# DRAFT BIOLOGICAL ASSESSMENT

Town of Sunset Beach - Navigation Project
Maintenance Dredging of South Jinks Creek,
the Bay Area & the Feeder Canal

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# 1.0 BACKGROUND

This Biological Assessment (BA) addresses the potential effects of the maintenance dredging and beneficial use placement proposed for South Jinks Creek, the Bay Area, and the Feeder Canal, inclusive of finger canals A-D, in Sunset Beach, NC. The BA evaluates the potential impacts the project may yield on federally protected resources, listed as endangered or threatened under the Endangered Species Act (ESA), and/or their designated critical habitat. Section 7 of the ESA requires a BA if a project, or action, could potentially jeopardize the continued existence of any threatened or endangered species. This includes the potential degradation or destruction of critical habitat believed to support a threatened or endangered species.

The Town of Sunset Beach is proposing to maintenance dredge South Jinks Creek, the Feeder Channel, inclusive of finger canals A-D, and the Bay Area in Sunset Beach, Brunswick County, NC. Sunset Beach lies in Brunswick County, along the southern coastal border of North Carolina, adjacent to Ocean Isle Beach. The proposed project will occur along the eastern border of Sunset Beach, within the interior waters of Tubbs Inlet. Figure 1 shows the proposed project area in relation to Brunswick County.

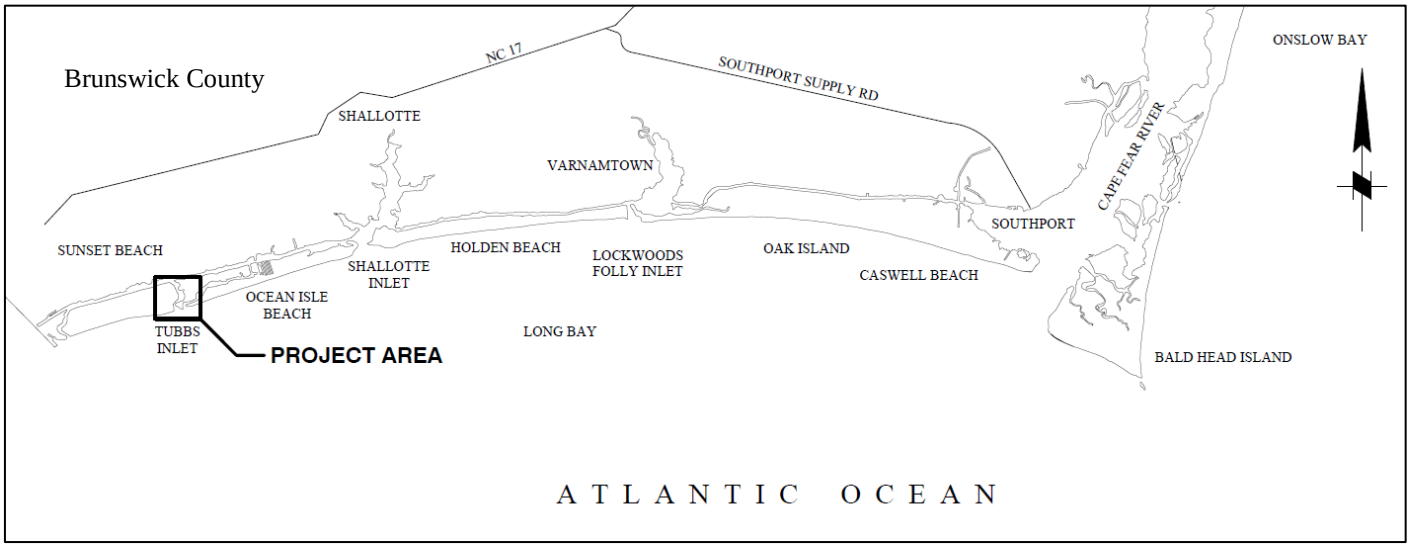


**Figure 1. Project Vicinity Map**

## 1.1 Summary of Proposed Project

In recent years, south Jinks Creek has incurred significant shoaling perceivably from tidal flows entering Tubbs Inlet. In addition, the Bay Area and Feeder Channel system, which were developed for recreational boating access, have been subject to infilling from adjacent upland run-off and erosion as well as wind and wave action. The shoaling and material infilling experienced by each waterbody has constricted navigable access in regards to the available width and depth. The current governing width of south Jinks Creek for navigation equals approximately 10 feet and the governing depth is above MLW. The Feeder Canal system and Bay Area are generally not constricted by width, but both maintain a governing depth between -2-ft and -3-ft MLW. The current shoaling patterns appear likely to continue and could potentially sever recreational access in each of the referenced work areas.

South Jinks Creek comprises a portion of the Jinks Creek connector channel that extends from the Atlantic Intracoastal Waterway (AIWW) to Tubbs Inlet and the Atlantic Ocean. The navigation project will connect the Bay Area and Feeder Channel systems along the southeast portion of Sunset Beach to south Jinks Creek. The Bay Area entails one (1) residential canal and the Feeder Channel system includes one (1) main channel connected to four (4) residential finger canals referenced as Canals A – D. The proposed project will help restore navigation access within these systems while also helping to restore access along Jinks Creek's eastern most shoreline within the Town's jurisdictional limits.

An estimated 40,500 cubic yards (CY) of beach compatible material will be dredged from S. Jinks Creek, and an additional 48,600 CY of non-compatible material will be removed from the Feeder Channel system and Bay Area. The beach compatible material will be hydraulically placed as beneficial reuse along approximately 1,600-ft of shoreline between 5th Street and 12th Street on Sunset Beach. The beneficial reuse material will provide an approximate 275-ft wide average berm with a maximum height of +9.0 MLW (6.1 NAVD). The non-compatible substrate will be mechanically dredged and placed at a permitted upland landfill facility.

South Jinks Creek, the Bay Area, and the Feeder Channel systems have been dredged previously, with the original event occurring approximate to 1970 (Cleary & Marden, 1999). Figures 2 and 3 show aerial photographs from 1966 and 1974 depicting before and after conditions of the initial dredging event. The initial dredging presumably occurred as part of a relocation project for Tubbs Inlet and the development of Sunset Beach. The action occurred prior to 1974 and the establishment of the Coastal Area Management Act (CAMA), so the action did not receive a CAMA Major permit authorization.

The first maintenance event for the feeder channel system occurred in 1985 under CAMA permit 211-85 and a subsequent maintenance occurred in 2002 under CAMA permit 45-02. The proposed action will be the first known maintenance event for south Jinks Creek and the Bay Area since the initial dredging approximate to 1970.

The proposed maintenance dredging will help establish and maintain a navigational channel for access to the residential docks along the east end of Sunset Beach. Sediment runoff from storm events has most likely impaired access through the Bay Area and Feeder Channel while shoaling from sediment transport has impaired navigation in south Jinks Creek. As a result, the Town of Sunset Beach has proposed the maintenance operations as part of a long-term management strategy to maintain navigation access for small recreational vessels through the waterbodies. However, future maintenance operations will be requested through separate permit applications.

**Figure 2. Tubbs Inlet 1966** (Originally printed in Cleary & Marden, 1999)

**Figure 3. Tubbs Inlet 1974** (Originally printed in Cleary & Marden, 1999)

Figure 4 provides a planview of the proposed maintenance dredging project as described above. The design template for the Feeder Channel follows the same alignment as proposed under permit 45-02 with small adjustments to avoid the existing marsh grass. In addition, the design depth for the proposed action has been raised from -5.27 MLW to -5 MLW. Raising of the design depth should help to simplify the construction process and reduce the potential for adverse impacts. The dredging proposal includes a 1-ft allowable overdredge template to provide a buffer for maneuvering the construction equipment within the work area. Therefore, the maximum dredge depth in the Feeder Channel extends to -6-ft MLW, inclusive of the proposed 1-ft allowable overdredge template. Within the finger canals the maximum dredge depth raises to -5-ft MLW, inclusive of the 1-foot overdredge tolerance.

The proposed template for the finger canals maintains a constant 20-ft width. This represents a reduction from the 2002 permitted template, which provided a varying width between 20-ft & 30-ft. The reduction in width helps provide adequate clearance between the proposed channel and the existing residential docks. In many instances, the navigable waterway through finger canals A-D remains even less than 20-ft wide. Therefore, the dredge equipment most likely will not be able to access the full channel even with the reduced 20-foot width. Although the docks may be moved by the private homeowners to help facilitate construction, expectations suggest the docks would

be returned to their original position after the maintenance event. Therefore, there would be little public benefit in providing more than a 20-foot channel through the residential waterway.

**Figure 4. South Jinks Creek, the Bay Area, and Feeder Channel Work Areas**

The dredge template for the Bay Area initiates with an 80-ft width at the connection with South Jinks Creek. The template reduces gradually to 20-ft progressing towards the Bay Area terminus. The larger width proposed for the Bay Area entrance should help control sediment shoaling during tidal influences by providing additional storage capacity within the dredge alignment. The template decreases in width to approximately 40-ft roughly 800-ft into the Bay Area. The minimized template helps reduce the potential for unexpected impacts while also attempting to balance the navigational need of the Bay Area residents. The maximum dredge depth for the Bay Area matches the Feeder Channel at -6-ft MLW for the complete system. The maximum dredge depth includes the 1-ft overdredge allowance provided from the design depth (-5 MLW) for maneuvering the dredge equipment. Table 1 provides a summary of the dredge templates.

The dredge material from the Feeder Channel and Bay Area will be mechanically dredged and trucked to a permitted landfill facility. Sediment tests show the material is not beach compatible in accordance with the North Carolina Administrative Code (NCAC). As a result, the upland landfill facility entails the most practical end use location identified for the dredge spoil. The template for south Jinks Creek also maintains the -6 MLW maximum dredge depth. The south Jinks Creek material meets the NCAC criterial for beneficial reuse and will be hydraulically dredged and placed between 5$^{th}$ Street and 12$^{th}$ Street on Sunset Beach.

The dredging operations will be conducted during the months of November 16th thru April 30th to reduce the potential for environmental impacts. In addition, the dredge footprint will be minimized to provide a minimum 10-ft buffer from any coastal marsh identified at the time of construction. The 6,500-ft hydraulic pipeline carrying the beneficial reuse material dredged from S. Jinks Creek will also be positioned away from any established dune or beach vegetation. These items are a few of the precautions proposed to help minimize the potential for environmental impacts on this project.

**Table 1. Dredge Template Description**

| Area | Existing Avg. Depth (MLW-ft) | Proposed Depth (MLW-ft) | Length (ft) | Width (ft) | Side Slope (H:V) | Est. Volume (CY) | Placement Location |
|---|---|---|---|---|---|---|---|
| **Feeder Channel** | -3 MLW | -6 (-5+1) MLW | 3,500 | 30 – 40 | 3:1 | 22,000 | Landfill |
| **Finger Canals A-D** | -2 MLW | -5 (-4+1) MLW | 3,200 | 20 | 3:1 | 10,700 | Landfill |
| **Bay Area** | -2 MLW | -6 (-5+1) MLW | 2,200 | 20 – 80 | 3:1 | 15,900 | Landfill |
| **S. Jinks Creek** | - 1.5 MLW | -6 (-5+1) MLW | 1,750 | 100 | 5:1 | 40,500 | Beneficial Reuse (5th–12th St) |
| **TOTAL** | | | **10,650** | **Varies** | **Varies** | **89,100** | **Varies** |

The maintenance dredging will remove approximately 89,100 CY of mixed beach compatible and non-compatible material. The beach compatible material will be placed as beneficial reuse along approximately 1,600-ft of shoreline between 5th Street and 12th Street to enhance an approximate 275-ft wide berm at elevation +9 MLW (+6.1 NAVD) on Sunset Beach. However, the non-compatible material will be excavated and trucked to an upland permitted landfill facility. Table 2 shows the material quantity estimated for removal from each work area.

The dredge template provides a 1-ft tolerance below the design depths to maneuver the dredge equipment in a manner sufficient to complete the work. Therefore, the maximum dredge depth for the maintenance operations equals – 6-ft (-5+1) MLW within south Jinks Creek, the Bay Area, and the Feeder Channel. The maximum dredge depth decreases to -5-ft (-4+1) MLW within finger canals A-D, which adjoin to the Feeder Channel.

**Table 2. Estimated Dredge Volumes and Placement Locations**

| Work Area | Dredge Quantity | Sediment Classification | Placement Location |
|---|---|---|---|
| **Feeder Channel & Finger Canals** | 32,700 CY | Non-Compatible | Upland |
| **Bay Area** | 15,900 CY | Non-Compatible | Upland |
| **South Jinks Creek** | 40,500 CY | Beneficial Reuse | Between 5th & 12th St on the Sunset Beach shoreline |
| **TOTAL** | 89,100 CY | | |

Note: Estimated volumes include the 1-ft tolerance for maneuvering the dredge equipment.

## 1.2 Construction Methods

The construction methodology will vary for each work area based on the dredge material composition. The methods implemented for south Jinks Creek will vary from the methods used for the Feeder Channel system and the Bay Area as described below.

### *1.2.1 South Jinks Creek*

The material within south Jinks Creek will be hydraulically dredged and placed along the shoreline between 5th Street and 12th Street on Sunset Beach. The material will be used to enhance a 1,600-ft long and 275-ft wide beach berm system and will be placed to a maximum elevation of +9.0-ft MLW (+6.1-ft NAVD). The south Jinks Creek material meets the minimum standards required for beneficial reuse in accordance with the NC standards for beach compatibility. A total of 26 sediment samples were collected from the proposed dredge area (borrow area) in efforts to define the beach compatible material. The calculated sediment characteristics from the dredge area were compared with composite characteristics of 65 samples analyzed from the recipient beach. Table 3 below shows the analysis results for the dredge material and recipient beach in accordance with the NCAC 15a 07h.0312.

**Table 3. Sediment Comparison (South Jinks Creek & Recipient Beach)**

| Analysis Area | Gravel (%) | Granular (%) | Sand (%) | Fines (%) | Calcium Carbonate |
|---|---|---|---|---|---|
| **South Jinks Creek** | 0.00% | 0.00% | 96.63% | 3.37 % | 16% |
| **Recipient Beach** | 0.07 % | 0.55 % | 98.15% | 1.23% | 2% |

Note: Sediment classifications determined in accordance with NCAC 15a07h.0312.

The hydraulic dredging work will be conducted on a 24-hr per day schedule by a cutterhead dredge between November 16th and April 30th, in accordance with the USFWS August 2017 Statewide Programmatic Biological Opinion (SPBO). The beneficial reuse material will be transported

through an approximate 6,500-ft hydraulic pipeline for beach placement. Floating pipeline will most likely be required immediately behind the hydraulic dredge plant and will have reflectors or lights as recommended by the USCG. Once the floating pipeline traverses landward of the MHW line, it will not be allowed to meander back into navigable waters. However, the shore pipe may be forced to cross navigable waterways at the Bay Area and Feeder Channel confluence with Jinks Creek. The pipeline will be anchored to the channel bottom to avoid a marine hazard at each crossing. The pipeline will also cross the waterways perpendicular to the directions of travel to minimize the pipeline length within the navigation channel. The pipeline will be anchored in the deepest depth available to not block navigation and will have buoys attached approximately every 25-feet along each crossing. Signage will also be provided and visible from both directions of travel to mark the pipeline crossing.

Along the beachfront, the pipeline will be located as close to the dune as reasonable without traversing over beach grass or other established vegetation. Markings shall be installed along the pipe to warn beach goers to use caution around the pipeline and to remain off the equipment. Sand ramps will also be constructed at each designated beach access for pedestrian crossings. The ramps may also be used for emergency beach access by the Town or construction related access for the Contractor.

The beneficial reuse material placement will occur directly on the sandy beach, seaward of the primary dune system. Sand dikes, or berms will be constructed as needed to help limit turbidity. The dikes will be constructed parallel to the beach front to direct the dredge slurry along the beach. This process will allow the beneficial reuse material to settle on the beach instead of entering the Atlantic Ocean. In addition, the project will implement the recommended SPBO conservation measures.

#### *1.2.2 Feeder Channel, Finger Canals, & Bay Area*

Dredging operations in the Feeder Channel, including the adjoining finger canals A-D, and the Bay Area will be conducted by a clamshell or bucket dredge / excavator also between November 16$^{th}$ and April 30$^{th}$. Dredging activities for the mechanical equipment will extend through day light hours but will not entail nighttime operations. Material will be dredged from the respective waterbody and placed on a barge or other floating work plant. The material will be transported to an offloading site designated at the end of Cobia Street within the Feeder Channel. The material will then be placed in a truck or carrying apparatus for transportation to the upland landfill facility. A backhoe or excavator will move the material from the barge to the truck or other hauling equipment. The trucks or hauling equipment shall be configured to prohibit spillage during material transport. The roadways or travel ways used for material transport shall be inspected during and after each delivery to the landfill site. Any spillage noted shall be immediately cleaned and removed from the roadways. In addition, any equipment found to be continuously leaking material onto public roadways shall be removed from the project until such time repairs or modifications can be made to facilitate clean and spill fill material transport.

## 2.0 LISTED SPECIES AND CRITICAL HABITAT IN THE PROJECT AREA

This assessment considers federally listed species that may occur within the project area; including the North Atlantic right whale, humpback whale, West Indian manatee, piping plover, red knot, wood stork, sea turtles (loggerhead, green, leatherback, Kemp's ridley, and hawksbill), Atlantic and shortnose sturgeon, and seabeach amaranth. This BA also addresses effects on designated and proposed critical habitats within the action area; including critical habitat for the piping plover Atlantic Coast wintering population, terrestrial and marine critical habitats for the loggerhead sea turtle and proposed North Atlantic right whale critical habitat. Based on a detailed evaluation of the effects of beneficial use sand placement on Sunset Beach, dredging operations within South Jinks Creek, the Feeder Canals and Bay Area as well as informal consultation with USFWS on August 5, 2019; determinations of effect for the species and critical habitats considered are as follows:

**Table 4. Threatened & Endangered Species that may occur within the Project Area**

| Species | | Listing Status | | | Effects Determination |
|---|---|---|---|---|---|
| **Scientific Name** | **Common Name** | **Federal Status** | **Record Status** | **Habitat Present** | |
| *Chelonia mydas* | Green sea turtle | T | Current | Yes | NE |
| *Eretmochelys imbricate* | Hawksbill sea turtle | T | Historic | Yes | NE |
| *Lepidochelys kempii* | Kemp's (Atlantic) ridley sea turtle | E | Current | Yes | MALAA |
| *Dermochelys coriacea* | Leatherback sea turtle | E | Current | Yes | MALAA |
| *Caretta caretta* | Loggerhead sea turtle | T | Current | Yes | MALAA |
| *Charadrius melodus* | Piping plover | T | Current | Yes | MALAA |
| *Picoides borealis* | Red-cockaded woodpecker | E | Current | No | NE |
| *Calidris canutus rufa* | Red knot | T | Current | Yes | MALAA |
| *Trichechus manatus* | West Indian manatee | E | Current | Yes | NE |
| *Mycteria americana* | Wood stork | T | Current | Yes | NE |
| *Thalictrum cooleyi* | Cooley's meadowrue | E | Current | No | NE |
| *Lysimachia asperulaefolia* | Rough-leaved loosestrife | E | Current | No | NE |
| *Amaranthus pumilus* | Seabeach amaranth | T | Current | Yes | MALAA |
| *Acipenser oxyrinchus oxyrinchus* | Atlantic sturgeon (Carolina DPS) | E | Current | No | NLAM |
| *Acipenser brevirostrum* | Shortnose sturgeon | E | Current | No | NE |

| Species | | Listing Status | | | Effects Determination |
|---|---|---|---|---|---|
| **Scientific Name** | **Common Name** | **Federal Status** | **Record Status** | **Habitat Present** | |
| *Eubalaena glacialis* | North Atlantic right whale | E | Current | No | NE |
| Loggerhead Marine and Terrestrial CH | | | | | NE |
| Piping Plover Wintering CH | | | | | NLAM |
| Proposed North Atlantic Right Whale CH | | | | | NLAM |

Source: USFWS, 2015; NMFS, 2017; KEY: E = endangered, T = threatened; MALAA = may affect, is likely to adversely affect; LAA = likely to adversely affect; NLAM = Not likely to adversely modify; NE = no effect

## 3.0 SPECIES NOT LIKELY TO OCCUR IN THE PROJECT AREA

The following discussion addresses the listed species considered not likely to occur within the project site due to lack of appropriate habitat. This includes the following species:

- Red-Cockaded Woodpeckers
- Cooley's Meadowrue
- Rough-leaf Loosestrife
- Shortnose Sturgeon
- North Atlantic Right Whale

### 3.1 Red-Cockaded Woodpecker

Red-Cockaded Woodpeckers (*Picoides borealis*) require open, mature, and old growth pine habitats. Roosting trees generally must be at least 60-120 years old, depending on species of pine. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with foraging preference for pine trees 10 inches or larger in diameter. In good, moderately-stocked, pine habitat, sufficient foraging substrate can be provided on 80 to 125 acres (USFWS 2003). Since these types of terrestrial habitat are found well inland of the proposed project area, the analysis does not consider impacts to the red-cockaded woodpecker likely to occur because of project construction.

### 3.2 Vegetative Species

Cooley's meadowrue (*Thalictrum cooleyi*) is known from North Carolina, Georgia, and Florida. The North Carolina populations are located in Brunswick, Columbus, Onslow, and Pender counties. Cooley's meadowrue occurs on circumneutral soils in grass-sedge bogs and wet pine savannahs and savannah-like areas. It may also grow along fire-plow lines, in roadside ditches, woodland clearings, and powerline rights-of-way. Disturbance of some kind is usually required to maintain open habitat for Cooley's meadowrue (USFWS 1994). The habitat within the Feeder Canal and Bay Area generally consists of fine grain sediment, muck, and coastal marsh. These areas generally do not meet the documented criteria for the Cooley meadowrue habitat. Therefore, the species most likely will not occur within the project area and has been removed from further analysis.

Rough-leaf loosestrife (*Lysimachia asperulaefolia*) is endemic to the coastal plain and sand hills of North Carolina and South Carolina. Habitat for rough-leaf loosestrife generally occurs in the ecotone between longleaf pine or oak savannas and wet, shrubby areas containing moist, sandy, or

peaty soils and low vegetation. The grass-shrub ecotone, where rough-leaf loosestrife generally occurs, is fire-maintained, as are the adjacent plant communities (longleaf pine – scrub oak, savanna, flatwoods, and pocosin). Several populations are known from roadsides and power line rights-of-way where regular maintenance mimics fire and maintains vegetation so that herbaceous species are open to sunlight (USFWS 1995). The habitat within the Feeder Canal and Bay Area consists of fine grain sediment, muck, and coastal marsh and generally does not meet the documented criteria for the rough-leaf loosestrife habitat. Therefore, the species most likely will not occur within the project area and has been removed from further analysis.

### 3.3 Shortnose Sturgeon

The shortnose sturgeon *(Acipenser brevirostrum)* was listed as endangered under the Endangered Species Preservation Act in March 1967 (32 FR 4001) (ESA). The species inhabits large Atlantic coast rivers from New Brunswick, Canada south to northeastern Florida. Adults in southern rivers are estuarine anadromous, foraging at the freshwater-saltwater interface and moving upstream to spawn in the early spring. Shortnose sturgeons spend most of their life in their natal river systems and rarely migrate to marine environments. Spawning habitats include river channels with gravel, gravel/boulder, rubble/boulder, and gravel/sand/log substrates.

Shortnose sturgeon are not expected to be present in the areas where the proposed action is occurring. Prior assumptions were that shortnose sturgeon tended not to leave riverine waters (i.e., venture beyond the freshwater-saltwater interface); however, in a recent report by the South Carolina Division of National Resources (DNR) and Georgia DNR, the species was detected as far as 12.4 mi from the mouths of their spawning rivers in those states. While spawning data is lacking for the rivers in North Carolina, the project area is located much greater than 12.4 mi from the mouth of any major river that may be used for spawning (i.e., Neuse River and Cape Fear River). Therefore, we believe the proposed action will have no effect on shortnose sturgeon.

### 3.4 North Atlantic Right Whale

Right whales were listed as endangered under the Endangered Species Conservation Act in June 1970 and were subsequently listed as endangered under the ESA in 1973. Based on a census of individual whales identified through photo-identification techniques, the best estimate of catalogued North Atlantic right whales in 2012 was 510 individuals (Pettis 2013). North Atlantic right whales calve in warm subtropical waters during winter and migrate to feed in highly productive cold temperate and subpolar waters in spring and summer (Green and Pershing 2004). Waters along the southeastern US coast constitute the only known calving habitat for North Atlantic right whales (Kraus et al. 1986, Knowlton et al. 1994, Reeves et al. 2001). Based on effort-corrected sightings data, the densest distribution of observed right whale mother-calf pairs is generally in waters of the inner shelf between St. Augustine, Florida and just south of Savannah, Georgia. However, recent aerial survey data indicate calving and nursing occur as far north as NC (Good 2008, McLellan et al. 2004). Reproductive females typically arrive in the calving areas during late November and early December after migrating south from feeding grounds in the northeastern US and Canada (Fujiwara and Caswell 2001, Garrison 2007, Hamilton et al. 2007).

Mothers and newborn calves reside within the southeast through winter and generally depart the calving grounds by the end of March or early April (Reeves et al. 2001). There is relatively little information on the geographic and temporal extent of the migratory corridor (Firestone et al. 2008, Schick et al. 2009). A review of sightings data collected in the mid-Atlantic found that 94 percent of all right whale sightings were within 56 kilometers from shore (Knowlton et al. 2002).

Currently designated critical habitat units for the right whale include northeastern feeding grounds in the Gulf of Maine/Georges Bank region, and southeastern nearshore ocean calving habitats from central Florida to Cape Fear, NC [81 Federal Register (FR) 4838] (Figure 5). The essential features of the southeastern calving critical habitat area include physical oceanographic conditions that support calving and nursing; including calm sea surface conditions, sea surface temperatures of 45 degrees (°) Fahrenheit (F) to 63°F, and water depths of 20 ft to 92 ft. The essential features of the northern critical habitat areas include physical and biological features that provide optimal foraging areas with an abundance of the right whales' preferred copepod prey.

Proposed dredging operations within the project area would coincide with migration and calving periods along the NC coast. Project-related dredging could potentially affect right whale through vessel strikes and/or acoustic disturbance. However, dredging operations would be confined to waters inshore of the COLREGS line, and thus would not be expected to result in any direct or indirect interactions with right whales, therefore the right whale is not considered further in this assessment. Underwater noise produced by dredging in South Jinks Creek and the Bay Area may propagate into the open ocean but would not be expected to reach the thresholds described above for injurious (≥180 dB re 1μPa rms) or behavioral (≥120 dB re 1μPa rms) effects on cetaceans.

The essential features of proposed right whale critical habitat within the project area are those associated with optimal calving habitat; including calm sea surface conditions, sea surface temperatures of 45°F to 63°F, and water depths of 20 ft to 92 ft. Proposed inshore dredging and beach fill placement operations would not affect any of these essential features.

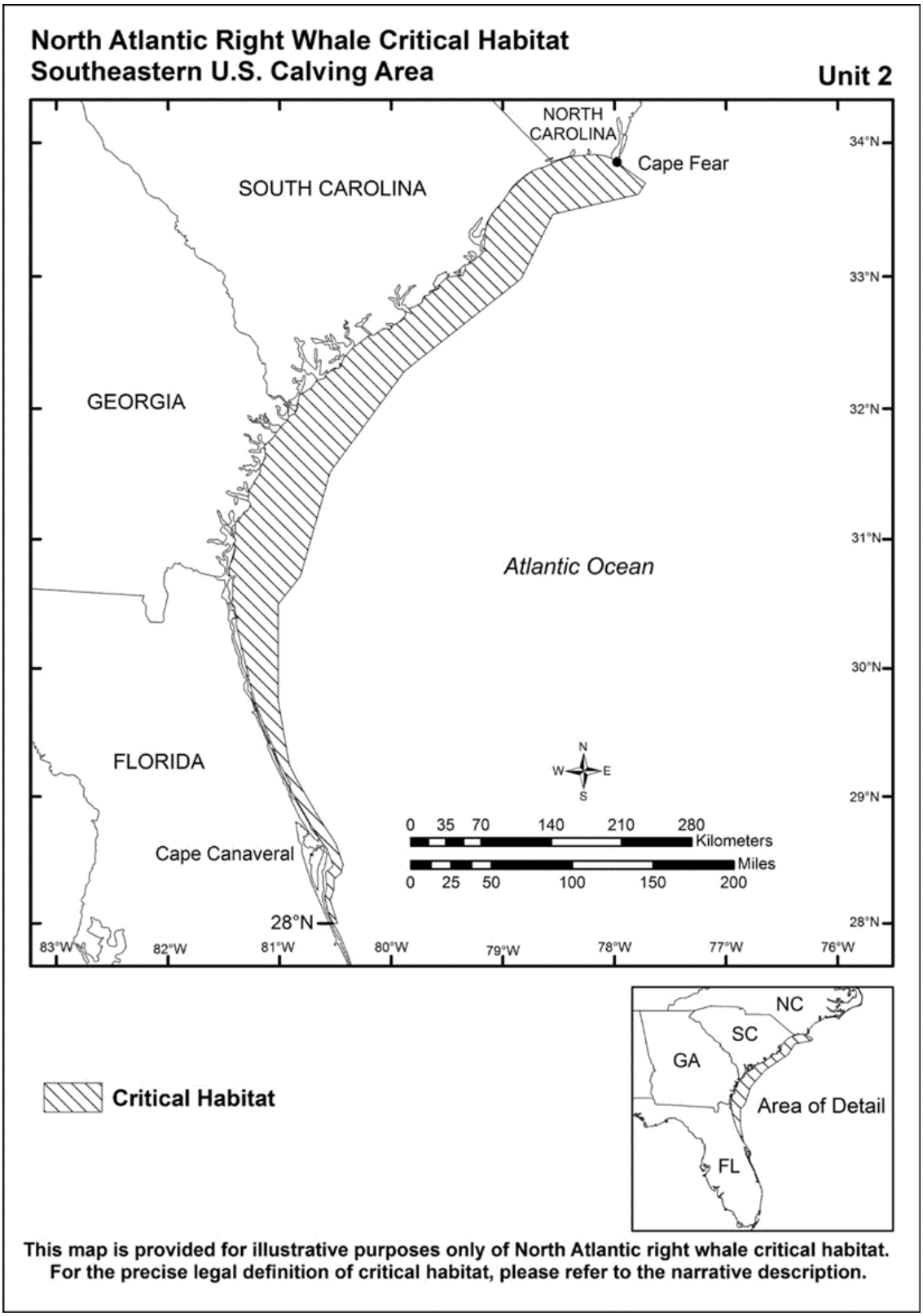


**Figure 5. North Atlantic Right Whale Southeastern Calving Critical Habitat (Source: 81 FR 4838).**

# 4.0 SPECIES THAT MAY OCCUR IN THE PROJECT AREA

The following discussion addresses listed, or endangered species generally considered likely to frequent the project site along with general construction practices proposed to help minimize potential impacts. This includes the following species:

- Sea Turtles
- Piping Plover
- Red Knot
- Wood Stork
- Atlantic Sturgeon
- West Indian Manatee
- Seabeach Amaranth

## 4.1 Sea Turtles

### *4.1.1 Green Sea Turtle*

The green sea turtle (*Chelonia mydas*) has been documented to occur in coastal areas of Dare, Onslow, New Hanover, and Brunswick Counties of North Carolina. Green sea turtles are generally found in shallow waters (except when migrating) inside reefs, bays, and inlets. The green turtle is attracted to lagoons and shoals with an abundance of marine grass and algae. No SAV beds have been identified in Brunswick County, including the project area. Inspections of the project area occurred during October 2016 as part of alternate field work efforts to conduct a shellfish survey. Open beaches with a sloping platform and minimal disturbance are required for nesting.

Green sea turtles nest in relatively small numbers along the NC coast, with reported nesting from 2000 through 2016 averaging 18 nests per year. According to the SPBO (USFWS 2017), no green sea turtles have nested within the project area, however, 13 nests have been documented along southern NC beaches to Caswell Beach (approximately 31 shoreline miles) between 2000 and 2016 (4% statewide). Since nesting may occur along Sunset Beach, the action should be considered as may affect and is likely to adversely affect (MALAA) the species in accordance with Section 7 of the ESA. Furthermore, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys (63 FR 46693). No designated critical habitat is present in the project area.

### *4.1.2 Hawksbill Sea Turtle*

The hawksbill sea turtle was listed as endangered throughout its range on 2 June 1970 (35 FR 8491). Nesting occurs on sandy beaches throughout the tropical and subtropical regions of the Atlantic, Pacific, and Indian Oceans. Nesting in the US is primarily limited to Florida and the US Caribbean on beaches throughout Puerto Rico and the US Virgin Islands (NMFS and USFWS 1993). Marine and nesting critical habitat for the hawksbill sea turtle have been designated in Puerto Rico along the islands of Mona, Monito, Culebrita, and Culebra (63 FR 46693). Rare nesting events in the continental US are essentially restricted to the southeastern coast of Florida and the Florida Keys (Meylan 1992; Meylan et al. 1995), although two hawksbill nests were

recently confirmed in NC (NPS 2015d). Sightings have been recorded from a handful of counties in North Carolina, but the turtle is not known to breed in the state, and there are no known occurrences of this species recorded from Brunswick County or near the project area (NCNHP 2017). The potential for in-water occurrences and/or nesting may occur along Sunset Beach therefore the action should be considered as may affect, and is likely to adversely affect (MALAA) the species in accordance with Section 7 of the ESA. Furthermore, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

#### *4.1.3 Kemp's Ridley Sea Turtle*

While sightings of the Kemp's ridley sea turtle (*Lepidochelys kempii*) in North Carolina remain rare, the occurrences may be on the rise. This species prefers shallow coastal waters. USFWS indicates sightings of this species has only occurred in Pamlico County within the past 20 years (USFWS, 2003). As a result, no sightings of this species have been recorded in the vicinity of the project area (NCNHP 2017). However, since nesting or in-water observations may occur along Sunset Beach, the action should be considered as may affect and is likely to adversely affect (MALAA) the species in accordance with Section 7 of the ESA. Furthermore, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

#### *4.1.4 Leatherback Sea Turtle*

Leatherbacks (*Dermochelys coriacea*) are distributed world-wide in tropical waters of the Atlantic, Pacific, and Indian oceans. They are generally open-ocean species and may be common off the North Carolina coast during certain times of the year. However, in northern waters leatherbacks are reported to enter bays, estuaries, and other inland bodies of water. Major nesting areas occur mainly in tropical regions. In the United States, primary nesting areas are in Florida; however, nests are known from Georgia, South Carolina, and North Carolina as well. The project area consists of two small interior channels and most likely could not support habitat suitable for a Leatherback. No known sightings of the Leatherback have been recorded near the project area (NCNHP 2017). However, since nesting or in-water observations may occur along Sunset Beach, the action should be considered as may affect and is likely to adversely affect (MALAA) the species in accordance with Section 7 of the ESA. Furthermore, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

#### *4.1.5 Loggerhead Sea Turtle*

The loggerhead sea turtle (*Caretta caretta*) is distributed widely in its range, including the entire North Carolina coast. It is often found hundreds of miles out to sea but can also be found in inshore areas such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Feeding areas are typically coral reefs, rocky places, and ship wrecks (USFWS 2003). The substrate of the Feeder Canal and Bay Area generally consist of soft muck or fine sediment and most likely would not be considered ideal habitat for the loggerhead. Young loggerheads are often found in SAV beds and nesting occurs mainly on open beaches or along narrows bays with suitable

soil (USFWS 2003). Loggerhead sightings near the project area have occurred over the past several decades (NCNHP 2017). Individual turtles may utilize the Feeder Canal and Bay Area temporarily during migration events. However, the species generally would not be expected during the colder winter months of October through March, when the proposed dredging will occur.

Loggerhead nesting occurs along the entire NC coast; however, nesting is concentrated along three sections of the coast: the Cape Fear region (Holden Beach, Oak Island, Caswell Beach, Bald Head Island, and Fort Fisher), Topsail Island and Onslow Beach, and the barriers that comprise from Shackleford Banks north to Bodie Island. Collectively, these three sections of the coast accounted for 83% of all loggerhead nesting in NC from 2000 through 2016. Based on data provided by NCWRC approximately 225 loggerhead nests have been laid on Sunset Beach between 2000 and 2018 with 2000 as a peak year with 28 nests (Appendix A – Sunset Beach Sea Turtle Data). Average annual density (nests/mile) along the 10 miles of oceanfront shoreline of Sunset Beach is 3.4. Beneficial placement of beach compatible material will take place during the environmental window of 16 November – 30 April, thereby avoiding nesting period of 1 May to 15 September. No designated critical habitat is present in the project area. However, since nesting occurs along Sunset Beach, the action should be considered as may affect and is likely to adversely affect (MALAA) the species in accordance with Section 7 of the ESA. Furthermore, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

## 4.2 Shorebirds

### *4.2.1 Piping Plover*

Piping Plovers (*Charadrius melodus*) have nests consisting of shallow scraped depressions in the sand lined with shell fragments and little or no adjacent vegetation (Cohen *et al*., 2008; USFWS 1996). Piping plovers breed in three discrete geographic areas: the Atlantic Coast from NC to Newfoundland, the Great Lakes region, and the Northern Great Plains region. Members of the Atlantic Coast breeding population arrive on the breeding grounds and initiate courtship in late March and early April. In NC, the breeding season extends from April through August. Nests in NC may be found mid-to-late April and continue to nest through late May and early June. Chicks and fledglings may be found May through August. Wintering plovers on the Atlantic coast are found at accreting ends of barrier islands, along sandy peninsulas, and near coastal inlets. Preferred foraging habitats include sandflats adjacent to inlets or passes, sandy mudflats along prograding spits, and overwash areas. Roosting sites generally include inlet and adjacent ocean and estuarine shorelines and nearby exposed tidal flats (USFWS 1996). Since the project is in the vicinity of Tubbs Inlet, operations may affect piping plover foraging activities. Therefore, in accordance with the Section 7 responsibilities of the ESA, the action should be considered as may affect and is likely to adversely affect (MALAA) the species. However, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

#### *4.2.2 Red Knot*

Red knots (*Calidris canutus rufa*) breed in the central Canadian Arctic and occur in three main wintering groups: short distance migrants that winter in the southeastern U.S., medium distance migrants that winter on the northern coast of Brazil, and long-distance migrants that winter in Tierra del Fuego (southern tip of South America) (Niles *et al*., 2012). In the southeastern U.S., red knots overwinter primarily in FL and GA (Niles *et al.*, 2008). However, red knots are known to winter as far north as VA (Niles *et al*., 2012). Major stopover sites during the southbound migration include MA, CT, and RI. During the northbound migration, stopover sites along the U.S. Atlantic coast include the primary stopover in Delaware Bay although some red knots stop farther south between VA and FL (Gillings *et al*., 2009; Niles *et al*., 2008). In NC, red knots use the Outer Banks as a stopover site during spring and fall migrations. In some cases the Outer Banks has also served as an overwinter site to migrating red knots (Niles *et al*., 2012; Dinsmore *et al*., 1998). Red knots are most abundant in NC during the spring migration (April-June), with the highest concentration generally observed in May.

Preferred wintering and migration habitats include muddy or sandy coastal areas, particularly the mouths of bays and estuaries and unimproved tidal inlets and tidal flats. Wintering habitat in the southeastern U.S. also includes peat banks, salt marshes, brackish lagoons, and mangroves. In this region, red knots forage along sandy beaches, in tidal mudflats, along peat banks, and along barrier islands (Niles *et al*., 2008). Preferred prey in nonbreeding habitats include horseshoe crab eggs, snails, clams, and crustaceans (Cohen *et al.*, 2010; Niles *et al*., 2008; Tsipoura and Burger, 1999).

Since the project area contains habitat suitable for red knot foraging activities, the construction operations may affect the red knot foraging activities. Therefore, in accordance with the Section 7 responsibilities of the ESA, the action should be considered as may affect and is likely to adversely affect (MALAA) the species. However, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

### 4.3 Wood Stork

Wood storks (*Mycteria americana*) are not true migrants, but they generally disperse following breeding. Beginning in late May, following breeding in FL, most fledglings, immatures, and adults disperse in peninsular FL and northward (Coulter *et al*., 1999). The non-breeding season range extends to eastern MS and includes the above-mentioned areas as well as the rest of FL and the coastal plains and large river systems of AL (79 FR 37078). Wood storks sighted farther west are likely part of the Mexican/Guatemalan populations. However, some population mixing may occur (Bryan *et al*., 2008).

Wood storks use a wide variety of freshwater and estuarine wetlands for nesting, feeding, and roosting sites. Nesting colony sites are in freshwater and marine-estuarine forested habitats, primarily in cypress swamps. However, depending on the location, colony sites may consist of other plants, such as dead oaks, mangroves, cactus, black gum, willow, and buttonbush (Coulter *et al*., 1999). Feeding habitat consists of natural and artificial wetlands where prey species are available and water depths are appropriate (<50 cm) (Coulter *et al*., 1999). However, wood storks

are also known to feed in shallow brackish and saltwater pools and channels (LeGrand, 2013). Wood storks also use man-made wetlands for foraging and breeding. Some of these man-made wetlands include storm water treatment areas and ponds, golf course ponds, borrow pits, reservoirs, roadside ditches, agricultural ditches, drainages, flow-ways, mining and mine reclamation areas, and dredge spoil sites (USFWS 2007). Roosting sites are generally in trees over water, but storks may also rest on the ground close to feeding sites (Coulter *et al.*, 1999).

Sightings of wood storks made during the summer of 2017 confirms the species presence near the project area. However, the dredging activities will occur during the months of October through March, outside of the general migration period for wood storks in NC. In addition, recreational water vessels utilize the construction area on frequent basis and further discourage the constant presence of the wood stork. Therefore, this analysis considers impacts to this species not likely to occur.

### 4.4 West Indian Manatee

West Indian manatees (*Trichechus manatus*) occur in shallow waters generally close to shore in estuarine and river mouth habitats (Rathbun et al., 1982). Preferred feeding habitats include shallow seagrass beds close to deep channels in coastal and riverine habitats (e.g., Lefebvre et al., 2000; USFWS 2001a). West Indian manatees are frequently located in secluded canals, creeks, embayments, and lagoons near the mouths of coastal rivers and sloughs. These areas serve as locations of feeding, resting, mating, and calving (USFWS 2001). Estuarine and brackish waters, including natural and artificial freshwater sources, are typical West Indian manatee habitat (USFWS 2001a). West Indian manatees rarely occur in offshore waters where abundant seagrass and vegetation are not available (Reynolds III and Odell, 1991); however, sighting and tracking data indicate that some animals have ventured offshore (e.g., Reynolds III and Ferguson, 1984; Lefebvre et al., 2001; Alvarez-Alemán et al., 2010). Critical habitat is designated for the West Indian manatee in FL (41 FR 41914).

The West Indian manatee occurs in warm, subtropical, and tropical waters of the western North Atlantic from the southeastern U.S. to Central America, northern South America, and the West Indies (Lefebvre *et al*., 2001). During winter months, the FL population confines itself to inshore and inner shelf waters of the southern half of peninsular FL where they utilize warm-water springs, heated industrial effluents, and other warm-water sites (Laist *et al*., 2013; Lefebvre *et al.,* 2001). As water temperatures rise in spring, West Indian manatees disperse from winter aggregation areas. West Indian manatees are frequently reported in coastal rivers of GA and SC during warmer months (Lefebvre *et al*., 2001), and have been sighted as far north as MA (Beck 2006).

The project area does not provide potential foraging habitat for manatees. Although, NCNHP shows sporadic occurrences of manatee in the project vicinity over the past several decades (NCNHP 2017). The northern limit of the manatee's range extends to North Carolina, but low temperatures prevent this species from commonly occurring in the area. The rarity of its occurrence in the vicinity of the project area makes impacts to this species unlikely (USFWS 2008). In addition, construction operations will occur during the months of October through March, when cooler water temperatures will further discourage the manatee presence. Further precautions to be implemented to help avoid impacts to the West Indian manatee include following the manatee

avoidance measures published by USFWS. Appendix B provides the referenced precautionary measures.

### 4.5 Atlantic Sturgeon

The Atlantic sturgeon (*A.* oxyrinchus oxyrinchus) was listed under the ESA on 6 February 2012 (77 FR 5914, 77 FR 5880). The NMFS recognizes five Distinct Population Segments (DPSs); including four that are listed as endangered (New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs) and one (Gulf of Maine DPS) that is listed as threatened. The Carolina DPS encompasses Atlantic sturgeons from the Roanoke, Tar/Pamlico, Cape Fear, Waccamaw, Pee Dee, and Santee-Cooper Rivers. The spawning population in each of these river systems is thought to number less than 300 adults [Atlantic Sturgeon Status Review Team (ASSRT) 2007]. Atlantic sturgeons spawn in freshwater but spend most of their adult life in the marine environment. Spawning adults generally migrate upriver in the spring/early summer (Smith and Clugston 1997). Spawning is believed to occur in flowing water between the salt front and fall line of large rivers. Post-larval juveniles move downstream into brackish waters and eventually move to estuarine waters where they reside for a period of months or years (Moser and Ross 1995). Subadult and adult Atlantic sturgeons emigrate from rivers into coastal waters where they may undertake long range migrations. Migratory subadult and adult sturgeon are typically found in shallow (10 to 50 m) nearshore waters with gravel and sand substrates (Collins and Smith 1997, Stein et al. 2004). Although extensive mixing occurs in coastal waters, Atlantic sturgeons return to their natal river to spawn (ASSRT 2007). In NC, spawning occurs in the Roanoke, Tar-Pamlico, and Cape Fear River systems and possibly in the Neuse River (ASSRT 2007).

The Atlantic sturgeon occurs in the Cape Fear River system east of the project area. Based on incidental capture data from tagging cruises, shallow nearshore ocean waters along the NC coast may represent a winter (January-February) aggregation site for Atlantic sturgeons (Laney et al. 2007). Incidental captures typically occurred over sand substrate in nearshore waters that were less than 59 ft deep. Based on previous communication with NOAA Fisheries, occurrences of Atlantic sturgeons are not expected in the inshore waters of the action area; however, the species may use Tubbs inlet and nearshore ocean along Sunset Beach as a feeding/staging area during coastal migrations.

### 4.6 Seabeach Amaranth

Seabeach amaranth (*Amaranthus pumilus*) is an annual plant found only along the Atlantic coastal plain where it inhabits barrier island beaches. Its primary habitat includes overwash flats at the accreting ends of the islands, lower foredunes, and upper strands of noneroding beaches (at the wrackline). Seabeach amaranth is usually found on a nearly pure silica sand substrate that is sparsely vegetated with annual herbs (forbs) and, less commonly, perennial herbs (mostly grasses) and scattered shrubs. In NC, seeds germinate from April through July and flowering begins as early as June. Seabeach amaranth seed production begins in July or August and peaks in September. The reproductive season may extend into January (USFWS 1996b). The construction

window for each sand placement event (16 November - 30 April) would avoid the majority of the seabeach amaranth growing season in NC, thereby minimizing the likelihood of direct impacts on actively growing plants. Although, the habitat within the Feeder Canal and Bay Area consists of fine grain sediment, muck, and coastal marsh and generally does not meet the documented criteria for seabeach amaranth habitat, it may occur on the oceanfront shoreline of Sunset Beach within the beneficial use placement area.

Sand placement activities may directly impact seabeach amaranth through the destruction or burial of plants and/or through the transfer of seeds to unsuitable habitats. The construction of stabilizing berms and dunes may have long-term indirect negative effects on the quality or availability of seabeach amaranth habitat. Wider beaches may induce additional recreational activities that impact seabeach amaranth through trampling or crushing and/or habitat modification. Based on these potential impacts, it is determined that the proposed action may affect, and is likely to adversely affect seabeach amaranth. However, the action relies on the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Sand Placement to fulfill our project-specific Section 7 responsibilities.

## 5.0 EFFECTS OF THE ACTION

Potential effects considered as a direct result of the maintenance dredging project primarily occur as temporary and localized impacts. These potential impacts include injury from entrainment or burial, behavioral effects caused by temporarily altered estuarine conditions such as dissolved oxygen reductions, increases in turbidity and suspended sediments, and effects on movement of certain species through the waterways. Construction best management practices (BMP)'s and turbidity controls will be utilized during construction activities to minimize impacts where possible.

The BMP's proposed include limiting the dredging activities to the months of October through March when colder temperatures discourage an abundance of environmental activity. In addition, marine vessels associated with the project will follow the precautionary measures recommended by the USFWS for minimizing impacts to manatee. The guidelines published by the NMFS for minimizing potential impacts to sea turtle and Smalltooth sawfish will also be followed. Appendix B provides a copy of the referenced precautionary measures and guidelines.

Turbidity controls will be implemented at the material placement site to minimize the suspended sediment re-introduced into the coastal waters surrounding the site. The effluent waters will be detained within the material placement site through the use of a weir system to allow settling time for the dredge effluent. Visual monitoring will also occur to help monitor the discharge waters and limit the turbidity effects. The settling time for the dredge effluent will be increased at any point when an increased turbidity plume becomes evident at the discharge location. Water quality testing may also occur at the discharge location of the material placement site to help monitor potential increases in turbidity. The tests, when considered necessary, will monitor the increase in NTU's provided by the effluent discharge compared to a background or control site adjacent to the project area.

The proposed maintenance dredging activities most likely will not create any long-term permanent effects to the project site. Both the Feeder Canal and Bay Area have previously been dredged and the current project does not exceed the original project footprint. Therefore, the project should not create any changes to the overall sedimentology or hydrology of the water bodies. The most recent maintenance dredging for the Feeder Canal occurred in 2002 and the initial dredging of both the Feeder Canal and Bay Area occurred in early 1970's.

## 6.0 CONCLUSION

This biological assessment concludes the proposed maintenance dredging of South Jinks Creek, the Feeder Canal and Bay Area and beneficial use placement of beach compatible material on the oceanfront shoreline of Sunset Beach may have a potential effect on the listed species/designated critical habitat within the vicinity of the project area. The action may affect, and is likely to adversely affect (MALAA) all five turtle species, red knot, piping plover, and seabeach amaranth. However, the findings of the August 28, 2017 Statewide Programmatic Biological Opinion for North Carolina Beach Sand Placement to fulfill the project-specific Section 7 responsibilities. In addition, dredge and placement activities will be limited to November 16$^{th}$ through April 30$^{th}$ to help minimize potential impacts. In addition, published guidelines and precautionary measures from the USFWS SPBO and the NMFS will be implemented during the construction process to reduce the potential for impacts.

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# APPENDIX A

# SUNSET BEACH SEA TURTLE DATA

| County | Activity | Activity Date | Year | Month | Week | Dayofyear | Species | Latitude | Longitude | Relocation | Total Eggs | Relocation Da | Relocation | Relocation | Emerge Date | Hatch Succ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brunswick | N | 5/28/2000 | 2000 | 5 | 22 | 149 | Cc | 33.87227 | -78.4861 | relocated | 132 | 5/28/2000 | 33.8724 | -78.4862 | 8/2/2000 | 93.94 |
| Brunswick | N | 6/4/2000 | 2000 | 6 | 23 | 156 | Cc | 33.85597 | -78.5328 | relocated | 120 | 6/4/2000 | 33.856 | -78.5327 | 8/6/2000 | 2.5 |
| Brunswick | N | 6/6/2000 | 2000 | 6 | 23 | 158 | Cc | 33.8681 | -78.5021 | in situ | | | | | 8/18/2000 | 61.2245 |
| Brunswick | N | 6/6/2000 | 2000 | 6 | 23 | 158 | Cc | 33.8707 | -78.4921 | in situ | | | | | 8/10/2000 | 60.9091 |
| Brunswick | N | 6/7/2000 | 2000 | 6 | 23 | 159 | Cc | 33.86223 | -78.5188 | in situ | | | | | 8/21/2000 | 88.4615 |
| Brunswick | N | 6/9/2000 | 2000 | 6 | 23 | 161 | Cc | 33.87208 | -78.4873 | in situ | | | | | 8/14/2000 | 89.4366 |
| Brunswick | N | 6/9/2000 | 2000 | 6 | 23 | 161 | Cc | 33.855 | -78.5347 | in situ | | | | | 8/8/2000 | 71.6667 |
| Brunswick | N | 6/9/2000 | 2000 | 6 | 23 | 161 | Cc | 33.85343 | -78.5385 | in situ | | | | | 8/26/2000 | 94.898 |
| Brunswick | N | 6/11/2000 | 2000 | 6 | 24 | 163 | Cc | 33.87015 | -78.4952 | in situ | | | | | 8/13/2000 | 97.8261 |
| Brunswick | N | 6/15/2000 | 2000 | 6 | 24 | 167 | Cc | 33.85568 | -78.5333 | in situ | | | | | 8/17/2000 | 93.3884 |
| Brunswick | N | 6/20/2000 | 2000 | 6 | 25 | 172 | Cc | 33.8638 | -78.5144 | in situ | | | | | 8/27/2000 | 98.1651 |
| Brunswick | N | 6/21/2000 | 2000 | 6 | 25 | 173 | Cc | 33.8698 | -78.4968 | in situ | | | | | 9/1/2000 | 72.2222 |
| Brunswick | N | 6/22/2000 | 2000 | 6 | 25 | 174 | Cc | 33.86982 | -78.4969 | in situ | | | | | 9/5/2000 | 63.8889 |
| Brunswick | N | 7/2/2000 | 2000 | 7 | 27 | 184 | Cc | 33.87085 | -78.4921 | in situ | | | | | 9/8/2000 | 97.8261 |
| Brunswick | N | 7/2/2000 | 2000 | 7 | 27 | 184 | Cc | 33.85148 | -78.5422 | in situ | | | | | 9/9/2000 | 97.6 |
| Brunswick | N | 7/4/2000 | 2000 | 7 | 27 | 186 | Cc | 33.8716 | -78.4872 | in situ | | | | | 9/4/2000 | 93.1818 |
| Brunswick | N | 7/8/2000 | 2000 | 7 | 27 | 190 | Cc | 33.87185 | -78.488 | in situ | | | | | 10/9/2000 | 75.7576 |
| Brunswick | N | 7/9/2000 | 2000 | 7 | 28 | 191 | Cc | 33.86932 | -78.4984 | in situ | | | | | 9/20/2000 | 78.3951 |
| Brunswick | N | 7/13/2000 | 2000 | 7 | 28 | 195 | Cc | 33.85638 | -78.532 | in situ | | | | | 9/25/2000 | 96.9697 |
| Brunswick | N | 7/16/2000 | 2000 | 7 | 29 | 198 | Cc | 33.856 | -78.5327 | in situ | | | | | 9/26/2000 | 94.3548 |
| Brunswick | N | 7/19/2000 | 2000 | 7 | 29 | 201 | Cc | 33.8719 | -78.488 | in situ | | | | | 9/24/2000 | 94.1176 |
| Brunswick | N | 7/23/2000 | 2000 | 7 | 30 | 205 | Cc | 33.87135 | -78.4906 | in situ | | | | | 10/9/2000 | 32.5 |
| Brunswick | N | 7/27/2000 | 2000 | 7 | 30 | 209 | Cc | 33.86827 | -78.5017 | in situ | | | | | 10/9/2000 | 89.8551 |
| Brunswick | N | 7/27/2000 | 2000 | 7 | 30 | 209 | Cc | 33.85365 | -78.5378 | in situ | | | | | 10/5/2000 | 95.9677 |
| Brunswick | N | 7/30/2000 | 2000 | 7 | 31 | 212 | Cc | 33.87098 | -78.492 | in situ | | | | | 10/19/2000 | 92.0792 |
| Brunswick | N | 7/30/2000 | 2000 | 7 | 31 | 212 | Cc | 33.87105 | -78.492 | in situ | | | | | 10/25/2000 | 84.9624 |
| Brunswick | N | 8/1/2000 | 2000 | 8 | 31 | 214 | Cc | 33.8707 | -78.492 | in situ | | | | | 11/6/2000 | 73.0769 |
| Brunswick | N | 8/9/2000 | 2000 | 8 | 32 | 222 | Cc | 33.85457 | -78.5358 | in situ | | | | | 11/10/2000 | 83.6066 |
| Brunswick | N | 8/11/2000 | 2000 | 8 | 32 | 224 | Cc | 33.85457 | -78.5358 | in situ | | | | | | 0 |
| Brunswick | N | 5/30/2001 | 2001 | 5 | 21 | 150 | Cc | 33.86787 | -78.5037 | in situ | | | | | 8/17/2001 | 95.2381 |
| Brunswick | N | 6/16/2001 | 2001 | 6 | 23 | 167 | Cc | 33.85511 | -78.5347 | relocated | 24 | 6/16/2001 | | | 8/22/2001 | 7.2 |
| Brunswick | N | 6/20/2001 | 2001 | 6 | 24 | 171 | Cc | 33.86945 | -78.4981 | in situ | | | | | 8/17/2001 | 87.8571 |
| Brunswick | N | 6/26/2001 | 2001 | 6 | 25 | 177 | Cc | 33.85567 | -78.5334 | relocated | 109 | 6/26/2001 | | | 8/30/2001 | 65.8 |
| Brunswick | N | 7/8/2001 | 2001 | 7 | 27 | 189 | Cc | 33.87072 | -78.4928 | relocated | 126 | 7/8/2001 | 33.871 | -78.493 | 9/5/2001 | 94.44 |
| Brunswick | N | 7/12/2001 | 2001 | 7 | 27 | 193 | Cc | 33.8678 | -78.504 | in situ | | | | | 9/8/2001 | 97.0149 |
| Brunswick | N | 7/21/2001 | 2001 | 7 | 28 | 202 | Cc | 33.87077 | -78.4927 | in situ | | | | | 9/25/2001 | 95.283 |
| Brunswick | N | 7/26/2001 | 2001 | 7 | 29 | 207 | Cc | 33.86835 | -78.502 | in situ | | | | | 9/24/2001 | 98.7342 |
| Brunswick | N | 5/18/2002 | 2002 | 5 | 19 | 138 | Cc | 33.8707 | -78.492 | in situ | | | | | 8/10/2002 | 75.3165 |
| Brunswick | N | 5/29/2002 | 2002 | 5 | 21 | 149 | Cc | 33.8593 | -78.5259 | relocated | 138 | 5/29/2002 | | | 8/1/2002 | 92.75 |
| Brunswick | N | 6/1/2002 | 2002 | 6 | 21 | 152 | Cc | 33.85297 | -78.5399 | in situ | | | | | 7/31/2002 | 98.9651 |
| Brunswick | N | 6/2/2002 | 2002 | 6 | 22 | 153 | Cc | 33.87235 | -78.4851 | in situ | | | | | 7/29/2002 | 84.0336 |
| Brunswick | N | 6/11/2002 | 2002 | 6 | 23 | 162 | Cc | 33.86477 | -78.5122 | relocated | 136 | 6/11/2002 | | | 8/15/2002 | 95.59 |
| Brunswick | N | 6/13/2002 | 2002 | 6 | 23 | 164 | Cc | 33.87125 | -78.4891 | in situ | | | | | 8/13/2002 | 92.8571 |
| Brunswick | N | 6/16/2002 | 2002 | 6 | 24 | 167 | Cc | 33.87085 | -78.4912 | in situ | | | | | 8/12/2002 | 90 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brunswick | N | 6/17/2002 | 2002 | 6 | 24 | 168 | Cc | 33.87125 | -78.4892 | relocated | 104 | 6/17/2002 | | | 8/13/2002 | 95.19 |
| Brunswick | N | 6/26/2002 | 2002 | 6 | 25 | 177 | Cc | 33.87287 | -78.4848 | in situ | | | | | 8/23/2002 | 70.8333 |
| Brunswick | N | 7/1/2002 | 2002 | 7 | 26 | 182 | Cc | 33.85565 | -78.5337 | relocated | 96 | 7/1/2002 | | | 8/24/2002 | 98.96 |
| Brunswick | N | 7/1/2002 | 2002 | 7 | 26 | 182 | Cc | 33.8727 | -78.4853 | in situ | | | | | 8/25/2002 | 98.5185 |
| Brunswick | N | 7/8/2002 | 2002 | 7 | 27 | 189 | Cc | 33.86975 | -78.4967 | relocated | 115 | 7/8/2002 | | | 9/1/2002 | 97.39 |
| Brunswick | N | 7/14/2002 | 2002 | 7 | 28 | 195 | Cc | 33.8674 | -78.5046 | relocated | 140 | 7/14/2002 | | | 9/7/2002 | 97.14 |
| Brunswick | N | 7/14/2002 | 2002 | 7 | 28 | 195 | Cc | 33.85253 | -78.5401 | relocated | 129 | 7/14/2002 | | | 9/6/2002 | 96.9 |
| Brunswick | N | 7/28/2002 | 2002 | 7 | 30 | 209 | Cc | 33.8704 | -78.4934 | relocated | 87 | 7/28/2002 | | | 9/19/2002 | 95.4 |
| Brunswick | N | 5/13/2003 | 2003 | 5 | 19 | 133 | Cc | 33.8714 | -78.4885 | in situ | | | | | 8/2/2003 | 82.4324 |
| Brunswick | N | 5/28/2003 | 2003 | 5 | 21 | 148 | Cc | 33.8703 | -78.4939 | in situ | | | | | 8/3/2003 | 94.9275 |
| Brunswick | N | 6/3/2003 | 2003 | 6 | 22 | 154 | Cc | 33.8584 | -78.5279 | in situ | | | | | 8/2/2003 | 95.5556 |
| Brunswick | N | 6/5/2003 | 2003 | 6 | 22 | 156 | Cc | 33.8578 | -78.5289 | in situ | | | | | 8/3/2003 | 84.058 |
| Brunswick | N | 6/12/2003 | 2003 | 6 | 23 | 163 | Cc | 33.856 | -78.5332 | in situ | | | | | 8/17/2003 | 93.3333 |
| Brunswick | N | 6/23/2003 | 2003 | 6 | 25 | 174 | Cc | 33.8718 | -78.487 | in situ | | | | | 8/25/2003 | 96.9925 |
| Brunswick | N | 6/26/2003 | 2003 | 6 | 25 | 177 | Cc | 33.8725 | -78.4846 | in situ | | | | | 8/28/2003 | 96.5986 |
| Brunswick | N | 6/28/2003 | 2003 | 6 | 25 | 179 | Cc | 33.8679 | -78.5029 | in situ | | | | | 8/22/2003 | 99.3197 |
| Brunswick | N | 7/1/2003 | 2003 | 7 | 26 | 182 | Cc | 33.8603 | -78.5231 | in situ | | | | | 8/27/2003 | 100 |
| Brunswick | N | 7/10/2003 | 2003 | 7 | 27 | 191 | Cc | 33.8696 | -78.4965 | in situ | | | | | 9/13/2003 | 94.8905 |
| Brunswick | N | 7/16/2003 | 2003 | 7 | 28 | 197 | Cc | 33.8611 | -78.5213 | in situ | | | | | 9/10/2003 | 97.1698 |
| Brunswick | N | 7/17/2003 | 2003 | 7 | 28 | 198 | Cc | 33.8718 | -78.487 | in situ | | | | | 9/12/2003 | 91.9355 |
| Brunswick | N | 7/20/2003 | 2003 | 7 | 29 | 201 | Cc | 33.8726 | -78.4843 | in situ | | | | | 9/19/2003 | 91.2752 |
| Brunswick | N | 7/22/2003 | 2003 | 7 | 29 | 203 | Cc | 33.858 | -78.5285 | relocated | 145 | 7/22/2003 | 33.85645 | -78.5321 | 10/7/2003 | 93.79 |
| Brunswick | N | 7/27/2003 | 2003 | 7 | 30 | 208 | Cc | 33.8719 | -78.4863 | in situ | | | | | 9/24/2003 | 94.5205 |
| Brunswick | N | 8/1/2003 | 2003 | 8 | 30 | 213 | Cc | 33.8721 | -78.4856 | in situ | | | | | 9/30/2003 | 97.9592 |
| Brunswick | N | 8/3/2003 | 2003 | 8 | 31 | 215 | Cc | 33.8698 | -78.4956 | in situ | | | | | 9/30/2003 | 95.6522 |
| Brunswick | N | 6/4/2005 | 2005 | 6 | 22 | 155 | Cc | 33.8579 | -78.5283 | in situ | | | | | 8/7/2005 | 100 |
| Brunswick | N | 6/13/2005 | 2005 | 6 | 24 | 164 | Cc | 33.8716 | -78.4871 | in situ | | | | | 8/10/2005 | 98.9247 |
| Brunswick | N | 6/21/2005 | 2005 | 6 | 25 | 172 | Cc | 33.871 | -78.4909 | in situ | | | | | 8/19/2005 | 90.678 |
| Brunswick | N | 6/27/2005 | 2005 | 6 | 26 | 178 | Cc | | | in situ | | | | | 8/27/2005 | 29.9145 |
| Brunswick | N | 7/2/2005 | 2005 | 7 | 26 | 183 | Cc | 33.8601 | -78.5234 | relocated | 113 | 7/2/2005 | | | 8/26/2005 | 97.35 |
| Brunswick | N | 7/4/2005 | 2005 | 7 | 27 | 185 | Cc | 33.8713 | -78.4879 | in situ | | | | | 8/29/2005 | 100 |
| Brunswick | N | 7/4/2005 | 2005 | 7 | 27 | 185 | Cc | 33.8581 | -78.5278 | relocated | 125 | 7/4/2005 | | | 8/26/2005 | 100 |
| Brunswick | N | 7/14/2005 | 2005 | 7 | 28 | 195 | Cc | 33.8536 | -78.5382 | relocated | 115 | 7/14/2005 | | | 9/9/2005 | 41.74 |
| Brunswick | N | 7/18/2005 | 2005 | 7 | 29 | 199 | Cc | 33.8547 | -78.5357 | relocated | 136 | 7/18/2005 | | | 9/18/2005 | 97.79 |
| Brunswick | N | 8/14/2005 | 2005 | 8 | 33 | 226 | Cc | 33.8722 | -78.4851 | in situ | | | | | | 0 |
| Brunswick | N | 6/8/2006 | 2006 | 6 | 23 | 159 | Cc | 33.8718 | -78.4865 | in situ | | | | | 8/7/2006 | 98.1366 |
| Brunswick | N | 6/14/2006 | 2006 | 6 | 24 | 165 | Cc | 33.8591 | -78.526 | in situ | | | | | 8/9/2006 | 85.3933 |
| Brunswick | N | 6/17/2006 | 2006 | 6 | 24 | 168 | Cc | 33.8715 | -78.488 | in situ | | | | | 8/9/2006 | 88.8889 |
| Brunswick | N | 6/18/2006 | 2006 | 6 | 25 | 169 | Cc | 33.8718 | -78.486 | relocated | 93 | 6/18/2006 | | | 8/14/2006 | 44.09 |
| Brunswick | N | 6/18/2006 | 2006 | 6 | 25 | 169 | Cc | 33.8591 | -78.526 | in situ | | | | | 8/13/2006 | 96.6443 |
| Brunswick | N | 7/3/2006 | 2006 | 7 | 27 | 184 | Cc | 33.8716 | -78.4871 | in situ | | | | | 8/27/2006 | 94.1667 |
| Brunswick | N | 7/3/2006 | 2006 | 7 | 27 | 184 | Cc | 33.8714 | -78.487 | in situ | | | | | 8/31/2006 | 96.6887 |
| Brunswick | N | 7/8/2006 | 2006 | 7 | 27 | 189 | Cc | 33.8553 | -78.5345 | in situ | | | | | 8/28/2006 | 96.4912 |
| Brunswick | N | 7/9/2006 | 2006 | 7 | 28 | 190 | Cc | 33.8712 | -78.4894 | in situ | | | | | 9/3/2006 | 95.7627 |
| Brunswick | N | 7/11/2006 | 2006 | 7 | 28 | 192 | Cc | 33.8621 | -78.5189 | in situ | | | | | 8/30/2006 | 90.4762 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brunswick | N | 7/11/2006 | 2006 | 7 | 28 | 192 | Cc | 33.8718 | -78.4866 | in situ | | | | | 8/30/2006 | 92.3077 |
| Brunswick | N | 8/10/2006 | 2006 | 8 | 32 | 222 | Cc | 33.8717 | -78.4871 | relocated | 125 | 8/10/2006 | | | 10/29/2006 | 62.4 |
| Brunswick | N | 6/5/2007 | 2007 | 6 | 22 | 156 | Cc | 33.87055 | -78.4928 | in situ | | | | | 8/2/2007 | 95.2381 |
| Brunswick | N | 6/9/2007 | 2007 | 6 | 22 | 160 | Cc | 33.87116 | -78.49 | in situ | | | | | 8/9/2007 | 79.7872 |
| Brunswick | N | 6/12/2007 | 2007 | 6 | 23 | 163 | Cc | 33.87084 | -78.492 | in situ | | | | | 8/12/2007 | 94.3925 |
| Brunswick | N | 6/24/2007 | 2007 | 6 | 25 | 175 | Cc | 33.86836 | -78.5014 | in situ | | | | | 8/18/2007 | 90.7143 |
| Brunswick | N | 6/25/2007 | 2007 | 6 | 25 | 176 | Cc | 33.86914 | -78.4987 | in situ | | | | | 8/17/2007 | 91.8367 |
| Brunswick | N | 6/26/2007 | 2007 | 6 | 25 | 177 | Cc | 33.86953 | -78.4973 | in situ | | | | | | 0 |
| Brunswick | N | 6/26/2007 | 2007 | 6 | 25 | 177 | Cc | 33.871 | -78.491 | in situ | | | | | 8/21/2007 | 88.4892 |
| Brunswick | N | 7/6/2007 | 2007 | 7 | 26 | 187 | Cc | 33.86047 | -78.5227 | in situ | | | | | 9/5/2007 | 18 |
| Brunswick | N | 7/7/2007 | 2007 | 7 | 26 | 188 | Cc | 33.85858 | -78.5269 | in situ | | | | | 9/7/2007 | 97.1429 |
| Brunswick | N | 8/18/2007 | 2007 | 8 | 32 | 230 | Cc | 33.855 | -78.5349 | in situ | | | | | 10/11/2007 | 100 |
| Brunswick | N | 6/13/2008 | 2008 | 6 | 23 | 165 | Cc | 33.8502 | -78.5436 | in situ | | | | | 8/17/2008 | 88.806 |
| Brunswick | N | 6/21/2008 | 2008 | 6 | 24 | 173 | Cc | 33.8642 | -78.5139 | in situ | | | | | 8/17/2008 | 71.519 |
| Brunswick | N | 6/22/2008 | 2008 | 6 | 25 | 174 | Cc | 33.863 | -78.5168 | in situ | | | | | 9/1/2008 | 80.1724 |
| Brunswick | N | 6/26/2008 | 2008 | 6 | 25 | 178 | Cc | 33.8603 | -78.5232 | in situ | | | | | | ? |
| Brunswick | N | 7/16/2008 | 2008 | 7 | 28 | 198 | Cc | 33.8697 | -78.4964 | in situ | | | | | | 0 |
| Brunswick | N | 7/21/2008 | 2008 | 7 | 29 | 203 | Cc | 33.86974 | -78.4964 | in situ | | | | | 9/30/2008 | 56.8966 |
| Brunswick | N | 7/26/2008 | 2008 | 7 | 29 | 208 | Cc | 33.87039 | -78.4938 | in situ | | | | | 9/18/2008 | 100 |
| Brunswick | N | 7/27/2008 | 2008 | 7 | 30 | 209 | Cc | 33.86259 | -78.5181 | in situ | | | | | 9/23/2008 | 59.7826 |
| Brunswick | N | 6/4/2009 | 2009 | 6 | 22 | 155 | Cc | 33.8671 | -78.5053 | in situ | | | | | 8/1/2009 | 94.2029 |
| Brunswick | N | 6/13/2009 | 2009 | 6 | 23 | 164 | Cc | 33.87 | -78.4953 | in situ | | | | | 8/9/2009 | 75 |
| Brunswick | N | 6/15/2009 | 2009 | 6 | 24 | 166 | Cc | 33.8604 | -78.5233 | in situ | | | | | 8/5/2009 | 93.3824 |
| Brunswick | N | 6/18/2009 | 2009 | 6 | 24 | 169 | Cc | 33.8576 | -78.5296 | in situ | | | | | | 97.3913 |
| Brunswick | N | 7/7/2009 | 2009 | 7 | 27 | 188 | Cc | 33.8643 | -78.5137 | in situ | | | | | 9/3/2009 | 92.1986 |
| Brunswick | N | 7/15/2009 | 2009 | 7 | 28 | 196 | Cc | 33.8615 | -78.5207 | in situ | | | | | 9/10/2009 | 95.2756 |
| Brunswick | N | 7/22/2009 | 2009 | 7 | 29 | 203 | Cc | 33.8695 | -78.4973 | in situ | | | | | 9/17/2009 | 98.0769 |
| Brunswick | N | 7/25/2009 | 2009 | 7 | 29 | 206 | Cc | 33.8559 | -78.5329 | in situ | | | | | 9/21/2009 | 91 |
| Brunswick | N | 5/25/2010 | 2010 | 5 | 21 | 145 | Cc | 33.8676 | -78.504 | in situ | | | | | 7/14/2010 | ? |
| Brunswick | N | 6/1/2010 | 2010 | 6 | 22 | 152 | Cc | 33.8649 | -78.5122 | in situ | | | | | 8/1/2010 | 91.9643 |
| Brunswick | N | 6/14/2010 | 2010 | 6 | 24 | 165 | Cc | 33.8712 | -78.4901 | relocated | 134 | 6/14/2010 | 33.8714 | -78.4902 | 8/7/2010 | 99.25 |
| Brunswick | N | 6/28/2010 | 2010 | 6 | 26 | 179 | Cc | 33.8648 | -78.5125 | in situ | | | | | 8/22/2010 | 97.2973 |
| Brunswick | N | 7/5/2010 | 2010 | 7 | 27 | 186 | Cc | 33.8726 | -78.4839 | in situ | | | | | 8/29/2010 | 85.1351 |
| Brunswick | N | 7/12/2010 | 2010 | 7 | 28 | 193 | Cc | 33.8578 | -78.5292 | in situ | | | | | 8/28/2010 | 98.5185 |
| Brunswick | N | 5/27/2011 | 2011 | 5 | 21 | 147 | Cc | 33.8554 | -78.5342 | relocated | 120 | 5/27/2011 | 33.8582 | -78.5284 | 7/28/2011 | 90 |
| Brunswick | N | 5/28/2011 | 2011 | 5 | 21 | 148 | Cc | 33.8691 | -78.4987 | in situ | | | | | 7/28/2011 | 86.3946 |
| Brunswick | N | 5/31/2011 | 2011 | 5 | 22 | 151 | Cc | 33.854 | -78.5375 | in situ | | | | | | 0 |
| Brunswick | N | 6/8/2011 | 2011 | 6 | 23 | 159 | Cc | 33.8586 | -78.527 | in situ | | | | | 8/9/2011 | 86.4865 |
| Brunswick | N | 6/10/2011 | 2011 | 6 | 23 | 161 | Cc | 33.866 | -78.5091 | in situ | | | | | 8/8/2011 | 95 |
| Brunswick | N | 6/29/2011 | 2011 | 6 | 26 | 180 | Cc | 33.8582 | -78.5284 | in situ | | | | | | 0 |
| Brunswick | N | 7/1/2011 | 2011 | 7 | 26 | 182 | Cc | 33.868 | -78.5021 | in situ | | | | | 8/22/2011 | 97.4359 |
| Brunswick | N | 7/1/2011 | 2011 | 7 | 26 | 182 | Cc | 33.8583 | -78.5275 | relocated | 6 | 7/1/2011 | 33.8584 | -78.5275 | | 0 |
| Brunswick | N | 7/2/2011 | 2011 | 7 | 26 | 183 | Cc | 33.8579 | -78.5283 | in situ | | | | | 8/21/2011 | 65.8537 |
| Brunswick | N | 7/17/2011 | 2011 | 7 | 29 | 198 | Cc | 33.8717 | -78.4883 | in situ | | | | | 9/8/2011 | 96.9697 |
| Brunswick | N | 7/17/2011 | 2011 | 7 | 29 | 198 | Cc | 33.8539 | -78.5373 | in situ | | | | | 9/16/2011 | 90.5109 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brunswick N | 7/21/2011 | 2011 | 7 | 29 | 202 Cc | 33.8619 | -78.5194 | in situ | | | | | | 0 |
| Brunswick N | 7/25/2011 | 2011 | 7 | 30 | 206 Cc | 33.8546 | -78.5359 | in situ | | | | | 9/20/2011 | 97.0149 |
| Brunswick N | 7/29/2011 | 2011 | 7 | 30 | 210 Cc | 33.8584 | -78.527 | in situ | | | | | 9/29/2011 | 82.2917 |
| Brunswick N | 5/29/2012 | 2012 | 5 | 22 | 150 Cc | 33.852 | -78.5413 | relocated | 132 | 5/29/2012 | 33.8701 | -78.4949 | 7/25/2012 | 77.27 |
| Brunswick N | 6/3/2012 | 2012 | 6 | 23 | 155 Cc | 33.8538 | -78.5378 | relocated | 133 | 6/3/2012 | 33.8539 | -78.538 | 7/29/2012 | 97.74 |
| Brunswick N | 6/10/2012 | 2012 | 6 | 24 | 162 Cc | 33.8724 | -78.4847 | relocated | 93 | 6/10/2012 | 33.8724 | -78.4847 | 8/5/2012 | 87.1 |
| Brunswick N | 6/19/2012 | 2012 | 6 | 25 | 171 Cc | 33.8521 | -78.5415 | in situ | | | | | 8/14/2012 | 94.8276 |
| Brunswick N | 7/3/2012 | 2012 | 7 | 27 | 185 Cc | 33.8524 | -78.5408 | relocated | 137 | 7/3/2012 | 33.8523 | -78.541 | 8/23/2012 | 98.54 |
| Brunswick N | 7/4/2012 | 2012 | 7 | 27 | 186 Cc | 33.8698 | -78.4961 | in situ | | | | | 8/27/2012 | 94.9495 |
| Brunswick N | 7/6/2012 | 2012 | 7 | 27 | 188 Cc | 33.871 | -78.4909 | in situ | | | | | 8/30/2012 | 97.1223 |
| Brunswick N | 7/16/2012 | 2012 | 7 | 29 | 198 Cc | 33.8606 | -78.5223 | relocated | 131 | 7/16/2012 | 33.8607 | -78.5223 | 9/17/2012 | 96.18 |
| Brunswick N | 6/5/2013 | 2013 | 6 | 22 | 156 Cc | 33.87063 | -78.4927 | in situ | | | | | 8/6/2013 | 92.8571 |
| Brunswick N | 6/6/2013 | 2013 | 6 | 22 | 157 Cc | 33.8536 | -78.5384 | in situ | | | | | 8/1/2013 | 94.697 |
| Brunswick N | 6/6/2013 | 2013 | 6 | 22 | 157 Cc | 33.85361 | -78.5385 | in situ | | | | | 8/7/2013 | 86.1314 |
| Brunswick N | 6/15/2013 | 2013 | 6 | 23 | 166 Cc | 33.8687 | -78.5001 | in situ | | | | | 8/11/2013 | 89.6226 |
| Brunswick N | 6/21/2013 | 2013 | 6 | 24 | 172 Cc | 33.8714 | -78.4892 | in situ | | | | | 8/17/2013 | 91.0345 |
| Brunswick N | 6/21/2013 | 2013 | 6 | 24 | 172 Cc | 33.8687 | -78.5001 | in situ | | | | | 8/19/2013 | 70.122 |
| Brunswick N | 7/4/2013 | 2013 | 7 | 26 | 185 Cc | 33.86786 | -78.5032 | in situ | | | | | 8/29/2013 | 89.8438 |
| Brunswick N | 7/5/2013 | 2013 | 7 | 26 | 186 Cc | 33.87066 | -78.4919 | relocated | 142 | 7/5/2013 | 33.87083 | -78.4919 | 8/26/2013 | 89.44 |
| Brunswick N | 7/7/2013 | 2013 | 7 | 27 | 188 Cc | 33.87066 | -78.4923 | relocated | 108 | 7/7/2013 | 33.87072 | -78.4923 | 8/29/2013 | 97.22 |
| Brunswick N | 7/14/2013 | 2013 | 7 | 28 | 195 Cc | 33.86005 | -78.5241 | in situ | | | | | 9/5/2013 | 86.0294 |
| Brunswick N | 7/15/2013 | 2013 | 7 | 28 | 196 Cc | 33.85984 | -78.5241 | relocated | 109 | 7/15/2013 | 33.85963 | -78.5247 | 9/9/2013 | 98.17 |
| Brunswick N | 7/17/2013 | 2013 | 7 | 28 | 198 Cc | 33.8701 | -78.4948 | in situ | | | | | 9/8/2013 | 92.1053 |
| Brunswick N | 7/18/2013 | 2013 | 7 | 28 | 199 Cc | 33.86068 | -78.5221 | relocated | 107 | 10/9/2013 | 33.86071 | -78.5222 | 9/9/2013 | 93.46 |
| Brunswick N | 7/19/2013 | 2013 | 7 | 28 | 200 Cc | 33.8677 | -78.5031 | relocated | 95 | 7/19/2013 | 33.86779 | -78.5033 | 9/11/2013 | 92.63 |
| Brunswick N | 7/27/2013 | 2013 | 7 | 29 | 208 Cc | 33.87158 | -78.4884 | relocated | 125 | 7/27/2013 | 33.87162 | -78.4887 | 9/22/2013 | 44 |
| Brunswick N | 7/28/2013 | 2013 | 7 | 30 | 209 Cc | 33.85769 | -78.5292 | relocated | 107 | 7/28/2013 | 33.85769 | -78.5293 | 9/20/2013 | 97.2 |
| Brunswick N | 7/28/2013 | 2013 | 7 | 30 | 209 Cc | 33.8608 | -78.5221 | in situ | | | | | 9/23/2013 | 98.7013 |
| Brunswick N | 7/31/2013 | 2013 | 7 | 30 | 212 Cc | 33.85742 | -78.5297 | relocated | 115 | 7/31/2013 | 33.85749 | -78.5298 | 9/25/2013 | 90.43 |
| Brunswick N | 8/16/2013 | 2013 | 8 | 32 | 228 Cc | 33.8602 | -78.5232 | in situ | | | | | 10/19/2013 | 95.1807 |
| Brunswick N | 6/9/2014 | 2014 | 6 | 23 | 160 Cc | 33.85544 | -78.5341 | relocated | 151 | 6/9/2014 | 33.85703 | -78.5307 | 8/10/2014 | 86.09 |
| Brunswick N | 6/23/2014 | 2014 | 6 | 25 | 174 Cc | 33.85448 | -78.5363 | relocated | 126 | 6/23/2014 | 33.85704 | -78.5307 | 8/22/2014 | 73.81 |
| Brunswick N | 6/24/2014 | 2014 | 6 | 25 | 175 Cc | 33.86176 | -78.5198 | in situ | | | | | 8/24/2014 | 91.0569 |
| Brunswick N | 5/25/2015 | 2015 | 5 | 21 | 145 Cc | 33.86194 | -78.5194 | relocated | 122 | 5/25/2015 | | | 7/20/2015 | 94.26 |
| Brunswick N | 5/27/2015 | 2015 | 5 | 21 | 147 Cc | 33.86278 | -78.5175 | in situ | | | | | 8/1/2015 | 97.7099 |
| Brunswick N | 6/3/2015 | 2015 | 6 | 22 | 154 Cc | 33.86222 | -78.5186 | in situ | | | | | 7/31/2015 | 98.9691 |
| Brunswick N | 6/10/2015 | 2015 | 6 | 23 | 161 Cc | 33.8616 | -78.5201 | in situ | | | | | 8/3/2015 | 97.3684 |
| Brunswick N | 6/17/2015 | 2015 | 6 | 24 | 168 Cc | 33.85833 | -78.5275 | in situ | | | | | 8/15/2015 | 93.8776 |
| Brunswick N | 7/1/2015 | 2015 | 7 | 26 | 182 Cc | 33.85306 | -78.5397 | in situ | | | | | | 0 |
| Brunswick N | 7/6/2015 | 2015 | 7 | 27 | 187 Cc | 33.85944 | -78.5253 | in situ | | | | | 8/25/2015 | 98.3051 |
| Brunswick N | 7/6/2015 | 2015 | 7 | 27 | 187 Cc | 33.86972 | -78.4967 | in situ | | | | | 8/26/2015 | 92.029 |
| Brunswick N | 7/7/2015 | 2015 | 7 | 27 | 188 Cc | 33.87222 | -78.485 | in situ | | | | | 8/31/2015 | 52.4752 |
| Brunswick N | 7/10/2015 | 2015 | 7 | 27 | 191 Cc | 33.87111 | -78.49 | in situ | | | | | 9/4/2015 | 100 |
| Brunswick N | 7/12/2015 | 2015 | 7 | 28 | 193 Cc | 33.85528 | -78.5344 | relocated | 114 | 8/29/2015 | 33.85531 | -78.5349 | 9/4/2015 | 98.25 |
| Brunswick N | 7/19/2015 | 2015 | 7 | 29 | 200 Cc | 33.86972 | -78.4961 | in situ | | | | | 9/11/2015 | 92.5926 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brunswick | N | 7/19/2015 | 2015 | 7 | 29 | 200 | Cc | 33.86306 | -78.5164 | in situ | | | | | 9/11/2015 | 98.8889 |
| County | Activity | Activity Date | Year | Month | Week | Dayofyear | Species | Latitude | Longitude | Relocation | Total Eggs | Relocation Da | Relocation | Relocation | Emerge Date | Hatch Succ |
| Brunswick | N | 5/28/2000 | 2015.441 | 6.558845 | 26.13762 | 183.0331 | Cc | 33.8625 | -78.5158 | relocated | 117.1632 | 5/28/2000 | 33.86139 | -78.5187 | 8/2/2000 | 84.7932 |
| Brunswick | N | 6/4/2000 | 2015.538 | 6.559496 | 26.14006 | 183.056 | Cc | 33.86248 | -78.5159 | relocated | 117.1861 | 6/4/2000 | 33.86136 | -78.5188 | 8/6/2000 | 84.81773 |
| Brunswick | N | 6/6/2000 | 2015.634 | 6.560146 | 26.1425 | 183.0788 | Cc | 33.86246 | -78.516 | in situ | 117.2091 | | 33.86134 | -78.5188 | 8/18/2000 | 84.84226 |
| Brunswick | N | 6/6/2000 | 2015.73 | 6.560796 | 26.14494 | 183.1016 | Cc | 33.86244 | -78.516 | in situ | 117.232 | | 33.86132 | -78.5189 | 8/10/2000 | 84.8668 |
| Brunswick | N | 6/7/2000 | 2015.826 | 6.561446 | 26.14738 | 183.1245 | Cc | 33.86242 | -78.5161 | in situ | 117.2549 | | 33.86129 | -78.519 | 8/21/2000 | 84.89133 |
| Brunswick | N | 6/9/2000 | 2015.923 | 6.562097 | 26.14982 | 183.1473 | Cc | 33.8624 | -78.5162 | in situ | 117.2779 | | 33.86127 | -78.5191 | 8/14/2000 | 84.91586 |
| Brunswick | N | 6/9/2000 | 2016.019 | 6.562747 | 26.15226 | 183.1702 | Cc | 33.86237 | -78.5162 | in situ | 117.3008 | | 33.86125 | -78.5191 | 8/8/2000 | 84.94039 |
| Brunswick | N | 6/9/2000 | 2016.115 | 6.563397 | 26.15471 | 183.193 | Cc | 33.86235 | -78.5163 | in situ | 117.3237 | | 33.86122 | -78.5192 | 8/26/2000 | 84.96493 |
| Brunswick | N | 6/11/2000 | 2016.212 | 6.564047 | 26.15715 | 183.2158 | Cc | 33.86233 | -78.5163 | in situ | 117.3467 | | 33.8612 | -78.5193 | 8/13/2000 | 84.98946 |
| Brunswick | N | 6/15/2000 | 2016.308 | 6.564697 | 26.15959 | 183.2387 | Cc | 33.86231 | -78.5164 | in situ | 117.3696 | | 33.86118 | -78.5193 | 8/17/2000 | 85.01399 |
| Brunswick | N | 6/20/2000 | 2016.404 | 6.565348 | 26.16203 | 183.2615 | Cc | 33.86229 | -78.5165 | in situ | 117.3925 | | 33.86115 | -78.5194 | 8/27/2000 | 85.03853 |
| Brunswick | N | 6/21/2000 | 2016.5 | 6.565998 | 26.16447 | 183.2843 | Cc | 33.86227 | -78.5165 | in situ | 117.4155 | | 33.86113 | -78.5195 | 9/1/2000 | 85.06306 |
| Brunswick | N | 6/22/2000 | 2016.597 | 6.566648 | 26.16691 | 183.3072 | Cc | 33.86225 | -78.5166 | in situ | 117.4384 | | 33.86111 | -78.5195 | 9/5/2000 | 85.08759 |
| Brunswick | N | 7/2/2000 | 2016.693 | 6.567298 | 26.16936 | 183.33 | Cc | 33.86223 | -78.5167 | in situ | 117.4613 | | 33.86108 | -78.5196 | 9/8/2000 | 85.11213 |
| Brunswick | N | 7/2/2000 | 2016.789 | 6.567949 | 26.1718 | 183.3528 | Cc | 33.86221 | -78.5167 | in situ | 117.4843 | | 33.86106 | -78.5197 | 9/9/2000 | 85.13666 |
| Brunswick | N | 7/4/2000 | 2016.886 | 6.568599 | 26.17424 | 183.3757 | Cc | 33.86218 | -78.5168 | in situ | 117.5072 | | 33.86104 | -78.5198 | 9/4/2000 | 85.16119 |
| Brunswick | N | 7/8/2000 | 2016.982 | 6.569249 | 26.17668 | 183.3985 | Cc | 33.86216 | -78.5169 | in situ | 117.5301 | | 33.86101 | -78.5198 | 10/9/2000 | 85.18573 |
| Brunswick | N | 7/9/2000 | 2017.078 | 6.569899 | 26.17912 | 183.4213 | Cc | 33.86214 | -78.5169 | in situ | 117.5531 | | 33.86099 | -78.5199 | 9/20/2000 | 85.21026 |
| Brunswick | N | 7/13/2000 | 2017.174 | 6.57055 | 26.18156 | 183.4442 | Cc | 33.86212 | -78.517 | in situ | 117.576 | | 33.86097 | -78.52 | 9/25/2000 | 85.23479 |
| Brunswick | N | 7/16/2000 | 2017.271 | 6.5712 | 26.184 | 183.467 | Cc | 33.8621 | -78.5171 | in situ | 117.5989 | | 33.86094 | -78.52 | 9/26/2000 | 85.25933 |
| Brunswick | N | 7/19/2000 | 2017.367 | 6.57185 | 26.18645 | 183.4898 | Cc | 33.86208 | -78.5171 | in situ | 117.6219 | | 33.86092 | -78.5201 | 9/24/2000 | 85.28386 |
| Brunswick | N | 7/23/2000 | 2017.463 | 6.5725 | 26.18889 | 183.5127 | Cc | 33.86206 | -78.5172 | in situ | 117.6448 | | 33.8609 | -78.5202 | 10/9/2000 | 85.30839 |
| Brunswick | N | 7/27/2000 | 2017.559 | 6.57315 | 26.19133 | 183.5355 | Cc | 33.86204 | -78.5172 | in situ | 117.6677 | | 33.86087 | -78.5202 | 10/9/2000 | 85.33293 |
| Brunswick | N | 7/27/2000 | 2017.656 | 6.573801 | 26.19377 | 183.5583 | Cc | 33.86201 | -78.5173 | in situ | 117.6907 | | 33.86085 | -78.5203 | 10/5/2000 | 85.35746 |
| Brunswick | N | 7/30/2000 | 2017.752 | 6.574451 | 26.19621 | 183.5812 | Cc | 33.86199 | -78.5174 | in situ | 117.7136 | | 33.86083 | -78.5204 | 10/19/2000 | 85.38199 |
| Brunswick | N | 7/30/2000 | 2017.848 | 6.575101 | 26.19865 | 183.604 | Cc | 33.86197 | -78.5174 | in situ | 117.7365 | | 33.8608 | -78.5205 | 10/25/2000 | 85.40652 |
| Brunswick | N | 8/1/2000 | 2017.945 | 6.575751 | 26.20109 | 183.6268 | Cc | 33.86195 | -78.5175 | in situ | 117.7595 | | 33.86078 | -78.5205 | 11/6/2000 | 85.43106 |
| Brunswick | N | 8/9/2000 | 2018.041 | 6.576402 | 26.20354 | 183.6497 | Cc | 33.86193 | -78.5176 | in situ | 117.7824 | | 33.86076 | -78.5206 | 11/10/2000 | 85.45559 |
| Brunswick | N | 8/11/2000 | 2018.137 | 6.577052 | 26.20598 | 183.6725 | Cc | 33.86191 | -78.5176 | in situ | 117.8053 | | 33.86073 | -78.5207 | | 85.48012 |
| Brunswick | N | 5/30/2001 | 2018.233 | 6.577702 | 26.20842 | 183.6953 | Cc | 33.86189 | -78.5177 | in situ | 117.8283 | | 33.86071 | -78.5207 | 8/17/2001 | 85.50466 |
| Brunswick | N | 6/16/2001 | 2018.33 | 6.578352 | 26.21086 | 183.7182 | Cc | 33.86187 | -78.5178 | relocated | 117.8512 | 6/16/2001 | 33.86069 | -78.5208 | 8/22/2001 | 85.52919 |
| Brunswick | N | 6/20/2001 | 2018.426 | 6.579002 | 26.2133 | 183.741 | Cc | 33.86185 | -78.5178 | in situ | 117.8741 | | 33.86066 | -78.5209 | 8/17/2001 | 85.55372 |
| Brunswick | N | 6/26/2001 | 2018.522 | 6.579653 | 26.21574 | 183.7638 | Cc | 33.86182 | -78.5179 | relocated | 117.8971 | 6/26/2001 | 33.86064 | -78.5209 | 8/30/2001 | 85.57826 |
| Brunswick | N | 7/8/2001 | 2018.619 | 6.580303 | 26.21818 | 183.7867 | Cc | 33.8618 | -78.518 | relocated | 117.92 | 7/8/2001 | 33.86062 | -78.521 | 9/5/2001 | 85.60279 |
| Brunswick | N | 7/12/2001 | 2018.715 | 6.580953 | 26.22063 | 183.8095 | Cc | 33.86178 | -78.518 | in situ | 117.9429 | | 33.86059 | -78.5211 | 9/8/2001 | 85.62732 |
| Brunswick | N | 7/21/2001 | 2018.811 | 6.581603 | 26.22307 | 183.8323 | Cc | 33.86176 | -78.5181 | in situ | 117.9659 | | 33.86057 | -78.5212 | 9/25/2001 | 85.65186 |
| Brunswick | N | 7/26/2001 | 2018.907 | 6.582254 | 26.22551 | 183.8552 | Cc | 33.86174 | -78.5181 | in situ | 117.9888 | | 33.86055 | -78.5212 | 9/24/2001 | 85.67639 |
| Brunswick | N | 5/18/2002 | 2019.004 | 6.582904 | 26.22795 | 183.878 | Cc | 33.86172 | -78.5182 | in situ | 118.0117 | | 33.86052 | -78.5213 | 8/10/2002 | 85.70092 |
| Brunswick | N | 5/29/2002 | 2019.1 | 6.583554 | 26.23039 | 183.9008 | Cc | 33.8617 | -78.5183 | relocated | 118.0347 | 5/29/2002 | 33.8605 | -78.5214 | 8/1/2002 | 85.72546 |
| Brunswick | N | 6/1/2002 | 2019.196 | 6.584204 | 26.23283 | 183.9237 | Cc | 33.86168 | -78.5183 | in situ | 118.0576 | | 33.86048 | -78.5214 | 7/31/2002 | 85.74999 |
| Brunswick | N | 6/2/2002 | 2019.293 | 6.584854 | 26.23527 | 183.9465 | Cc | 33.86165 | -78.5184 | in situ | 118.0805 | | 33.86045 | -78.5215 | 7/29/2002 | 85.77452 |
| Brunswick | N | 6/11/2002 | 2019.389 | 6.585505 | 26.23772 | 183.9693 | Cc | 33.86163 | -78.5185 | relocated | 118.1035 | 6/11/2002 | 33.86043 | -78.5216 | 8/15/2002 | 85.79905 |
| Brunswick | N | 6/13/2002 | 2019.485 | 6.586155 | 26.24016 | 183.9922 | Cc | 33.86161 | -78.5185 | in situ | 118.1264 | | 33.86041 | -78.5216 | 8/13/2002 | 85.82359 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brunswick N | 6/16/2002 | 2019.581 | 6.586805 | 26.2426 | 184.015 | Cc | 33.86159 | -78.5186 | in situ | 118.1493 | 33.86038 | -78.5217 | 8/12/2002 | 85.84812 |

# APPENDIX B

# CONSTRUCTION CONDITIONS PROPOSED TO HELP MINIMIZE POTENTIAL IMPACTS TO MANATEE, SEA TURTLES, & SMALLTOOTH SAWFISH

moffatt & nichol

# United States Department of the Interior

**FISH AND WILDLIFE SERVICE**
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726


## GUIDELINES FOR AVOIDING IMPACTS TO THE WEST INDIAN MANATEE
### Precautionary Measures for Construction Activities in North Carolina Waters

The West Indian manatee (*Trichechus manatus*), also known as the Florida manatee, is a Federally-listed endangered aquatic mammal protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) and the Marine Mammal Protection Act of 1972, as amended (16 U.S.C 1461 *et seq.*). The manatee is also listed as endangered under the North Carolina Endangered Species Act of 1987 (Article 25 of Chapter 113 of the General Statutes). The U.S. Fish and Wildlife Service (Service) is the lead Federal agency responsible for the protection and recovery of the West Indian manatee under the provisions of the Endangered Species Act.

Adult manatees average 10 feet long and weigh about 2,200 pounds, although some individuals have been recorded at lengths greater than 13 feet and weighing as much as 3,500 pounds. Manatees are commonly found in fresh, brackish, or marine water habitats, including shallow coastal bays, lagoons, estuaries, and inland rivers of varying salinity extremes. Manatees spend much of their time underwater or partly submerged, making them difficult to detect even in shallow water. While the manatee's principal stronghold in the United States is Florida, the species is considered a seasonal inhabitant of North Carolina with most occurrences reported from June through October.

To protect manatees in North Carolina, the Service's Raleigh Field Office has prepared precautionary measures for general construction activities in waters used by the species. Implementation of these measure will allow in-water projects <u>which do not require blasting</u> to proceed without adverse impacts to manatees. In addition, inclusion of these guidelines as conservation measures in a Biological Assessment or Biological Evaluation, or as part of the determination of impacts on the manatee in an environmental document prepared pursuant to the National Environmental Policy Act, will expedite the Service's review of the document for the fulfillment of requirements under Section 7 of the Endangered Species Act. These measures include:

1. The project manager and/or contractor will inform all personnel associated with the project that manatees may be present in the project area, and the need to avoid any harm to these endangered mammals. The project manager will ensure that all construction personnel know the general appearance of the species and their habit of moving about completely or partially submerged in shallow water. All construction personnel will be informed that they are responsible for observing water-related activities for the presence of manatees.

2. The project manager and/or the contractor will 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 and the Endangered Species Act.

3. If a manatee is seen within 100 yards of the active construction and/or dredging operation or vessel movement, all appropriate precautions will be implemented to ensure protection of the manatee. These precautions will include the immediate shutdown of moving equipment if a manatee comes within 50 feet of the operational area of the equipment. Activities will not resume until the manatee has departed the project area on its own volition (i.e., it may not be herded or harassed from the area).

4. Any collision with and/or injury to a manatee will be reported immediately. The report must be made to the U.S. Fish and Wildlife Service (ph. 919.856.4520 ext. 16), the National Marine Fisheries Service (ph. 252.728.8762), and the North Carolina Wildlife Resources Commission (ph. 252.448.1546).

5. A sign will be posted in all vessels associated with the project where it is clearly visible to the vessel operator. The sign should state:

> CAUTION: The endangered manatee may occur in these waters during the warmer months, primarily from June through October. Idle speed is required if operating this vessel in shallow water during these months. All equipment must be shut down if a manatee comes within 50 feet of the vessel or operating equipment. A collision with and/or injury to the manatee must be reported immediately to the U.S. Fish and Wildlife Service (919-856-4520 ext. 16), the National Marine Fisheries Service (252.728.8762), and the North Carolina Wildlife Resources Commission (252.448.1546).

6. The contractor will maintain a log detailing sightings, collisions, and/or injuries to manatees during project activities. Upon completion of the action, the project manager will prepare a report which summarizes all information on manatees encountered and submit the report to the Service's Raleigh Field Office.

7. All vessels associated with the construction project will operate at "no wake/idle" speeds at all times 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.

8. If siltation barriers must be placed in shallow water, these barriers will be: (a) made of material in which manatees cannot become entangled; (b) secured in a manner that they cannot break free and entangle manatees; and, (c) regularly monitored to ensure that manatees have not become entangled. Barriers will be placed in a manner to allow manatees entry to or exit from essential habitat.

Prepared by (rev. 06/2003):
U.S. Fish and Wildlife Service
Raleigh Field Office
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919/856-4520

Figure 1. The whole body of the West Indian manatee may be visible in clear water; but in the dark and muddy waters of coastal North Carolina, one normally sees only a small part of the head when the manatee raises its nose to breathe.

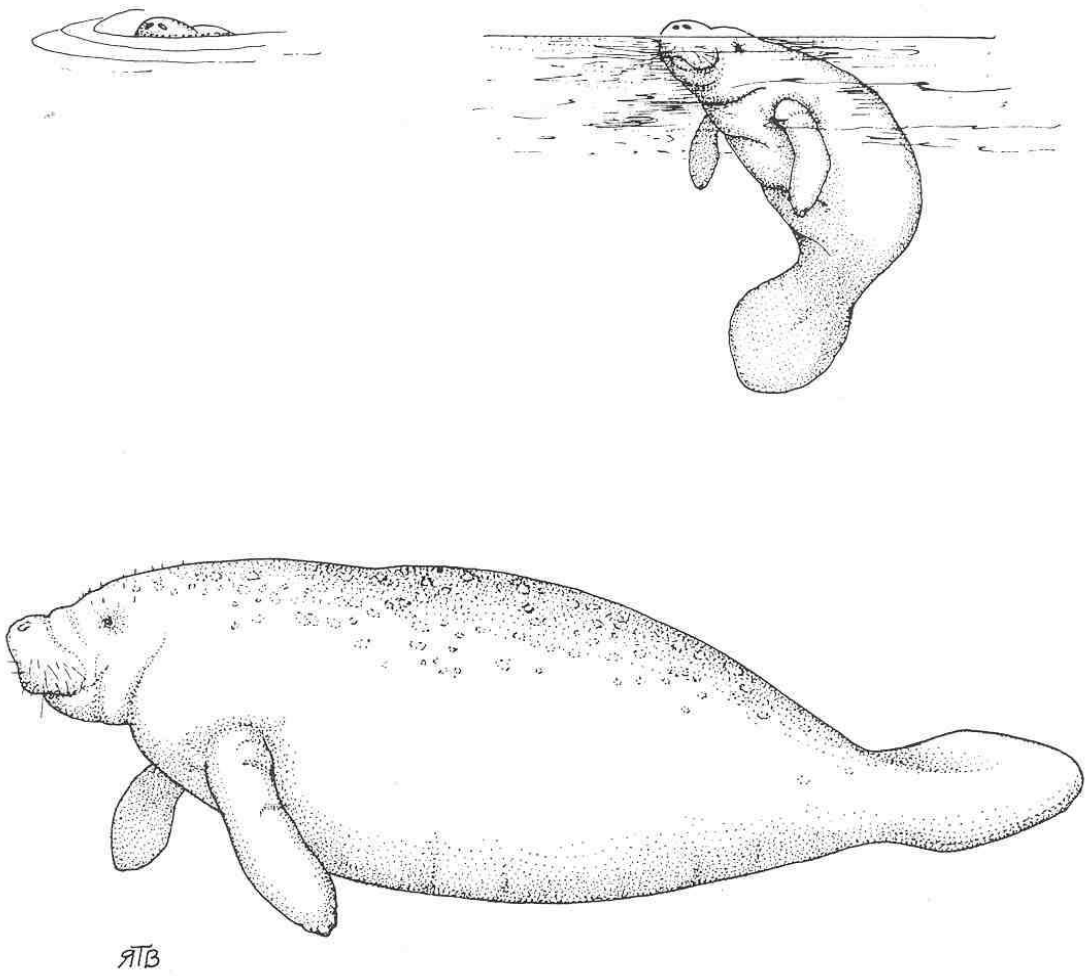


Illustration used with the permission of the North Carolina State Museum of Natural Sciences. Source: Clark, M. K. 1987. Endangered, Threatened, and Rare Fauna of North Carolina: Part I. A re-evaluation of the mammals. Occasional Papers of the North Carolina Biological Survey 1987-3. North Carolina State Museum of Natural Sciences. Raleigh, NC. pp. 52.

**UNITED STATES DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
**NATIONAL MARINE FISHERIES SERVICE**
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

## SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
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