

## APPENDIX B

# Biological Assessment

B



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# BIOLOGICAL ASSESSMENT







**Threatened and Endangered Species Survey Update  
Hilton Head Airport, HDX  
Approximately 179.79 Acres  
Hilton Head Island, South Carolina  
July 10, 2019**

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### Executive Summary

An assessment of potential threatened and endangered species habitat, was conducted during December, 2018 and June, 2019 by Jim Gentry, a natural resources consultant for Ward Edwards Engineering Inc. This assessment is an update to assessments performed in 2014 and 2011 (WS Log Nos.2015-I-0117, 2012-1-0172). The project boundary is approximately 179.79 acres, which includes approximately 8.36 acres in 5 lots east of and adjacent to the airport tract that the airport is purchasing. The tracts are located in the Town of Hilton Head, in Beaufort County, South Carolina. (Exhibit A, Figure 1). Beginning in the first half of 2019, the airport will initiate jet passenger service to regional hub airports, which is projected to increase passenger and freight service by over 50%. It is anticipated that areas within the project boundary will be impacted to provide projected infrastructure improvements. The impacts include, but are not limited to placing fill in wetlands adjacent to the existing terminal infrastructure. Federal grants will provide for the infrastructure expansion. Consequently, a threatened and endangered species assessment of the site was initiated in order to comply with current state and federal regulations including, but not limited to:

- 1 – Federal Endangered Species Act of 1973 (16 USC 1531 – 1543).
- 2 – South Carolina Non-Game and Endangered Species Conservation Act of 1974 (SC Code: 58 – 2384).
- 3 – National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.)

The threatened and endangered species assessment included a literature review of currently available local, state and federal protected species records obtained from the US Fish & Wildlife Service and the South Carolina Department of Natural Resources in June of 2019. Following the literature review, intensive pedestrian and vehicular assessments were undertaken to identify individual species and potential critical habitat within the subject tracts. Since the investigator's experience on the site dates to 2007 and includes extensive onsite investigations, past observations are utilized.

The literature review indicated that US Fish & Wildlife Service lists 3 plant species, 6 mammal species, 9 bird species, 3 fish species, 9 reptile, and 1 amphibian species that are Federal and/or State listed as threatened, endangered, proposed for listing, or "at risk" are known to



occur in Beaufort County, South Carolina. (Appendix C, Tables 1 &2). Although the bald eagle (*Haliaeetus leucocephalus*) has been removed from the threatened and endangered species list, it is protected by the Bald and Golden Eagle Protection Act (1940, Amended 1978) and has been included in this survey.

Species that require habitat not found within the project boundary were excluded. These species include:

1. Blueback Herring (*Alosa aestivalis*)
2. Atlantic Sturgeon (*Acipenser oxyrinchus*)
3. Short nose sturgeon (*Acipenser brevirostrum*)
4. Finback whale (*Balaenoptera physalus*)
5. Leatherback sea turtle (*Dermochelys coriacea*)
6. Atlantic right whale (*Eubalaena glacialis*)
7. Kemp's ridley sea turtle (*Lepidochelys kempi*)
8. Humpback whale (*Megaptera novaeangliae*)
9. Loggerhead turtle (*Caretta caretta*)
10. Humpback whale (*Megaptera novaeangliae*)
11. Green sea turtle (*Chelonia mydas*)
12. Florida manatee (*Trichechus manatus*)

The pedestrian assessments, conducted during site visits in December and June at various times of day, were designed to delineate wetland areas as well as assess current conditions on the approximately 179.79 acre project site. Significant natural and anthropomorphic changes have occurred on the site since 2012 which has potentially degraded habitat for some species. The runway approach located adjacent to and south of Dillon Road has experienced two separate impacts. In 2012 the airport removed the mature trees in wetland B and removed the scrub/shrub vegetation located in the upland portion of the approach. Removal of the mature tree canopy has allowed undergrowth to flourish and become thick. A second impact occurred in 2016 when Hurricane Matthew impacted the island and caused significant damage to mature trees in wetlands E, F, G, adjacent to the airport terminal and wetlands H and I, which are located in the westernmost lot of the 5 adjacent lots that Beaufort County is in the process of purchasing. Mature trees which were blown down by Matthew and the resulting shrub/sapling undergrowth make these areas extremely difficult to traverse. Two permitted activities were conducted with USACE permits: piping an open ditch under USACE permit no. 2015-00606-1T



and placing fill in wetland H under USACE permit no. 2017-00150 to provide additional hangar space (Please see Appendix A, Figure 7, Appendix B, Photos). Summary GIS acreage estimates of land use indicate approximately 84.7% of the 179.79 acre subject site has been converted to infrastructure, commercial use, mowed areas, or storm water retention areas. Impacts due to tree trimming and hurricane impacts described above account for an additional 11.6% of habitat disruption. When GIS accuracy errors are considered, it is apparent that the site does not have any area that has not been disturbed.

Examination of the site using the National Wetlands Inventory map (USFWS) and available aerial imagery indicates the subject site is dominated by paved infrastructure, buildings, and mowed areas. GIS estimates indicate approximately 40% of the subject site consists of commercial area, infrastructure, buildings, and mowed open area. Appendix B contains representative pictures and Appendix A Figure 3 is a land use map constructed using aerial photography and Figure 5 is the National Wetland Inventory map. The site also contains approximately 0.36 acres of upland constructed storm water retention ponds and approximately 5.31 acres of Federal jurisdictional freshwater wetlands. The USACE has reviewed the wetlands within the airport boundary (Appendix A, Figure 9), but not in the additional planned purchase. (Appendix A, Figure 9). Wetlands in the northern approach easement and the 5 parcels adjacent to the airport terminal have not been verified or reviewed by the USACE. The wetlands and storm water retention areas in Appendix A, Figure 10 have not been verified. All wetlands portrayed in this report are considered jurisdictional.

No Federal or State listed threatened and/or endangered species were detected during the course of the field investigations. An active bald eagle nest was removed from the northeastern portion of the existing runway under a USFWS takings permit dated 06/24/2010 (Appendix C). An interview with the personnel at the Hilton Head Island Fire Station, who are responsible for keeping wildlife out of the active runway did reveal that aerial noise devices are used to deter bird usage of the airport. It should be noted that the airport is fenced with a deer proof fence. Limited suitable habitat may exist for the spotted turtle (Federal at risk species, State threatened), MacGillivray's seaside sparrow (Federal at risk species), eastern diamondback snake (Federal at risk species), southern hog nosed snake (Federal at risk species, State threatened), monarch butterfly (Federal at risk species), and tricolored bat (Federal at risk species). Habitat for one State threatened species may exist on the subject site.



The findings of this investigation indicate that the potential for the existence of threatened or endangered species, other than the species noted above, is unlikely on the subject tract. Activities such as permitted wetland impacts and upland land use for commercial, residential, agricultural, or silvicultural purposes should not have any impact on threatened and endangered species populations. However, it should be noted that both threatened and endangered plant and animal populations are considered transitory and may be subject to change due to habitat alterations over time and seasonal variations. Consequently, potential findings in the future should be evaluated and assessed.





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## 1.0 METHODOLOGY

Prior to initiating the field investigations, Jim Gentry conducted a literature review of available local, state, and federal species records, including, but not limited to; U.S. Fish & Wildlife Service (USFWS) - Endangered and Threatened Species for the Southeastern United States (dated 06, 17, 2019), USFWS- South Carolina Endangered and Threatened Species List, the South Carolina Department of Natural Resources (SCDNR) Natural Heritage Program List of Protected Species, and internet distributed databases maintained by the regulatory agencies. A table identifying threatened and endangered species known to occur in Beaufort County and preferred and or critical habitat was developed using the South Carolina Rare, Threatened, and Endangered Species Inventory (distributed by the SCDNR and reviewed 07/06/2019) and South Carolina Distribution Records of Endangered, Threatened, Candidate, and Species of Concern (distributed by the USFWS and obtained 07/06/2019). Appropriate U.S. Geologic Survey (USGS) 7.5' topographic quadrangles, 1999 NAPP infrared photography, and the 1980 Soil Survey of Beaufort County, South Carolina were also reviewed for database information. The site was visited during the months of December 2018 and June, 2019 by Jim Gentry. Both pedestrian and vehicular tours of the site were performed. During the tours, potential habitat types were visited for observation. Existing conditions, biotic communities, and status (natural, impacted, or degraded) were assessed. The assessments were then used to estimate and map the observed biotic communities and status with Geographic Information Systems (GIS) computer software and 1999 NAPP infrared photography.

## 2.0 SITE LOCATION

The approximately 352.8 acre subject site is located southeast of Beach City Road in the Town of Hilton Head, Beaufort County, SC (Appendix A, Figure 1). The subject site is owned by Beaufort County, and the project boundary includes two easements located in the runway approaches at each end of the airport as well as 5 lots adjacent to the terminal that Beaufort County is in the process of purchasing.. The following coordinates approximate the center of the sites: Latitude: 30° 13' 29" north, Longitude: 80° 41' 51".



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### 3.0 SITE DESCRIPTION

#### 3.1 Overall Site Description

The site visits revealed that the approximately 352.8 acre project boundary appears to contain 5 major habitats: Pavement and buildings, mowed/maintained, wooded, and freshwater wetlands and jurisdictional connections. Analysis of available aerial photography indicate that over 75% of the site is mowed/maintained, cleared, pavement, and buildings. Please see Appendix A, Figure 3 and Appendix B, Pictures.

Clearing and the removal of trees at the north end of the runway was conducted in late 2011/early 2012 to meet FAA safety regulations defining vegetation height allowed within runway approaches. Planning for this work began in 2008 and has been coordinated with the proper government agencies. Please see Appendix A, Exhibit 7.

A significant portion of the mixed pine/hardwood forest upland areas are dominated by live oak (*Quercus virginiana*) and loblolly pine (*Pinus teada*) with a limited understory containing wax myrtle (*Myrica cerifera*). It appears that a mature overstory has limited understory and herbaceous growth in areas other than areas where mature trees were impacted by Hurricane Matthew and the southern approach which was impacted by tree trimming to meet FAA safety regulations. Please see Appendix B for pictures and Appendix A, Figure 7.

A review of the impact map, which was produced with onsite observations, indicates that the airport tract has experienced significant impacts to natural wooded areas due to hurricane damage and reducing canopy height in the approaches. Two other impacts occurred by piping approximately 1.99 acres of open ditch to meet Federal Aviation Administration (FAA) safety requirements and placing approximately 0.6-acre of fill in wetland H to provide additional needed hangar storage. Appendix A, Fig. 7. The changes to the tree canopy caused by Hurricane Matthew and manipulation to reduce canopy height appear to have allowed thick understory growth to flourish. Appendix B contains representative pictures.





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### 3.2 Wetlands

There are approximately 7.22 acres of freshwater wetlands within the approximately 352.80 acre project boundary. Appendix A, Figure 8 portrays the delineated wetland areas. Wetlands E (1.49 acres), F (0.48-acre), G (0.41-acre), EA (0.49-acre), and DA (0.47-acre) appear to be of associated as a system that was historically old dune swales. It also appears that wetlands EA and DA were separated from wetlands E, F, and G, located adjacent to the terminal, by a previously constructed drainage swale. No jurisdictional connections were evident at the time of delineation. Hardwood trees such as sweetgum (*Liquidambar styraciflua*) and red maple (*Acer rubrum*) are dominant in the overstory, with a shrub layer that includes wax myrtle and fetter bush (*Lyonia lucida*). The herbaceous layer appears to be dominated by cinnamon fern (*Osmunda cinnomomea*) and black stemmed chain fern (*Woodwardia virginica*). The plants observed are listed as hydric plants in the *National List of Plant Species that Occur in Wetlands: Southeast (Region 2)* which is published by the USFWS. Hydrology in wetlands E, F, G, EA, and DA appears to be dependent on rainfall and natural drainage. Wetland F does receive runoff drainage from an adjacent parking lot. A significant number of mature trees were uprooted by hurricane Matthew. Appendix B contains pictures of the damage. Wetland A was defined by the USACE as a non-jurisdictional borrow pit and no longer exists.

Wetland B (0.99-acre) is an ephemeral depression that is possesses wooded fringes and an interior of herbaceous vegetation. Wetland B is piped under Dillon Road to another wetland and examination of aerial photography indicates this wetland eventually drains into St. Helena Sound. Hydrology appears to be maintained by drainage from surrounding higher elevations. The overstory contains red maple, black gum (*Nyssa sylvatica*), and sweetgum; the shrub layer contains wax myrtle and dwarf palmetto (*Sabal minor*); and the herbaceous layer appears to be dominated by cinnamon fern and black stemmed chain fern (*Woodwardia virginica*). Wetland B has also been impacted by the removal of mature trees and the vegetation is now dominated by a herbaceous and scrub/shrub regime. Please see Appendix B for pictures.

Wetlands C (0.77- acre) and D (0.12-acre) appear to have been separated when the ditch that exits the airport was constructed. Hydrology appears to be maintained by surface sheet flow from higher elevations. The overstory is dominated by water oak (*Quercus nigra*), red maple, and sweetgum; the shrub layer contains wax myrtle and red bay (*Persia borbonia*); and the herbaceous layer is dominated by cinnamon fern. Please see Appendix B for pictures.



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Wetlands to the north of Dillon Road, estimated to be approximately 2.1 acres, and 11.65 acres respectively were not accessible for delineation and were delineated using GIS with remote sensing using available aerial photography and digital data. Therefore the acreages are estimates. Both wetlands appear to be natural drainages that lead to St. Helena Sound. The larger area is defined as critical area with a freshwater wetland fringe. Observations taken at the intersection of the smaller wetland and Dillon Road indicate the vegetation is dominated by red maple (*Acer rubrum*), sweet gum (*Liquidambar styraciflua*), and water oak (*Quercus nigra*). The shrub stratum appeared to consist of wax myrtle (*Myrica cerifera*) and the herbaceous layer was dominated by cinnamon fern (*Osmunda cinnomomea*). Wetland hydrology appears to be maintained as natural drainage systems enhanced by road side ditches supplying water during rain events. Please see Appendix A, Figure 8 for locations.

Wetlands to the south of the airport proper contain black gum, fetter bush, wax myrtle, and water oak. The two largest wetlands (0.9-acre and 1.4 acres) were inundated when visited during normal rainfall periods. These wetlands may be described as depressions and it appears that storm water runoff from adjacent parking areas may provide water during rain events. Both wetlands also contained red maple, sweet gum, black gum and water oak that are in the sapling stage. The shrub stratum appeared to contain wax myrtle and fetter bush and the herbaceous layer contained cinnamon fern and black stemmed chain fern. These wetlands have been impacted by the removal of mature trees that are in the runway approach. Please see Appendix A, Figure 8 for locations.

The southern approach easement also contains a series of storm water retention ponds with steep sides and limited vegetation.

### 3.3 Biotic Communities

Examination of the NWI and the true color aerial photography reveals that the project site consists of approximately 44.2% mowed grass and 35% infrastructure and buildings (GIS estimates). The remaining mixed pine and hardwood areas and wetlands have been impacted by tree trimming to reduce height and clearing to extend the runway approaches. In addition, Hurricane Matthew in 2016 caused storm damage to a significant number of mature trees located in the wetlands.



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GIS estimates indicate the site consists of approximately 44.2% mowed/open area, 35% infrastructure and buildings, 9.1% mixed pine and hardwood forest, 5.7% scrub shrub area, 2.7% commercial use, 2.5% freshwater wetlands, 0.3% open area, and 0.3% storm water retention areas. Please see Appendix A, Figure 3.

Due to the high percentage of land that is intensively utilized for airport services, the biotic communities with potential to contain threatened and endangered species habitat are considered to be mixed pine/hardwood maritime forest and hardwood bottom freshwater wetlands. The habitat survey was conducted within the freshwater wetlands and mixed pine/hardwood uplands. It appears that the small and fragmented areas possess limited potential for suitable threatened and endangered species habitat or immigration into the site. It is also important to note that heavy vehicular traffic poses a significant threat to species migration into new areas.

The mixed pine/hardwood forest identified in Appendix A, Figure 3 has been impacted by tree cutting and by Hurricane Matthew. A significant number of live oak trees (*Quercus virginiana*) were observed in each upland area. Water oak (*Quercus nigra*), sweetgum, and loblolly pine (*Pinus taeda*) are also present. The sapling/shrub layer in the areas observed is dominated by wax myrtle. The herbaceous layer in the areas observed is greatly limited due to mature overstory shading, with bracken fern being the dominant plant. Each wetland's vegetation has been described in Section 3.2. It does appear that each of the wetlands is ephemeral and site visits for the threatened and endangered species survey conducted in 2008 substantiates this premise. The ditch which connected wetlands through the airport that was lined with granite rip-rap in 2012 is now entirely piped to meet FAA guidelines for the removal of runway hazards.

### 3.4 Soils

The predominant soils onsite are identified by the Natural Resource Conservation Service (NRCS) as Wando, Rosedhu, Seabrook, and Ridgeland. Seabrook and Rosedhu are listed in the NRCS Beaufort County Field Office Technical Guide as hydric soils which may contain inclusions of hydric soils within each mapped unit. Wando and Ridgeland soils are not mapped as hydric soils. Appendix A, Figure 4 contains a NRCS soils map.



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#### 4.0 THREATENED AND ENDANGERED SPECIES

##### 4.1 Listed Species Eliminated Due to Specific Habitat Requirements

A list of state and federal threatened and endangered species was obtained for Beaufort County (Appendix D, Tables 1 and 2) and screened to develop a target list of threatened and endangered species and preferred habitat that could possibly exist on the subject site. Appendix C, Table 1 contains a list of state and federal threatened and endangered species known to exist or to have existed in Beaufort County, South Carolina. Species that require habitat not found within the project boundary were excluded. These species include:

1. Blueback Herring (*Alosa aestivalis*)
2. Atlantic Sturgeon (*Acipenser oxyrinchus*)
3. Short nose sturgeon (*Acipenser brevirostrum*)
4. Finback whale (*Balaenoptera physalus*)
5. Leatherback sea turtle (*Dermochelys coriacea*)
6. Atlantic right whale (*Eubalaena glacialis*)
7. Kemp's ridley sea turtle (*Lepidochelys kempi*)
8. Humpback whale (*Megaptera novaeangliae*)
9. Loggerhead turtle (*Caretta caretta*)
10. Humpback whale (*Megaptera novaeangliae*)
11. Green sea turtle (*Chelonia mydas*)
12. Florida manatee (*Trichechus manatus*)



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#### **4.2 Federal and State Species Listed as Threatened, Endangered, At Risk, or Under Review**

##### **Plants 4.2.1**

###### **American Chaffseed – USFWS Listed Endangered**

American chaffseed (*Schwalbea americana*) is federal and state listed as endangered in Beaufort County. American chaffseed is an erect perennial herb with un-branched stems, large, purplish-yellow tubular flowers which are borne singly on short stalks in the axils of the uppermost reduced leaves (bracts). The leaves are alternate, lance-shaped to elliptic, stalkless, 2 to 5 centimeters long, and entire. The entire plant is hairy throughout, including the flowers. Flowering occurs from April to June in the South. Chaffseed fruits are long, narrow capsules enclosed in a sac-like structure, which mature in the early summer. Chaffseed is a semi-parasite (partially dependent upon another plant as host). The plant occurs in acidic sandy peat or sandy loam soils which are seasonally moist to dry. Chaffseed prefers open habitats which may be found in moist pine flatwoods, fire-maintained savannas, transitional areas between peaty wetlands and xeric sandy soils, and open grass-sedge systems.

Habitat suitability is dependent on factors which reduce competition from other plants and provide open habitat, such as fire, mowing, or fluctuating water tables. There is no evidence either of mowing or of controlled burning in the areas that are not within the cleared utility ROW and the methods used to control vegetation within the ROW preclude chaffseed growth.

The project boundary did not possess suitable habitat, nor did adjoining areas. No individuals were observed during site investigations and a review of available literature did not reveal any known populations within the Hilton Head quadrangle. Activity on the subject site should have no effect on the species.





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**Pondberry USFWS - Listed Endangered**

Pondberry (*Lindera melissifolia*) is federal listed as endangered in Beaufort County. Pondberry is a deciduous shrub approximately 2 meters tall, which spreads vegetatively by stolons. Pale yellow flowers appear in the spring before the leaves begin growth. The mature fruits are oval, bright red, approximately 12 millimeters in length, and mature in the fall. Pondberry is associated with wetland habitats such as the margins of sinks, ponds and depressions in coastal sites. The plants prefer shaded areas but may also be found in full sun. The most significant threats to pondberry are drainage, ditching, and conversion of its habitat to other uses. Alterations to hydrology by draining may reduce the plant's vigor or create unsuitable habitat.

Suitable habitat may be present in wetland areas identified as wetlands B, E, F, G, H, and I. Site visits indicate these wetlands may be seasonally inundated with normal rainfall. No individuals were observed during site investigations and a review of available literature did not reveal any known populations within the Hilton Head quadrangle. Activity on the subject site should have no effect on the species.

**Ciliate-leaf Tickseed, *Coreopsis integrifolia***

Ciliate-leaf tickseed is under review for Federal listing and is described as a perennial herb, 3-10 dm tall, that flowers in late summer with flower heads that have bright yellow ray flowers surrounding a purple-red disk. Ciliate-leaf tickseed is found in Riparian, Palustrine habitats including, but not limited to, the edges of small blackwater streams, the edges of swamp forests, or on the edges of brackish marshes. None of the described wetland types exist within the project boundary. Consequently, activity on the subject site should have no effect on the species. Please see Figure 8, Wetland Locations and Description.

**Raven's Seedbox, *Ludwigia ravenelii***

Raven's seedbox is under review for Federal listing and is described as a branched, leafy perennial herb, usually 3.5-9 dm tall, densely covered with short, somewhat coarse hairs. Numerous flowers are borne in the leaf axils. The flowers have green sepals and no petals. Flowering: July-September. Fruiting: August-October. Raven's seedbox is restricted to open, wet, peaty places, such as ditches and the margins of swamps, ponds, and bogs. No areas with



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peat have been noted on the site and the wetlands are characterized by dense midstory and understory vegetation. Therefore, it is doubtful that Raven's seedbox exists within the project boundary and activity on the site should have no effect on species population.

#### **Carolina Birds in a Nest**

Carolina birds in a nest (*Macbridea caroliniana*) is under review for Federal listing and is a perennial herb with erect stems, 6-9 dm tall, and alternate leaves. The pink to lavender flowers are in clusters in a terminal mixed inflorescence, the petals striped with purple and white, bloom at the top of the stems above whorls of overlapping bracts. Flowering: mid-July - September (first-frost). Carolina birds in a nest usually occurs in a variety of habitats including wet longleaf pine (*Pinus palustris*), pond pine (*P. serotina*) savannas, and acidic (blackwater) swamp forests.

These types of habitats do not exist on the subject site. Consequently, any activity on the site should have no effect on the species.

#### **Birds 4.2.2**

##### **Bald Eagle**

The bald eagle (*Haliaeetus leucocephalus*) is protected under the Bald and Golden Eagle Protection Act in the United States. Adults possess a white head, white tail, and a large bright yellow bill, with the rest of the plumage dark colored. Immatures are dark with variable amounts of light splotching on the body, underwing coverts, flight feathers, and tail base. Adults average 79-94 cm in length with a wingspan of 178-229 cm. Breeding habitat most commonly includes areas close to coastal areas (within 4km), bays, rivers, lakes, or other bodies of water that provide primary food sources such as fish, waterfowl, and seabirds. Preferred foraging habitat is open water and open areas. Bald eagles generally roost in conifers or other sheltered sites in the winter months and typically select large accessible trees. Nesting sites are generally found in tall trees or on cliffs near water.

During the December and June site visits, no mature or immature individuals were observed. However, it is possible that eagles might attempt to use open areas within the subject tract to forage or adjacent properties with mature untrimmed trees for nesting. It is very important to note that an active bald eagle nest was removed from the airport property in 2010 with a USFWS takings permit dated 06/24/2010. (Appendix C). An interview with personnel at the



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Hilton Head Island Fire Station (tasked with keeping the runways clear of wildlife), revealed that an aggressive plan using noise devices is in place to deter eagles and other birds from using the airport or attempting to construct nests.

A review of available literature and SCDNR GIS data indicates that several eagle nests are located on and near Hilton Head Island, with the closest recorded nest being approximately 3.1 miles south of the project site. Given the aggressive airport stance on eagle use of the site and the need for avoiding bird strikes, it appears that any bald eagle activity on or near the subject site will be of short duration. Therefore, any activity on the subject site should have no affect on the species.

#### **Wood Stork**

The wood stork (*Mycteria americana*) is federal and state listed as endangered in Beaufort County. Mature wood storks are long-legged wading birds, approximately 127 cm in height, with a wingspan of 152 to 165 cm. Plumage is white with black primaries and secondaries and a short black tail. The head and neck are mostly un-feathered and dark gray in color. The bill is black, thick at the base, and slightly decurved. The plumage of immature birds is dingy gray plumage and the decurved bill is yellow. Wood storks in South Carolina lay eggs from March to late May, with fledging occurring in July and August. Nests are frequently located in the upper branches of large cypress trees. Wood storks usually feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools and are attracted to depressions in marshes or swamps where fish become concentrated during periods of falling water levels. Wood storks prefer water depths of 6" to 10" as their prey location is tactile. Wood storks are highly colonial and may travel as far as 80 miles to find suitable foraging habitat. Habitat which appears suitable for foraging and roosting may exist on the subject site.

During numerous site visits, no individuals were sighted foraging and evening visits did not reveal any use of these areas for roosting. The subject tract does not appear to possess any suitable roosting habitat and may possess limited foraging habitat following heavy rainfall events. However, no feathers or droppings were noted in any of the wetlands visited and continuous activity and noise associated with the airport may deter wood stork use of storm water retention ponds or wetland B.





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The subject tract does not appear to possess any suitable habitat for woodstork foraging, nesting or roosting. Consequently, any activity on the subject site should have no affect on the species.

#### **Red-Cockaded Woodpecker**

The red-cockaded woodpecker (*Picoides borealis*) is federal and state listed as endangered in Beaufort County. The red-cockaded woodpecker is 18 to 20 centimeters long with a wing span of 35 to 38 centimeters. Plumage on the bird's back has black and white horizontal stripes with white cheeks and underparts. The flanks are generally black streaked and the cap and stripe on the side of the neck and the throat are black. The male has a small red spot on each side of the black cap. After the first post-fledgling molt, fledgling males have a red crown patch. Egg laying occurs during April, May, and June in roosting cavities constructed in living pine trees. Generally the parent birds and some of their male offspring from previous years form a family unit called a group. A group may include one breeding pair and as many as seven other birds. Rearing young birds is a shared responsibility of the group. Preferred trees for nesting have a minimum age range of 80 to 120 years. Longleaf pines (*Pinus palustris*) are most commonly used, but other species of southern pine are also acceptable. Dense stands, stands that are primarily hardwoods, or stands with a dense hardwood understory are avoided. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with a preference for pine trees 10 inches or larger in diameter.

Available literature indicates that the rapid re-growth of hardwood species and other tree species in the areas opened by the timber harvest may render the subject site unsuitable for red-cockaded woodpecker foraging. However, there is one recorded red-cockaded woodpecker colony located on Sherwood plantation, which is approximately 4.5 miles from the approximate center of the subject site. Home range estimates in some available literature suggests 37 to 543 acres, and most available literature agrees that red-cockaded woodpeckers prefer pine stands with decreased percentages of slash, decreased percentages of loblolly, decreased percentages of loblolly pine between 20 and 39 years of age, and increased percentages of long leaf pine (*Pinus palustris*).

In addition, the available literature indicates that suitable foraging habitat is not significant if suitable cavity trees are not available for nesting. No trees suitable for nesting exist on the subject site or on visible areas of the adjacent site containing uplands. Existing colonies are



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often associated with large tracts of land that are managed for quail populations and which are not used for timber production. These areas are managed to produce limited understory with a mature pine overstory.

No individuals were observed during site investigations and a review of available literature did not reveal any known populations within the Hilton Head or Bluffton quadrangles. The subject site and the surrounding areas do not possess suitable habitat. No individuals or cavity trees were observed during site investigations. Consequently, activity on the subject site should have no effect on the species.

#### Kirtland's Warbler

Kirtland's warbler (*Dendroica kirtlandii*) is federal listed as endangered in Beaufort County. Adult upperparts are blue-gray, tending to be more brown in the fall and winter, streaked with black. The underparts are yellow with black streaks on the sides and a white eye ring is broken by black lores and eye line; whitish wing bars are indistinct. The female possesses plumage which is dull with brownish upperparts. Breeding is limited mainly to a small area in Michigan and less than a thousand pairs exist. It appears that Kirtland's warbler enters and exits the U.S. along the coasts of South and North Carolina during migration. The warbler prefers little or no hardwoods and areas of dense scrubby pine, less than 6 meters in height. When trees reach 3.5 meters in height, with no live needles present below 1 meter, the habitat becomes unfavorable. In addition, Kirtland's warbler seldom nests in tracts less than 75 acres with minimal ground cover. Kirtland's warbler depends on active management such as controlled burning to maintain habitat.

The project boundary does not possess any areas with pine and little to no hardwoods. No individuals were observed during site investigations and a review of available literature did not reveal any known populations within the Hilton Head quadrangle. Activity on the subject site should have no effect on the species.

#### Piping Plover

The piping plover (*Charadrius melodus*) is Federal and State listed as threatened in Beaufort County. Piping plovers are small plovers approximately 18 cm in length. Male heads are plain white on the forehead and sides with a dark band across the front of the crown from eye to eye, and black shoulder patches that may extend across the breast. Non-breeding birds lose the dark bands. The upper parts are pale gray-brown, lightest on the rump and upper tail coverts.



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Primaries are dusky-black at the tips with inner webs mostly white. The legs and feet are orange yellow (Bent 1929, Roberts 1955, Wilcox 1959, Dinsmore 1981). Immature plumage resembles adult non-breeding plumage and juveniles acquire adult plumage the spring after fledging. Breeding occurs when adults reach breeding grounds in mid to late April (Hull 1981). Piping plovers prefer gently sloping foredunes and blow-out areas behind primary dunes of coastal beaches (USFWS 1988).

No habitat of this type is located on the subject site and no individuals were observed during the site investigation. A review of available literature did not reveal any known populations within the Hilton Head quadrangles. Consequently, activity on the subject site should have no effect on the species.

#### **Rufus Red Knot**

The rufus red knot (*Calidris canutus rufa*) is federal listed as endangered in Beaufort County. The red knot is 25-28 cm. in length and is finely mottled. Adults in the spring are finely mottled with grays, black, and light ochre running into stripes on the crown. The throat, breast, and sides of the head are cinnamon-brown with a dark gray line through the eye. The abdomen and under tail coverts are white and the upper tail coverts are white barred with black. The rufus red knot may be found during migration on coastal mudflats, tidal zones, and occasionally on open sandy beaches. Food sources include invertebrates and horseshoe crab. The subject site does not possess any habitat suitable for the rufus red knot.

Habitat as described above does not exist on the subject site. No individuals were observed during site investigations and a review of available literature did not reveal any known populations within the Hilton Head quadrangle. Activity on the subject site should have no effect on the species.

#### **Black-Capped Petrel**

The black-capped petrel (*Pterodroma hasitata*) is proposed to be listed as threatened. The bird is described as pelagic and nesting on steep forested cliffs. Black-capped Petrel is a distinctive gadfly petrel with a clearly defined black cap separated from the dark mantle by a white collar and with conspicuous white uppertail coverts that form a broad U shape. Literature suggests the black-capped petrel is migratory and follows the Gulf stream south to nest in Cuba.



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The subject site is not associated with the sea habitat this bird frequents. No individuals have been noted during frequent site visits; therefore activity on the site should have no effect on the species.

#### **Eastern Black Rail**

The eastern black rail (*Laterallus jamaicensis*) is Federal proposed threatened and are small rails, approximately 10-15 cm in length with adults possessing blackish-gray bills and red eyes. They appear to utilize salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps.

No suitable habitat exists within the project boundary and no individuals were sighted during site visits. A review of available literature does not indicate any sightings in the Hilton Head quadrangle. Therefore, any activity on the site should not have any effect on the species.

#### **MacGillivray's Seaside Sparrow**

MacGillivray's seaside sparrow (*Ammodramus maritimus macgillivrayi*) is listed as an "at risk species" by SCDNR. Adults have brownish upperparts with gray on the crown and nape, and a grayish-buff-colored breast with dark streaks; they have a dark face with gray cheeks, a white throat, and a short, pointed tail. Birds show a small yellow streak just above the eye. The seaside sparrow utilizes tidal marshes along the Atlantic coast with extensive stands of *Spartina* and/or *Juncus*. Optimum habitats contain contiguous nesting and feeding areas. Some birds are known to nest behind the marsh and even up tidal rivers, 15 miles from the coast, when tidal amplitude is high.

The subject site does possess one small area defined by the National Wetlands Inventory map as critical area, which may have habitat utilized by the seaside sparrow. Informal records indicate that the seaside sparrow has been found in areas of marsh at the beach north of the airport and in other areas on Hilton Head Island.

MacGillivray's seaside sparrow prefers foraging in marsh areas, which do not exist in the project boundary. Any activity on the subject site should not have an affect on the species.





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#### **Least Tern**

The least tern (*Sterna antillarum*) is listed as State threatened in South Carolina. The least tern is approximately 21-24 cm and as a breeding adult is mainly gray above, with a black cap and nape, white forehead, black line running from the crown through the eye to the base of the bill, orange-yellow bill often with a dark tip, white or grayish underparts, short deeply forked tail, and yellow-orange legs and feet; a black wedge on the outer primaries is conspicuous in flight. The least tern appears to migrate north to breed in northern states. The least tern uses sandy flats and dune areas for roosting.

The subject site does not possess suitable habitat. Therefore, none of the planned activity should have an effect on the species.

#### **Amphibians and Reptiles 4.2.3**

##### **Flatwoods Salamander**

The flatwoods salamander (*Ambystoma cingulatum*) is listed as Federal threatened in Beaufort County. The flatwoods salamander possesses variable gray or grayish dorsal markings that may form a "frosted" or netlike pattern or narrow light rings. The belly is black with scattered small gray spots and total length ranges 9-13 cm. Larvae are long and slender with a black to brown body coloring with white to yellow stripes, slender legs, and fragile tail fins. Movements to breeding ponds occur usually between early October and January during rainy evenings when the barometric pressure is falling. Eggs are laid terrestrially before depressions fill with water. The eggs develop to hatching size within three weeks, but do not hatch until inundated. Post-larval individuals inhabit mesic longleaf pine (*Pinus palustris*)-wiregrass (*Aristida stricta*) flatwoods and savannas. The terrestrial habitat is best described as topographically flat or slightly rolling wiregrass-dominated grassland having little to no midstory and an open overstory of widely scattered longleaf pine. Low-growing shrubs, such as saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*) and blueberries (*Vaccinium spp.*), co-exist with grasses and forbs in the groundcover. Wiregrass is dependent on regular burning during the summer months to stimulate growth and flowering.

The subject site does not have experienced controlled burning due to its location. Wiregrass is not indigenous to Hilton Head Island, was not noted on the subject site, and individuals were not noted during site visits. Based on reviews of available literature, it does not appear that the subject



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site possesses suitable habitat. Consequently, it appears that activity on the subject site should have no effect on the species.

#### **Spotted Turtle**

The spotted turtle (*Clemmys guttata*) is state listed as threatened in Beaufort County. The spotted turtle is a small black turtle with small round and yellow spots on a broad, smooth, and keelless carapace. Small and old individuals may not possess spots and some individuals may have growth layers evident on the carapace scutes. The plastron is yellow to yellow-orange and has a large black blotch on each scute. The head is mostly black with scattered yellow spots and blotches and the limbs are gray to black above and often have yellow spots. The skin under the legs and neck is orange or pinkish. Suitable habitat includes unpolluted small shallow bodies of water such as small marshes, marshy pastures, bogs, fens, woodland streams, swamps, small ponds, and vernal pools. Ponds surrounded by relatively undisturbed meadow or undergrowth are most favorable and the preferred bottom is soft. The spotted turtle often basks along water edges, brush piles in water, logs, or vegetation clumps. The spotted turtle hides in bottom mud and detritus when it is inactive.

The airport site does possess storm water retention areas that contain water and one area that is ponded where the ditch that was piped exits the property. It also appears that the spotted turtle likes areas that are unpolluted and protected by undisturbed meadows or undergrowth. Since the permanent water located on the airport site consists of waterflow from systems designed to drain infrastructure, it is unlikely that suitable habitat exists on the site.

No individuals were observed during site investigations and a review of available literature did not reveal any known populations within the Hilton Head quadrangle. Activity on the subject site should have no effect on the species.

#### **Eastern Diamondback Rattlesnake**

The eastern diamondback rattlesnake (*Crotalus adamanteus*) is listed as an "at risk species" by the USFWS in Beaufort County. The eastern diamondback rattlesnake is poisonous and can reach sizes exceeding 6 feet in length and can be identified by a diamondback pattern along the snake's back. The preferred habitat includes grassland, old fields, savannas, shrub land, and both hardwood and pine dominated forests. Rattlesnakes become dormant during cold winter days, may often be found sunning during early spring, and are most active during early fall. It is



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possible that the eastern diamondback could be found in the scrub/shrub area to in the northern runway approach and in the remaining wooded habitat at the northeast of the runway and runway approach. No individuals were observed during site investigations. It does appear that suitable habitat exists in the area noted above and it is possible that individuals may occupy those areas.

Although suitable habitat may exist, limited viable food sources, such as rats, mice, rabbits, or squirrels were observed on the subject site. No individuals were observed during site investigations. However, this species is transient, reclusive, and may exist on the site or move into the site.

#### **Southern Hognose Snake**

The southern hognose snake is listed as an "at risk species" by the USFWS in Beaufort County. The southern hognose snake is a small snake with a brownish to light brown color and averages 18" in length and can be identified by the upturned nose tip. They spend a significant amount of time burrowed in soil and the inhabit open, xeric habitats with well drained sandy or sandy loam soils. Habitat examples in the Hilton Head Island area include stabilized coastal sand dunes, pine flatwoods, mixed oak/pine woods, and old fields. Limited habitat may exist in the remaining scrub/shrub, forested, and wetland areas.

No individuals were observed during site investigations. It does appear that suitable habitat exists in the area noted above and it is possible that individuals may occupy those areas. Further investigation may be warranted before significant land disturbance is performed.

#### **Florida Pine Snake**

The Florida pine snake (*Pituophis melannocephalus*) is listed as an "at risk species" and is A large stocky snake with dark brown to reddish dorsal blotches (generally indistinct anteriorly in adults) on a light gray to sandy-colored background; 4 prefrontal scales; dorsal scales keeled; anal undivided; adults usually 90-168 cm in total length. Their habitat includes high sandy pine/turkey oak areas where pocket gophers are present.

Since the subject site does not include suitable habitat, the Florida pine snake is not likely to inhabit the site. Any activity on the site should have no effect on the species.



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#### **American Alligator**

The American alligator (*Alligator mississippiensis*) is Federal and State listed as threatened and is a large aquatic, reptile that are generally 13 feet in length or less. They prefer habitats such as rivers, creeks, swamps, impoundments, and canals. Alligators are abundant in the Hilton Head quadrangle and may be found anywhere during nesting season as they tend to prefer fresh water.

There is a large piped waters of the US that bisects the airport and exits on the eastern property boundary. There is a bulk head at this exit point that is designed to prevent alligators and other wildlife from accessing the runway areas. It does not appear that suitable habitat is located on the subject site and any activity should have no effect on the species.

#### **Insects 4.2.4**

##### **Monarch Butterfly**

The monarch butterfly is State listed as an "at risk species" by SCDNR. The monarch wingspan ranges from 8.9 to 10.2 cm. The upperside of the wings are tawny orange, the veins and margins are black, and there are two series of small white spots in the margins. The monarch migrates through South Carolina to southern Florida and the possibly the Yucatan Peninsular to breed. The habitat they utilize includes, but is not limited to wetlands, open field, forests, and sand dunes.

It is possible that monarch butterflies migrate through and utilize the available habitat on the airport site. Migration occurs during the fall months as they migrate to northern climates to overwinter. Since monarchs are transitory and are in migration through the area, activity on the airport should not effect the species.

#### **Mammals 4.2.5**

##### **Tricolored Bat**

The tricolored bat (*Perimyotis subflavus*) is listed as a "species of concern" in South Carolina. Tricolored bats are associated with forested landscapes, where they forage near trees, forest perimeters, and along waterways. Maternity and other summer roosts may be in dead or live tree foliage, lichen clumps, and Spanish moss.





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No waterways are present on the subject site. However, it is possible that the tricolored bat may use the woods perimeter that is formed by maintenance of the open areas of the airport. Since these bats are not migrant, further investigation may be warranted if forested areas of the airport that are located on the perimeter of the mowed areas are impacted.

#### **Northern Long Eared Bat**

The northern long eared bat (*Myotis septentrionalis*) is Federal listed as threatened and is a small insect eating bat. This bat generally is associated with old-growth forests composed of trees 100 years old or older and relies on intact interior forest habitat, with low edge-to-interior ratios. Relevant late-successional forest features include a high percentage of old trees, uneven forest structure (resulting in multilayered vertical structure), single and multiple tree-fall gaps, standing snags, and woody debris.

No individuals were sighted during site visits and the subject site does not possess suitable habitat. Therefore, any activity on the site should have no effect on the species.

#### **5.0 SUMMARY**

The findings of this investigation indicate that the potential habitat exists for the existence of the spotted turtle and southern hog nosed snake which are listed as Federal "at risk species" and State threatened. In addition, potential habitat for MacGillivray's seaside sparrow, eastern diamondback snake, monarch butterfly, and tricolored bat may exist on the subject site. The potential for other listed species to exist on the site is unlikely due to natural and anthropogenic impacts as well as the natural characteristics of the airport and surrounding and use. The natural characteristics, which are long term, include noise, vehicular traffic, and future development. Also, the potential habitat areas are relatively small and fragmented by infrastructure. The characteristics above will likely limit habitat use by the species listed above.

Therefore, activities such as permitted wetland impacts and upland land use for commercial, residential, agricultural, or silvicultural purposes should not have any impact on threatened and endangered species populations. However, it should be noted that both threatened and endangered plant and animal populations are considered transitory and may be subject to change due to habitat alterations over time and seasonal variations. Consequently, potential findings in the future should be evaluated and assessed.



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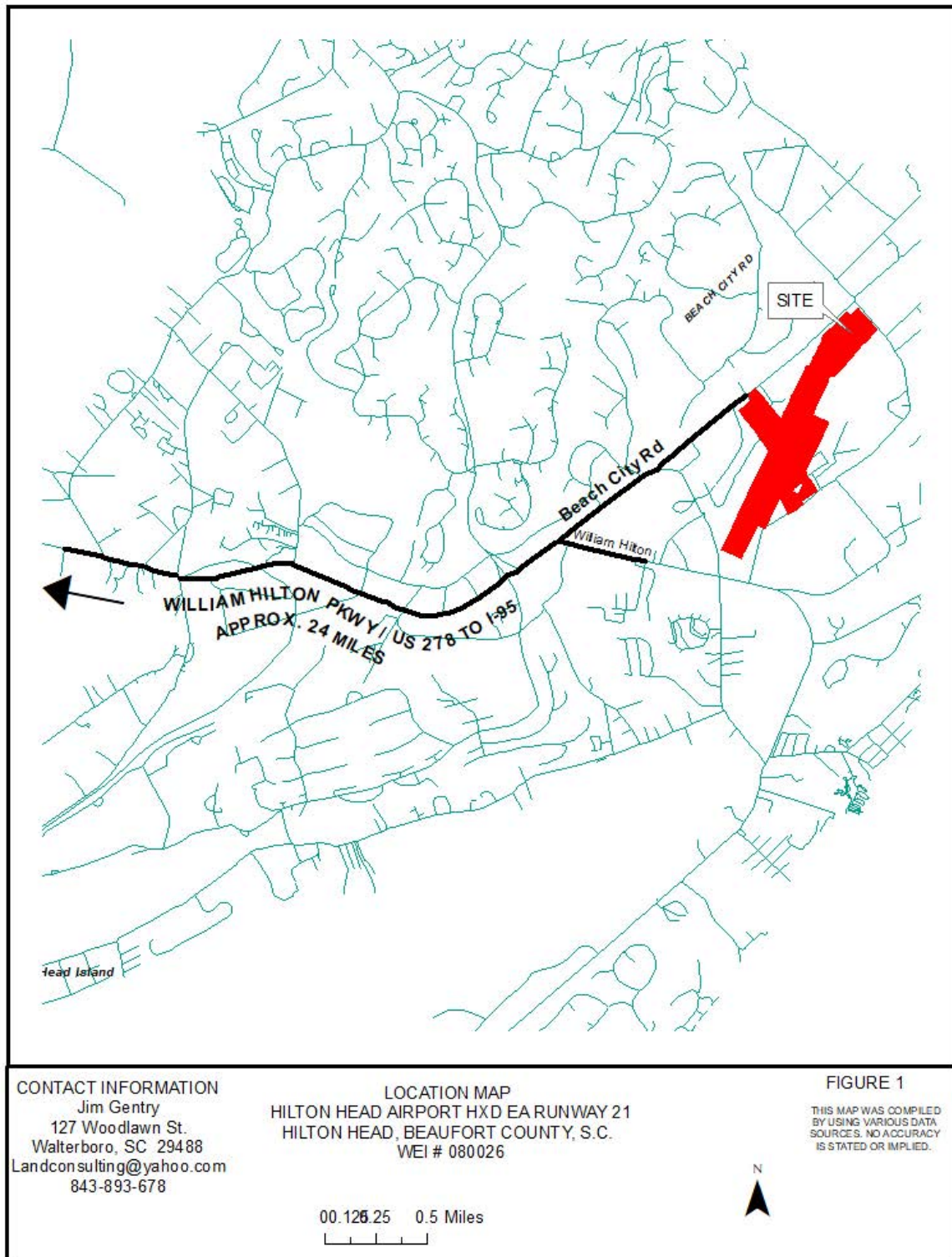
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## **Appendix A**

### **Figures**



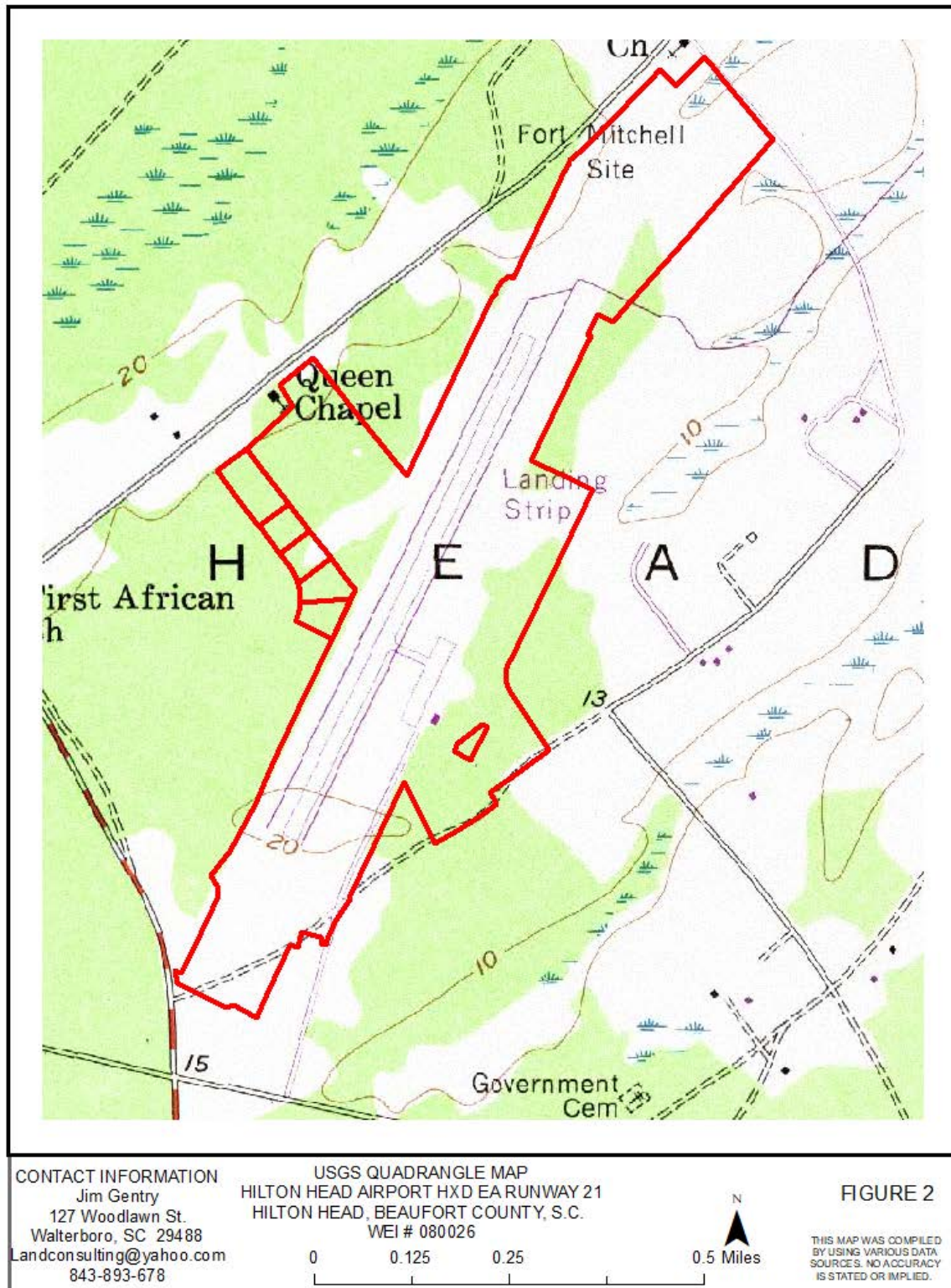
# HILTON HEAD ISLAND AIRPORT Terminal Area Improvements Environmental Assessment







# HILTON HEAD ISLAND AIRPORT Terminal Area Improvements Environmental Assessment



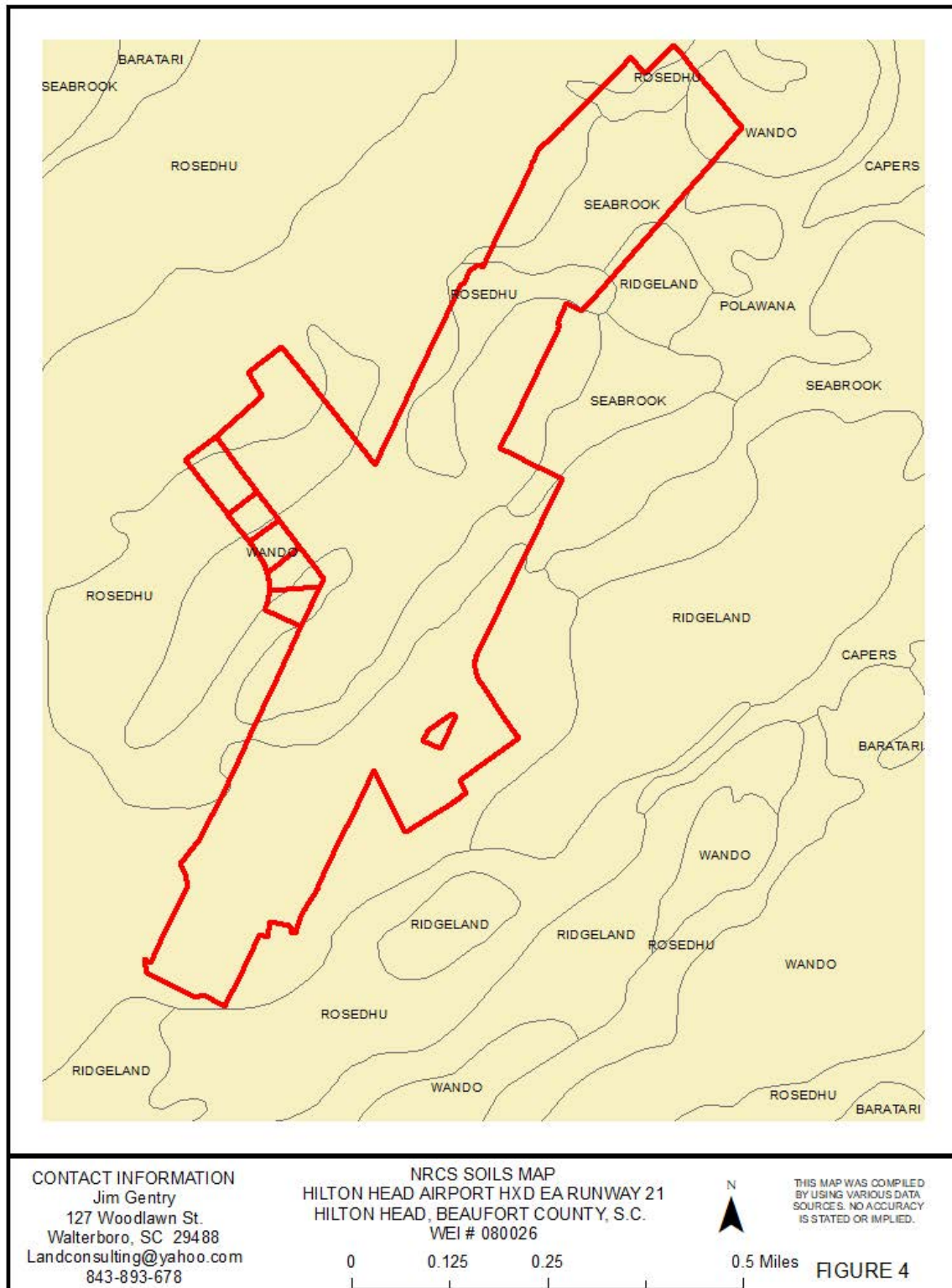


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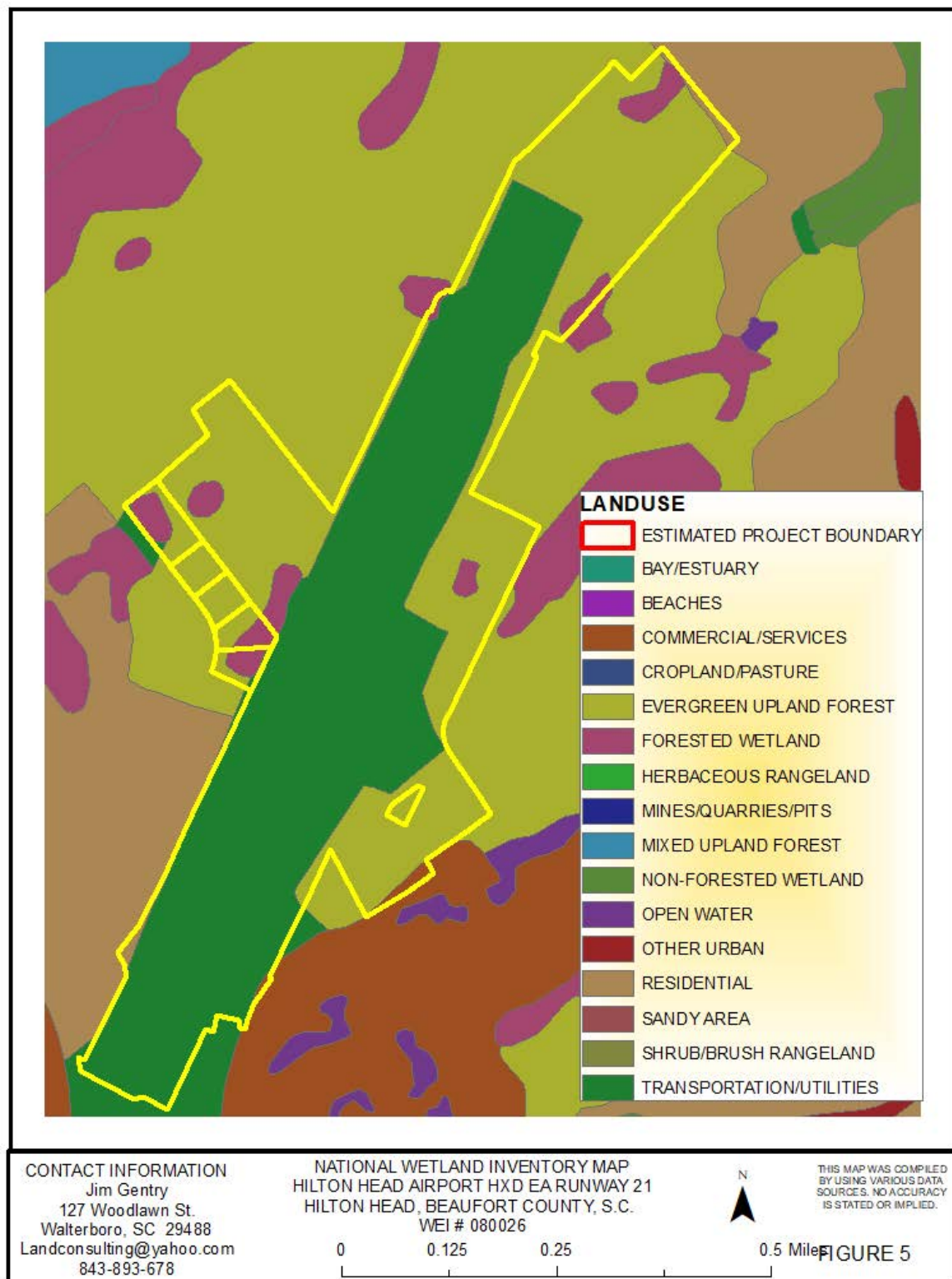
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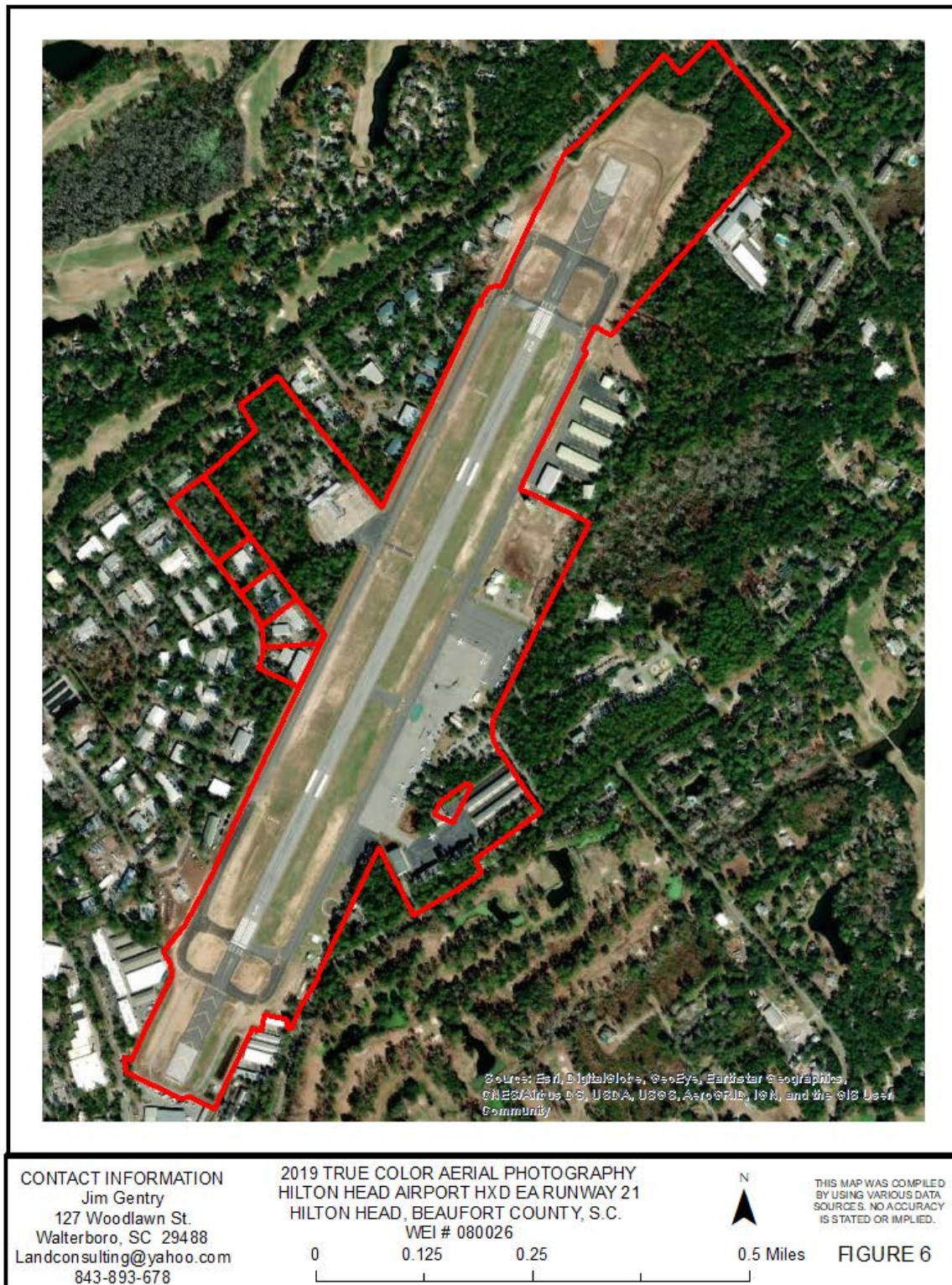


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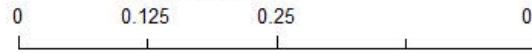
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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2019 TRUE COLOR AERIAL PHOTOGRAPHY  
HILTON HEAD AIRPORT HXD EA RUNWAY 21  
HILTON HEAD, BEAUFORT COUNTY, S.C.  
WEI # 080026



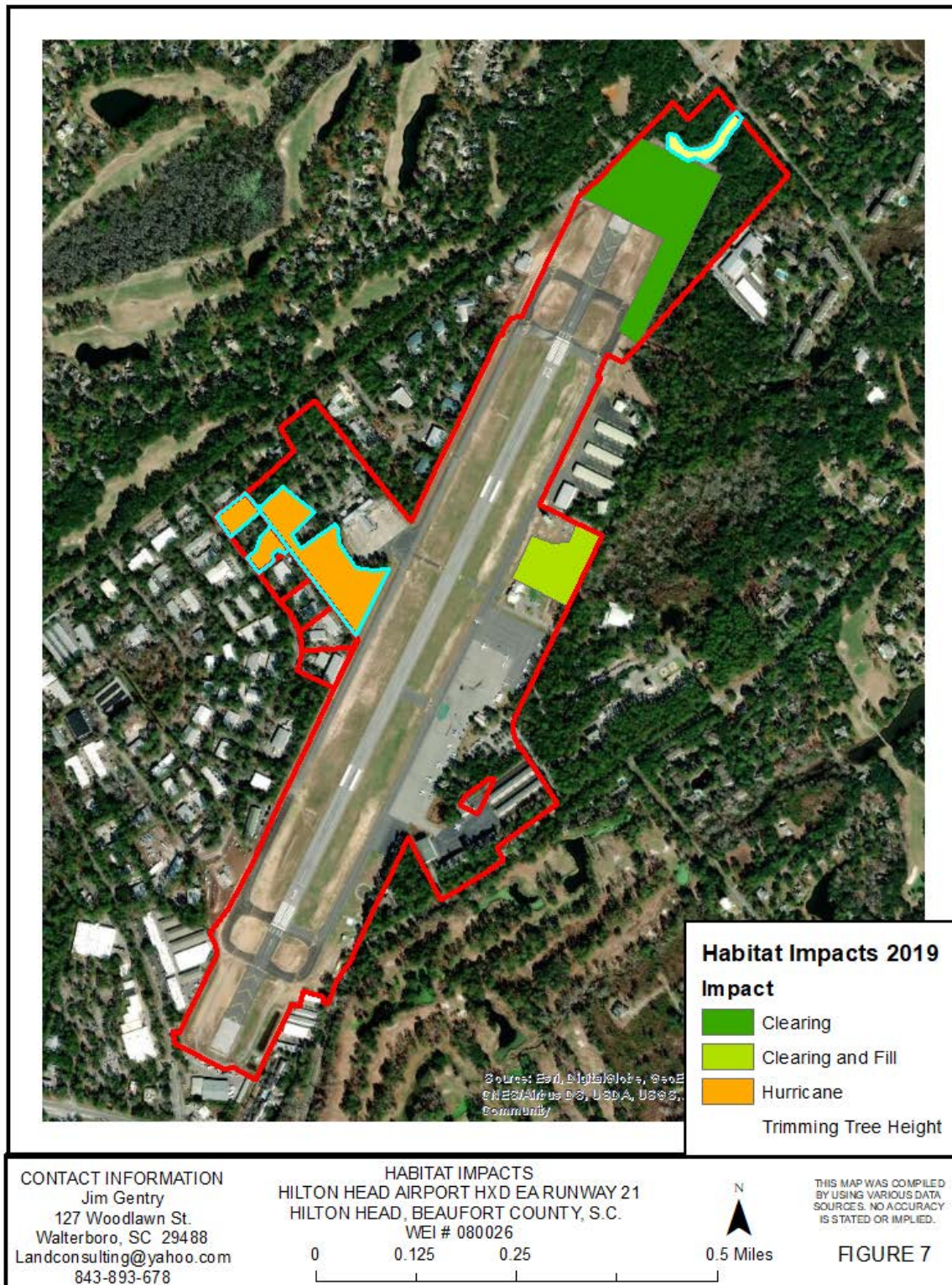
THIS MAP WAS COMPILED  
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SOURCES. NO ACCURACY  
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**FIGURE 6**



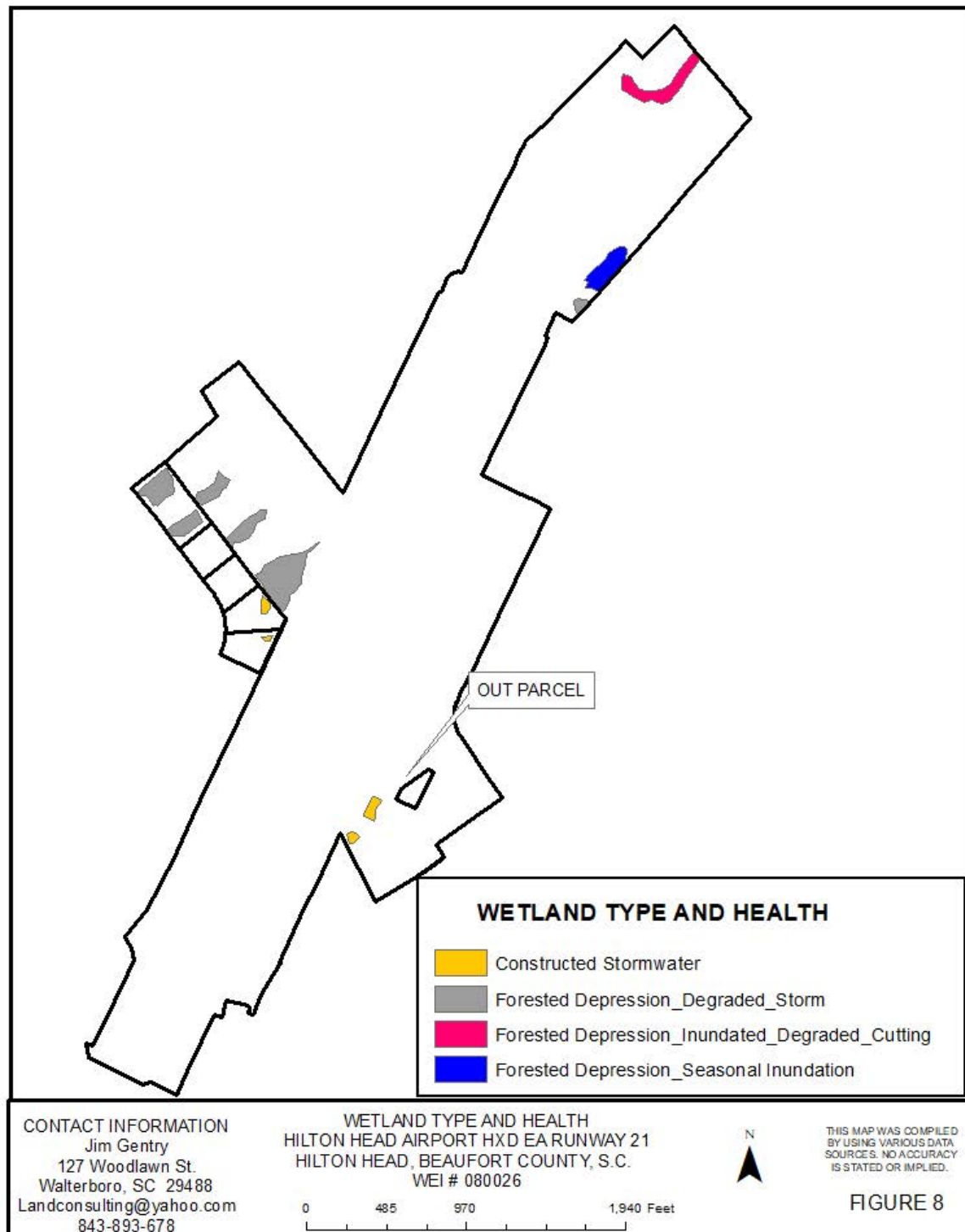


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**Appendix B**  
**Pictures**



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**1 – Wetland B after heavy rain event.**



**2 - Typical photo of Wetlands by terminal (E, F, G) prior to hurricane damage.**



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**3- Typical hurricane damage within wetlands.**





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**4 - Typical upland.**





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5 - Typical wetland, south easement.



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**6 - Fence surrounding airport.**







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**8 - Typical view of existing terminal.**



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10 - Typical commercial area, south easement.





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11 - Pipe area where piped Waters of the US exit the airport.



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## Appendix C

### Tables



SCDNR - Wildlife Information - Rare, Threatened & Endangered ...

<http://dnr.sc.gov/species/beaufort.html>

### Rare, Threatened, and Endangered Species of South Carolina - by County

The lists below indicate what species have been reported to the Heritage Trust Program as occurring in each county. They are not a complete listing of what actually exists, as no complete survey of the state has ever been done.

#### Beaufort County

##### Animals

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
<i>Ambystoma cingulatum</i>	Frosted Flatwoods Salamander	LT: Threatened	SE: Endangered	G2	S1
<i>Acipenser brevirostrum</i>	Shortnose Sturgeon	LE: Endangered	SE: Endangered	G3	S3
<i>Acipenser oxyrinchus</i>	Atlantic Sturgeon	LE: Endangered	--	G3	S3
<i>Alligator mississippiensis</i>	American Alligator	LT: Threatened	ST: Threatened	G5	S5
<i>Alosa aestivalis</i>	Blueback Herring	ARS*: Risk, priority	--	G3G4	S5
<i>Ammodramus maritimus macgillivrayi</i>	MacGillivray's Seaside Sparrow	ARS*: Risk, priority	--	G4	SNR
<i>Balaenoptera physalus</i>	Finback Whale	LE: Endangered	SE: Endangered	G3G4	SNR
<i>Callidris canutus rufa</i>	Red Knot	LT: Threatened	--	G4	SNRN
<i>Caretta caretta</i>	Loggerhead	LT: Threatened	ST: Threatened	G3	S3
<i>Charadrius melodus</i>	Piping Plover	LT: Threatened	SE: Endangered	G3	SNRN
<i>Chelonia mydas</i>	Green Sea Turtle	LT: Threatened	ST: Threatened	G3	SNR
<i>Clemmys guttata</i>	Spotted Turtle	ARS*: Risk, priority	ST: Threatened	G5	S5
<i>Crotalus adamanteus</i>	Eastern Diamondback Rattlesnake	ARS*: Risk, priority	--	G4	S3
<i>Danaus plexippus</i>	Monarch Butterfly	ARS*: Risk, Priority	--	G4	SNR
<i>Dermochelys coriacea</i>	Leatherback Sea Turtle	LE: Endangered	SE: Endangered	G2	SNA
<i>Eptesicus fuscus</i>	Big Brown Bat	--	--	G5	S5?
<i>Eubalaena glacialis</i>	Atlantic Right Whale	LE: Endangered	SE: Endangered	G1	SNA
<i>Haliaeetus leucocephalus</i>	Bald Eagle	--	ST: Threatened	G5	S2
<i>Heterodon simus</i>	Southern Hognose Snake	ARS*: Risk, priority	ST: Threatened	G2	SNR
<i>Hyla avivoca</i>	Bird-voiced Treefrog	--	--	G5	S5
<i>Lasiurus intermedius</i>	Northern Yellow Bat	--	--	G5	SNR
<i>Lasiurus seminolus</i>	Seminole Bat	--	--	G5	S4?
<i>Laterallus jamaicensis</i>	Black Rail	LT: Threatened (Proposed)	--	G3G4	SNR
<i>Lepidochelys kempi</i>	Kemp's Ridley Sea Turtle	LE: Endangered	SE: Endangered	G1	SNA
<i>Limnothlypis swainsonii</i>	Swainson's Warbler	--	--	G4	S4
<i>Megaptera novaeangliae</i>	Humpback Whale	LE: Endangered	SE: Endangered	G4	S1
<i>Micrurus fulvius</i>	Eastern or Harlequin Coral Snake	--	--	G5	S2
<i>Mycteria americana</i>	Wood Stork	LT: Threatened	SE: Endangered	G4	S1S2
<i>Myotis austroriparius</i>	Southeastern Bat	--	--	G4	S1S2
<i>Myotis lucifugus</i>	Little Brown Myotis	--	--	G3	S1S2

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SCDNR - Wildlife Information - Rare, Threatened & Endangered ... <http://dnr.sc.gov/species/beaufort.html>

<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT: Threatened	--	G1G2	S1
<i>Neotoma floridana haematorea</i>	Eastern Woodrat	--	--	G5T4Q	S3S4
<i>Nycticeius humeralis</i>	Evening Bat	--	--	G5	S5
<i>Pelecanus occidentalis</i>	Brown Pelican	--	--	G4	S1S2
<i>Perimyotis subflavus</i>	Tricolored Bat	ARS*: Risk, priority	--	G2G3	S1S2
<i>Phoca vitulina</i>	Harbor Seal	--	--	G5	SNA
<i>Picoides borealis</i>	Red-cockaded Woodpecker	LE: Endangered	SE: Endangered	G3	S2
<i>Pituophis melanoleucus mugitus</i>	Florida Pine Snake	ARS*: Risk, priority	--	G4T3	S2
<i>Pseudotriton montanus flavissimus</i>	Gulf Coast Mud Salamander	--	--	G5T4	S3S4
<i>Pterodroma hasitata</i>	Black-capped Petrel	LT: Threatened (Proposed)	--	G1	SNR
<i>Sciurus niger</i>	Southern Fox Squirrel	--	--	G5	S3S4
<i>Sterna antillarum</i>	Least Tern	--	ST: Threatened	G4	S3
<i>Trichechus manatus</i>	Florida Manatee	LT: Threatened	SE: Endangered	G2	S1S2

**Plants**

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
<i>Aletris obovata</i>	White Colicroot	--	--	G4G5	S1
<i>Asclepias connivers</i>	Large-flower Milkweed	--	--	G4?	S1
<i>Asclepias pedicellata</i>	Savannah Milkweed	--	--	G4	S2
<i>Canna flaccida</i>	Bandana-of-the-everglades	--	--	G4?	S2
<i>Carex basiantha</i>	Widow Sedge	--	--	G5	S2
<i>Carex hyalinolepis</i>	Shore-line Sedge	--	--	G4G5	S2
<i>Carya myristiciformis</i>	Nutmeg Hickory	--	--	G4	S2
<i>Coreopsis integrifolia</i>	Ciliate-leaf Tickseed	ARS*: Risk, priority	--	G1G2	S1
<i>Cynanchum scoparium</i>	Leafless Swallow-wort	--	--	G4	S1
<i>Cyperus distinctus</i>	Marshland Flatsedge	--	--	G4	S1
<i>Cyperus tetragonus</i>	Piedmont Flatsedge	--	--	G4?	S2
<i>Epidendrum conopseum</i>	Green-fly Orchid	--	--	G4	S3?
<i>Eriochloa michauxii</i>	Longleaf Cupgrass	--	--	G3G4	S1
<i>Eupatorium scabridum</i>	Rough Thoroughwort	--	--	G5T3T5	S1
<i>Forestiera godfreyi</i>	Godfrey's Privet	--	--	G2	S1
<i>Helianthemum georgianum</i>	Georgia Frostweed	--	--	G4	S2
<i>Ipomoea macrohiza</i>	Large-stem Morning-glory	--	--	G3G5	S1
<i>Lindera melissifolia</i>	Pondberry	LE: Endangered	--	G3	S2
<i>Lipocarpa micrantha</i>	Dwarf Bulrush	--	--	G5	S2
<i>Litsea aestivalis</i>	Pondspice	--	--	G3?	S3
<i>Ludwigia ravenelii</i>	Raven's Seedbox	ARS*: Risk, priority	--	G1G2	S1
<i>Lyonia ferruginea</i>	Rusty Lyonia	--	--	G5	S1
<i>Muhlenbergia filipes</i>	Bentgrass	--	--	G5T5?	S3S4
<i>Nyssa ogeche</i>	Ogeechee Tupelo	--	--	G4G5	S1
<i>Panicum webberianum</i>	A Panicgrass	--	--	GNR	SNR
<i>Pinckneya pubens</i>	Hairy Fever-tree	--	--	G4	S1
<i>Psilotum nudum</i>	Whisk Fern	--	--	G5	S1
<i>Quercus austrina</i>	Bluff Oak	--	--	G4?	S1

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## HILTON HEAD ISLAND AIRPORT Terminal Area Improvements Environmental Assessment

SCDNR - Wildlife Information - Rare, Threatened & Endangered ... <http://dnr.sc.gov/species/beaufort.html>

<i>Quercus myrtifolia</i>	Myrtle-leaf Oak	--	--	G5	S1
<i>Rhapidophyllum hystrix</i>	Needle Palm	--	--	G4	S1
<i>Ruellia carolinensis</i> ssp. <i>ciliosa</i>	Sandhills Wild Petunia	--	--	G5T3T5	S1
<i>Sageretia minutiflora</i>	Tiny-leaved Buckthorn	--	--	G4	S3
<i>Thalia dealbata</i>	Powdery Thalia	--	--	G4	S2
<i>Xyris brevifolia</i>	Short-leaved Yellow-eyed Grass	--	--	G4G5	S1

For additional information about rare, threatened, and endangered species or questions about these lists, please contact [Anna Smith](#).

### Environmental Review

- [Office of Environmental Programs](#)
- [Bald Eagle Nest Data](#)
- [Planning & Conservation](#)

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# HILTON HEAD ISLAND AIRPORT Terminal Area Improvements Environmental Assessment

Species By County Report <https://ecos.fws.gov/ecp0/reports/species-by-current-range-county...>

 U.S. Fish & Wildlife Service  
**ECOS Environmental Conservation Online System**  
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## Species By County Report

The following report contains Species that are known to or are believed to occur in this county. Species with range unrefined past the state level are now excluded from this report. If you are looking for the Section 7 range (for Section 7 Consultations), please visit the [IPaC](#) application.

County: Beaufort, South Carolina

Need to contact a FWS field office about a species? Follow [this link](#) to find your local FWS Office.

Group	Name	Population	Status	Lead Office	Recovery Plan	Recovery Plan Action Status	R P S
Amphibians	Frosted Flatwoods salamander ( <i>Ambystoma cingulatum</i> )	Wherever found	Threatened	Panama City Ecological Services Field Office			
Birds	Bald eagle ( <i>Haliaeetus leucocephalus</i> )	lower 48 States	Recovery	Illinois-Iowa Ecological Services Field Office	<a href="#">Southwestern Bald Eagle Recovery Plan</a>	<a href="#">Implementation Progress</a>	F
Birds	Bald eagle ( <i>Haliaeetus leucocephalus</i> )	lower 48 States	Recovery	Illinois-Iowa Ecological Services Field Office	<a href="#">Recovery Plan for the Pacific Bald Eagle</a>	<a href="#">Implementation Progress</a>	F
Birds	Bald eagle ( <i>Haliaeetus leucocephalus</i> )	lower 48 States	Recovery	Illinois-Iowa Ecological Services Field Office	<a href="#">Southeastern States Bald Eagle Recovery Plan</a>	<a href="#">Implementation Progress</a>	F R 1

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# HILTON HEAD ISLAND AIRPORT Terminal Area Improvements Environmental Assessment

Species By County Report <https://ecos.fws.gov/ecp0/reports/species-by-current-range-county...>

Group	Name	Population	Status	Lead Office	Recovery Plan	Recovery Plan Action Status	R P S
Birds	Bald eagle ( <i>Haliaeetus leucocephalus</i> )	lower 48 States	Recovery	Illinois-Iowa Ecological Services Field Office	<a href="#">Northern States Bald Eagle Recovery Plan</a>	<a href="#">Implementation Progress</a>	F
Birds	Bald eagle ( <i>Haliaeetus leucocephalus</i> )	lower 48 States	Recovery	Illinois-Iowa Ecological Services Field Office	<a href="#">Chesapeake Bay Bald Eagle Recovery Plan</a>	<a href="#">Implementation Progress</a>	F R 1
Birds	Kirtland's Warbler ( <i>Seiophaga kirtlandii</i> / <i>Dendroica kirtlandii</i> )	Wherever found	Endangered	Michigan Ecological Services Field Office	<a href="#">Kirtland's Warbler Recovery Plan, Updated</a>	<a href="#">Implementation Progress</a>	F R 1
Birds	Red-cockaded woodpecker ( <i>Picoides borealis</i> )	Wherever found	Endangered	Mississippi Ecological Services Field Office	<a href="#">Red-cockaded Woodpecker Recovery Plan, Second Revision</a>	<a href="#">Implementation Progress</a>	F R 2
Birds	Wood stork ( <i>Mycteria americana</i> )	AL, FL, GA, MS, NC, SC	Threatened	North Florida Ecological Services Field Office	<a href="#">Revised Recovery Plan for the U.S. Breeding Population of the Wood Stork</a>	<a href="#">Implementation Progress</a>	F R 1
Birds	Piping Plover ( <i>Charadrius melodus</i> )	[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.	Threatened	Office of the Regional Director	<a href="#">Piping Plover Atlantic Coast Population Revised Recovery Plan</a>	<a href="#">Implementation Progress</a>	F R 1

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# HILTON HEAD ISLAND AIRPORT Terminal Area Improvements Environmental Assessment

Species By County Report <https://ecos.fws.gov/ecp0/reports/species-by-current-range-county...>

Group	Name	Population	Status	Lead Office	Recovery Plan	Recovery Plan Action Status	R P S
Birds	Piping Plover ( <i>Charadrius melodus</i> )	[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.	Threatened	Office of the Regional Director	<a href="#">Volume I: Draft Revised Recovery Plan for the Northern Great Plains Piping Plover (Charadrius melodus)</a>	Recovery efforts in progress, but no implementation information yet to display.	D R 1
Birds	Black-capped petrel ( <i>Pterodroma hesitata</i> )	Wherever found	Proposed Threatened	Assistant Regional Director-Ecological Services			
Birds	Red knot ( <i>Calidris canutus rufa</i> )	Wherever found	Threatened	New Jersey Ecological Services Field Office	<a href="#">Recovery Outline for the Rufa Red Knot (Calidris canutus rufa)</a>	Recovery efforts in progress, but no implementation information yet to display.	O
Birds	Eastern Black rail ( <i>Lateralus jamaicensis</i> ssp. <i>jamaicensis</i> )	Wherever found	Proposed Threatened	Assistant Regional Director-Ecological Services			
Flowering Plants	Pondberry ( <i>Lindera melissifolia</i> )	Wherever found	Endangered	Mississippi Ecological Services Field Office	<a href="#">Pondberry</a>	<a href="#">Implementation Progress</a>	F
Flowering Plants	American chaffseed ( <i>Schwalbea americana</i> )	Wherever found	Endangered	South Carolina Ecological Services	<a href="#">American Chaffseed (Schwalbea americana) Recovery Plan</a>	<a href="#">Implementation Progress</a>	F

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# HILTON HEAD ISLAND AIRPORT Terminal Area Improvements Environmental Assessment

Species By County Report <https://ecos.fws.gov/ecp0/reports/species-by-current-range-county...>

Group	Name	Population	Status	Lead Office	Recovery Plan	Recovery Plan Action Status	R P S
Flowering Plants	Carolina birds-in-a-nest ( <i>Marchilea caroliniana</i> )	Wherever found	Under Review	Assistant Regional Director-Ecological Services			
Flowering Plants	Ciliate-leaf tickseed ( <i>Coreopsis integrifolia</i> )	Wherever found	Under Review	Assistant Regional Director-Ecological Services			
Flowering Plants	Raven's seedbox ( <i>Ludwigia ravenii</i> )	Wherever found	Under Review	Assistant Regional Director-Ecological Services			
Insects	Monarch butterfly ( <i>Danaus plexippus plexippus</i> )	Wherever found	Under Review	Office of the Regional Director			
Mammals	West Indian Manatee ( <i>Trichechus manatus</i> )	Wherever found	Threatened	North Florida Ecological Services Field Office	<a href="#">Florida Manatee Recovery Plan, Third Revision</a>	<a href="#">Implementation Progress</a>	F R 3
Mammals	West Indian Manatee ( <i>Trichechus manatus</i> )	Wherever found	Threatened	North Florida Ecological Services Field Office	<a href="#">Recovery Plan Puerto Rican Population of the West Indian (Antillean) Manatee</a>	<a href="#">Implementation Progress</a>	F
Mammals	Northern Long-Eared Bat ( <i>Myotis septentrionalis</i> )	Wherever found	Threatened	Minnesota-Wisconsin Ecological Services Field Office			

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# HILTON HEAD ISLAND AIRPORT Terminal Area Improvements Environmental Assessment

Species By County Report <https://ecos.fws.gov/ecp0/reports/species-by-current-range-county...>

Group	Name	Population	Status	Lead Office	Recovery Plan	Recovery Plan Action Status	R P S
Mammals	Tricolored bat ( <i>Perimyotis subflavus</i> )	Wherever found	Under Review	Assistant Regional Director-Ecological Services			
Reptiles	Leatherback sea turtle ( <i>Dermochelys coriacea</i> )	Wherever found	Endangered	North Florida Ecological Services Field Office	<a href="#">Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic, and Gulf of Mexico</a>	<a href="#">Implementation Progress</a>	F R 1
Reptiles	Leatherback sea turtle ( <i>Dermochelys coriacea</i> )	Wherever found	Endangered	North Florida Ecological Services Field Office	<a href="#">Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle</a>	<a href="#">Implementation Progress</a>	F R 1
Reptiles	Kemp's ridley sea turtle ( <i>Lepidochelys kempi</i> )	Wherever found	Endangered	Texas Coastal Ecological Services Field Office	<a href="#">BI-National Recovery Plan for the Kemp's Ridley Sea Turtle (Lepidochelys kempi) SECOND REVISION</a>	<a href="#">Implementation Progress</a>	F R 2
Reptiles	Green sea turtle ( <i>Chelonia mydas</i> )	North Atlantic DPS	Threatened	North Florida Ecological Services Field Office	<a href="#">Recovery Plan for U.S. Population of Atlantic Green Turtle</a>	<a href="#">Implementation Progress</a>	F R 1

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# HILTON HEAD ISLAND AIRPORT Terminal Area Improvements Environmental Assessment

Species By County Report <https://ecos.fws.gov/ecp0/reports/species-by-current-range-county...>

Group	Name	Population	Status	Lead Office	Recovery Plan	Recovery Plan Action Status	R P S
Mammals	Tricolored bat ( <i>Perimyotis subflavus</i> )	Wherever found	Under Review	Assistant Regional Director-Ecological Services			
Reptiles	Leatherback sea turtle ( <i>Dermochelys coriacea</i> )	Wherever found	Endangered	North Florida Ecological Services Field Office	<a href="#">Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic, and Gulf of Mexico</a>	<a href="#">Implementation Progress</a>	F R 1
Reptiles	Leatherback sea turtle ( <i>Dermochelys coriacea</i> )	Wherever found	Endangered	North Florida Ecological Services Field Office	<a href="#">Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle</a>	<a href="#">Implementation Progress</a>	F R 1
Reptiles	Kemp's ridley sea turtle ( <i>Lepidochelys kempi</i> )	Wherever found	Endangered	Texas Coastal Ecological Services Field Office	<a href="#">Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (<i>Lepidochelys kempi</i>) SECOND REVISION</a>	<a href="#">Implementation Progress</a>	F R 2
Reptiles	Green sea turtle ( <i>Chelonia mydas</i> )	North Atlantic DPS	Threatened	North Florida Ecological Services Field Office	<a href="#">Recovery Plan for U.S. Population of Atlantic Green Turtle</a>	<a href="#">Implementation Progress</a>	F R 1

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**Appendix D**  
**Research Material**





Porcher, Richard D. 2001. *Guide to the Wildflowers of South Carolina*. Columbia, South Carolina. University of South Carolina Press

Environmental Laboratory January, 1987, *U.S. Army Corps of Engineers 1987 Wetland Delineation Manual* Springfield, Virginia. National Technical Information Service. .

Redford, Albert R, Harry E. Ahles and C. Ritchie Bell 1968. *Manual of the Vascular Flora of the Carolinas*. Chapel Hill, North Carolina. The University of North Carolina Press.

National Geographic Society 1983. *Field Guide to the Birds of North America*. National Geographic Society, Washington, DC.

Andrew, J.M. and J.A. Mosher. 1982. Bald Eagle Nest Site Selection and Nesting Habitat in Maryland. *J. Wildlife Management*

Green, N. 1985. The Bald Eagle. Pp 508-531 in R.L. DiSilvestro, ed., *Audubon Wildlife Report* 1985. National Audubon Society, New York.

Campbell, R. W., N. K. Dawe, I. McTaggart-Cowan, J. M. Cooper, G. W. Kaiser, and M. C. E. McNall. 1990. *The Birds of British Columbia. Volume 1. Nonpasserines: Introduction and loons through waterfowl*. University of British Columbia Press, Vancouver, BC, Canada.

Wilson Bull., 114(2), 2002, pp. 235-242

Mayfield, H. F. 1988. Do Kirtland's warblers migrate in one hop? *Auk* 105:204-

205Brewer, R., G.A. McPeck, and R.J. Adams, Jr. 1991. *The Atlas of Breeding Birds of Michigan*. Michigan State University Press, East Lansing, Michigan. xvii + 594 pp.

Mayfield, H. F. 1993. Kirtland's warblers benefit from large forest tracts. *Wilson Bulletin* 105:351-3.

Moler, P. E., and J. Kezer. 1993. Karyology and systematics of the salamander genus *PSEUDOBANCHUS* (Sirenidae). *Copeia* 1993:39-47.

Harding, J. H., and J. A. Holman. 1990. *Michigan Turtles and Lizards, A Field Guide and Pocket Reference*. Michigan State University Museum.

Conant, R. and J. T. Collins. 1991. *A field guide to reptiles and amphibians: eastern and central North America*. Third edition. Houghton Mifflin Co., Boston, Massachusetts. 450 pp.

Ernst, C. H., and R. W. Barbour. 1972. *Turtles of the United States*. Univ. Press of Kentucky, Lexington. x + 347 pp.



Hallinan, T. 1923. Observations made in Duval County, northern Florida, on the gopher tortoise (GOPHERUS POLYPHEMUS). Copeia 1923:11-20.

Landers, J. L. 1980. Recent research on the gopher tortoise and its implications. Pages 8-14 in R. Franz and R. J. Bryant, editors. The dilemma of the gopher tortoise--is there a solution? Proceedings of the 1st Annual Meeting, Gopher Tortoise Council.

Diemer, J. E. 1989. GOPHERUS POLYPHEMUS. Pages 14-19 in I. R. Swingland and M. W. Klemens, editors. The conservation biology of tortoises. Occasional Papers IUCN Species Survival Commission 5.

Mushinsky, H. R., D. S. Wilson, and E. D. McCoy. 1994. Growth and sexual dimorphism of GOPHERUS POLYPHEMUS in central Florida. Herpetologica 50:119-128.

Porter, M. L., and R. F. Labisky. 1986. Home range and foraging habitat of red-cockaded woodpeckers in northern Florida. J. Wildlife Management 50:239-247

Peng, C.-I. 1984. Ludwigia ravenii (Onagraceae), a new species from the Coastal Plain of the southeastern United States. Systematic Botany. 9(2): 129-132.

Natureserve Explorer, *Coreopsis integrifolia*, Accessed 07/14/2019

[http://explorer.natureserve.org/servlet/NatureServe?sourceTemplate=tabular\\_report.wmt&loadTemplate=species\\_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular\\_report.wmt&elKey=159754&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=159754&offPageSelectedElType=species&offPageYesNo=true&post\\_processes=&radiobutton=radiobutton&selectedIndexes=159754](http://explorer.natureserve.org/servlet/NatureServe?sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=159754&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=159754&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=159754)

Neotropical Birds, Accessed 07/14/2019 <https://neotropical.birds.cornell.edu/Species-Account/nb/species/bkcpet/overview>

American Ornithologists' Union (AOU). 1983. Check-list of North American Birds, 6th edition. Allen Press, Inc., Lawrence, Kansas. 877 pp.

Ridgway, R., and H. Friedmann. 1941. The birds of North and Middle America. Part IX. U.S. Natl. Mus. Bull. 50.

Evens, J., and G. W. Page. 1986. Predation on black rails during high tides in salt marshes. Condor 88:107-109.



Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas. Univ. North Carolina Press, Chapel Hill, NC. 1183 pp.

Wikipedia, accessed 07/14/2019 [https://en.wikipedia.org/wiki/Seaside\\_sparrow](https://en.wikipedia.org/wiki/Seaside_sparrow)

Peterson, R. T. 1990b. A field guide to western birds. Third edition. Houghton Mifflin Co., Boston. 432 pp.

Craig, A. M. 1971. Survey of California least tern nesting sites. California Dept. Fish and Game, Project W54R-4. 55 pp

Braby, Michael F. (2000). [Butterflies of Australia: Their Identification, Biology and Distribution](#). CSIRO Publishing. pp. 597–599.

Conant, R., and J.T. Collins. 1991. A Field Guide to Reptiles and Amphibians, Eastern and Central North America, Third Ed Houghton Mifflin Company, Boston, Massachusetts. 450 PP.

Carter, T. C., and J. M. Menzel. 2007. Behavior and day-roosting ecology of North American foliage-roosting bats. Pages 61-81 in M. J. Lacki et al., editors. Bats in forests. Johns Hopkins University Press, Baltimore.

Fujita, M.S., and T.H. Kunz. 1984. Mammalian Species No. 228, *Pipstrellus Subflavus*: The American Society of Mammalogists, 6 P.