Appendix F – NMFS Biological Assessment

HIGHWAY 41 CORRIDOR IMPROVEMENTS

Biological Assessment for NOAA-NMFS Species

April 2022

Acronyms

dB	decibel
dB_{peak}	decibels at peak sound pressure level
DPS	Distinct Population Segment
ESA	Endangered Species Act
IPaC	Information for Planning and Consultation
LOD	limits of Project disturbance
NLAA	may affect, not likely to adversely affect
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
SC 41	SC Highway 41
SCDNR	South Carolina Department of Natural Resources
SEL	sound exposure level
TSS	total suspended solids
US 17	US Highway 17
USFWS	US Fish and Wildlife Service

Contents

Tables

Figures

Appendices

1.0 Introduction

To accommodate an increase in traffic volume, Charleston County, the Town of Mount Pleasant, and the South Carolina Department of Transportation are partnering to improve roadway capacity and ease traffic congestion along SC Highway 41 (SC 41; Project and proposed action). This biological assessment, prepared on behalf of Charleston County, addresses the proposed action in compliance with Section 7(c) of the Endangered Species Act (ESA) of 1973 [16 United States Code 1536 (c)], as amended. Section 7 of the ESA requires that federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species or result in the destruction or adverse modification of critical habitat. This is achieved through consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS).

A Letter of Intent was distributed to stakeholder agencies on July 13, 2017, providing general Project information and requesting comments or concerns. Subsequently, a biological assessment was completed for the SC Highway 41 Bridge Replacement over the Wando River, which occurs within the study area, and is included as part of the SC 41 Bridge Environmental Assessment dated May 2010. However, no additional Project construction is scheduled to occur on SC 41 Wando River Bridge. This biological assessment evaluates the potential effects of the proposed Project on species that are listed under the ESA and under the jurisdiction of the NOAA-NMFS. A separate biological assessment has been prepared for species under the jurisdiction of the USFWS.

1.1 Project Description

The primary purpose of the proposed action is to reduce traffic congestion within the SC 41 corridor to accommodate future traffic growth projections. The secondary purposes of the proposed Project are to enhance safety throughout the corridor, improve the transportation system and community connections, and provide bicycle and pedestrian accommodations, while minimizing community and environmental impacts. Charleston County proposes to improve SC 41 for a total of approximately 5.6 miles from North US Highway 17 (US 17) across the Wando River Bridge to Clements Ferry Road, in Charleston and Berkeley Counties, South Carolina (**Figures 1-1 and 1-2**). Improvements are also planned at the intersection of SC 41 and US 17, at a new tie-in road between SC 41 and Winnowing Way, and a new 1.3-mile-long roadway (Laurel Hill Parkway) between SC 41 and Park West Boulevard.

Along SC 41, the proposed typical section would include four travel lanes, curb-and-gutter with a planted median from US 17 to Joe Rouse Road and from Dunes West Boulevard to Clements Ferry Road, with a 5-foot-wide sidewalk on the west side and a 10-foot-wide multi-use path on the east side. On SC 41 between Joe Rouse Road and Dunes West Boulevard, the proposed typical section would include a three-lane, curb-and-gutter section with one travel lane in each direction, a center two-way left-turn lane, and a 5-foot-wide sidewalk on both sides. The proposed typical section along Laurel Hill Parkway would include two lanes with curb-and-gutter and a 10-foot-wide multi-use path on the east side.

The Project would cross Horlbeck and Mill Creeks, and the Wando River. This section of SC 41 is an arterial route that has experienced an increase in traffic and is currently exceeding capacity. The existing two-lane roadway would be widened to four lanes, with a center median and multi-use pathway. No construction work would occur within the Wando River because the existing bridge over the Wando River would accommodate the proposed lane widening. Field studies were conducted in a 696-acre study area (i.e., action area). The Project limits of disturbance (LOD) would be entirely confined to within the larger study area and would not exceed about 91 acres (**Appendix A**).

Figure 1-1. Overview of Project Location

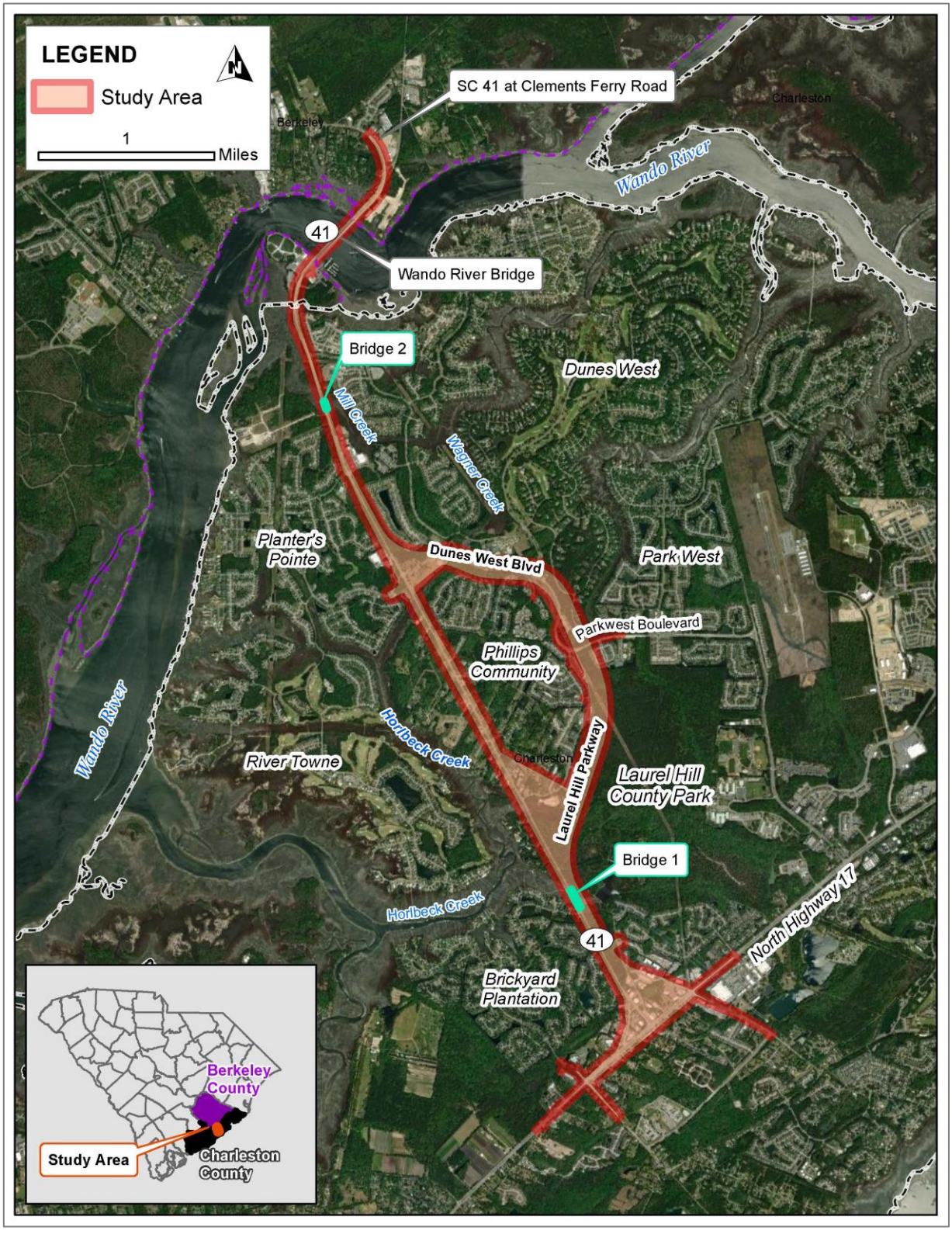

Figure 1-2. Detailed View of Project Location

2.0 Environmental Baseline

2.1 Project Setting

The Project is in central Charleston County and southern Berkeley County in the Lower Coastal Plain of South Carolina. The Project would occur within the Cooper River watershed (Hydrologic Unit Code 03050201) and the Sea Islands/Coastal Marsh Level IV ecoregion. The land uses within the study area include incorporated areas, vacant/undeveloped areas, agriculture, estuarine and marine wetlands and deepwater, freshwater wetlands, residential, commercial, industrial, public/institutional, and parks/recreation/open space. Land use / land cover in the watershed includes 33.1 percent forested land, 22.6 percent forested wetland, 17.0 percent non-forested wetland, 16.8 percent urban land, 7.7 percent water, 2.4 percent agricultural land, and 0.4 percent barren land.

This area of Charleston and Berkeley Counties is experiencing significant growth, primarily due to planned commercial and residential developments. Commercial growth is primarily occurring in the Charleston County portion of the study area, whereas residential growth is occurring in Berkeley County north of the Wando River.

2.2 Coastal Habitats

The estuarine salt marshes in and near the study area occur in association with Horlbeck Creek, Mill Creek, and the Wando River. The salt marshes within the study area occur as a mosaic of high marsh dominated by sea oxeye (*Borrichia frutescens*) and black needlerush (*Juncus roemerieanus*), and fully inundated or low marsh dominated by smooth cordgrass (*Sporobolus alterniflora*) and mud flats. Common macrobenthic species in the salt marsh include fiddler crabs (*Uca pugnax*), ribbed mussels (*Geukensia demissa*), and periwinkle snails (*Littoria irrorata*).

Freshwater wetlands identified within the study area are characterized by a tree canopy consisting of laurel oak (*Quercus laurifolia*), sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), and slash pine (*Pinus elliotti*). The shrub strata consist primarily of dwarf palm (*Sabal minor*), wax myrtle (*Morella cerifera*), Chinese privet (*Ligustrum sinense*), and sweet gum. The herbaceous strata are composed of bladder sedge (*Carex intumescens*), royal fern (*Osmunda regalis*), netted chain fern (*Woodwardia areolata*), and slender spike grass (*Chasmanthium laxum*).

Upland habitats adjacent to the salt marsh primarily consist of the SC 41 roadway along with commercial and residential developments. Upland habitats associated with the undeveloped forests include a tree stratum consisting of water oak (*Quercus nigra*), loblolly pine (*Pinus taeda*), sweet gum, and red maple with a shrub stratum of wax myrtle and Chinese privet. The herbaceous/woody vine stratum in these habitats is primarily composed of yellow jasmine (*Gelsemium sempervirens*), common green briar (*Smilax rotundifoila*), muscadine (*Vitis rotundifolia*), and Japanese honeysuckle (*Lonicera japonica*).

3.0 Federally Protected Species

Field reconnaissance surveys were conducted in 2017 and 2019 and included site investigation for federal listed species and verification of habitat types detailed in this assessment. Federally listed species under NOAA-NMFS jurisdiction with the potential to occur in the study area are presented in **Table 3-1**. These species consist of four fish, five sea turtles, and five whales. No designated critical habitat was identified within the study area for any federal listed species (NOAA 2022a).

Table 3-1. Threatened or Endangered Species under NMFS Jurisdiction

Species	Federal Status	Habitat Description	Suitable Habitat in Study Area	Effects Determination
FISH				
Atlantic Sturgeon (*Acipenser oxyrhynchus oxyrhynchus*)	Endangered	Inhabit open ocean, coastal bays and rivers along the East Coast; adults spawn in freshwater where offspring are born, then make migratory trips to the sea[1]	Yes	NLAA
Shortnose Sturgeon (*Acipenser brevirostrum*)	Endangered	Inhabit coastal bays and rivers along the East Coast; adults spawn in freshwater where offspring are born, then make migratory trips to the sea[2]	Yes	NLAA
Giant Manta Ray (*Mobula birostris*)	Threatened	Prefer offshore, oceanic waters near productive coastlines and have been observed in estuarine waters near oceanic inlets, commonly found in water ranging from 66–72 degrees Fahrenheit (°F)[3]	No	No effect
Oceanic Whitetip Shark (*Carcharhinus longimanus*)	Threatened	Generally remain offshore in open ocean in water depths greater than 600 feet; strong preference for mixed surface layer of warm waters above 68°F[4]	No	No effect
REPTILES				
Green Sea Turtle (*Chelonia mydas*)	Threatened	Prefer shallow waters in coastal bays, reefs, and inlets with an abundance of marine grass and algae; nest on open, undisturbed sandy beaches[5]	Yes	NLAA
Hawksbill Sea Turtle (*Eretmochelys imbricata*)	Endangered	Prefer rocky or coral substrates in oceanic water less than 65 feet deep; also inhabit shallow coastal areas including lagoons and creeks[6]	Yes	NLAA
Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)	Endangered	Migrate through open oceans. Found in nearshore coastal habitats that typically contain muddy or sandy bottoms. Hatchlings inhabit offshore waters. Juveniles associated with floating *Sargassum* sp.[7]	Yes	NLAA
Leatherback Sea Turtle (*Dermochelys coriacea*)	Endangered	Mostly pelagic; female adults nest on dry, sandy beaches adjacent to deep and rough seas[8]	No	No effect

Species	Federal Status	Habitat Description	Suitable Habitat in Study Area	Effects Determination
Loggerhead Sea Turtle (*Caretta caretta*)	Threatened	Wide habitat range including pelagic ocean, inshore bays, lagoons, salt marshes, creeks, and mouths of large rivers; trans-oceanic migration and nest on sandy beaches[9]	Yes	NLAA
MARINE MAMMALS				
Blue Whale (*Balaenoptera musculus*)	Endangered	Found in all oceans except the Arctic; may visit shelf waters of eastern U.S. during seasonal migration[10]	No	No effect
Fin Whale (*Balaenoptera physalus*)	Endangered	Deep, offshore waters of all major oceans in temperate to polar latitudes[11]	No	No effect
North Atlantic Right Whale (*Eubalaena glacialis*)	Endangered	Occur in coastal waters or close to continental shelf, may migrate to deep offshore waters; calving areas specifically in shallow coastal waters of southeast Atlantic[12]	No	No effect
Sei Whale (*Balaenoptera borealis*)	Endangered	Globally distributed throughout subtropical, temperate, and subpolar water; primarily inhabit deeper waters far from coastlines[13]	No	No effect
Sperm Whale (*Physeter macrocephalus*)	Endangered	Globally distributed in oceanic waters with no clear migratory patterns[14]	No	No effect

NLAA = may affect, not likely to adversely affect

Source: USFWS 2022; NOAA 2022a; [1]NOAA 2022b; [2]NOAA 2022c; [3]NOAA 2022d; [4]NOAA 2022e;[5]NOAA 2022f; [6]NOAA 2022g [7]NOAA 2022h; [8]NOAA 2022i; [9]NOAA 2022j; [10]NOAA 2022k; [11]NOAA 2022l; [12]NOAA 2022m; [13]NOAA 2022n; [14]NOAA 2022o

The five whale species require deep oceanic waters and therefore would not occur within or near the study area. Similarly, the preferred habitat of the oceanic whitetip shark (*Carcharhinus longimanus*) is offshore waters greater than 600 feet (NOAA 2022e). The giant manta ray (*Mobula birostris*) could occur near the mouth of Charleston Harbor on a seasonal basis, but the Wando River and its tributaries do not contain suitable habitat for the species. Leatherback sea turtles (*Dermochelys coriacea*) primarily inhabit deep oceanic waters and only enter the coastal zone for nesting on sandy beaches (NOAA 2022i). The Wando River and narrow tidal creeks adjacent and within the study area do not provide suitable habitat for these species. Due to the lack of suitable habitat, these species would not occur in the study area or be impacted by the proposed action; therefore, these species and are not considered or discussed further in this biological assessment. Also, no federal proposed or candidate species were identified for effects analysis and the study area does not contain critical habitat for any federally listed species.

3.1 Atlantic Sturgeon

The Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) originating from the New York Bight, Chesapeake Bay, South Atlantic, and Carolina Distinct Population Segments (DPS) are listed as federally endangered. The Gulf of Maine DPS are listed as federally threatened (NOAA 2017).

The Atlantic sturgeon is a long-lived, late-maturing, estuarine dependent, anadromous species. Adults spend most of their life in the marine environment but migrate upriver in the spring/early summer to spawn (NOAA 2022b). Atlantic sturgeon spawning is believed to occur in flowing water between the salt front and fall line of large rivers, where optimal flows are 46–76 centimeters/second with depths of 11–27

meters. Spawning intervals range from 1–5 years for males and 2–5 years for females (NOAA 2022b). No spawning or juvenile populations, or necessary habitat for these life stages, have been identified in the Wando River, Ashley River, or Cooper River (NOAA 2017). Spawning has been documented in South Carolina within the Pee Dee, Edisto, Combahee, and Savannah Rivers and the Waccamaw River.

Based on the known locations of the Carolina DPS of Atlantic sturgeon, the potential exists for this species to occur in the Wando River. No spawning is known to occur within the Wando River, but adult Atlantic sturgeon could occur seasonally in the Wando River.

3.2 Shortnose Sturgeon

The federally and state endangered shortnose sturgeon (*Acipenser brevirostrum*) are anadromous species that live in rivers and coastal environments from Canada to Florida. They are similar to Atlantic sturgeon in that they are slow-growing and late to reach reproductive maturity; however, compared to the Atlantic sturgeon, shortnose sturgeon spend relatively little time in the ocean, and typically remain in nearshore marine waters (NOAA 2022c).

Historically, shortnose sturgeon were found in coastal rivers and major estuaries throughout the East Coast. Currently, they are found in 41 bays and rivers, but their distribution is segmented, with a 250-mile gap separating the northern and mid-Atlantic metapopulations from the southern metapopulation (NOAA 2022c). The southern metapopulation, also known as the Carolinian Province, includes habitat in the Cooper River, the Ashley River, and potentially the Wando River in South Carolina.

Shortnose sturgeon habitat varies depending on their life stage. Adults spawn in freshwater and juvenile fish remain in their natal river, making trips to saltwater occasionally to feed on bottom-dwelling marine invertebrates, such as crustaceans, worms, and mollusks (NOAA 2022c). In the Carolinian Province population, spawning migrations typically occur from January to April (NOAA 2022c). Adult shortnose sturgeon are expected to remain in the deeper waters of the Wando River. Shortnose sturgeon have a potential to occur in the Wando River but are not expected to occur within the smaller tidal influenced tributaries (Horlbeck Creek and Mill Creek) crossed by the Project due to the lack of water at low tides. Therefore, the occurrence of individual shortnose sturgeon would be transient or seasonal.

3.3 Sea Turtles

Sea turtles are highly migratory, long-lived reptiles that occur throughout the open-ocean and coastal regions of the world, generally within tropical to subtropical latitudes. Habitat and distribution vary depending on species and life stages and are discussed further in the species profiles. Sea turtles can be found in South Carolina's nearshore waters April through November or nesting on South Carolina beaches from May through October (SCDNR 2014).

Sea turtles have shared jurisdiction between NOAA Fisheries and USFWS under the ESA, where NOAA leads the conservation and recovery of sea turtles in the marine environment and USFWS leads the conservation and recovery of turtles on nesting beaches (NOAA 2022p). Therefore, for the purposes of this biological assessment, the effects determination is made based on NOAA-NMFS jurisdiction of sea turtles in the marine environment.

3.3.1 Green Sea Turtle

In 1978, the green sea turtle (*Chelonia mydas*) was listed under the ESA as a threatened species throughout its range except for the Central Pacific DPS and South Pacific DPS, which were listed as endangered (NOAA 2022f). In the United States, nesting green sea turtles are found in the waters of the

Pacific, Puerto Rico, the Virgin Islands, and the east coast of Florida, but nests are also occasionally found in Georgia, South Carolina, and North Carolina. Critical habitat has been designated for this species but does not occur in the study area.

Adult and juvenile green sea turtle habitat typically includes nearshore waters as well as bays and lagoons, particularly in areas with seagrass beds to support their diet (NOAA 2022f). Juveniles are prevalent in coastal areas throughout the species' entire range, as well as the Gulf of Mexico. Green sea turtles become reproductively mature between 25 and 40 years old. Adults may migrate up to 1,850 miles between their breeding beaches and feeding areas. Adults prefer shallow, low energy waters with adequate submerged vegetation, mollusks, sponges, crustaceans, and jellyfish for feeding. Eggs and hatchlings generally experience high mortality resulting from aquatic and terrestrial predators, tidal extremes, and beach erosion. Although green sea turtles do not typically nest in South Carolina, juvenile turtles consistently utilize South Carolina's inshore and nearshore waters as foraging grounds from April through November (SCDNR 2014).

In 2021, a total of five green sea turtle nests were documented in South Carolina at Garden City Beach (3 nests), Hilton Head Island (1 nest), and Huntington Beach State Park (1 nest), all located at least 60 miles to the north of the study area (SCDNR 2022). Green sea turtle nests have been documented on the beaches of the Isle of Palms within the last 10 years (SCDNR 2022). While the study area does not contain critical or suitable nesting habitat for green sea turtles, the species may use the estuarine waters of the Wando River for foraging. In the event that an individual occurs in the study area or nearby Wando River, Project activities could result in behavioral changes from noise disturbances but no adverse effects on the species are expected to occur.

3.3.2 Hawksbill Sea Turtle

The hawksbill sea turtle (*Eretmochelys imbricata*) is ESA listed as endangered throughout its range, which includes tropical waters of the Atlantic, Pacific, and Indian Oceans (NOAA 2022g). Degradation of coral reef habitat and overharvesting have led to the species' decline. Critical habitat has been designated in Puerto Rico but there is no critical habitat within the study area.

Hawksbill sea turtles have a mixed migratory strategy. Some migrate over 1,000 miles between nesting beaches and foraging habitat, while others have limited migration patterns between 50 and 100 miles (NOAA 2022g). Nesting beaching in the continental United States is typically restricted to southeast Florida and the Florida Keys. Hatchlings and young juveniles are primarily pelagic, but after several years in the open ocean, juveniles may enter shallower coastal areas for feeding. Hawksbill turtles are omnivorous (feeding on both plants and other animals), but their preferred food is sea sponges. They will also eat marine algae, corals, mollusks, tunicates, crustaceans, sea urchins, small fish, and jellyfish. They are commonly found feeding among coral reefs, rock formations, and high energy shoals that provide habitat for sponge growth (NOAA 2022g).

Hawksbill sea turtles have not been documented nesting on nearby beaches, such as Folly Beach and Sullivan's Island, in the last 10 years (SCDNR 2022). The study area does not contain suitable nesting or foraging habitat for hawksbill sea turtles. In the event that an individual occurs in the study area or nearby Wando River, Project activities could result in behavioral changes from noise disturbances but no adverse effects on the species are expected to occur.

3.3.3 Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle (*Lepidochelys kempii*) was listed as endangered in 1970. A recovery plan exists for this species and was issued in 1984 and updated in 1992 and 2011. This species is part of the NOAA-NMFS and USFWS 5-year review initiated in 2012 for four species of sea turtles (77 Federal

Register 61573 61574). NOAA-NMFS and USFWS published the 5-year review for Kemp's ridley in July 2015, which concluded that the species remain classified as endangered. Critical habitat has been proposed for this species but does not occur in the Project area.

Female reproductive maturity occurs between 10 and 17 years. The preferred foraging habitat for the Kemp's ridley sea turtle is the nearshore waters and inshore salt marshes of the Gulf of Mexico where their preferred crab prey occurs. In addition to the Gulf, juvenile Kemp's ridley sea turtles also inhabit waters of Long Island Sound, New England, and Nova Scotia. Juveniles feed primarily on *Sargassum* and mollusks (NOAA 2022h). They do not typically nest in South Carolina but can be found in inshore and nearshore waters from April through November (SCDNR 2014).

The majority (95 percent) of Kemp's ridley nesting occurs on the beaches of the western Gulf of Mexico in the state of Tamaulipas, Mexico. Rare nesting has been documented on the beaches of North Carolina, South Carolina, Georgia, Florida, Alabama, and Texas (NOAA 2022h). The study area does not contain suitable nesting habitat for the Kemp's ridley sea turtle. In the event that an individual occurs in the study area or nearby Wando River, Project activities could result in behavioral changes from noise disturbances but no adverse effects on the species are expected to occur.

3.3.4 Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*) was listed as threatened in 1978 and a recovery plan was issued in 1984 and updated in 1991 and 2008. In 2011, a final rule was issued to list four DPS as endangered and five DPS as threatened. The listed threatened Northwest Atlantic Ocean DPS covers individuals that could occur along the coast adjacent to the Project area. The nearest critical habitat is located about 15 miles southwest of the Project area at Folly Beach (NOAA 2022j).

In the southeastern United States, female loggerheads reach reproductive maturity at 15 to 30 years. Loggerhead nesting has been well documented and averages over 100,000 nests per year in the United States (SCDNR 2014). Their nesting range in the United States occurs from southern Florida to North Carolina (SCDNR 2020). In South Carolina, loggerheads nest on open sandy beaches above the high tide line. Primary nesting sites in South Carolina are beaches between North Inlet and Price Inlet, with moderate nesting activity occurring between Kiawah Island and Hilton Head Island (SCDNR 2020).

Adult loggerhead sea turtles are generally considered pelagic but often remain near shore in bays, estuaries, lagoons, creeks, and mouths of rivers. In the southeastern United States, some loggerhead sea turtles migrate north in the spring and south in the fall. Their diet is the most varied of the sea turtles, consisting of marine invertebrates, vegetation, and fish. The Project area does not have suitable nesting habitat but does contain low quality foraging habitat. Although unlikely, individual(s) could occur in the lower reaches of the Wando River. In the event that an individual occurs in the study area or nearby Wando River, Project activities could result in behavioral changes from noise disturbances but no adverse effects on the species are expected to occur.

4.0 Environmental Impacts

Several types of impacts on species were analyzed for the proposed action, including permanent and temporary effects associated with direct and indirect impacts. No permanent effects are anticipated as a result of the proposed action; however, temporary effects from sound pressure could occur during the Project construction phase. Project impacts and associated effects are detailed in **Table 4-1**.

Table 4-1. Potential Effects on Federally Protected Species

Impact	Permanent Effects		Temporary Effects	
	Direct	Indirect	Direct	Indirect
Habitat Resources	Tidal wetlands and tidal creeks	No Effects	No Effects	
Physical Harm	No Effects			
Sound Pressure	No Effects		Behavioral changes (pile driving)	No Effects
Turbidity	No Effects		Erosion and soil transport into aquatic features	No Effects
Lighting	No Effects			

4.1 Habitat Resources

Temporary impacts on habitat resources would include vegetation removal not exceeding about 0.1 acre. These temporary impacts would be associated with the installation of control measures for sediment and erosion control. However, most control measures would be placed in uplands and thus would not impact aquatic features. No effects on unconsolidated bottom habitat would occur because construction of the bridge over the Wando River would not require Project related work or improvements.

Approximately 3.2 acres of non-tidal wetlands would be permanently impacted as a result of the Project. Additionally, about 3.7 acres of tidal wetlands would be permanently affected (shaded or filled) from construction of the two bridges. Up to 0.3 acre of temporary impacts on tidal creek habitat would occur at Horlbeck Creek and Mill Creek during the installation of the two proposed bridges (**Table 4-2**). These effects on habitat resources would include the minor permanent effects from the installation of 475 collective H-piles at the two proposed bridges. The impacts on habitat resources are not anticipated to result in indirect effects on federal species because the aquatic habitat resources do not represent important habitat for any federal listed species or their preferred food.

Table 4-2. Aquatic Habitat Resources in the Study Area and LOD*

Habitat Type	Study Area (acres)	Project LOD (acres)
Unconsolidated Bottom	13	2.9
Tidal Wetlands	43	3.7
Non-Tidal Wetlands	62	3.2
Tidal Creek	3.0	0.3
Intertidal Non-Vegetated Flat	1.3	0.03

*Based on desktop habitat delineation and site-specific delineation of wetlands

4.2 Physical Harm

The proposed action is not expected to result in direct physical harm (injury or death) to any federal listed species. This is because the majority of construction activities are occurring within uplands. Additionally, H-piles used for the proposed bridges would be installed using equipment located in uplands; therefore, no incidental vessel strikes would occur on aquatic organisms. Furthermore, at least half of the time required for construction within or near the wetlands or tidal creeks would occur during low tide when fish and other sensitive aquatic species could not occur in the study area.

4.3 Sound Pressure

Sound pressure caused by pile driving has the potential to cause permanent or temporary impacts to species if individuals occur in close proximity to pile driving construction activities. Construction noise is generally considered to generate impulsive or non-impulsive sounds, as defined below.

- Impulsive sounds are transient, brief (less than 1 second), and typically consist of high peak pressure with rapid rise time and rapid decline (ANSI 1986; NIOSH 1998; ANSI 2005). Examples of impulsive sounds include air guns or impact pile drivers.
- Non-impulsive sounds can be brief or prolonged and continuous or intermittent, but typically do not have a high peak pressure with rapid rise time (ANSI 1995; NIOSH 1998). Examples of non-impulsive activities include sonar and vibratory pile drivers.

Noise levels are generally higher if impact pile driving is used, as compared to vibratory hammer driving or extraction. Impact pile driving creates an impulsive sound, while vibratory hammers generate a continuous, low-level noise that is generally considered non-impulsive. For this Project, 14-inch steel H-piles would be installed with impact pile hammers. It is estimated that the average sound pressure level from pile installation would be 174 decibels (dB) at peak sound pressure levels (dB_{peak}), 162 dB root-mean-squared, and 145 dB sound exposure level (SEL) (CalTrans 2015). However, due to the dense emergent vegetation along Horlbeck and Mill Creeks, these sound levels would attenuate faster than in open water. Furthermore, during low tide there would be little or no potential for effects on aquatic species in the study area due to the lack of a water column to transmit the sound pressure.

Bridge 1 is a 640-foot-long flat slab bridge proposed across a branch of Horlbeck Creek. This bridge is estimated to require about 537,800 strikes to install the collective 323 14-inch H-pile bents. Assuming 0.5 hour per pile installation, approximately 161 hours of active pile driving would be required to install 323 piles. Bridge 2 is a 280-foot-long flat slab bridge proposed across Mill Creek near the intersection of SC 41 and Dunes West Boulevard. This bridge is estimated to require about 253,100 strikes to install the collective 152 14-inch H-pile bents. Assuming 0.5 hour per pile installation, approximately 76 hours of active pile driving would be required to install 152 piles. **Table 4-3** outlines the general details required to install the steel H-piles for each of the two proposed bridges.

Table 4-3. Project H-Pile Details by Bridge Location

Bridge Site	Map Label	Bridge Length	Total # of Piles	Average # of Strikes / Pile	Total # of Strikes
Horlbeck Creek Tributary	Bridge 1	640 feet	323	1,665	537,800
Mill Creek	Bridge 2	280 feet	152	1,665	253,100

Some in-water pile driving for both bridges would be performed within the tidal wetlands and associated tidal creeks. If an aquatic species occurs in the study area during pile driving, the species could be disturbed from increased sound pressure levels. However, effects from increased sound pressure are not

expected to rise to the level resulting in harm. The most likely result of sound pressure disturbances would be a temporary behavioral change to avoid areas with Project activities.

4.4 Turbidity

Elevated turbidity levels may occur during the installation of the H-pile bents, wetland filling, and work adjacent to aquatic features. Turbidity can result in lower visual acuity of some species to effectively forage and/or could increase the risk of predation due to reduced sight for predator avoidance. Simultaneously, predation risks may be temporarily decreased if turbidity disrupts predators' visual acuity to hunt prey. Appropriate control measures (e.g., silt fencing) would be implemented to minimize effects of construction runoff and other sources of turbidity in surface waters within the study area. With the appropriate sediment control measures and considering that no listed species are expected to inhabit the narrow tidal creeks within the study area, no effects associated with increased turbidity are expected to occur as a result of the Project.

4.5 Lighting

The Project would adhere to the roadway lighting requirements defined in the American Association of State Highway and Transportation Officials' Roadway Lighting Design Guide (AASHTO 2005). Permanent downward-facing and shielded roadway lighting would be installed intermittently along the SC 41 roadway length. Temporary lighting could also be used for construction work at night; however, the majority of construction would occur during the day. Regardless, no impacts on listed species are expected because listed species are not expected to occur within the narrow tidal creeks. Also, the lighting on the SC 41 bridge over the Wando River would include low lumen, shielded light that would only illuminate the roadway surface.

5.0 Effects Analysis

5.1 Fish

Atlantic and shortnose sturgeon adults or juveniles could occur in the Wando River. However, these two sturgeon species are not expected to occur within the study area where the Project crosses tidal creeks. However, if sturgeon individuals do occur within or near (i.e., Wando River) the study area during construction, impacts are expected to be limited to increased sound pressure resulting in temporary disturbances which could induce behavioral responses and/or temporary displacement from the study area. The potential effects on federal listed species and habitat are discussed below.

5.1.1 Habitat Resources

Limited impacts on aquatic habitat resources would occur as a result of the Project. About 2.4 aces of impacts on tidal wetlands would occur from the construction of the two proposed bridges at Mill and Horlbeck Creek. However, the two sturgeon species are not expected to inhabit the narrow tidal creeks in the study area. Therefore, no effects on the two fish species are anticipated as a result of impacts on habitat resources.

5.1.2 Physical Harm

Some H-piles will be installed within wetlands associated with Horlbeck Creek (Bridge 1) and Mill Creek (Bridge 2). However, because the two sturgeon species are benthic fish, they are not expected to occur

near the water surface or otherwise inhabit shallow tidal streams in the study area. Therefore, no direct effects would occur from Project activities because construction would occur primarily within uplands. However, Project activities associated with bridge construction would occur within and near tidal wetlands associated with Horlbeck and Mill Creeks. Unless permitted, equipment used within or adjacent to wetland habitat boundaries would be stationed and operated from uplands or existing road surfaces. Regardless, Project activities are not likely to result in the direct physical harm of either federal listed sturgeon species because neither of the species are expected to occur in the narrow tidal creeks.

5.1.3 Sound Pressure

Project construction activities and in-water pile driving that result in increased sound pressure could harm fish if they occur close to the noise source for prolonged periods. The sound pressure levels associated with the installation of H-piles could reach about 203 dB at peak sound pressure levels (i.e., single strike), 216 dB cumulative SEL, and 188 dB root-mean-squared pressure. NOAA-NMFS generally recognize that sound pressure levels in excess of 150 dB can result in behavioral changes in fish. Furthermore, the onset of injury from sound pressure begins at an estimated 187 dB for fish over 2 grams (Popper et al. 2014; CalTrans 2015) (**Table 5-1**).

Table 5-1. NOAA-NMFS In-Water Sound Pressure Thresholds for Generalist Fish > 2 grams

Effect	Metric	Threshold (dB)	Estimated Sound Pressure Level from H-pile Installation (dB)*
Onset of Physical Injury	Peak Sound Pressure Levels	206	203
	Cumulative SEL	187	216
Behavioral Disturbance	Root Mean Square Pressure	150	188

Source: CalTrans 2015

* Estimated at 10 meters from the source of sound pressure

Use of an impact hammer to install the bridge H-pile structures may approach 203 dB but would not exceed the 206 dB threshold above which injurious effects on fish could occur. Should a sturgeon occur in the study area during the installation of H-piles, behavioral disturbance could occur if individuals are exposed to sound pressure above 150 dB. However, sturgeon occupancy of the study area would be transitory; therefore, prolonged exposure and resulting cumulative effects are not expected to occur.

Neither sturgeon species is expected to occur within or near the study area where the proposed bridge 1 crosses Horlbeck Creek; therefore, sound pressure produced during the construction of Bridge 1 would not risk effects on either species. Both sturgeon species have a low potential to occur within the Wando River which occurs within about 0.5 mile from the proposed Bridge 2 at Mill Creek. However, this distance to the Wando River combined with the dissipating effects of tidal wetland vegetation is expected to attenuate the sound pressure levels before reaching the Wando River. Additionally, where the Project crosses tidal creeks, it can be assumed that about half of the construction time at these locations would occur during low tide or otherwise when the tidal creek and adjacent tidal wetlands lack a water column. The installation of steel H-piles during low tide would have no risk of injurious effects on fish due to the lack of a water column to convey the sound pressure to the Wando River.

If either of the sturgeon species occur in or near the study area during construction, individuals exposed to increased sound pressure from pile driving could be temporarily disturbed and subsequently forced to modify their behavior to avoid the study area during construction. However, the sound pressure levels produced from the Project are not expected exceed the levels risking injurious effects.

5.1.4 Turbidity

Short-term increases in turbidity may occur during periods of pile driving or other in-water construction work. Should either sturgeon species occur in the study area during construction, increased turbidity could limit visual acuity, leading to a decrease in the ability to forage and potential displacement from the study area. Increased turbidity can also result in changes to water quality (declines in dissolved oxygen or toxicity of total suspended solids [TSS]), however the TSS levels expected for pile driving is 5.0 to 10.0 milligrams per liter (mg/L), which are far below those shown to have adverse effects on fish (typically up to 1,000.0 mg/L) or benthic communities (390.0 mg/L) (GARFO 2021). Turbidity from surface runoff would be minimized by the use of stormwater control measures and any soil that evades the control measures is not expected to measurably impact turbidity outside of the study area. Therefore, the temporary impacts from turbidity on fish are expected to be minimal and limited to the immediate area of construction, where sturgeon are not anticipated to occur

5.1.5 Lighting

Intermittent downward-facing lighting would be permanently installed along the widened SC 41 roadway. In general, artificial lighting can cause temporary disorientation of organisms and potential aversion to otherwise suitable habitat. However, no impact on either sturgeon species is expected to occur, primarily because individuals are not anticipated to occur within the narrow tidal creeks. Also, any artificial lighting installed on the SC 41 bridge over the Wando River would be low lumen, shielded light that would only illuminate the roadway surface. Therefore, no lighting effects would occur on either sturgeon species.

5.2 Sea Turtles

Potential Project impacts on sea turtles would be limited to behavioral disturbances as a result of increased sound pressure from bridge pile driving at Mill and Horlbeck Creeks. The following sections detail potential effects on sea turtles in the study area.

5.2.1 Habitat Resources

There is no nesting habitat in the study area for sea turtles. However, inland riverine habitat occurs within the Wando River that could support limited foraging or incidental occurrence. However, sea turtles are not expected to forage within the tidal creeks in the study area due to the shallow (less than 6 feet deep) and fluctuating water levels. The tidal wetlands and tidal creeks within the study area would not provide a substantial or an important habitat resource for sea turtle foraging; therefore, no effects on sea turtles are anticipated as a result of the proposed action.

5.2.2 Physical Harm

Construction activities would not result in the physical harm of sea turtles by accidental strikes from equipment or vessels. This is primarily because sea turtles are not expected to occur in the tidal creeks and associated tidal wetlands within the study area.

5.2.3 Sound Pressure

Sea turtle hearing is limited to low-frequency sounds, which may be used as guideposts during migration and to identify nesting beaches (Lenhardt et al. 1983). In general, the potential for impacts on sea turtles is greatest during the nesting and hatching season from early May to late October. Although no suitable nesting beaches occur within the study area, other effects could result from increased sound pressure

levels including, but not limited to, temporary behavioral disturbance (e.g., startle reactions) to injurious effects such as the loss of hearing and damage to internal organs.

The sound pressure levels associated with the installation of H-piles could reach about 203 dB at peak sound pressure levels (i.e., single strike), 216 dB cumulative SEL, and 188 dB root-mean-squared pressure. NOAA-NMFS generally recognize that sound pressure levels in excess of 175 dB can result in behavioral changes in sea turtles. Furthermore, the onset of injury from sound pressure begins at an estimated 204 dB (**Table 5-2**) (Popper et al. 2014; CalTrans 2015).

Table 5-2. NOAA-NMFS In-Water Sound Pressure Thresholds for Sea Turtles

Effect	Disturbance	Threshold (dB)	Estimated Sound Pressure Level from H-pile Installation (dB)*
Onset of Physical Injury	Peak Sound Pressure Levels	232	203
	Cumulative SEL	204	216
Behavioral Disturbance	Root Mean Square Pressure	175	188

Source: CalTrans 2015

* Estimated at 10 meters from the source of sound pressure

Use of an impact hammer to install the bridge H-pile structures may approach 203 dB but would not exceed the 232 dB threshold above which injurious effects could occur. Should a sea turtle occur in the study area during the installation of H-piles, behavioral disturbance could occur if individuals are exposed to sound pressure above 175 dB. However, sea turtle occupancy of the study area would be transitory; therefore, prolonged exposure and resulting cumulative effects are not expected to occur.

Where the Project crosses tidal creeks, it can be assumed that about half of the construction time at these locations would occur during low tide or otherwise when the tidal creek and adjacent tidal wetlands lack a water column. Therefore, the installation of steel H-piles during low tide would have no risk of injurious effects on sea turtles due to the lack of a water column to convey the sound pressure to the Wando River. Furthermore, the two proposed bridges are located at least 0.5 mile from the Wando River. This distance combined with the dissipating effects of tidal wetland vegetation is expected to attenuate the sound pressure levels to well below threshold levels before reaching the Wando River.

In summary, should sea turtles occur within or near the study area during Project activities, individuals could be disturbed and temporarily forced to modify their behavior to avoid areas such as the two proposed bridges. Regardless, sound pressure levels from the Project are unlikely to exceed the levels risking injurious effects.

5.2.4 Turbidity

Elevated turbidity associated with construction would be limited to areas involving the placement of fill material for bridge approaches, installation of H-piles, and any areas that evade the stormwater control measures. However, sea turtles are not expected to occur within the study area where soil disturbing construction activities are proposed.

Short-term increased turbidity levels may temporarily reduce water quality and the foraging efficacy of sea turtles, which are visual foragers and predators. The increased turbidity is expected to dissipate over a matter of hours and would not permanently degrade water quality conditions or sea turtles' ability to forage. The Greater Atlantic Regional Fisheries Office states that although there is no information available on the effects of TSS on juvenile and adult sea turtles, the minor alterations in movement caused by increased suspected sediments is too small to be meaningfully measured or detected (GARFO 2021).

Furthermore, since turtles are air-breathing and mobile organisms, individuals would be able to pass through the TSS plume without adverse effects.

5.2.5 Lighting

In general, artificial lighting has the potential to cause temporary disorientation of sea turtles and aversion to otherwise suitable habitat. Intermittent downward-facing lighting would be permanently installed along the widened SC 41 roadway. No impacts on sea turtles are expected because individuals are not expected to occur within the narrow tidal creeks. Also, the lighting on the SC 41 bridge over the Wando River would include low lumen, shielded light that would only illuminate the roadway surface. Therefore, no effects on sea turtles are expected to occur on sea turtles.

6.0 Conservation Measures

The following conservation measures/actions would minimize the potential effects on species:

- Bridge construction access would occur from upland areas to the maximum extent practicable;
- Standard sediment and erosion control practices would be applied, including:
  - No permanent bank erosion or decreased stabilization
  - To the maximum extent practicable, the Project will be implemented in stages of development so that only areas that are under active construction have exposed soils. All other areas should have good cover of either temporary or permanent vegetation (using native seed mixtures), or bioengineering material.
  - Grading would be completed as soon as possible following commencement
  - Runoff velocities would be kept as low as possible and retained on-site using sediment and erosion control measures; and
  - Sediment and erosion control measures would be maintained in effective operating condition throughout the duration of the Project.
- Equipment and materials used during the construction of the bridges would not obstruct or impede passage through more than 50 percent of the channel;
- Raw or live concrete would not come into contact with wetlands or open water until cured
- Only clean riprap would be used if necessary
- Pollutants would be prevented from entering waterways or wetlands
- No mechanized equipment would operate in wetlands or waters of the U.S. unless clearly identified and authorized in the approved plans
- Use of “slow-starts” while pile driving would minimize disturbances
- Siltation barriers would be made of material in which a sea turtles cannot become entangled.

The above listed and other conservation measures and conditions are detailed further in the NOAA-NMFS Sea Turtle Construction Conditions (NMFS 2006) and National Pollutant Discharge Elimination System permit conditions.

7.0 Effects Determination

This biological assessment was conducted to identify the potential effects on federal listed species as a result of the proposed action. The potential for effects on federal listed species are limited to construction-associated sound pressure resulting from pile driving. Therefore, effects on listed species may occur but are not expected to result in adverse effects or the taking of any federal listed species. Effects on fish or sea turtles due to the proposed action would be insignificant and temporary.

Based on the limited availability of suitable habitat, the presence of sturgeon and sea turtles in the study area is unlikely. Due to the lack suitable habitat in the study area and limited potential for impacts, the proposed Project **may affect, but is not likely to adversely affect** the Atlantic sturgeon, shortnose sturgeon, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, and loggerhead sea turtle (**Table 7-1**). **No effects** would occur on any of the remaining species as a result of the proposed action.

Table 7-1. Effects Determination

Common Name	Federal ESA Designation	Effect Determination	Justification
Atlantic Sturgeon	Endangered	NLAA	Project area may contain migratory habitat. In-water construction sound pressure may cause behavioral disturbances.
Shortnose Sturgeon	Endangered	NLAA	
Giant Manta Ray	Threatened	No Effect	Suitable habitat does not occur within or near in the study area; biological assessment is not required of species that cannot be present in the proposed study area.
Oceanic Whitetip Shark	Threatened	No Effect	Suitable pelagic habitat does not occur within or near in the study area; biological assessment is not required of species that cannot be present in the proposed study area.
Green Sea Turtle	Threatened	NLAA	Project area contains potentially suitable foraging habitat. In-water sound pressure from pile driving could result in behavioral disturbances or temporary displacement of individuals from the study area.
Hawksbill Sea Turtle	Endangered	NLAA	
Kemp's Ridley Sea Turtle	Endangered	NLAA	
Loggerhead Sea Turtle	Threatened	NLAA	
Leatherback Sea Turtle	Endangered	No Effect	Suitable pelagic habitat does not occur within or near in the study area; biological assessment is not required of species that cannot be present in the proposed study area.
Blue Whale	Endangered	No Effect	Suitable pelagic or near-shore habitat does not occur within or near in the study area; biological assessment is not required of species that cannot be present in the proposed study area.
Fin Whale	Endangered	No Effect	
North Atlantic Right Whale	Endangered	No Effect	
Sei Whale	Endangered	No Effect	
Sperm Whale	Endangered	No Effect	

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HIGHWAY 41 CORRIDOR IMPROVEMENTS

APPENDIX A

Detailed Project Figures

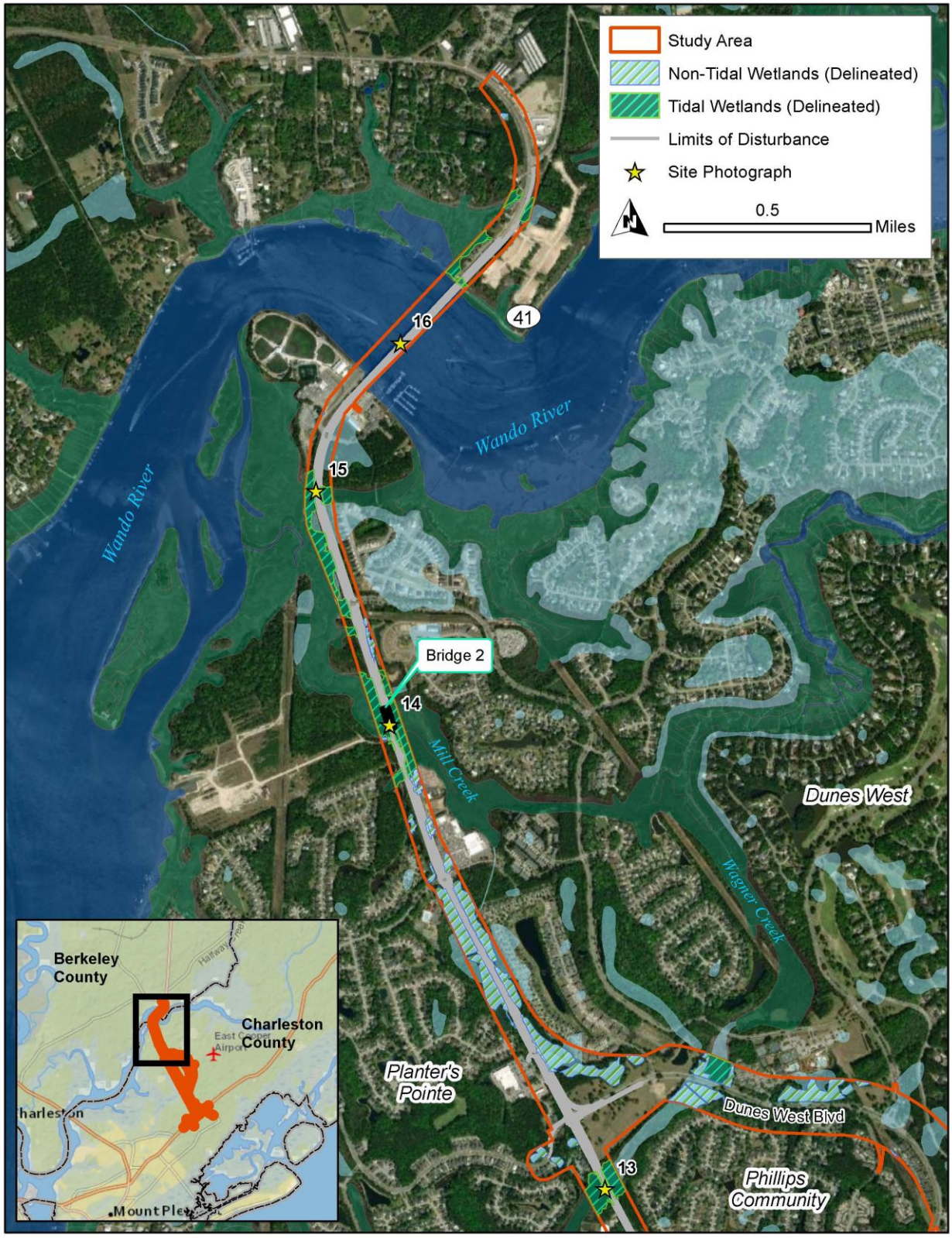

Figure A-1. Potential Habitat for Threatened and Endangered Species, Preferred Alternative

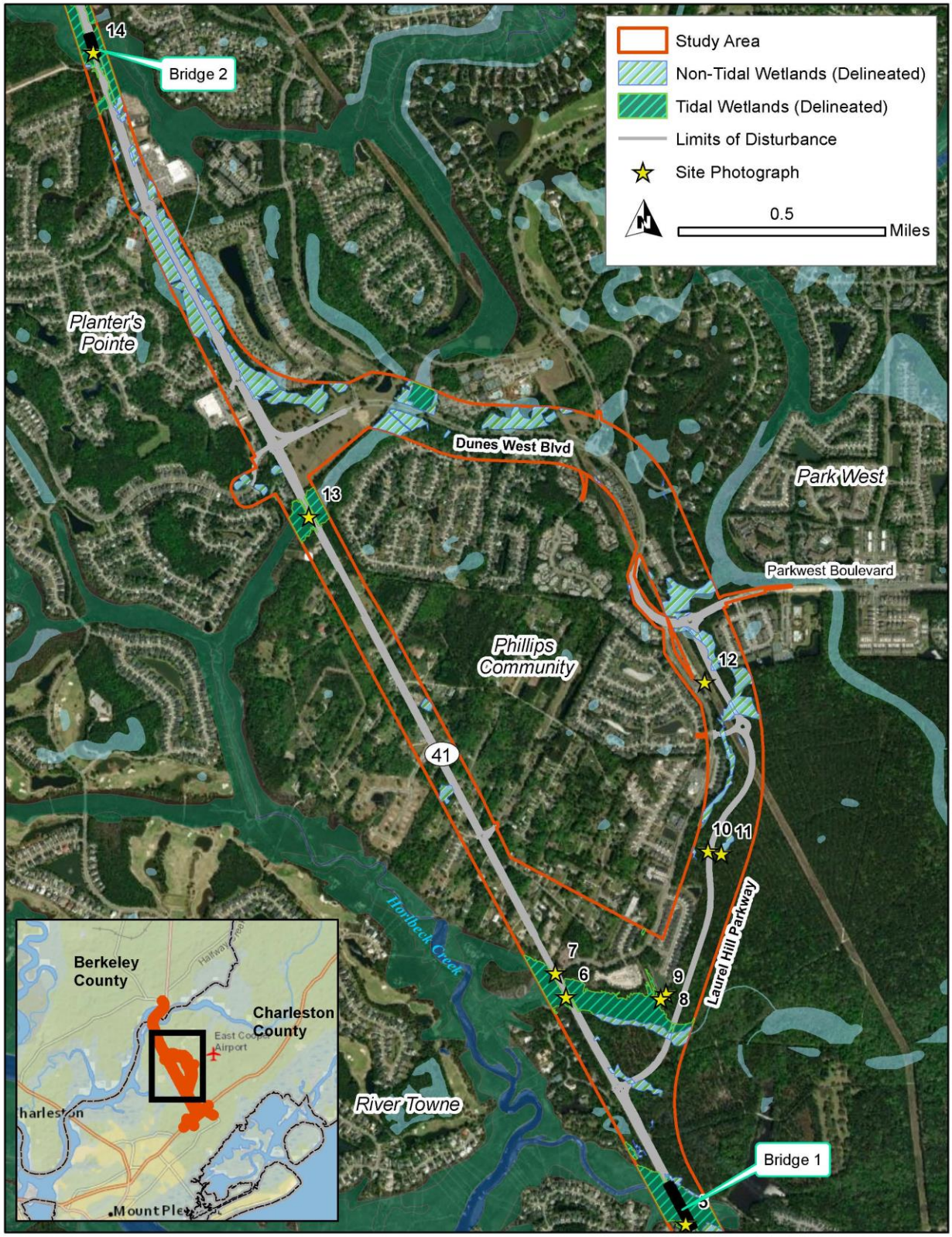

Figure A-2. Potential Habitat for Threatened and Endangered Species, Preferred Alternative

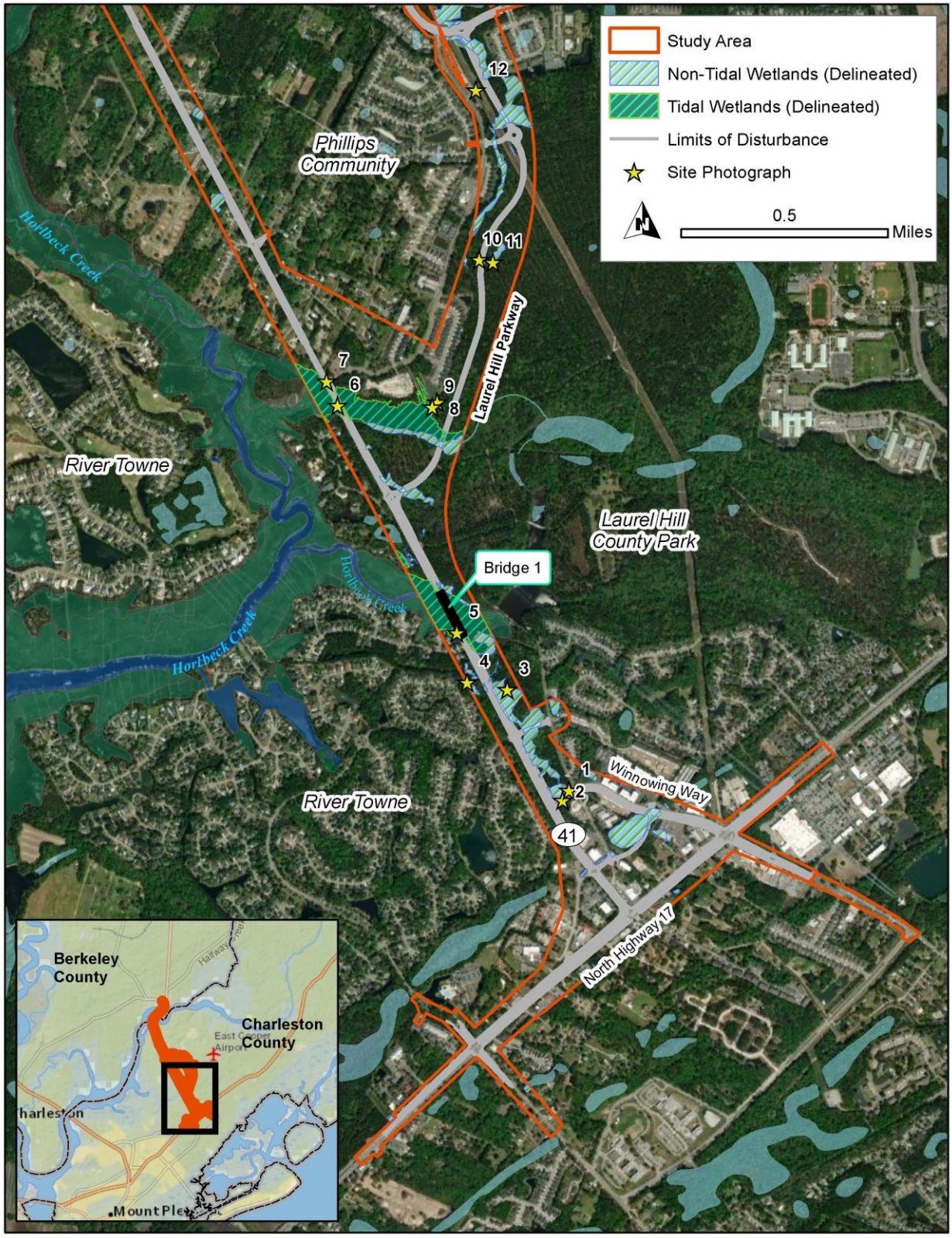

Figure A-3. Potential Habitat for Threatened and Endangered Species, Preferred Alternative

HIGHWAY 41 CORRIDOR IMPROVEMENTS

APPENDIX B

B1 -- USFWS Information for Planning and Consultation Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
Phone: (843) 727-4707 Fax: (843) 727-4218
http://www.fws.gov/charleston/

In Reply Refer To:
Project Code: 2022-0028747
Project Name: SC Highway 41 Corridor Improvements Project

April 06, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Marine Mammals
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
(843) 727-4707

Project Summary

Project Code: 2022-0028747
Event Code: None
Project Name: SC Highway 41 Corridor Improvements Project
Project Type: Road/Hwy - Maintenance/Modification
Project Description: The proposed project is to reduce traffic congestion within the SC 41 corridor to accommodate future traffic projections. The secondary purposes of the proposed project are to enhance safety throughout the corridor, improve transportation system and community connections, and provide bicycle and pedestrian accommodations, while minimizing community and environmental impacts. Charleston County proposes to improve SC Highway 41 (SC 41) for a total of approximately 5.6 miles from US Highway 17 (US 17) across the Wando River Bridge to Clements Ferry Road, located in Berkeley and Charleston Counties, South Carolina. The proposed project also includes improvements to the intersection of SC 41 and US 17, a new tie-in road between SC 41 and Winnowing Way, and 1.3 mile new location roadway, Laurel Hill Parkway, between SC 41 and Park West Boulevard.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@32.892658850000004,-79.80272606953667,14z

Counties: Berkeley and Charleston counties, South Carolina

Endangered Species Act Species

There is a total of 17 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened
West Indian Manatee *Trichechus manatus* There is **final** critical habitat for this species. The location of the critical habitat is not available. ***This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.*** Species profile: https://ecos.fws.gov/ecp/species/4469	Threatened

Birds

NAME	STATUS
Bachman's Warbler (=wood) *Vermivora bachmanii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3232	Endangered
Eastern Black Rail *Laterallus jamaicensis ssp. jamaicensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered
Wood Stork *Mycteria americana* Population: AL, FL, GA, MS, NC, SC No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8477	Threatened

Reptiles

NAME	STATUS
Green Sea Turtle *Chelonia mydas* Population: North Atlantic DPS There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/6199	Threatened
Kemp's Ridley Sea Turtle *Lepidochelys kempii* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5523	Endangered
Leatherback Sea Turtle *Dermochelys coriacea* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/1493	Endangered
Loggerhead Sea Turtle *Caretta caretta* Population: Northwest Atlantic Ocean DPS There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/1110	Threatened

Amphibians

NAME	STATUS
Frosted Flatwoods Salamander *Ambystoma cingulatum* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4981	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
American Chaffseed *Schwalbea americana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1286	Endangered
Canby's Dropwort *Oxypolis canbyi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7738	Endangered
Pondberry *Lindera melissifolia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1279	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Kestrel *Falco sparverius paulus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
American Oystercatcher *Haematopus palliatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8935	Breeds Apr 15 to Aug 31

NAME	BREEDING SEASON
Bachman's Sparrow *Aimophila aestivalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6177	Breeds May 1 to Sep 30
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Black Skimmer *Rynchops niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Gull-billed Tern *Gelochelidon nilotica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9501	Breeds May 1 to Jul 31
King Rail *Rallus elegans* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8936	Breeds May 1 to Sep 5
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Ruddy Turnstone *Arenaria interpres morinella* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Swallow-tailed Kite *Elanoides forficatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30

NAME	BREEDING SEASON
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 5
Wilson's Plover *Charadrius wilsonia* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Aug 20
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

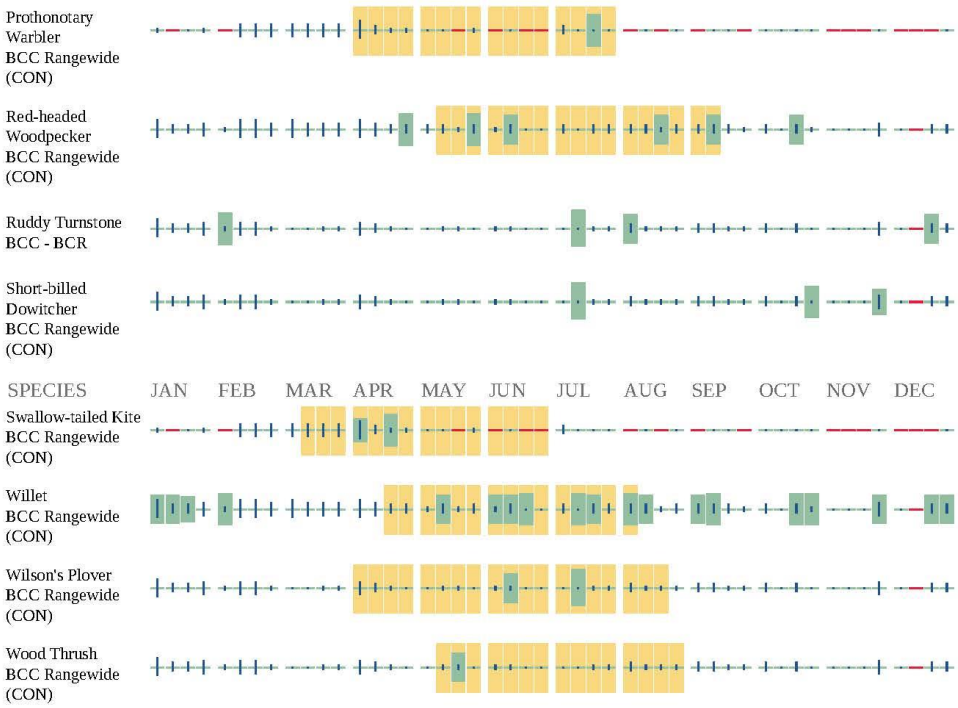
Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits

may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);

2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities,

should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Marine Mammals

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

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1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

NAME

West Indian Manatee *Trichechus manatus*
Species profile: https://ecos.fws.gov/ecp/species/4469

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

HIGHWAY 41 CORRIDOR IMPROVEMENTS

APPENDIX B

B2 -- SCDNR Species Report

South Carolina Department of

Natural Resources

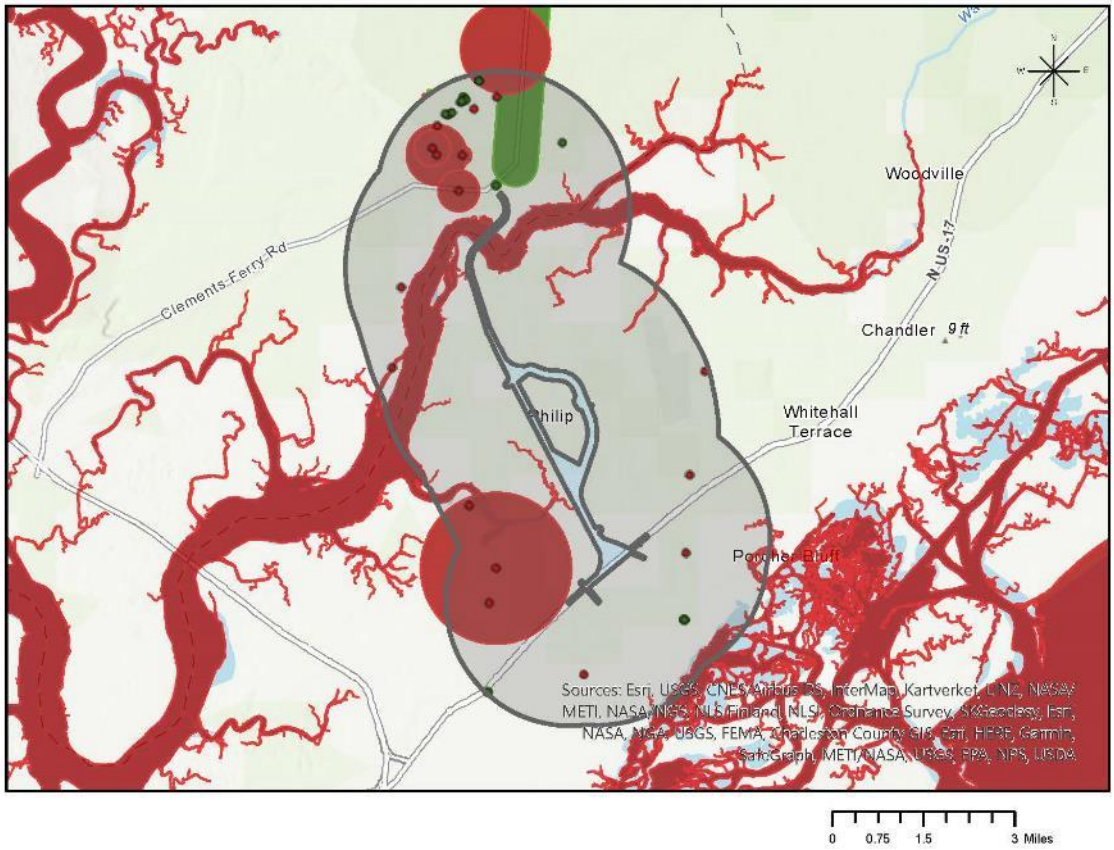
PO Box 167
Columbia, SC 29202
(803) 734-1396
speciesreview@dnr.sc.gov

Robert H. Boyles, Jr.
Director
Emily C. Cope
Deputy Director for
Wildlife and Freshwater Fisheries

Requested on Saturday, January 8, 2022 by *Andrew Phillips*.

Re: Request for Threatened and Endangered Species Consultation
Andrew Phillips - SC Highway 41 Corridor Improvements Project
Road
Charleston County-Berkeley County County, South Carolina

The South Carolina Department of Natural Resources (SCDNR) has received your request for threatened and endangered species consultation of the above named project in Charleston County-Berkeley County County, South Carolina. The following map depicts the project area and a 2 mile buffer surrounding:



South Carolina Department of
Natural Resources

Robert H. Boyles, Jr.
Director
Emily C. Cope
Deputy Director for
Wildlife and Freshwater Fisheries

This report includes the following items:
A - A report for species which intersect the project area
B - A report for species which intersect the buffer around the project area
C - A list of best management practices relevant to species near to or within the project area
D - A list of best management practices relevant to the chosen project type
E - Instructions to submit new species observation records to the SC Natural Heritage Program

Please be advised:

The contents of this report, including all tables, maps, recommendations, and various other text, are produced as a direct result of the information a user provides at the time of submission. The SCDNR assumes that all information submitted by the user represents the project scope as proposed, and recommends that additional reports be requested should the scope deviate from how the project was initially represented to the SCDNR.

The technical comments outlined in this report are submitted to speak to the general impacts of the activities as described through inquiry by parties outside the South Carolina Department of Natural Resources. These technical comments are submitted as guidance to be considered and are not submitted as final agency comments that might be related to any unspecified local, state or federal permit, certification or license applications that may be needed by any applicant or their contractors, consultants or agents presently under review or not yet made available for public review. In accordance with its policy 600.01, Comments on Projects Under Department Review, the South Carolina Department of Natural Resources, reserves the right to comment on any permit, certification or license application that may be published by any regulatory agency which may incorporate, directly or by reference, these technical comments.

Interested parties are to understand that SCDNR may provide a final agency position to regulatory agencies if any local, state or federal permit, certification or license applications may be needed by any applicant or their contractors, consultants or agents. For further information regarding comments and input from SCDNR on your project, please contact our Office of Environmental Programs by emailing environmental@dnr.sc.gov or by visiting www.dnr.sc.gov/environmental. Pursuant to Section 7 of the Endangered Species Act, requests for formal letters of concurrence with regards to federally listed species should be directed to the USFWS.

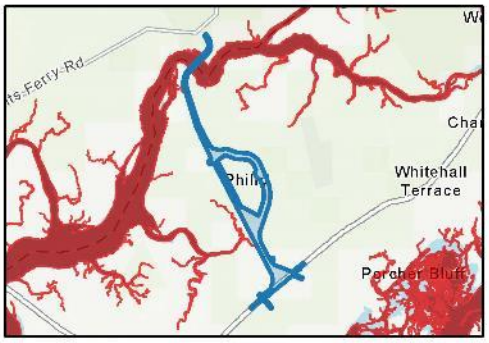
Should you have any questions or need more information, please do not hesitate to contact our office by email at speciesreview@dnr.sc.gov or by phone at 803-734-1396.

Sincerely,

Joseph Lemeris, Jr.
Heritage Trust Program
SC Department of Natural Resources

A. Project Area - Species Report

There are 2 tracked species records found within the project foot print. The following table outlines occurrences found within the project footprint (if any), sorted by listing status and species name. Please keep in mind that this information is derived from existing databases and do not assume that it is complete. Areas not yet inventoried may contain significant species or communities. You can find more information about global and state rank status definitions by visiting Natureserve's web page. Please note that certain sensitive species found on site may be listed in this table but are not represented on the map. Please contact speciesreview@dnr.sc.gov should you have further questions related to sensitive species found within the project area.

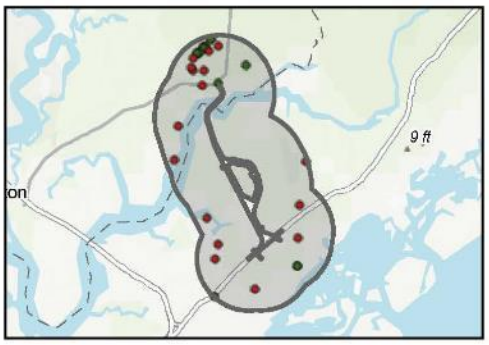


Map Credits: Sources: Esri, USGS, CNES/Airbus DS, InterMap, Kartverket, LINZ, NASA/METI, NASA/NGS, NLS Finland, NLSI, Ordnance Survey, SK Geodesy, Esri, NASA, NGA, USGS, Charleston County GIS, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA

Scientific Name	Common Name	G Rank	S Rank	Fed. Status	State Status	SWAP Priority	Last Obs. Date
Lithobates capito	Carolina Gopher Frog	G2G3	S1	ARS: At-Risk Species	SE: State Endangered	Highest	1951-04-13
Trichechus manatus	West Indian Manatee	G2G3	S1S2	LT: Federally Threatened	SE: State Endangered	Highest	2020

B. Buffer Area - Species Report (1 of 2)

The following table outlines rare, threatened or endangered species found within 2 miles of the project footprint, arranged in order of protection status and species name. Please keep in mind that this information is derived from existing databases and do not assume that it is complete. Areas not yet inventoried may contain significant species or communities. You can find more information about global and state rank status definitions by visiting Natureserve's web page. Please note that certain sensitive species found within the buffer area may be listed in this table but are not represented on the map.

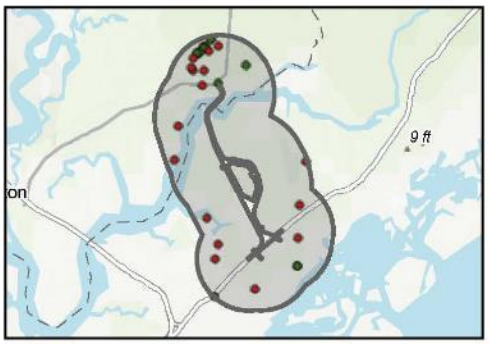


Map Credits: Sources: Esri, USGS, CNES/Airbus DS, InterMap, Kartverket, LINZ, NASA/METI, NASA/NGS, NLS Finland, NLSI, Ordnance Survey, SKGeodesy, Charleston County GIS, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Scientific Name	Common Name	G Rank	S Rank	Fed. Status	State Status
Lithobates capito	Carolina Gopher Frog	G2G3	S1	ARS: At-Risk Species	SE: State Endangered
Lithobates capito	Carolina Gopher Frog	G2G3	S1	ARS: At-Risk Species	SE: State Endangered
Clemmys guttata	Spotted Turtle	G5	S3	ARS: At-Risk Species	ST: State Threatened
Clemmys guttata	Spotted Turtle	G5	S3	ARS: At-Risk Species	ST: State Threatened
Clemmys guttata	Spotted Turtle	G5	S3	ARS: At-Risk Species	ST: State Threatened
Haliaeetus leucocephalus	Bald Eagle	G5	S3B,S3N	Bald & Golden Eagle Protection Act	ST: State Threatened
Haliaeetus leucocephalus	Bald Eagle	G5	S3B,S3N	Bald & Golden Eagle Protection Act	ST: State Threatened
Haliaeetus leucocephalus	Bald Eagle	G5	S3B,S3N	Bald & Golden Eagle Protection Act	ST: State Threatened
Haliaeetus leucocephalus	Bald Eagle	G5	S3B,S3N	Bald & Golden Eagle Protection Act	ST: State Threatened
Lindera melissifolia	Southern Spicebush, Pondberry	G3	S2	LE: Federally Endangered	Not Applicable
Dryobates borealis	Red-cockaded Woodpecker	G3	S2	LE: Federally Endangered	SE: State Endangered
Dryobates borealis	Red-cockaded Woodpecker	G3	S2	LE: Federally Endangered	SE: State Endangered
Dryobates borealis	Red-cockaded Woodpecker	G3	S2	LE: Federally Endangered	SE: State Endangered
Dryobates borealis	Red-cockaded Woodpecker	G3	S2	LE: Federally Endangered	SE: State Endangered
Ambystoma cingulatum	Frosted Flatwoods Salamander	G2	S1	LT: Federally Threatened	SE: State Endangered
Ambystoma cingulatum	Frosted Flatwoods Salamander	G2	S1	LT: Federally Threatened	SE: State Endangered
Ambystoma cingulatum	Frosted Flatwoods Salamander	G2	S1	LT: Federally Threatened	SE: State Endangered
Mycteria americana	Wood Stork	G4	S2	LT: Federally Threatened	SE: State Endangered
Trichechus manatus	West Indian Manatee	G2G3	S1S2	LT: Federally Threatened	SE: State Endangered
Ammospiza maritima macgillivraii	Macgillivray's Seaside Sparrow	G4T3	S2	MBTA: Migratory Bird Treaty Act	Not Applicable
Ardea alba	Great Egret	G5	S4S5	MBTA: Migratory Bird Treaty Act	Not Applicable
Ardea alba	Great Egret	G5	S4S5	MBTA: Migratory Bird Treaty Act	Not Applicable
Amblyscirtes alternata	Dusky Roadside-Skipper	G2G3	SNR	Not Applicable	Not Applicable
Ambystoma mabeei	Mabee's Salamander	G4	S3S4	Not Applicable	Not Applicable
Canna flaccida	Golden Canna, Yellow Canna	G4?	S2	Not Applicable	Not Applicable
Carex gholsonii	Gholson's Sedge	G4G5	S2S3	Not Applicable	Not Applicable
Iris hexagona	Angiepod Blue Flag	G4G5	S1	Not Applicable	Not Applicable
Liodytes pygaea	Black Swamp Snake	G5	SU	Not Applicable	Not Applicable
Lithobates palustris	Pickerel Frog	G5	S3S4	Not Applicable	Not Applicable
Litsea aestivalis	Pondspice	G3?	S3	Not Applicable	Not Applicable
Litsea aestivalis	Pondspice	G3?	S3	Not Applicable	Not Applicable
Ophioglossum petiolatum	Long-stem Adder's-tongue	G5	S1	Not Applicable	Not Applicable
Pseudacris ornata	Ornate Chorus Frog	G4	S3S4	Not Applicable	Not Applicable
Rhexia aristosa	Awned Meadow-beauty, Bristly Meadow-beauty	G3G4	S3	Not Applicable	Not Applicable
Rhynchospora inundata	Narrow-fruit Horned Beaksedge	G4?	S2?	Not Applicable	Not Applicable
Sarracenia rubra ssp. rubra	Carolina Sweet Pitcherplant, Carolina Redflower Pitcherplant	G3G4T3T4	S3S4	Not Applicable	Not Applicable
Satyrium kingi	King's Hairstreak	G3G4	S2S4	Not Applicable	Not Applicable
Spiranthes laciniata	Lace-lip Ladies'-tresses	G4G5	S1S2	Not Applicable	Not Applicable

B. Buffer Area - Species Report (2 of 2)

The following table outlines rare, threatened or endangered species found within 2 miles of the project footprint, arranged in order of protection status and species name. Please keep in mind that this information is derived from existing databases and do not assume that it is complete. Areas not yet inventoried may contain significant species or communities. You can find more information about global and state rank status definitions by visiting Natureserve's web page. Please note that certain sensitive species found within the buffer area may be listed in this table but are not represented on the map.

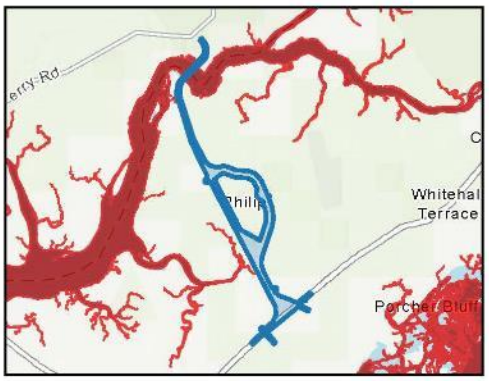


Map Credits: Sources: Esri, USGS, CNES/Airbus DS, InterMap, Kartverket, LINZ, NASA/METI, NASA/NGS, NLS Finland, NLSI, Ordnance Survey, SKGeodesy, Charleston County GIS, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Scientific Name	Common Name	G Rank	S Rank	Fed. Status	State Status	SWAP Priority	Last Obs. Date
Helenium pinnatifidum	Southeastern Sneezeweed	G4	S2	Not Applicable	Not Applicable	Not Applicable	1977-04-01
Litsea aestivalis	Pondspice	G3?	S3	Not Applicable	Not Applicable	High	2006-06-15
Litsea aestivalis	Pondspice	G3?	S3	Not Applicable	Not Applicable	High	2006-06-15
Litsea aestivalis	Pondspice	G3?	S3	Not Applicable	Not Applicable	High	2002-08-01
Litsea aestivalis	Pondspice	G3?	S3	Not Applicable	Not Applicable	High	2006-05-31
Litsea aestivalis	Pondspice	G3?	S3	Not Applicable	Not Applicable	High	2010-05-30
Litsea aestivalis	Pondspice	G3?	S3	Not Applicable	Not Applicable	High	2010-05-30
Litsea aestivalis	Pondspice	G3?	S3	Not Applicable	Not Applicable	High	2010-06-13
Litsea aestivalis	Pondspice	G3?	S3	Not Applicable	Not Applicable	High	2012-10-17
Neottia bifolia	Southern Twayblade	G4	S2	Not Applicable	Not Applicable	Not Applicable	1973-03-28
Orthochilus ecristatus	Spiked Medusa, Smooth-lipped Eulophia	G2G3	S2	Not Applicable	Not Applicable	High	1998-08-31
Procambarus blandingii	Santee Crayfish	G4	S4	Not Applicable	Not Applicable	Moderate	1969-01-10
Rhynchospora tracyi	Tracy's Beaksedge	G4	S3	Not Applicable	Not Applicable	Not Applicable	2002-08-03
Sageretia minutiflora	Small-flowered Buckthorn	G4	S3	Not Applicable	Not Applicable	Not Applicable	1975-06-14
Waterbird Colony	Waterbird Colony	GNR	S3S4	Not Applicable	Not Applicable	Not Applicable	1995
Waterbird Colony	Waterbird Colony	GNR	S3S4	Not Applicable	Not Applicable	Not Applicable	1998
Deirochelys reticularia	Chicken Turtle	G5	S3S4	Not Applicable	R: Regulated	Moderate	2022-01-02
Kinosternon subrubrum	Eastern Mud Turtle	G5	SNR	Not Applicable	R: Regulated	Not Applicable	1952-12-06
Heterodon simus	Southern Hog-nosed Snake	G2	S1S2	Not Applicable	ST: State Threatened	Highest	1911-05

C. Species Best Management Practices (1 of 3)

SCDNR offers the following comments and best management practices (BMPs) regarding this project's potential impacts to species of concern which may be found on or near to the project area. Please contact speciesreview@dnr.sc.gov should you have further questions with regard to survey methods, consultation, or other species-related concerns.



Map Credits: Sources: Esri, USGS, CNES/Airbus DS, InterMap, Kartverket, LINZ, NASA/METI, NASA/NGS, NLS Finland, NLSI, Ordnance Survey, SKGeodesy, Esri, NASA, NGA, USGS, Charleston County GIS, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA

One or more occurrences of state listed species are found within or near to your project area. Please note that take of these species are prohibited under S.C. Code of Laws §50-15-30.

Frosted flatwoods salamander, a federally threatened and state endangered species, has been known to occur near to your project area. Flatwoods salamanders live underground most of the year and migrate between isolated wetlands and uplands through mostly open woodland habitats. Should appropriate habitat exist within the project area, surveys are recommended to rule out presence of frosted flatwoods salamander. If frosted flatwoods salamander are found within the project area, please consult with the U.S. Fish & Wildlife Service before proceeding with any construction activities. Please note a take of this state listed species is prohibited under S.C. Code of Laws §50-15-30.

To reduce potential construction-related impacts to the manatee to discountable and insignificant levels, the US Fish & Wildlife Service recommends implementing the following Standard Manatee Construction Conditions to all projects affecting the coastal waters of South Carolina (1 of 2):

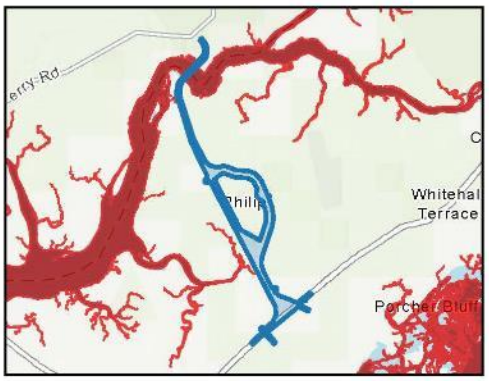
- The permittee shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel must monitor water-related activities for the presence of manatee(s) during May 1 - November 15. Construction personnel are requested to monitor outside of that timeframe as manatees may be in the area before or after the above dates.
- The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973.
- Any siltation barriers used during the project shall be made of material in which manatees cannot become entangled and must be properly secured, and regularly monitored to avoid manatee entrapment.
- All vessels associated with the project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

To reduce potential construction-related impacts to the manatee to discountable and insignificant levels, the US Fish & Wildlife Service recommends implementing the following Standard Manatee Construction Conditions to all projects affecting the coastal waters of South Carolina (2 of 2):

- If manatee(s) are seen within 100 yards of the active construction area all appropriate precautions shall be implemented to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet to a manatee. Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment. Activities will not resume until the manatee(s) has departed the project area of its own volition.
- The permittee understands and agrees that all in-water lines (rope, chain, and cable, including the lines to secure turbidity curtains) must be stiff, taut, and non-looping. Examples of such lines are heavy metal chains or heavy cables that do not readily loop and tangle. Flexible in-water lines, such as nylon rope or any lines that could loop or tangle, must be enclosed in a plastic or rubber sleeve/tube to add rigidity and prevent the line from looping and tangling. In all instances, no excess line is allowed in the water. Where appropriate in water wires, cables, should be fitted with PVC sleeve from the surface to the bottom to prevent any potential scraping of the passing manatees.
- Any collision with and/or injury to a manatee shall be reported immediately to the U.S. Fish and Wildlife Service contacts: Melanie Olds, South Carolina Manatee Lead, Charleston Field Office, at 843-727-4707 ext. 205; or Terri Calleson, Manatee Recovery Coordinator, North Florida Field Office, at 904-731-3286.

C. Species Best Management Practices (2 of 3)

SCDNR offers the following comments and best management practices (BMPs) regarding this project's potential impacts to species of concern which may be found on or near to the project area. Please contact speciesreview@dnr.sc.gov should you have further questions with regard to survey methods, consultation, or other species-related concerns.



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The spotted turtle is a state-threatened species and a federal At-Risk species (ARS). If spotted turtles are found to occur on the proposed site, please note the following:

- Prior to habitat disturbance in the proposed work area, the areas of impact be completely surveyed by individuals qualified to identify this species and its habitat;
- It is unlawful for any person to take, possess, transport, import, export, process, sell, offer for sale, ship, or receive for shipment any spotted turtle without a permit from the department;
- Spotted turtles may be allowed to be relocated into areas of suitable habitat, management, and conservation status; however, any plans for relocation should be submitted for review to SCDNR with a detailed description and images of the current and future habitat and proposed work plan and methodologies as it pertains to a relocation project.

An active bald eagle nest(s) is known to occur within or near to your project area. Surveys during the nesting season (October through May) to rule out nests in the project area are advised to avoid negative impacts to bald eagles. Eagle nests may occur in areas which have not yet been surveyed where suitable habitat is present, as the SCDNR does not survey every nest every year. Bald eagles are a state listed threatened species and are federally protected under the Bald and Golden Eagle Protection Act. If bald eagle nests are found to be within 660 feet of the project area, please consult with the U.S. Fish and Wildlife Service and the National Bald Eagle Management Guidelines to ensure that impacts are avoided to this species before proceeding with any construction activities.. https://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf

An occurrence of southern hognose snake (Heterodon simus) is known to exist within or near the project area. This state threatened species is often associated with open pine habitats. Southern hognose snakes are most active and vulnerable above ground during the spring (March-April) and fall (September-early November). The SCDNR recommends activities during these times are minimized, especially the use of heavy equipment, to reduce impacts to highly fossorial species underground from soil compaction and crushing. If the southern hognose snake is found within the project footprint, efforts must be made to avoid any negative impacts or take of the species. No southern hognose snake may be removed from the project site without first obtaining a permit from SCDNR.

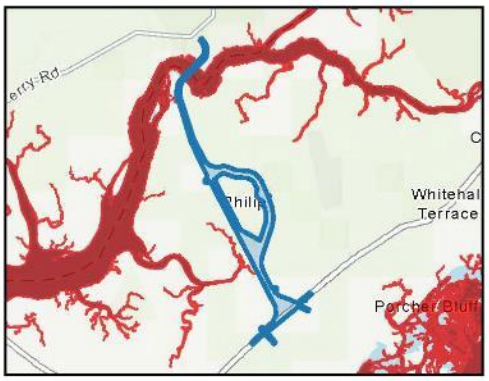
The gopher frog is a state listed endangered and federal At-Risk species (ARS). Take of this state listed species is prohibited under S.C. Code of Laws §50-15-30. If gopher frogs are found to occur on the proposed site, please note the following:

- Prior to habitat disturbance in the proposed work area, the areas of impact be completely surveyed by individuals qualified to identify this species and its habitat;
- It is unlawful for any person to take, possess, transport, import, export, process, sell, offer for sale, ship, or receive for shipment any gopher frog without a permit from the department;
- Gopher frogs may be allowed to be relocated into areas of suitable habitat, management, and conservation status; however, any plans for relocation should be submitted for review to SCDNR with a detailed description and images of the current and future habitat and proposed work plan and methodologies as it pertains to a relocation project.

Wood stork, a federally threatened and state endangered species, is known to occur within or near to your project area. Surveys to rule out nests in the project area are advised to avoid negative impacts to wood stork. While nesting sites may not be located on the project site, wood storks and other wading birds may seasonally use the water features if any are within the project footprint. If wood storks are found to be within the project area, please consult with the U.S. Fish and Wildlife Service before proceeding with construction or other management activities.

C. Species Best Management Practices (3 of 3)

SCDNR offers the following comments and best management practices (BMPs) regarding this project's potential impacts to species of concern which may be found on or near to the project area. Please contact speciesreview@dnr.sc.gov should you have further questions with regard to survey methods, consultation, or other species-related concerns.



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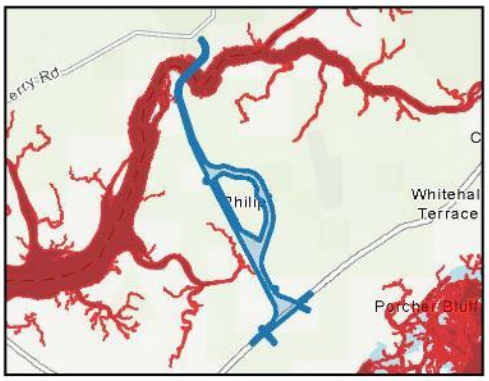
Red-cockaded woodpecker, a federally endangered and state endangered species, is known to occur within or near your project area. Surveys of mature pine trees (50-years or older) to rule out RCW within the project footprint is advised, regardless of habitat condition, and use of heavy machinery is prohibited within 200-feet of a cavity tree during the breeding season (April through July). If RCW are found within the project area, please consult with the U.S. Fish and Wildlife Service before proceeding with any construction activities. Please note the take of this state listed species is prohibited under S.C. Code of Laws §50-15-30.
Pondberry is a federally endangered deciduous shrub typically associated with shaded edges of wetland habitats. Surveys to rule out pondberry within the project footprint is recommended during the months of February, March, September or October when the species is most easily identifiable. Should pondberry be found within the project site, please consult with the U.S. Fish & Wildlife Service before proceeding with construction activities.
Cavity- and tree-roosting bat species including the federally threatened northern long-eared bat (Myotis septentrionalis), state-endangered Rafinesque's big-eared bat (Corynorhinus rafinesquii), and the federally at-risk tricolored bat (Perimyotis subflavus) have been known to occur in the county of the proposed site. As a conservation measure, it is recommended that any tree clearing activities be conducted during the inactive season for Northern long-eared bat (November 15th through March 31st) to avoid negative impacts to the species. If any of the above species are found on-site, please contact the USFWS and SCDNR.
In the interest of preserving plant diversity, the South Carolina Plant Conservation Alliance performs native plant rescues in order to protect and preserve our diversity of native plants. If you are interested in assisting with this important endeavor please contact Mrs. April Punsalan at (843) 727-4707 ext. 218, or by email: scpca@lists.fws.gov before any development occurs onsite. There may be plants of interest on the project site that the Alliance would like to preserve.
Species in the above table with SWAP priorities of High, Highest or Moderate are designated as having conservation priority under the South Carolina State Wildlife Action Plan (SWAP). SWAP species are those species of greatest conservation need not traditionally covered under any federal funded programs. 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. SCDNR recommends that appropriate measures should be taken to minimize or avoid impacts to the aforementioned species of concern.

D. Project Best Management Practices (1 of 2)

SCDNR offers the following comments and best management practices (BMPs) regarding this project's potential impacts to natural resources within or surrounding the project area. Please contact our Office of Environmental Programs at environmental@dnr.sc.gov should you have further questions with regard to best management practices related to this project area.



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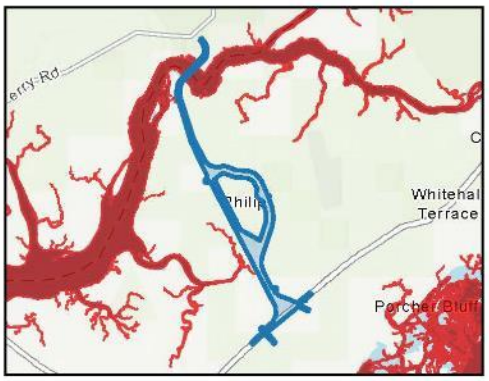
Our records indicate one or more parcels within your project area may be associated with a conservation easement. We recommend you inquire with the appropriate County to receive a copy of the recorded deed and plat before moving forward with any alterations to the project site.
If this project is associated with the Federal Government and the project area is or once was used as farmland, we recommend that consultation occur with the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS) per the Farmland Protection Policy Act; areas of the site are classified as prime farmland or farmland of statewide importance.
• All necessary measures must be taken to prevent oil, tar, trash and other pollutants from entering the adjacent offsite areas/wetlands/water. • Once the project is initiated, it must be carried to completion in an expeditious manner to minimize the period of disturbance to the environment. • Upon project completion, all disturbed areas must be permanently stabilized with vegetative cover (preferable), riprap or other erosion control methods as appropriate. • The project must be in compliance with any applicable floodplain, stormwater, land disturbance, shoreline management guidance or riparian buffer ordinances. • Prior to beginning any land disturbing activity, appropriate erosion and siltation control measures (e.g. silt fences or barriers) must be in place and maintained in a functioning capacity until the area is permanently stabilized. • Materials used for erosion control (e.g., hay bales or straw mulch) will be certified as weed free by the supplier. • Inspecting and ensuring the maintenance of temporary erosion control measures at least: a. on a daily basis in areas of active construction or equipment operation; b. on a weekly basis in areas with no construction or equipment operation; and c. within 24 hours of each 0.5 inch of rainfall. • Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts. • Land disturbing activities must avoid encroachment into any wetland areas (outside the permitted impact area). Wetlands that are unavoidably impacted must be appropriately mitigated. • Your project may require a Stormwater Permit from the SC Department of Health & Environmental Control, please visit https://www.scdhec.gov/environment/water-quality/stormwater
• If clearing must occur, riparian vegetation within wetlands and waters of the U.S. must be conducted manually and low growing, woody vegetation and shrubs must be left intact to maintain bank stability and reduce erosion. • Construction activities must avoid and minimize, to the greatest extent practicable, disturbance of woody shoreline vegetation within the project area. Removal of vegetation should be limited to only what is necessary for construction of the proposed structures. • Where necessary to remove vegetation, supplemental plantings should be installed following completion of the project. These plantings should consist of appropriate native species for this ecoregion.

D. Project Best Management Practices (2 of 2)

SCDNR offers the following comments and best management practices (BMPs) regarding this project's potential impacts to natural resources within or surrounding the project area. Please contact our Office of Environmental Programs at environmental@dnr.sc.gov should you have further questions with regard to best management practices related to this project area.



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- Review of available data, National Hydrography Dataset, indicates that streams or waters of the United States are present within your project area. These areas may require a permit from the U.S. Army Corps of Engineers (USACE), as well as a compensatory mitigation plan. SCDNR advises that you consult with the USACE Regulatory to determine if jurisdictional waters are present and if a permit and mitigation is required for any activities impacting these areas. For more information, please visit their website at www.sac.usace.army.mil/Missions/Regulatory. Additionally, a 401 Water Quality Certification or a State Navigable Waters permit may also be required from the SC Department of Health & Environmental Control. For more information, please visit the following websites:
  - https://www.scdhec.gov/environment/water-quality/water-quality-certification-section-401-clean-water-act
  - https://www.scdhec.gov/environment/water-quality/navigable-waters
- Excavation/Construction activities must not occur during fish spawning season from March through June due to its negative impacts on eggs and reproduction activities.
- If clearing must occur, riparian vegetation within wetlands and waters of the U.S. must be conducted manually and low growing, woody vegetation and shrubs must be left intact to maintain bank stability and reduce erosion.
- Construction activities must avoid and minimize, to the greatest extent practicable, disturbance of woody shoreline vegetation within the project area. Removal of vegetation should be limited to only what is necessary for construction of the proposed structures.
- Where necessary to remove vegetation, supplemental plantings should be installed following completion of the project. These plantings should consist of appropriate native species for this ecoregion.

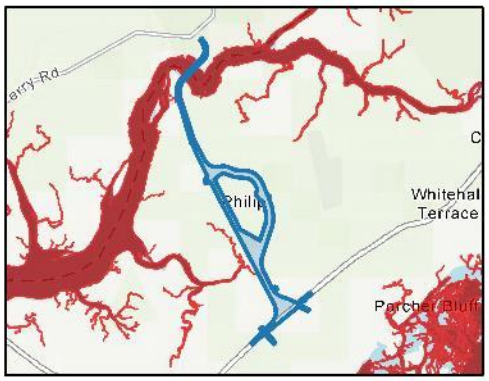
Your project area includes a FEMA special flood hazard area and may require a permit from the County National Floodplain Insurance Program Manager before impacts occur to aquatic resources and the associated floodplains on site. Please refer to https://www.dnr.sc.gov/water/flood/documents/nfipadmindirectory.pdf to find your appropriate contact information.

All tributary crossings for road projects must be made with appropriately sized bridges and/or culverts. Culverts must be sized and designed to prevent alteration of the natural stream morphology. SCDNR prefers that arched or bottomless culverts are utilized; however, if using boxed culverts or pipes, the bottom elevation of the culvert or pipe must be at or below the stream bed elevation to allow for natural migration of aquatic organisms up- and downstream. Where feasible, disturbed stream banks should be restored by using bioengineering techniques for stream bank stabilization. Stream banks at crossings must be restored after construction has been completed. Disturbed stream banks can be restored by planting woody vegetation and by using bioengineering techniques for stream bank stabilization.

- Your project boundary lies within a coastal county in South Carolina which means you may also need a Coastal Zone Consistency Certification for your project from the SC Department of Health and Environmental Control. For more information, visit: https://www.scdhec.gov/environment/your-water-coast/ocean-coastal-management/beach-management/coastal-permits/coastal-zone
- If your project could affect coastal waters, tidelands, beaches and beach/dune systems, you may also need a critical area permit from the SC Department of Health and Environmental Control. For more information, visit: https://www.scdhec.gov/environment/your-water-coast/ocean-coastal-management/beach-management/coastal-permits/critical-l

E. Instructions for Submitting Species Observations

The SC Natural Heritage Dataset relies on continuous monitoring and surveying for species of concern throughout the state. Any records of species of concern found within this project area would greatly benefit the quality and comprehensiveness of the statewide dataset for rare, threatened and endangered species. Below are instructions for how to download the SC Natural Heritage Occurrence Reporting Form through the Survey123 App.



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Instructions for accessing the SC Natural Heritage Occurrence Reporting Form

For use in a browser (on your desktop/PC):

1) Follow https://bit.ly/scht-reporting-form
2) Select 'Open in browser'
3) The form will open and you can begin entering data!

This method of access will also work on a browser on a mobile device, but only when connected to the internet. To use the form in the field without relying on data/internet access, follow the steps below.

For use on a smartphone or tablet using the field app:

1) Download the Survey123 App from the Google Play store or the Apple Store. This app is free to download. Allow the app to use your location.

2) No need to sign in. However, you will need to provide the app with our Heritage Trust GIS portal web address. You will only need to do this once: (this is a known bug with ESRI's software, and future releases of the form should not require the below steps. Bear with us in the meantime!).

a. Tap 'Sign in'
b. Tap the settings (gear symbol) in the upper right corner
c. Tap 'Add Portal'
d. After the 'https://', type schtportal.dnr.sc.gov/portal
e. Tap 'Add Portal'
f. Tap the back-arrow icon (upper left corner) twice to return to the main sign in page.

3) Use the camera app (or other QR Reader app) to scan the QR code on this page from your smartphone or tablet. Click on the 'Open in the Survey123 field app'. This will prompt a window to allow Survey123 to download the SC Natural Heritage Occurrence Reporting Form. Select 'Open.'

4) The form will automatically open in Survey123, and you can begin entering data! This form will stay loaded in the app on your device until you manually delete it, and you can submit as many records as you like.

HIGHWAY 41 CORRIDOR IMPROVEMENTS

APPENDIX C

Site Photographs

Photograph 1 – Wetland area adjacent to Winnowing Way and SC 41 intersection (dry/winter season)

Photograph 2 – Wetland area adjacent to Winnowing Way and SC 41 intersection (wet/growing season)

Photograph 3 – Wetland area adjacent to SC 41 south of Horlbeck Creek (east of SC 41)

Photograph 4 – Wetland area adjacent to SC 41 south of Horlbeck Creek (west of SC 41)

Photograph 5 – Tidal wetland associated with Horlbeck Creek (facing northwest)

Photograph 6 – High marsh / tidal wetland along Horlbeck Creek (facing east)

Photograph 7 –Tidal wetlands adjacent to Horlbeck Creek (facing west)

Photograph 8 – Forested uplands (facing east)

Photograph 9 – Forested uplands in foreground and tidal marsh in background (facing south)

Photograph 10 – Forested uplands (facing north)

Photograph 11 – Forested wetland avoided during construction (facing north)

Photograph 12 – Transmission line corridor (facing northwest)

Photograph 13 – Tidal marsh along upper tributary of Horlbeck Creek (facing southwest)

Photograph 14 – Tidal marsh along Mill Creek (facing southeast)

Photograph 15 – Tidal wetland along Wando River (facing west)

Photograph 16 – Wando River Bridge (facing north)