstory at 30-40% cover with the oldest reaching approximately 50 years old; no areas within the habitat type are considered old growth. The midstory is sparse, consisting of the same species found in the overstory. Within more seasonally wet Carolina bays, a shrub and herbaceous layer is present consisting of redbay, dwarf palmetto (*Sabal minor*), and fetterbush in the shrub layer, with various grasses and sedges making up the herbaceous layer. Perennial flooded bays have no shrub or herbaceous vegetation present.

Plantation Pine Converted Carolina Bays were once Carolina bays but have been completely harvested, ditched, and planted in plantation pine for future harvest. This comprised 32.3 acres within the project corridor, and the timber within this habitat type was approximately 10 to 30 years of age. This habitat type mirrors the wetland plantation pine habitat type.

Several **depressional pond (PFO1C)** wetlands are interspersed along the corridor, covering approximately 17 acres. These wetlands are seasonally inundated and characterized by age classes ranging from new growth to approximately 30 years old. No old growth was found within this habitat type. The overstory is composed of black gum, sweet gum, red maple, and in larger gum ponds that are semi-permanently flooded, pond cypress is present. The overstory cover ranges from 20-40% in the overstory. The

¹ Piovan, S. & Hodgeson, M. 2016. How many Carolina bays? An analysis of Carolina bays from USGS topographic maps at different scales. Journal of Cartography and Geographic Information Science. Pgs 1-17.

midstory is sparse, approximately 10% cover, consists of black gum, sweet gum, and red maple. The shrub stratum is composed of fetterbush and redbay. The understory cover is variable, ranging from open water to 100% cover. Species in this stratum include smartweed (*Polygonum* spp.), arrowhead (*Sagittaria lancifolia*), soft rush (*Juncus effusus*), giant cane, netted chain fern, and various other grasses and sedges.

The **bottomland hardwood forested wetland (PFO1C, PFO2C, PFO1B)** habitat comprised 174.8 acres and is characterized by an overstory composed of bald cypress (*Taxodium distichum*), water oak, black gum, swamp tupelo and swamp chestnut oak (*Quercus michauxii*). Overstory closure ranged from 30-50% characterized by an age class from 10 to 50 years old. No old growth was found within or immediately adjacent to the proposed project corridor. The midstory is composed of bald cypress, black gum, sweetgum, and swamp tupelo characterized by a cover ranging from 10-20%. The shrub and herbaceous layer ranges from sparse to heavy, approximately 10-60% cover, and is composed primarily of dwarf palmetto, giant cane, sphagnum moss, Virginia chain fern and cinnamon fern based on the hydrologic regimen of the wetland. Areas that are seasonally flooded are characterized by a sparse understory due to flooding. Areas that are characterized as temporarily flooded or saturated contain a well-developed understory. Defined stream channels occur within a few of the bottomland hardwood forests within the proposed project corridor.

The project corridor crosses **open water (L1UBHh)** at the Diversion Canal between the Santee-Cooper lakes. This area comprised 2.4 acres of the corridor. The canal was excavated in 1941. It is 7.5 miles long, approximately 500 feet wide and approximately 12 feet deep. The bottom consists of sand and clay, with some sediments washed downstream from the Santee River. There is very little organic material or vegetation in this part of the canal and it was last dredged in 2014 to remove accumulated silt and sediments on the Lake Moultrie side of the canal. The Diversion Canal was once an important access for inland maritime trade, but today is used primarily for recreational access between the lakes.

Several small **agricultural fields (U21)** exist within the project corridor (1.3 acres), primarily as wildlife food plots. Commonly planted vegetation included chufa, wheat, peas and soybeans. In areas that are not planted, a variety of native grasses dominate, including: broomstraw, chalky bluestem (*Andropogon capillipes*), dog fennel, switchgrass (*Panicum virgatum*), and tapered rosette grass (*Dichanthelium acuminatum*). These areas are routinely disked and cultivated.

Various **Roads and Utilities** cross the corridor, comprising approximately 6% of the proposed project corridor (48.9 acres). The roads are filled, either paved or gravel, and

are culverted over wetland crossings. Utility right of ways are maintained throughout the proposed project corridor, from large transmission lines to smaller distribution lines.

Wetland Types and Condition

There are multiple wetland types within the project corridor. These wetlands have been classified by type and further by their existing condition as defined in Appendix C of the US Army Corps of Engineers' "Guidelines for Preparing a Compensatory Mitigation Plan"² (see Appendix A attached). Various wetland types share habitat types with differences lying in hydrologic periods, genesis of the wetland, and landscape position. Table 3 provides the approximate amount of each wetland type and its condition(s) in the corridor.

The majority ~62% (323.9 acres) of wetlands identified within the project corridor are within bedded **plantation pine forests**. Plantation pine forests span both upland and wetland areas and comprised approximately 66% of the corridor (576.7 Acres). These areas have been routinely logged with heavy equipment for decades. Bedding is the practice of using a plow to build up a raised "bed" on which the trees are planted to keep them elevated from surface water. As the trees grow, they use a substantial amount of water, lowering the water table in the area. These areas are ditched on the stand boundaries to remove excess surface water. Ditches are routed to larger canals that move water off site or into adjacent wetland features. Some Carolina bay wetland features have been converted to pine monoculture, and the plantation pine forest spans both upland and wetlands. These wetland areas are considered *Impaired* and have experienced heavy soil disturbance and compaction. In some areas, beds are constructed against the native topography, trapping water between beds.

The project corridor spans five **Carolina bays** identified as Bulltown Bay, Skeleton Bay, Todd Bay, Beech Island Bay, and an un-named bay. These areas comprise approximately 2% of the wetland acreage of the corridor (10.5 acres), and this habitat type covers approximately 1% of the total corridor. A part of Bulltown Bay that is impacted by the existing rail line is considered *Very Impaired* due to the fill material and lack of hydrologic connections through the railroad grade. Skeleton Bay, Todd Bay, and Beech Island Bay are all *Impaired* wetlands. They have been harvested and re-planted in loblolly pine. Within Beech Island Bay a utility easement is maintained, creating an emergent wetland habitat. Skeleton Bay and Todd Bay have been completely converted to plantation pine, thus these areas were counted as such.

The un-named Carolina bay is *Partially Impaired* due to timber harvesting up to the edges of the bay. This Carolina bay makes up over 1% of the wetlands identified within the corridor (8.4 acres). The outer ring of cypress has been removed, and loblolly has been planted in beds adjacent to the Carolina bay. On one border of the bay, the planted

pine has been recently clear-cut, and a ditch outfalls under the road to a culvert to maintain water below flood level within the Carolina bay.

The proposed project corridor contains multiple **depressional wetlands**. These comprised 3% (16.9 acres) of the total wetland acreage of the corridor and approximately 2% of the total corridor. The depressional wetlands along the corridor within industrial forestlands are considered *Impaired* due to the conversion of the landscape to pine monoculture. Minor ditching has altered the hydrology within these areas as well. The depression wetlands within the South Carolina Department of Natural Resources' (SCDNR) Hall Wildlife Management Area (WMA) are considered *Fully Functional* as they retain their natural hydrology. Although minor logging has taken place within these wetlands, they remain pristine wetlands.

Bottomland Hardwood forests compose 33% (174.8 acres) of the total wetland acreage of the corridor, and approximately 20% of the entire corridor. These areas exhibit evidence of past logging and are often bisected by roads with adequately sized culverts to allow unimpeded flow of water through the wetland. There are no old growth stands along the corridor; all stands are considered second or third growth based on species composition and tree size. Early successional wetland species such as river birch (*Betula nigra*), sweet gum, black willow (*Salix nigra*), water oak, and red maple dominate recently harvested bottomland hardwood areas. In older regeneration, bald cypress, swamp white oak, and swamp tupelo dominate. These areas mostly lack a defined tributary, but rather are seasonally saturated and flooded, to semi-permanently flooded wetlands. For those few bottomland hardwood forests with a defined watercourse, it often has been channelized and crossed by forestry roads. Hydrology is altered in the industrial forest lands through the extensive ditching to remove surface water. These ditches are routed into wetland areas for eventual downstream discharge into a larger named watercourse. The bottomland hardwood forests within the South Carolina Department of Natural Resources' (SCDNR) Hall Wildlife Management Area (WMA) are *Partially Impaired*. The hydrology of this area is partially altered with the construction of the Bulltown Ditch. There is also slight fragmentation with the construction of the CSX rail line crossing through wetlands shown on habitat type map, page 1, as well as ruts and soil compaction due to past logging activity within the wetland areas. The remainder of the corridor's bottomland hardwood wetlands are considered *Impaired* due to the extensive ditches altering the hydrology within these forest areas and fragmentation of the bottomlands with interspersed planting of loblolly pine.

The corridor crosses the Diversion Canal between Lakes Moultrie and Marion. This navigable **Open Water** wetland comprises <1% (2.4 acres) of the total wetlands within the corridor and < 1% of the total corridor. The open water is used for commercial and recreational purposes. The Diversion Canal was constructed in the 1980s by the US Army

Corps of Engineers. It provides aquatic habitat for a variety of species; however, there is no vegetation associated with the open water wetland. This area is considered *Very Impaired* due to the excavated nature of the canal and the periodic dredging to remove accumulated sediment. Also, spoil has been placed adjacent to the canal on either side, filling wetlands and altering the natural hydrology of these adjacent areas.

Linear Conveyances occur throughout the project corridor. These features are used to drain and direct water from one area to another. Some of these features hold water long enough to allow for wetland vegetation growth in the base and along the banks, while others do not. The larger linear conveyances on industrial timberland properties contain some water flow or evidence of recent flow in the form of drift deposits and scouring. Smaller linear conveyances are often dry or contain standing water. Some of these features have been dug in uplands, while others have been excavated in wetlands. All linear conveyances within the industrial timber properties are routinely maintained with a tracked excavator to promote unimpeded water flow during large storms. Often, spoil is placed adjacent to the linear conveyance or incorporated into an adjacent road. All linear conveyances within the project corridor are considered *Very Impaired* due to their excavated nature and purpose of altering or removing hydrology in the adjacent areas.

There are two areas within the corridor that exhibit characteristics of a perennial, relatively permanent water (PRPW) tributary, identified by the USACE as “Non-Wetland Waters.” Of the two (see Habitat Descriptions maps, pages 1 & 8) identified PRPW Tributaries, one is considered a naturally occurring feature with a sinuous channel and well-defined bed and bank. The channel is approximately 6-8 feet wide and the water level typically occurs approximately 5 feet below top of bank. This wetland feature crosses under various forestry roads via large concrete and metal culverts that are large enough not to impede the natural flow. There is no channelization of the water course. This wetland is considered a *Partially Impaired* wetland. Due to streamside management best management practices, the adjacent forest is buffered to protect water quality. Outside of the approximately 50’ buffer, loblolly pine is planted in rows for future harvest. This buffer consists of a mixed hardwood and pine forest with a sandy soil.

The second PRPW Tributary feature consists of a channelized run named “Bulltown Ditch” and is shown on Habitat Description maps page 1 & 2. The Bulltown Ditch extends over 18,000 feet from the Santee Canal off of Lake Moultrie to the Diversion Canal, bisecting Bulltown Bay. This feature is approximately 6 feet wide and 4 feet deep. The canal is crossed by various public and forestry roads as well as the CSX rail line serving the Cross Generating Station through large concrete and metal culverts. The Bulltown Ditch dates from sometime after the Santee Canal (circa 1793) and is a maintained watercourse. This wetland system is highly impacted and is considered a *Very Impaired* wetland feature. It removes hydrology from some areas and is an excavated

feature with an adjacent spoil berm that alters hydrology in the immediate area of the ditch. In some areas, the Bulltown Ditch flows through uplands before draining back into wetlands.

PALMETTO RAILWAYS – CROSS ROUTE WETLAND CLASSIFICATIONS	
Cowardin Code (NWI)	Description
PFO1B	Palustrine forested with broad-leafed deciduous vegetation, saturated soils
PFO1C	Palustrine forested with broad-leafed deciduous vegetation, seasonally flooded
PFO1H	Palustrine forested with broad-leafed deciduous vegetation, permanently flooded
PFO2C	Palustrine forested with needle-leafed deciduous vegetation, seasonally flooded
PFO4B	Palustrine forested with needle-leafed evergreen vegetation, saturated soils
PFO4C	Palustrine forested with needle-leafed evergreen vegetation, seasonally flooded
PSS1B	Palustrine scrub shrub with broad-leafed deciduous vegetation, saturated soils
PSS1E	Palustrine scrub shrub with broad-leafed deciduous vegetation, seasonally flooded/saturated
PSS1H	Palustrine scrub shrub with broad-leafed deciduous vegetation, permanently flooded
U14	Upland transportation and utilities
U21	Upland agriculture
U42P	Upland evergreen forest (pine)
U43	Upland mixed forest
L1UBHh	Lacustrine limnetic with unconsolidated bottom, permanently flooded due to diking

Table 1- Description of Cowardin Code (National Wetland Index) used to classify wetland types.

PALMETTO RAILWAYS - CROSS ROUTE HABITAT DESCRIPTIONS	
HABITAT DESCRIPTION	ACREAGE
AGRICULTURAL FIELDS	1.3
BOTTOMLAND HARDWOOD FORESTED WETLANDS	174.8
CAROLINA BAYS	10.5
DEPRESSIONAL PONDS	16.9
OPEN WATER	2.4
PLANTATION PINE CONVERTED CAROLINA BAYS	32.3
ROADS AND UTILITIES	48.9
UPLAND HARDWOOD FORESTS	8.5
UPLAND MIXED HARDWOOD AND PINE FORESTS	25.8
UPLAND PLANTATION PINE	252.8
WETLAND PLANTATION PINE	291.6
Total	865.8 Acres

Table 2- Acreage of different habitat types along the 22.7-mile Project Corridor

PALMETTO RAILWAYS - CROSS ROUTE WETLAND HABITAT INFORMATION		
HABITAT DESCRIPTION	CONDITION	ACREAGE
BOTTOMLAND HARDWOOD FORESTED WETLANDS	PARTIALLY IMPAIRED	94.2
BOTTOMLAND HARDWOOD FORESTED WETLANDS	IMPAIRED	71.2
BOTTOMLAND HARDWOOD FORESTED WETLANDS	VERY IMPAIRED	9.5
CAROLINA BAYS	PARTIALLY IMPAIRED	5.3
CAROLINA BAYS	IMPAIRED	5.2
DEPRESSIONAL PONDS	FULLY FUNCTIONAL	4.9
DEPRESSIONAL PONDS	PARTIALLY IMPAIRED	1.2
DEPRESSIONAL PONDS	IMPAIRED	9.8
DEPRESSIONAL PONDS	VERY IMPAIRED	1.0
PLANTATION PINE CONVERTED CAROLINA BAYS	IMPAIRED	32.3
WETLAND PLANTATION PINE	IMPAIRED	291.6
Total		526.2 Acres

Table 3 – Acreage and Condition of Wetland Habitat Types within Project Corridor

Appendix A

From the USACE's "Guidelines for Preparing a Compensatory Mitigation Plan"²

Existing Condition- the degree of disturbance relative to the ability of a site to perform its physical, chemical, and biological functions. This factor evaluates site disturbances relative to the existing functional state of the system.

Fully Functional- The typical suite of functions attributed to the aquatic resource type are functioning naturally. Existing disturbances do not substantially alter important functions. Examples include: Pristine (undisturbed) wetlands, aquatic resources with non-functional ditches or old logging ruts with no effective drainage, or minor selective cutting.

Partially Impaired- Site disturbances have resulted in partial or full loss of one or more functions typically attributed to the aquatic resource type but functional recovery is expected to occur through natural processes. Examples include: clear-cut wetlands, aquatic areas with ditches that impair but do not eliminate wetland hydrology, or temporarily cleared utility corridors.

Impaired- Site disturbances have resulting in the loss of one or more functions typically attributed to the aquatic resource type and functional recovery is unlikely to occur through natural processes. Restoration activities are required to facilitate recovery. Examples include: areas that have been impacted by surface drainage and converted to pine monoculture or agriculture, areas that are severely fragmented, or wetlands within maintained utility corridors.

Very Impaired- Site disturbances have resulted in the loss of most functions typically attributed to the aquatic resource type and functional recovery would require a significant restoration effort. Examples include: filled areas, excavated areas, or effectively drained wetlands (hydrology removed or significantly altered)

² USACE, Guidelines for Preparing a Compensatory Mitigation Plan. 2010. Pgs 1-114.