

APPENDIX B: BIOLOGICAL ASSESSMENT

Biological Assessment
for
Cumberland Island National Seashore
North End Access and Transportation Management
Plan
August, 2008

Prepared by
Doug M. Hoffman, Biologist
Resource Management Division

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Transportation Management Plan
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Introduction

Cumberland Island National Seashore (CUIS) is the southernmost and largest of Georgia's barrier islands. The island is approximately 17 miles long and ranges in width from ½ mile to 2 ½ miles. CUIS was established by Congress as a unit of the National Park System in the Act of October 23, 1972 (Public Law 92-536, codified at 16 U.S.C. 459i *et seq.*). The purpose of the park, as stated in Section 1 of the foregoing act, is "to provide for public outdoor recreation use and enjoyment of certain significant shoreline lands and waters of the United States and to preserve related scenic, scientific, and historical values." Furthermore, as stated in the Final General Management Plan (CUIS), the purpose and significance of CUIS has been translated into the following Mission Statement: "Cumberland Island National Seashore is dedicated to preserving the island's primitive character, natural processes, and the natural, cultural, historic and wilderness resources, while offering visitors a feeling of isolation and wonder, and an opportunity to understand, learn about, and appreciate this island paradise." On September 8, 1982, much of the northern half of CUIS was designated as wilderness or potential wilderness to be managed as part of the National Wilderness Preservation System (Public Law 97-250, 16 U.S.C. 1131 *et seq.*).

This document has been prepared to address potential impacts of the three (3) action alternatives described in the North End Access and Transportation Management Plan Draft Environmental Assessment (EA) for Cumberland Island National Seashore. It is National Park Service policy to assess both Federal and State listed Threatened and Endangered species when Section 7 consultation is undertaken. The Transportation Management Plan Interdisciplinary Team (IDT) recognized early in the decision making process that additional information was needed for potential effects on T & E species, roadway and wilderness boundary establishment, and other issues to fully evaluate the proposed alternatives. This Biological Assessment (BA) was initially developed to assess the three action alternatives identified in the draft EA relative to potential effects on T & E species. The findings presented in this document are based on the scientific literature; opinions of federal and state wildlife and resource managers; and the knowledge of species presence, distribution, biology, and available habitat on Cumberland Island. The IDT used the BA in conjunction with information gained through environmental

screening of other issues unrelated to T & E species to choose the “preferred alternative.” These issues are discussed in the EA. This assessment has been modified to include the determination of the preferred alternative and provides mitigation measures for the species potentially impacted.

Project Background and Scope

CUIS can only be reached by boat, and there are no paved roads on the island. The island’s General Management Plan limits visitation to no more than 300 persons per day. Most visitors travel to the island on a passenger ferry run by the park’s single concessionaire. Once on the island, visitors travel primarily by foot or bicycle. The backcountry is accessible by trail networks and campsites; however visitors must travel a considerable distance to those locations. As a result, visitation to the park is primarily clustered on the southern 1/4 of the island, where the concessionaire docks the ferry . Areas receiving high visitor traffic include the Dungeness Historic District, Sea Camp, the Dungeness and Sea Camp docks, and the southern beach area.

The island is traversed from north to south by a single principal dirt roadway known as the Main Road. Various shorter dirt tracks radiate from the Main Road, principally on the southern half of the island. The Main Road extends from the Dungeness Mansion ruins on the island’s south end to the Cumberland Wharf ruins on the north end, a distance of approximately 14 miles.

Before 2004, a large part of the Main Road was included in the park’s designated wilderness area. Until that time, only island residents having a pre-existing legal right to do so could drive on this portion of the Main Road. The NPS was prevented from using motorized vehicles on this portion of the road for routine operations or most maintenance activities.

Congress included language in the Cumberland Island Wilderness Boundary Adjustment Act/ Public Law 108-447 (2004) removing the road corridor for the Main Road and two other roads (North Cut Road and the Plum Orchard Spur) from wilderness designation. This statute also directs the Seashore to develop a plan for managing visitor access to the north end. Specifically, the statute directs NPS to:

“complete a management plan to ensure that not more than eight and not less than five round trips are made available daily on the Main Road north of the Plum Orchard Spur and the North Cut Road by the National Park Service or a concessionaire for the purpose of transporting visitors to and from the historic sites located adjacent to [the Cumberland Island National Seashore] Wilderness.”

The Transportation Management Plan IDT interpreted the legislation and defined a trip as follows: a group of up to approximately 30 people in two to three vehicles taken to the north end of the island and returning to their point of origin between five and eight times a day. The terms “trip” and “tour” are used interchangeably in this document and both refer to the previous definition unless otherwise specified. Tours would be offered based on level of demand. The exact type of vehicle (fuel, electric, etc.) has not been chosen in

the Draft EA. Vehicles under consideration include solar, electric, bio-fuel, and gasoline-powered engines. The IDT determined that appropriate sized vehicles may range from sport utility vehicles to mid-size (15 passenger) vans. Suitable tour staging sites include Dungeness Dock, Sea Camp Visitor Center, and Plum Orchard Dock. Tour vehicle use of roads would include the Main Road, Plum Orchard Spur, and North Cut Road.

No additional roads will be constructed as part of this plan. Current road maintenance includes periodic grading of the Main Road from Dungeness to the first bridge located just south of Plum Orchard Spur (White Bridge). Additional activities conducted on all roads involve occasional trimming of vegetation from edges and removal of downed trees and limbs. There are 4 one-lane timber bridges crossing tidal creeks along the Main Road. Each bridge is approximately 30 feet in length with a 20-ton weight limit rating. As a result of this plan, expected road maintenance for the Plum Orchard Spur, North Cut Road, and the Main Road north of the White Bridge would include periodic minor filling of ruts, clearing of vegetation from edges, and removal of downed trees and limbs. Pull-offs allowing safe passage of vehicles would be constructed at intervals where conditions permitted (i.e. lack of vegetation and suitable shoulder gradient). Vehicle pull-offs would be a pre-determined length and width suitable to allow one to three vehicles to safely pull over to the edge of the road. While some minor clearing of vegetation is expected for pull-off construction, the primary plant species that would be affected is saw palmetto, which is neither threatened nor endangered.

The Cumberland Island Transportation Management Plan's principal focus will be the management of access to the north end of the island consistent with the foregoing statute, the park's mission, and its enabling legislation. However, the plan will also cover all other developed visitor use areas on the island. Among other issues, the transportation plan will address travel routes, travel schedules, vehicle types, number of trips, and entities authorized to conduct tours (e.g. NPS, a contractor operating pursuant to a service contract, holders of special use permits, concessionaires). The final plan must be consistent with NPS policies and guidance documents, including but not limited to, Director's Order No. 89A ("Concession Management"), as well as NPS management policies 9.2 ("Transportation Systems"), 10.2 ("Concessions"), and 10.3 ("Commercial Use Authorizations"). Because most of the north half of the Seashore is congressionally designated wilderness, it is imperative that the motorized transport of visitors through this area be compatible with wilderness values to the greatest extent possible. The EA for this project analyzes the environmental consequences of implementing the proposed transportation plan. This BA further analyzes the four alternatives identified in the EA and their potential impacts on both federal and state listed Threatened and Endangered species.

Description of Alternatives

The EA identified four alternatives. They are described below.

Alternative 1 (No Action)

Alternative 1 is the action of continuing the present management and operation of the existing access to CUIS by ferry, the rental of bicycles on the island, and continued ranger-led pedestrian tours. The No Action Alternative provides a basis for comparing the management direction and environmental consequences of the proposed alternatives. Should the No Action Alternative be selected, the NPS would not be in compliance with Public Law 108-447 (2004). They would continue to respond to visitor mobility needs and conditions in the project area at varying levels without major actions or policy changes.

Alternative 2 (North End Access)

Alternative 2 proposes to provide guided motorized trips that would also incorporate a shuttle service to the north end of the island using a combination of the Main Road, Plum Orchard Spur, and North Cut Road (Figure 1). Tours would be available to day visitors accessing the island by the concessionaire ferry or private boat and to overnight campers. Trips could originate at the Dungeness Dock, Sea Camp, or the Plum Orchard Dock. Under this alternative, tours would only utilize the island's road system. No beach driving tours would be offered.

Alternative 3 (Island Mobility) – Preferred Alternative

The Preferred Alternative, and the Park Service's proposed action, calls for an integrated transportation plan to fulfill the Congressional mandate of P.L. 108-447. Alternative 3 proposes a plan to increase visitor access opportunities and meet the diverse needs of the island's visitor population. It incorporates the north end access in Alternative 2, while including a separate South End-only shuttle system. Implementation of this alternative would provide access to multiple destinations at both the southern and northern ends of the island. No beach driving tours would be allowed under this alternative. Alternative 3 is designed to meet both north end access and mobility while also providing tours and connections to the destinations on the south end for less mobile visitors. The south-end shuttle would offer a service to drop off and pick up visitors at the Dungeness Beach Access. This would involve driving a vehicle out the Dungeness dune crossing to the beach; picking up/dropping off visitors; and returning along the same route. The shuttle would not be expected to traverse the beach any more than necessary to turn around to reverse the route. Exceptions would involve the occasional need to respond to human health and safety issues along the Sea Camp/Dungeness beach area. The IDT identified Little Greyfield and Stafford Campground beach access points as alternate drop off/pick up sites should Dungeness access become temporarily impassible due to weather/flooding conditions (Figure 1).

Alternative 4 (Comprehensive Island Mobility)

Alternative 4 includes all activities described in Alternative 3 with the additional feature of including beach driving as part of a tour. The IDT determined that a beach driving tour would be a one-way trip consisting of one to three tour vehicles traveling to or returning from the historical sites on the north end of the island. Access would be provided to

numerous destinations on CUIS including Plum Orchard, the Settlement, Sea Camp, Dungeness, and the beach. This alternative was identified during the initial development of the EA but rejected for final consideration due to potential environmental impacts, including wetlands issues and impacts to state and Federal T&E species. As such, Alternative 4 is listed in the EA as an “alternative considered but rejected.”

List of Federal and State T&E Species

The following table lists Federal and State listed threatened and endangered species of plants and animals known to occur in the Camden County/Cumberland Island area.

Table 1. Federal and State Listed Species Known to Occur in Camden County, GA.

Species	Federal Status	State Status	Habitat	Threats
Mammal				
Humpback whale <i>Megaptera novaeangliae</i>	E	E	Coastal waters during migration	Entanglement in commercial fishing gear and collisions/disturbance associated with boats and barges
Right whale <i>Eubalaena glacialis</i>	E	E	Mate and calve in shallow coastal waters; critical habitat designated from the mouth of Altamaha River south to Sebastian Inlet, FL (from shoreline east 5-15 nautical miles)	Initial decreases probably due to overharvesting. Slow population growth after exploitation halted may be due to collisions/disturbance associated with boats and barges, inbreeding, inherently low reproductive rates, or a reduction in population below a critical size for successful reproduction.
Round-tailed muskrat <i>Neofiber alleni</i>	No Federal Status	T	Bogs and ponds; creates pyramid-shaped nest in vegetation	Habitat loss from human activities and natural succession. Loss of bog/floating mat vegetation-type habitat due to man’s suppression of wildfires.

West Indian manatee <i>Trichechus manatus</i>	E	E	Coastal waters, estuaries, and warm water outfalls	Initial decreases probably due to overharvesting for meat, oil and leather. Current mortality due to collisions with boats and barges and from canal lock operations. Declines also related to coastal development and loss of suitable habitat, particularly destruction of seagrass beds.
Bird				
Bachman's warbler <i>Vermivora bachmanii</i>	E	E	Probably extinct; last seen in Georgia in 1976	
Kirtland's warbler <i>Dendroica kirtlandii</i>	E	E	Varying habitats during late spring and fall as the bird migrates between Michigan and wintering grounds in the Bahamas.	Habitat degradation as a result of wildfire suppression, and incubation and hatchling competition from brown-headed cowbirds are major threats for this species.
Bald eagle <i>Haliaeetus leucocephalus</i>	No Federal Status	T	Inland waterways and estuarine areas in Georgia. Two active eagle nest was documented on Cumberland in 2008.	Major factor in initial decline was lowered reproductive success following use of DDT. Current threats include habitat destruction, disturbance at the nest, illegal shooting, electrocution, impact injuries, and lead poisoning.
Peregrine Falcon <i>Falco peregrinus</i>	No Federal Status	R	Extreme north Georgia is the southern limit of the historic nesting range. Peregrines are commonly seen along the Georgia coast during winter migration.	Major factor in initial decline was lowered reproductive success from DDT concentrations. While DDT use in South America is still a concern, expansion of human population and subsequent loss of undisturbed nesting habitat and foraging areas is a factor currently.
Gull-billed tern <i>Sterna nilotica</i>	No Federal Status	T	Nests in colonies on sandy sites; forages over salt marsh, dunes and other grassy areas for insects, spiders, and	Nest disturbance and loss of habitat to beach-front development are the major threats to this species.

			other invertebrates	
Piping plover <i>Charadrius melodus</i>	T	T	Winter on Georgia's coast; prefer areas with expansive sand or mudflats (foraging) in close proximity to a sand beach (roosting)	Habitat alteration and destruction and human disturbance in nesting colonies. Recreational and commercial development has contributed greatly to loss of breeding habitat.
Wilson's Plover <i>Charadrius wilsonia</i>	No Federal Status	T	Atlantic Coast breeding populations range from New Jersey to northern South America. Nesting habitat includes beaches, sand flats and spits.	Loss of nesting habitat from human development; predation from wild, feral, and domestic animals; and human disturbance in the form of pedestrians and vehicles are primary threats to this species.
Least Tern <i>Sterna antillarum</i>	Not listed in GA; interior U.S. populations Endangered	R	Atlantic Coast breeding populations range from Massachusetts to Florida. Nesting colonies have been documented in all Georgia coastal counties.	Human disturbance of nesting colonies is the primary threat to this species' success. Predation also is a concern.
American Oystercatcher <i>Haematopus palliatus</i>	Not Listed	R	Nests on marsh islands, upland dunes, beaches, and dredge spoils. Atlantic Coast population nests from Massachusetts to southern Florida.	Human disturbance, loss of nesting habitat to development, and predation are known threats to this species' success.
Black Skimmer <i>Rynchops niger</i>	Not Listed	R	Atlantic Coast population nests on barrier island beaches and man-made dredge spoil islands primarily in the mid-Atlantic states. Winters in southern U.S. and Caribbean.	Main threats include loss of nesting habitat due to beachfront development and human disturbance at nesting colony sites.
Red Knot <i>Calidris</i>	Not Listed	R	Nests in the Arctic and winters on southern tip of South	Reduction in population is thought to be related to lack of preferred food sources during

<i>canutus</i>			America. Georgia coast serves as a stopover for winter/early spring migrants.	migration and subsequent decline in body condition.
Red-cockaded woodpecker <i>Picoides borealis</i>	E	E	Nest in mature pine with low understory vegetation (<1.5m); forage in pine and pine hardwood stands > 30 years of age, preferably > 10" dbh	Reduction of older age pine stands and encroachment of hardwood mid-story in older age pine stands due to fire suppression
Wood stork <i>Mycteria americana</i>	E	E	Primarily feed in fresh and brackish wetlands and nest in cypress or other wooded swamps. Active rookeries were located in Camden County 1991-2002.	Decline due primarily to loss of suitable feeding habitat, particularly in south Florida. Other factors include loss of nesting habitat, prolonged drought/flooding, raccoon predation on nests, and human disturbance of rookeries.

Reptile				
Eastern indigo snake <i>Drymarchon corais couperi</i>	T	T	During winter, den in xeric sandridge habitat preferred by gopher tortoises; during warm months, forage in creek bottoms, upland forests, and agricultural fields	Habitat loss due to uses such as farming, construction, forestry, and pasture and to overcollecting for the pet trade
Gopher tortoise <i>Gopherus polyphemus</i>	Not listed in GA; federally threatened in portions of its range in AL, MS, and LA.	T	Well-drained, sandy soils in forest and grassy areas; associated with pine overstory, open understory with grass and forb groundcover, and sunny areas for nesting	Habitat loss and conversion to closed canopy forests. Other threats include mortality on highways and the collection of tortoises for pets.
Green sea turtle <i>Chelonia mydas</i>	T	T	Rarely nests in Georgia; migrates through Georgia's coastal waters	Exploitation for food, high levels of predation, loss of nesting habitat due to human encroachment, hatchling disorientation due to artificial lights on beaches, and drownings when trapped in fishing and shrimping nets

Hawksbill sea turtle <i>Eretmochelys imbricata</i>	E	E	Migrates through Georgia's coastal waters	Primary causes of population decline are development and modification of nesting beaches and exploitation for the shell. Secondary causes include egg consumption, use of the skin for leather, and heavy predation of eggs and hatchlings.
Kemp's ridley sea turtle <i>Lepidochelys kempii</i>	E	E	Migrates through Georgia's coastal waters	Overharvesting of eggs and adults for food and skins and drowning when caught in shrimp nets
Leatherback sea turtle <i>Dermochelys coriacea</i>	E	E	Rarely nests in Georgia; migrates through Georgia's coastal waters	Human exploitation, beach development, high predation on hatchlings, and drowning when caught in nets of commercial shrimp and fish trawls and longline and driftnet fisheries
Loggerhead sea turtle <i>Caretta caretta</i>	T	E	Nests on Georgia's barrier island beaches; forages in warm ocean waters and river mouth channels	Loss of nesting beaches due to human encroachment, high natural predation, drownings when turtles trapped in fishing and shrimping trawls, and marine pollution
Fish				
Shortnose sturgeon¹ <i>Acipenser brevirostrum</i>	E	E	Atlantic seaboard rivers	Construction of dams and pollution, habitat alterations from discharges, dredging or disposal of material into rivers, and related development activities.
Plant				
Climbing buckthorn <i>Sageretia minutiflora</i>	No Federal Status	T	Calcareous rocky bluffs, forested shell middens on barrier islands, and evergreen hammocks along streambanks and coastal marshes. Recorded from 5 counties in Georgia.	
Hartwrightia <i>Hartwrightia floridana</i>	No Federal Status	T	Peaty muck of pine flatwoods, sedge meadows, and wettest parts of poorly drained ditches/sloughs;	

			often with water-spider orchid (<i>Habenaria repens</i>). Recorded from 3 counties in Georgia.
Pondspice <i>Litsea aestivalis</i>	No Federal Status	R	Margins of swamps, cypress ponds, and sandhill depression ponds and in hardwood swamps. Recorded from 13 counties in Georgia.
Wagner spleenwort <i>Asplenium heteroresiliens</i>	No Federal Status	T	Marl outcrops, damp limestone ledges, and tabby masonry. Recorded from 3 counties in Georgia.

Key: E = Endangered; T = Threatened; SC = Species of Concern; R = Rare
Source: U.S. Fish and Wildlife Service Georgia Ecological Service Field Office
Georgia Dept. Natural Resources, Protected Species List

SPECIES/CRITICAL HABITAT DESCRIPTIONS

Species Not Affected by Alternatives Proposed in the Transportation Management Plan EA

The following species are known to occur along the Georgia coast, but not within the proposed project area: Humpback Whale, Right Whale, West Indian Manatee, Round-tailed Muskrat, Bachman’s Warbler, Kirtland’s Warbler, Red-cockaded Woodpecker, Eastern Indigo Snake, Hawksbill Sea Turtle, Kemp’s Ridley Sea Turtle, Shortnose Sturgeon, Climbing Buckthorn, Hartwrightia, Pondspice, and Wagner Spleenwort. The determination of “no effect” has been made for these species. A brief description of each species is included in this document.

Humpback Whale

Humpback whales are baleen whales of medium size, reaching lengths of 15 m and weighing up to 27,000 kg. They are widely distributed throughout all the world’s oceans but are less common in arctic regions. Wintering humpbacks typically seek temperate waters near coastal areas and islands for mating and calving. Summer months are spent feeding at higher latitudes. Humpbacks have been observed off the Georgia and Florida coasts during the winter (Ozier et al., 1999). They are not present in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a “no effect” determination is given.

Northern Right Whale

Northern Right Whales are baleen whales reaching lengths of 17 m and weights up to 63,000 kg. The eastern Atlantic population is thought to be the last remaining representative of this species. The Atlantic coastal waters of Georgia and Florida serve as the only known calving grounds (Ozier et al., 1999). The Central Early Warning System aerial survey project routinely sights right whales off the coast of Cumberland Island during calving season, which runs from December through March (C. George, pers. comm.). During the remainder of the year, whales are found as far north as Cape Cod/Massachusetts Bay and the Bay of Fundy. They are not present in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a “no effect” determination is given.

West Indian Manatee

Commonly referred to as the Florida Manatee, this marine mammal reaches lengths of 400 cm and weights up to 1,600 kg. Manatees are found in riverine, estuarine, and marine environments, feeding primarily on ocean and marsh vegetation. Range is seasonal and varies with water temperature and associated energy constraints. Although rare, occasional sightings have been reported north of Georgia along the Atlantic Coast. Louisiana is considered the western range of the species in the Gulf of Mexico (Ozier et al., 1999). Routine surveys conducted annually by the Georgia Department of Natural Resources and anecdotal observations by NPS personnel confirm that manatees are commonly present along the western boundary of Cumberland Island in sounds, rivers, marshes, and tidal creeks from May through October (C. George, D. Hoffman, pers. comm.). They are not present in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a “no effect” determination is given.

Round-Tailed Muskrat

The round-tailed muskrat is the only member of the genus *Neofiber*. Adults reach lengths of 29 to 38 cm and weigh between 200 to 330 g. While similar in appearance to the muskrat (*Ondatra zibethicus*), the ranges of the two species do not overlap. Round-tailed muskrats are found throughout peninsular Florida and parts of extreme southern Georgia. Preferred habitat includes shallow grassy ponds, marshes, and bogs with a combination of open water and floating and emergent vegetation. While not specifically confirmed on Cumberland Island, the easternmost documentation of this species in Georgia is from skulls found in barn owl pellets in Camden County (Ozier et al., 1999). Based on the known range of this species, it is believed to be absent in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a “no effect” determination is given.

Bachman’s Warbler

The Bachman's warbler is thought to be extinct. It inhabited swamps and forests of the southeastern U. S., wintering in Cuba. The last confirmed sighting in the U. S. was in 1981 in South Carolina (Ozier et al., 1999). No documented sightings have occurred on Cumberland Island. As such, this species is not known to occur in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a "no effect" determination is given.

Kirtland's Warbler

Kirtland's warblers are small songbirds reaching 15 cm in length. They nest in northern Lower Michigan and winter in the Bahamas. Only a few seasonal occurrences have been documented in Georgia, likely migrants passing through (Ozier et al., 1999). No documented sightings have occurred on Cumberland Island. As such, this species is not known to occur in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a "no effect" determination is given.

Red-Cockaded Woodpecker

The historical range of the red-cockaded woodpecker stretched from eastern Texas and Oklahoma to the Atlantic Coast. In Georgia, the habitat that likely supported the highest populations was the Coastal Plain longleaf pine forest maintained by frequent fire events. The birds are considered cooperative breeders, existing in family groups that typically consist of an adult breeding pair and several "helpers" that are male offspring from previous years. While red-cockaded woodpecker colonies have been documented throughout the coastal plain of Georgia, it is believed that approximately 94 percent of the state's population is contained within 5 population centers, all of which are large military installations or national wildlife refuges (Ozier et al., 1999). There have been no documented nesting colonies or sightings of this species on Cumberland Island. As such, this species is not known to occur in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a "no effect" determination is given.

Eastern Indigo Snake

The eastern indigo snake once ranged from southern South Carolina to southeastern Mississippi. Currently, only extant populations are documented in Georgia and Florida. It is the longest snake in North America, reaching lengths of 2.6 m. Preferred habitat includes longleaf pine, sandhills, and turkey oak scrub forests. Floodplains and areas adjacent to cypress ponds are used for feeding during spring and summer. During the cooler winter months snakes are known to take refuge in gopher tortoise burrows and stump holes. There are historical accounts of indigo snakes inhabiting the Georgia barrier islands, but biologists believe it is unlikely that they occur on any island currently (Ozier et al., 1999). There have been no documented sightings of this species on Cumberland Island. As such, it is not known to occur in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a "no effect" determination is given.

Hawksbill Sea Turtle

Hawksbill sea turtles are found in the tropical waters of the Atlantic, Pacific, and Indian oceans. Adults are medium sized turtles having carapace lengths ranging from 76-89 cm and weighing up to 75 kg. Preferred habitat includes shallow water with hard bottoms including coral reefs and rock outcrops. Most breeding occurs in Central and South America. Hawksbills are observed with some regularity along the southern coast of Florida. Occasional nesting has been documented in Florida, particularly along the southeastern coast and Florida Keys (National Marine Fisheries Service, 1993). Adult females exhibit nesting behavior on a 2-3 year cycle. The average clutch size is 160 eggs, and up to 5 nests are deposited by a single female during the nesting season. It is believed that hawksbills pass through the coastal waters of Georgia occasionally as transients (Ozier et al., 1999). Sea turtle stranding records for the Georgia coast dating back to 1980 have only documented four (4) hawksbill sea turtles, two (2) of which washed up on Cumberland Island. This species is not known to occur in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a “no effect” determination is given.

Kemp’s Ridley Sea Turtle

Kemp’s Ridley sea turtles are small turtles with carapace lengths ranging from 58-70 cm and weights up to 41 kg. Adults are found primarily in the Gulf of Mexico. Juveniles are commonly found in the Atlantic Ocean. Shallow coastal waters are preferred. Nesting occurs mainly on the beaches of Rancho Nuevo on the Mexican gulf coast (U. S. Fish and Wildlife Service, 1992). Females nest at intervals ranging from 1 to 3 years. Clutch size ranges from 50-185 eggs. Sea turtle stranding records suggest that juvenile Kemp’s Ridelys are present off the Georgia coast from April through October annually with few existing in the area during the winter months (Ozier et al., 1999). Cumberland Island typically documents several Kemp’s strandings each year. This species is not known to occur in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a “no effect” determination is given.

Shortnose Sturgeon

Sturgeons are an ancient family of fishes containing one species that is considered to be the largest freshwater fish in the world. The shortnose sturgeon ranges from Florida to Canada. They are anadromous, swimming up large coastal rivers to spawn. Spawning in Georgia rivers is associated with warming water temperatures and usually begins in February and ends in March. Sturgeons spend most of their time in estuaries and rarely inhabit the Atlantic Ocean. Adult females range in length from 1 to 1.4 m and weigh up to 24 kg. Males are typically smaller. Georgia populations are known to occur in the Altamaha, Ogeechee, and Savannah river systems (Ozier et al., 1999). No recent documentation exists of the species in the St. Marys and Satilla rivers. This species does not occur in the project area affected by the actions proposed in the Transportation Management Plan EA and thus a “no effect” determination is given.

Climbing Buckthorn

Climbing buckthorn is a member of the family Rhamnaceae. It is a sprawling/climbing vine-like deciduous shrub with thorn-tipped branchlets. Flowering occurs in August with flowers in axillary or terminal spikes with leafy bracts. Fruiting occurs in September and October with fruit resembling a drupe purplish in color. The known range is the southeastern coastal plain from Mississippi to North Carolina. The plant is found mainly on or near the coast, but a few instances of inland presence have been documented. Typical habitat includes calcareous rocky bluffs, forested shell middens on barrier islands, and evergreen hammocks along stream banks and coastal marshes. This species has been recorded from 5 Georgia counties, including Camden (Patrick et al., 1995). Its presence on Cumberland Island has not been confirmed. Given the apparent lack of existence of this plant in the project area affected by the actions proposed in the Transportation Management Plan EA a “no effect” determination is given.

Hartwrightia

Hartwrightia is a member of the family Asteraceae, growing upright to 1.5 m in height. The plant is slender in appearance with narrowly elliptic basal leaves. Flowering occurs in late September into November. Flower color ranges from white to lavender and numerous disk-like flowers are produced per plant. Fruiting occurs from October to December and consists of achenes covered with knob-tipped hairs. The range of this species is from north central peninsular Florida to southeastern Georgia. Typical habitat includes the peaty muck of pine flatwoods, sedge meadows, and poorly drained ditches and sloughs. It is often found in conjunction with water-spider orchid. This species has been recorded from 3 Georgia counties, including Camden (Patrick et al., 1995). Its presence on Cumberland Island has not been confirmed. Given the apparent lack of existence of this plant in the project area affected by the actions proposed in the Transportation Management Plan EA a “no effect” determination is given.

Pondspice

Pondspice, a member of the family Lauraceae, is a deciduous shrub growing up to 3 m in height. Leaves are alternate, oblong to narrowly elliptic. Plants are dioecious, producing male and female flowers on different plants. Flowering occurs in March and April. Flowers are produced in umbellate clusters at the ends of branchlets and are yellow in color. Fruiting occurs in May and June with the fruit being a globose, red drupe. The known range of this plant is the southeastern Coastal Plain from Louisiana to northern Florida to North Carolina. Typical habitat includes swamp margins, cypress ponds, sandhill depression ponds, and hardwood swamps. This species has been recorded from 13 Georgia counties (Patrick et al., 1995). Its presence on Cumberland Island has not been confirmed. Given the apparent lack of existence of this plant in the project area affected by the actions proposed in the Transportation Management Plan EA a “no effect” determination is given.

Wagner Spleenwort

Wagner spleenwort is a member of the family Aspleniaceae. It is an erect to spreading evergreen fern with leaves leathery in texture growing 7-15 cm long and up to 2 cm in width. This plant produces spores from April to October. Spores are produced in 1-1.5 mm long cases located on the undersides of the leaflets along the secondary veins. The known range of this plant is the Coastal Plain from southern Alabama and northern Florida to North Carolina. Typical habitat includes marl outcrops, damp limestone ledges, and masonry composed of tabby. This species has been recorded from 3 Georgia counties, including Camden (Patrick et al., 1995). Its presence on Cumberland Island has not been confirmed. Given the apparent lack of existence of this plant in the project area affected by the actions proposed in the Transportation Management Plan EA a “no effect” determination is given.

Species Potentially Affected by Alternatives Proposed in the Transportation Management Plan EA

The activities described in the Cumberland Island Transportation Management Plan encompass increased vehicular activity and visitor use of roads, trails, and the beach. The following Federal and State listed species are known to occur in the proposed project area as permanent residents, nesters, or migrants: Piping Plover, Wood Stork, Loggerhead Sea Turtle, Green Sea Turtle, Leatherback Sea Turtle, Gopher Tortoise, Bald Eagle, Peregrine Falcon, Gull-Billed Tern, Wilson’s Plover, Least Tern, American Oystercatcher, Black Skimmer, and Red Knot.

Federally Listed Species

Piping Plover

Piping plovers are small shorebirds approximately six inches long with sand-colored plumage on their backs and crown and white under parts. Breeding birds have a single black breast band, a black bar across the forehead, bright orange legs and bill, and a black tip on the bill (Sibley, 2003). During the winter, the birds lose the black bands, the legs fade to pale yellow, and the bill becomes mostly black.

Piping plovers nest along the sandy beaches of the Atlantic Coast from Newfoundland to North Carolina, the gravelly shorelines of the Great Lakes, and on river sandbars and alkali wetlands throughout the Great Plains region. They prefer to nest in sparsely vegetated areas that are slightly raised in elevation (like a beach berm). Piping plover breeding territories generally include a feeding area, such as a dune pond or slough, or near the lakeshore or ocean edge. The piping plover winters on the Atlantic and Gulf of Mexico coasts from North Carolina to Mexico, and in the Bahamas West Indies. Preferred wintering areas are characterized by expansive sand or mudflats (feeding) in close proximity to a sandy beach (roosting). The primary threats to the piping plover are related to habitat modification and destruction, and human disturbance to nesting adults and flightless chicks (U. S. Fish and Wildlife Service, 1996).

Non-breeding migrant piping plovers spend a considerable amount of time on the CUIS coast annually, with individuals normally arriving in late July and early August and remaining into mid-May. Piping plovers are considered threatened species under the Endangered Species Act of 1973, as amended, when on their wintering grounds. The species is not known to nest in the project area. Piping plovers are listed as “Highly Imperiled” by the U. S. Shorebird Conservation Plan (2004) and are listed as Threatened by the state of Georgia. A mid-winter waterbird count is conducted annually by the Georgia Department of Natural Resources. This is a one-day event coordinated with volunteers along the entire Georgia coast. Count data from CUIS for the years 2003 through 2008 show piping plover numbers ranging from 28 to 75, with a mean annual count of 45. It is standard protocol to record locations of piping plovers during this census. Locations are marked with GPS units when available or by noting approximate locations on a map. Analysis of location data for Cumberland shows that piping plovers are observed as single birds or small groups randomly occurring along the beach with the majority of birds counted from the St. Marys River entrance on the south end up to North Cut Road. Figure 1 depicts location data for piping plovers observed along the Cumberland beach during mid-winter waterbird surveys.

Wood Stork

The wood stork is the only true stork that regularly occurs in the U.S. It is a large, long-legged wading bird averaging 99 cm in height, having a wing span averaging 160 cm. Plumage is primarily white with some greenish black feathers occurring on the wing tips and tail. The head and neck of adults are featherless and black in color.

Diet consists of fish, amphibians, crayfish, and other small aquatic animals. Storks feed by tacto-location, using a variety of feeding sites in both freshwater and estuarine environments. In coastal settings, storks will utilize tidal creeks and marsh flats during low tide when prey items are concentrated. Flocks of storks are commonly seen in remote freshwater and estuarine wetlands of Cumberland with numbers of birds ranging from 6 to 40 individuals (D. Hoffman, pers. obs.).

The breeding range includes the southeastern U.S., Mexico, and Central and South America. Historical accounts show wood stork nesting occurring in all coastal states ranging from Texas to South Carolina (Ogden, et al., 1987). They are currently known to nest in Florida, Georgia, and South Carolina, with a recent shift in nesting locations northward from southern Florida (Mitchell, 1999). This shift is presumed a result of increasing agricultural uses and development with a subsequent drainage of wetland areas in the south Florida region. Storks normally form breeding colonies with preferred sites being trees in standing water or trees on islands surrounded by water. The Georgia Department of Natural Resources surveys wood storks annually. There were an estimated 1,900 breeding pairs in the state in 2007 (B. Winn, pers. comm.). Colony sizes in Georgia range from as few as 12 nests to more than 500 nests. Breeding normally begins in March and incubation takes approximately 30 days. There are historic records of breeding colonies on Cumberland with recent data showing small numbers of storks nesting on this island intermittently.

Wood storks gather in communal roosts along the coast post-nesting, beginning in late summer. While the majority of storks winter further south, there are some birds that remain in the southernmost region of coastal Georgia. One known roosting site on Cumberland Island is located in trees adjacent to the Plum Orchard Mansion pond. This pond is approximately 0.5 acre in size and is located to the north of the mansion and directly adjacent to the Brickhill River and associated marsh. Stork numbers at this site vary from several birds to 30+ birds (B. Huber, pers. comm.).

Loggerhead Sea Turtle

The loggerhead sea turtle is found in temperate and subtropical waters throughout the world. It is considered a turtle of shallow water with juveniles preferring bays and estuaries. Crustaceans, mollusks, squid, jellyfish, fish, and plant materials are known foods. Preferred nesting habitat consists of remote beaches with minimal human disturbance. Major nesting areas in North America occur along the Southeast Coast from North Carolina to Florida (National Marine Fisheries Service, 1991a). The Georgia barrier islands provide valuable nesting habitat for loggerheads, accounting for an average of 1,023 nests annually (M. Dodd, pers. comm.). Reported turtle strandings along the Georgia coast from the last 6 years ranged from 251 in 2002 to 104 in 2007, with an annual average of 202 during that time period (A. Mackinnon, pers. comm.). The majority of all stranded sea turtles in Georgia are loggerheads and most stranding reports occur from May to August. Principal causes of dead and injured stranded turtles are related to boat strikes, incidental capture in fish/shrimp nets, and illness related to harmful algal blooms (red tide).

In Georgia, the nesting season generally begins in mid-May and ends by mid-August, with peak activity occurring in June and July. On the average, nests are present on Cumberland's beach through mid-October. Loggerheads are known to nest from one to seven times within a nesting season; the mean is approximately 4.1. The internesting interval varies around a mean of about 14 days. There is general agreement that females mate prior to the nesting season and afterwards lay multiple clutches of fertile eggs throughout some portion of the nesting season. Mean clutch size varies from about 100 to 126 along the southeastern U.S. coast. Loggerheads are nocturnal nesters, but exceptions to the rule do occur infrequently. Multi-annual remigration intervals of two and three years are most common in loggerheads, but the number can vary from one to six years. The length of the incubation period is related to nest temperature. A 60-day incubation period is used on Cumberland for nest monitoring purposes. Sex determination in loggerhead hatchlings is temperature-dependent and the species apparently lacks sex chromosomes. The Cumberland Island sea turtle nest monitoring project recorded hatching success of 80 and 83 percent in the 2006 and 2007 seasons respectively. Loggerhead hatchlings engage in a "swimming frenzy" for about 20 hours after they enter the sea and that frenzy takes them about 22 to 28 kilometers offshore. At some point thereafter they become associated with Sargassum rafts and/or debris at current gyres. Upon reaching about 45 cm mean straight carapace length (sCL), they abandon the pelagic existence and migrate to near-shore and estuarine waters of the eastern United

States, the Gulf of Mexico and the Bahamas and begin the sub-adult stage. As adults, loggerheads become migratory for the purpose of breeding. Reported tag recoveries suggest a "migratory path" from Georgia to Cape Hatteras, North Carolina with a single recovery of a Georgia tagged female on the Florida Gulf Coast (Tampa Bay). Little else is known of the travels of Georgia, South Carolina, and North Carolina nesters outside of the nesting season.

Green Sea Turtle

Breeding colony populations in Florida and on the Pacific Coast of Mexico are listed as Endangered; all others are listed as Threatened (National Marine Fisheries Service, 1991b).

Green sea turtles inhabit the tropical zones of the Atlantic, Pacific, and Indian oceans. Adult carapace lengths range from 87 to 120 cm. The carapace is typically heart-shaped and the head is proportionally smaller than other sea turtle species. Adults feed on grasses and algae in shallow water. Juveniles are believed to be both herbivorous and carnivorous. In general, the Georgia coast lacks the submerged aquatic vegetation favored by this species for food. Sexual maturity is reached between 20 and 50 years of age. An adult female will nest between one to seven times during a season with an interesting interval of 13 days. Females may exhibit nesting behavior every two to four years. The average clutch size ranges between 70-200 eggs. Mean incubation is 50-55 days. Nesting season in the southeastern U. S. runs from June through September with the majority of nests occurring in Florida. Green turtle nests have been documented as far north along the Atlantic coast as North Carolina (U. S. Fish and Wildlife Service, 2007).

Although little is known about green sea turtle diet and distribution along the Georgia coast, it is assumed that they are rare in this area. Georgia sea turtle stranding data from 1980 to 1998 documented 4,437 dead turtles, of which 38 were green turtles. Sea turtle nest databases maintained by the Georgia DNR document 40 known emergences of green sea turtles since 1974. Four (4) of these emergences occurred on Cumberland.

Leatherback Sea Turtle

Leatherbacks are the largest turtles in the world with carapace measurements averaging 132 to 172 cm and weights exceeding 454 kg. This species has a layer of skin covering a flexible shell, unlike the scutes and carapace found in the other sea turtle species. They are considered to be highly migratory and pelagic (National Marine Fisheries Service, 1992). Leatherbacks are distributed throughout the world, likely a result of their ability to tolerate cooler water temperatures. Diet includes primarily jellyfish species, but sea urchins, squid, octopi, crustaceans, and other items are commonly consumed. Sexual maturity is reached at approximately 6 to 10 years of age. Females exhibit nesting behavior every 2-4 years. An adult female may nest between 5-7 times in a season with an interesting interval of 10 days. Average clutch size ranges between 80-90 eggs. Mean incubation is 50-78 days. Nesting occurs in the tropic regions of the Atlantic,

Pacific, and Indian oceans. Small nesting populations occur along the east coast of Florida numbering approximately 35 females each year. Nesting season in the U. S. runs from March through July (U. S. Fish and Wildlife Service, 2007).

Leatherbacks are present off the Georgia coast in early spring, fall, and early winter during migration to and from the tropics. Sea turtle nest databases maintained by the Georgia DNR document 24 known emergences of Leatherback sea turtles since 1981. Five (5) of these emergences occurred on Cumberland.

State Listed Species

Bald Eagle

The Bald Eagle is listed as Threatened by the state of Georgia. The species was federally de-listed in July 2007. While not currently a federally listed species, it is still afforded federal protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940. Eagle numbers declined nationwide in the mid-1900's due primarily to effects of DDT use. U.S. Fish and Wildlife Service data show an estimated number of nesting pairs at 417 in the lower 48 U.S. in 1963. Increased protection efforts combined with a ban on DDT use has resulted in a significant increase in eagle numbers, with a current estimate of 9,789 pairs. Annual Georgia DNR surveys documented 114 nests in Georgia in 2007 (J. Ozier, pers. comm.). Known nest sites occur throughout all physiographic regions of the state. Cumberland has two active nests annually and both are in the Wilderness and in areas of minimal human disturbance. Estimated distance of the nests from island roads or trails ranges from 300 to 400 feet.

Adults are large birds with wingspreads ranging from 182 to 249 cm. Nesting in Georgia begins in October and November, with an incubation period of approximately 35 days. Juveniles (usually 1 or 2 per nest) fledge within 12 weeks, normally by late March or April. Young do not reach maturity until about 5 years of age, when they attain adult plumage. While adult Georgia eagles are essentially non-migratory, it is believed that a percentage of juvenile birds migrate in some form. Known food items include fish, waterfowl and other birds, turtles, small mammals, and carrion.

Multiple eagles, typically family groups, are seen along the Cumberland coastline from late August through October.

Peregrine Falcon

The Peregrine Falcon is listed as Rare by the state of Georgia. The American peregrine falcon was one of the first species protected under the Endangered Species Act. While peregrine falcons have never been very abundant historically, the effects of DDT pesticide use caused significant declines in the population between the late 1940's and mid-1970's. The bird was officially declared recovered and removed from the endangered species list on August 25, 1999 (U. S. Fish and Wildlife Service, 2006).

Adult falcons have wingspans reaching up to 112 cm. Their diet consists almost exclusively of other bird species. Preferred nesting sites are high inaccessible cliff ledges and, more recently, bridges and high buildings. Nesting occurs in late March and early April with up to 3 eggs laid. Incubation is approximately 32 days, with fledging occurring at 6 weeks. Juveniles reach maturity at about 2 years of age. The historic nesting range in Georgia was the extreme northern region, with the last documented wild nest in Dade County in the early 1940's (Ozier et al., 1999). Current known nesting sites occur only in a few northern Georgia counties and are associated with released or hacked birds. Peregrines are commonly seen along the coast, Cumberland in particular, during winter migration. These migrants are likely from Alaska, Canada, and Greenland en route to Central and South America for the winter.

Gull-billed Tern

The Gull-billed Tern is listed as Threatened by the state of Georgia. This species was impacted throughout its range along with other tern species, herons, and egrets in the late 1800's and early 1900's from killing of birds for collection of feathers for women's hat decorations. While this species likely inhabits Cumberland's beaches during a portion of the year, no documented sightings have been recorded during mid-winter waterbird surveys or Christmas bird counts for more than 5 years (S. Willis, pers. comm.).

Preferred nesting sites include beaches, spits, small islands near inlets, and artificial dredge spoil islands. Sites are often shared with nesting black skimmers. USFWS figures for the Southeast U.S. Waterbird Conservation Region estimated 3,000 nesting pairs in 2006. Nesting occurs in April and May, with an incubation period of about 23 days. Chicks are precocial and leave the nest within a few days after hatching. First flight occurs within 35 days of age. Juveniles reach maturity at about 5 years. Diet includes insects, lizards, crustaceans, small fishes, and the chicks of other tern species.

This species is known to be vulnerable to high levels of human disturbance. Nest disturbance and loss of habitat to development are major threats to its survival. The primary management challenge for conservation of the gull-billed tern in Georgia centers around protection of shorebird nesting sites from human disturbance.

Wilson's Plover

Wilson's plovers are listed as Threatened by the state of Georgia. They are listed as a "Species of High Concern" in the U. S. Shorebird Conservation Plan (2004). Atlantic Coast breeding populations range from New Jersey to northern South America. Preferred nesting sites include open beaches, sand flats, and sand spits at the mouths of large rivers. Nesting begins in late April and May, with 2 to 4 eggs produced. Incubation lasts for approximately 28 days. Chicks are precocial and believed to become independent of their parents less than one month post hatching. Diet includes primarily crustaceans, including fiddler crabs, shrimp, insects, and spiders.

Most Atlantic Coast birds winter from Florida to northern South America, although some birds are known to remain along Georgia's barrier islands. Mid-winter waterbird survey data from 2003 to 2008 documented Wilson's plover numbers ranging from 3 to 19 birds with a mean annual count of 11 birds. Wilson's plovers nest along the entire stretch of Cumberland's beach annually and are considered solitary nesters. There have been no recent comprehensive nest surveys for this species, but observations made during the 2007 and 2008 nesting seasons confirmed at least 30 successful nesting pairs on the island annually (S. Schweitzer, D. Hoffman, pers. obs.).

Least Tern

The least tern is the smallest of the North American tern species at 21 to 23 cm in length. Known nesting areas include the Atlantic and Pacific coasts, West Indies, Belize, Honduras, Venezuela, and Bermuda. A segment of the population nests within the interior U.S. along major river systems including the Mississippi, Colorado, Arkansas, Red, Missouri, and Ohio rivers. This interior least tern population is federally listed as Endangered. Least terns in Georgia, while not federally listed, are state listed as Rare. Wintering grounds include Mexico, Central and South America.

Primary nesting habitats in Georgia include barrier island beaches, dredge spoil islands, and gravel roof tops of large buildings. Nesting behavior usually begins in late April. Clutch size ranges from 1 to 4 eggs, with an incubation period of 20 to 25 days. Chicks are precocial and normally leave the nest within a day or two after hatching. Chicks are able to fly at about 20 days old, but are dependant on adults for several weeks after fledging. Least tern nesting on Cumberland is variable each year, with potential colony sites including the dunes adjacent to the North Cut road access and the sand flats located on the north and south ends of the island. Local biologists believe that the nesting population alternates between available habitat at Kings Bay Naval Base and Cumberland (B. Winn, pers. comm.). Diet is primarily fish with occasional invertebrates consumed.

American Oystercatcher

While not a federally listed T&E species, American Oystercatchers are listed as a "Species of High Concern" by the U. S. Shorebird Conservation Plan (2004), in part because of threats during the breeding season. The state of Georgia lists oystercatchers as Rare. A comprehensive effort utilizing aerial and ground surveys estimated the eastern population ranging from New Jersey to Texas to be 11,000 individuals in 2003 (Brown et al., 2005). A recent graduate research project conducted on Cumberland documented 11 breeding pairs in 2003 and 10 breeding pairs in 2004 (Sabine, 2005).

Adult American oystercatchers average 40 to 44 cm in length. Breeding ranges occur along the Atlantic and Pacific coasts, and the Gulf Coast. Preferred nesting sites include barrier island dunes and flats, with documented nesting occurring on dredge spoil islands, marsh islands, and oyster shell mounds to a lesser extent (Lauro, 1989). Clutch size is 2 to 3 eggs with an incubation period of approximately 27 days. Chicks take approximately 35 days to fledge. Oystercatchers are normally solitary nesters, but have

been observed nesting among other shorebird colonies. It is common for pairs to re-nest if the first clutch is destroyed. Diet consists of oysters and other mollusks, crabs, and marine worms.

Little is known about migration of this species. South Carolina is thought to winter a substantial portion of the eastern population of oystercatchers (Brown, et al. 2005). The Georgia coast, including Cumberland, also supports flocks of oystercatchers throughout the winter. Mid-winter waterbird survey data from 2003 to 2008 documented oystercatcher numbers on Cumberland ranging from 34 to 66 birds with a mean annual count during this time period of 51 birds.

Black Skimmer

The Black skimmer is listed as Rare by the state of Georgia.

Black skimmers occur along the Atlantic and Pacific coasts of North and South America. The North American Atlantic coast population nests primarily along the northeastern coast and winters in the southern U. S. and northern Caribbean (Burger, 1990). Black skimmers are colonial nesters and have been observed nesting in mixed species colonies on sandy beaches, salt marshes, and dredge spoil islands (Gochfield, 1978, Mallach, 1999). Adults average 43 cm in length. Clutch size ranges from 2 to 5 eggs with an incubation period of 21 to 26 days. Chicks are considered semi-precocial, normally remaining in their nesting territory until after fledging, which takes 23 to 25 days. Primary food items include shrimp and numerous fish species (Black, 1983).

Red Knot

The Red Knot is listed as “Highly Imperiled” by the U. S. Shorebird Conservation Plan (2004). It is listed as Rare by the state of Georgia.

Red knots are the largest of the sandpipers at 23 to 25 cm in length with wingspans of 52 to 56 cm (Sibley, 2003). Clutch size is up to 4 eggs with an incubation period of 21 to 23 days. Chicks are precocial and leave the nest soon after hatching and fledge in 18 to 20 days. Food items include bivalves, small snails, crustaceans, terrestrial invertebrates, and horseshoe crab eggs (Gough, et al., 1998).

Red knots undertake one of the largest annual migrations known in the world. Breeding grounds of the North American race are located in the Arctic from Hudson’s bay northward, with documented nesting in the Alaskan North Slope. The Atlantic coast has two distinct wintering populations (Harrington et al., 1988). Of these two populations, the largest numbers winter in southern Argentina and Chile while a smaller group is found in Florida. Delaware Bay is a known major stopover site for spring migrants, primarily due to availability of horseshoe crab eggs, an important food source to sustain migration and pre-breeding condition (Clark et al., 1993). Current conservation issues in this region center around reducing the harvest of horseshoe crabs to ensure that eggs

continue to be present in sufficient numbers for knots and other birds (Morrison et al., 2004).

Red knots are seen annually on Cumberland during the winter. Mid-winter waterbird survey data from 2003 to 2008 documented red knot numbers ranging from 72 to 673 birds with a mean annual count during this time period of 325 birds.

Gopher Tortoise

The Gopher Tortoise is listed as Threatened by the State of Georgia. Federal status is provided to populations west of the Tombigbee and Mobile rivers in Alabama, Mississippi, and Louisiana. It is considered the official state reptile of Georgia.

One of four species of North American tortoises, Gopher tortoises occur along the southeastern Coastal Plain from South Carolina to Louisiana. They are generally associated with well-drained sandy soils of the sandhill community, but are not limited to this habitat type (Diemer, 1986). Burrows are excavated and provide an escape from predation and temperature extremes. A single tortoise may use multiple burrows over the course of a year. The degree of tortoise activity throughout the year is correlated with ambient temperatures. Research has documented tortoises to be relatively inactive during the winter months of November through February (McCrae, 1981).

While they are not believed to occur naturally on Georgia's barrier islands, there are known populations on St. Simons and Cumberland islands. Local biologists believe both of these are a result of human releases. Cumberland's population is known to exist from Stafford Field southward to the Greyfield Inn property. No surveys have been conducted to evaluate numbers and distribution. An occasional tortoise is found along the beach and dunes, presumably a result of juvenile dispersal (D. Hoffman, pers. obs.).

Gopher tortoises are relatively large terrestrial turtles with a carapace length averaging 23 to 28 cm, with some adults reaching lengths exceeding 35 cm. Females reach sexual maturity between 10 and 20 years of age. Mating takes place from April into June. Nesting activity normally peaks in early June, but may extend into July. A tortoise lays a single clutch of eggs each year. Average clutch size is 6 eggs with an incubation period ranging from 97 to 106 days. Eggs are typically deposited in excavated sand at burrow entrances. Diet includes a variety of species of broadleaf grasses and legumes (Garner, 1981).

Primary limiting factors for this species include the presence of well-drained sandy soil, adequate herbaceous food, and sunlit nesting sites. Major causes of decline in gopher tortoise numbers are habitat destruction, habitat degradation due to exclusion of natural and prescribed fire, and human depredation for food (Butler, 1996). Additional obstacles are present in the form of heavy depredation on hatchlings and eggs from birds, mammals (raccoons and armadillos), snakes, and fire ants (Douglass, 1977). Most of the species that have been documented preying on eggs and hatchlings throughout the tortoise's

range occur on Cumberland, including the eastern coachwhip, eastern diamondback rattlesnake, Florida cottonmouth, raccoon, armadillo, and fire ant.

EFFECTS ON LISTED SPECIES/CRITICAL HABITATS

Alternative 1 – “No Action” includes the current activities associated with NPS personnel and island residents. While these activities potentially impact species described in this Biological Assessment, Alternative 1 is not considered a candidate for being chosen as the Preferred Alternative for the transportation management plan. As such, it was not considered in detail in this assessment. The IDT has tentatively chosen Alternative 3 as the Preferred Alternative. Effect determinations for all alternatives are included in this assessment to serve as an appendix to the final EA and support the evaluation of the alternatives contained therein. The National Park Service is seeking consultation with the FWS and GADNR only on alternative 3, the preferred alternative. Appendix 1 summarizes the effect determinations for the three action alternatives relative to all federal and state listed species occurring in the Camden County/Cumberland Island, Georgia area.

Federally Listed Species

Piping Plover

Piping plovers typically inhabit Cumberland’s beaches from late July to mid-May. There has been no documented nesting of this species on Cumberland. Birds are seen in small groups or as individuals feeding between the high tide line and the surf. Alternatives 2 and 3 “may affect, are not likely to adversely affect” this species since both may lead to increased pedestrian use and a minimal level of disturbance to birds on some sections of the beach. Alternative 3’s proposed south end beach shuttle service will result in an increased vehicle presence on the beach at Dungeness Beach Access with Little Greyfield and Stafford beach accesses being identified as alternate sites. Although the proposed activity consists of vehicles traversing only that amount of beach directly adjacent to the access point(s) to pick up/drop off visitors and turn around to return to the Main Road, it will increase the level of disturbance in these areas beyond what is currently experienced. The effect determination for Alternative 4 is “may affect, likely to adversely affect” wintering piping plovers. Piping plover behavior associated with the presence of vehicles or pedestrians can be described as exiting the area by flight; running away from oncoming vehicles or pedestrians; and running/flying to high tide wrack line to hide. The increase in vehicular activity (maximum of 24 additional vehicles daily) and potential increase in pedestrians associated with tours may initiate aversive behavior in piping plovers to the level where the birds seek more remote feeding and resting sites.

Wood Stork

While historic records document breeding colonies on Cumberland, recent data suggests small numbers of storks nest on this island intermittently. None of the alternatives listed in the EA would impact known nesting sites. Previous surveys documented one nesting site located on private property owned by Greyfield and another site in a remote area of the island virtually inaccessible to visitors. One known roosting site is located in trees adjacent to the Plum Orchard Mansion pond. This pond is approximately 0.5 acre in size and is located 200 feet to the north of the mansion and directly adjacent to the Brickhill River and associated marsh. Ogden (1990) recommended buffer distances of 500 to 1,000 feet to prevent human disturbance of wood stork roosting sites. Plum Orchard Mansion is currently open for tours two days each month. Implementation of any of the alternatives (2, 3, and 4) has the potential to adversely impact this roost site, thus the effect determination for all three alternatives is “may affect, likely to adversely affect.” Plum Orchard Mansion tours are currently conducted by NPS two days each month with visitation ranging from 10 to 120 people per tour. Private tours are also conducted regularly by Greyfield Inn and other entities. A change in human presence from the current schedule adding 5 to 8 tours daily with potentially 240+ people per day may cause storks to abandon this site.

Loggerhead Sea Turtle

Cumberland’s 17 miles of undeveloped beach support the largest annual loggerhead nesting population on the Georgia Coast, averaging over 200 nests per year. The Georgia Department of Natural Resources conducts intensive nest monitoring and protection actions on all nesting beaches. NPS assists with this effort, employing four technicians who patrol the beach daily from May through October. Nests are located, marked, and protective screening is installed to prevent predation and human disturbance. Educational presentations are given twice weekly to island visitors. Alternatives 2 and 3 “may affect, are not likely to adversely affect” this species since both may lead to increased pedestrian tracks on some sections of beach, and these tracks may have a small effect on the ability of hatchlings to reach the ocean (Hosier et al., 1981). Alternative 4, including beach driving as part of a tour, is given an effect determination of “may affect, likely to adversely affect” for this species due to the potential for numerous tour vehicles to create excessive tire ruts on the beach which may affect the ability of hatchlings to reach the ocean (Hosier et al., 1981, National Marine Fisheries Service, 1991a). Both excessive pedestrian footprints and vehicle tire ruts increase the amount of time and energy expended by hatchlings attempting to reach the ocean, thus increasing the chance that they will be lost to predators or to desiccation during daylight hours. Adult nesting females typically crawl out of the ocean to nest during night hours. Additionally, nests normally hatch during night hours, with a portion hatching at dawn. Tours associated with Alternative 4 would be expected to utilize the beach during daylight hours only and likely between the hours of 10:00 am and 4:00 pm, times when adult turtles or hatchlings would not typically be present.

Green Sea Turtle

Alternatives 2 and 3 “may affect, are not likely to adversely affect” green sea turtles since both may lead to increased pedestrian tracks on some sections of beach, and these tracks may have a small effect on the ability of hatchlings to reach the ocean (Hosier et al., 1981). Alternative 4, including beach driving as part of a tour, is given an effect determination of “may affect, likely to adversely affect” for this species due to the potential for numerous tour vehicles to create excessive tire ruts on the beach which may affect the ability of hatchlings to reach the ocean (Hosier et al., 1981, National Marine Fisheries Service, 1991b). Both excessive pedestrian footprints and vehicle tire ruts increase the amount of time and energy expended by hatchlings attempting to reach the ocean, thus increasing the chance that they will be lost to predators or to desiccation during daylight hours. Sea turtle nest data from 1974 to 2007 show that this species is an infrequent nester on Cumberland, with only 4 nests documented during this time period. Adult nesting females typically crawl out of the ocean to nest during night hours. Additionally, nests normally hatch during night hours, with a portion hatching at dawn. Tours associated with Alternative 4 would be expected to utilize the beach during daylight hours only and likely between the hours of 10:00 am and 4:00 pm, times when adult turtles or hatchlings would not typically be present.

Leatherback Sea Turtle

Alternatives 2 and 3 “may affect, are not likely to adversely affect” leatherback sea turtles since both may lead to increased pedestrian tracks on some sections of beach, and these tracks may have a small effect on the ability of hatchlings to reach the ocean (Hosier et al., 1981). Alternative 4, including beach driving as part of a tour, is given an effect determination of “may affect, likely to adversely affect” for this species due to the potential for numerous tour vehicles to create excessive tire ruts on the beach which may affect the ability of hatchlings to reach the ocean (Hosier et al., 1981, National Marine Fisheries Service, 1992). Both excessive pedestrian footprints and vehicle tire ruts increase the amount of time and energy expended by hatchlings attempting to reach the ocean, thus increasing the chance that they will be lost to predators or to desiccation during daylight hours. Sea turtle nest data from 1981 to 2007 show that this species is an infrequent nester on Cumberland, with only 5 nests documented during this time period. Adult nesting females typically crawl out of the ocean to nest during night hours. Additionally, nests normally hatch during night hours, with a portion hatching at dawn. Tours associated with Alternative 4 would be expected to utilize the beach during daylight hours only and likely between the hours of 10:00 am and 4:00 pm, times when adult turtles or hatchlings would not typically be present.

State Listed Species

Bald Eagle

Cumberland has two known active nests annually and both are in the Wilderness and in areas of minimal human disturbance; however Bald eagles nesting on Cumberland may be impacted by Alternatives 2, 3, and 4 of this EA. The shuttling of visitors by daily tours will likely result in increased use of trails in areas where eagles currently nest.

Although the nest sites are in remote areas, increased human activity in and around these areas may have negative impacts. Multiple juvenile and adult birds are seen along the beach in the fall and winter months. Beach driving associated with Alternative 4 may adversely affect eagles using the beach for feeding during fall/winter months.

Adult/juvenile groups on the beach have been observed to show aversive reactions to the presence of vehicles (D. Hoffman, pers. obs.). The potential for a significant increase in numbers of vehicles using the beach on a daily basis (maximum of 24 additional vehicles) may discourage eagles from feeding to the extent that they abandon use of the Cumberland beach entirely. While limited studies have been conducted on the effects of automobiles on eagle behavior, the effects of boats have been documented. McGarigal et al. (1991) noted that eagles tended to keep a distance of 300 to 400 m from boat traffic along the Columbia River, and recommended buffer zones of 400 to 800 m around high use bald eagle foraging areas. Wood (1999), however, suggested that eagles were tolerant of boat disturbance in 3 lakes in northcentral Florida. The effect determination for Alternatives 2, 3, and 4 is “may affect, likely to adversely affect” bald eagles on Cumberland Island.

Peregrine Falcon

Peregrines are commonly seen on Cumberland’s beaches from October through January. Alternatives 2 and 3 “may affect, not likely to adversely affect” these migrating birds since the alternatives may result in an increase in the number of pedestrians on the beach, which may lead to a minimal chance of disturbance to resting or foraging peregrine falcons. The effect determination for Alternative 4 is “may affect, not likely to adversely affect.” Beach driving tours associated with Alternative 4 would likely disturb some falcons using the beach, but these birds may acclimate to vehicle activity due to the fact that island residents and other park vehicles currently use the beach daily and the daily hunting ranges of individual birds cover a large area, likely encompassing other lands in addition to Cumberland. They are considerably less susceptible to vehicle disturbance on the beach than are bald eagles (D. Hoffman, pers. obs.).

Gull-billed Tern

Gull-billed terns are sighted occasionally on Cumberland. There have been no documented sightings during the annual mid-winter waterbird surveys or Christmas bird counts over the last 5 years (S. Willis, pers. comm.). Alternatives 2 and 3 “may affect, are not likely to adversely affect” this species due to its uncommon use of the island and the minimal disturbance caused by increased numbers of pedestrians on some sections of beach. Similarly, the effect determination for Alternative 4 is “may affect, not likely to adversely affect” gull-billed terns due to their apparent minimal presence on the island and ability to move away from temporary and infrequent human sources of disturbance.

Wilson's Plover

Wilson's plovers nest annually on Cumberland. More than 30 successful nesting pairs were documented annually on the island in 2007 and 2008 (S. Schweitzer, D. Hoffman, pers. obs.). Nesting occurs along the entire length of beach from south of the St. Marys Entrance jetty to the northernmost dunes at Christmas Creek. Current research interests of the scientific community center around the effects of human disturbance and vehicles on Wilson's plover nesting and fledging success (S. Schweitzer, B. Winn, pers. comm.). Human activity, in the form of pedestrians or vehicles, increases nesting adult vigilance behavior (Burger, 1994); decreases time spent by nesting adults incubating; decreases the amount of foraging time by chicks; increases the amount of energy expended by chicks trying to escape; and poses direct threats to chicks by potential vehicle collisions. An additional threat in areas of heavy beach vehicle use comes in the form of deep tire ruts impeding chicks' ability to reach the beach for foraging or, even worse, causing chicks to become entrapped and subsequently run over by vehicles. Alternatives 2 and 3 "may affect, are not likely to adversely affect" Wilson's Plovers since both may lead to increased pedestrian use and disturbance of birds on some sections of the beach. Alternative 3's proposed south end beach shuttle service will result in an increased vehicle presence on the beach at Dungeness Beach Access with Little Greyfield and Stafford beach accesses being identified as alternate sites. Although the proposed activity consists of vehicles traversing only that amount of beach directly adjacent to the access point(s) to pick up/drop off visitors and turn around to return to the Main Road, it will increase the level of disturbance in these areas beyond what is currently experienced. The effect determination for Alternative 4 is "may affect, likely to adversely affect" this species' nesting success on Cumberland. Although there is currently beach driving by island residents and park personnel, the potential increase in beach vehicle traffic (maximum of 24 additional vehicles daily) associated with this alternative could have significant cumulative impact on chick survival.

Least Tern

Least tern nesting colonies are documented on Cumberland annually. Location of nesting sites for this species on Cumberland can best be described as sporadic and colony size is variable. Preferred nesting habitat exists on sandy flats located on the southern tip below the St. Marys Entrance jetty and the northern tip at Christmas Creek. There has been a colony observed at the North Cut Road beach access multiple times during the park's existence. NPS resource management staff have been successful in protecting this colony by posting bird nesting signs and roping off the area to prevent access. Alternatives 2 and 3 "may affect, are not likely to adversely affect" Least terns since the alternatives may lead to increased pedestrian use and disturbance of birds on some sections of the beach. Posting and roping off nesting areas will minimize the level of disturbance. The effect determination for Alternative 4 is "may affect, likely to adversely affect" this species nesting on Cumberland. Human activity, in the form of pedestrians or vehicles, increases nesting adult vigilance behavior; decreases time spent by nesting adults incubating; decreases the amount of foraging time by chicks; increases the amount of energy expended by chicks trying to escape; and poses direct threats to chicks by

potential vehicle collisions. An additional threat in areas of heavy beach vehicle use comes in the form of deep tire ruts impeding chicks' ability to reach the beach for foraging or causing chicks to become entrapped and subsequently run over by vehicles.

American Oystercatcher

American Oystercatchers are observed on Cumberland throughout the year. Detailed observations during a graduate research project in 2003 and 2004 documented 11 and 10 breeding pairs respectively using the island's beach. No detailed data on breeding pair numbers have been recorded since this study, but park resource managers routinely search for nests and post active sites to prevent human intrusion. Sabine (2005), studying oystercatcher nesting success on Cumberland, found pedestrian activity during incubation reduced the amount of time devoted to reproductive behavior. This same study showed vehicular activity decreased foraging behavior during brood rearing. McGowan (2004), studying oystercatcher nesting on Cape Lookout National Seashore, documented 24% of trips away from nests were associated with ATV's, 17% with vehicles, and 3% with pedestrians. A separate study in 2005 and 2006 found that vehicles accounted for 8% of pre-fledging chick mortality in coastal North Carolina. Cape Hatteras data from 1999 to 2006 shows 27% oystercatcher chick survival (n = 116) on beaches partially closed to humans versus 48% survival (n = 122) on full beach closure areas (USGS, 2006). Alternatives 2 and 3 "may affect, are not likely to adversely affect" this species since the alternatives may lead to increased pedestrian use and disturbance of birds on some sections of the beach. Alternative 3's proposed south end beach shuttle service will result in an increased vehicle presence on the beach at Dungeness Beach Access with Little Greyfield and Stafford beach accesses being identified as alternate sites. Although the proposed activity consists of vehicles traversing only that amount of beach directly adjacent to the access point(s) to pick up/drop off visitors and turn around to return to the Main Road, it will increase the level of disturbance in these areas beyond what is currently experienced. The effect determination for Alternative 4 is "may affect, likely to adversely affect" American oystercatchers nesting on Cumberland. While there are current effects from beach driving and pedestrians on Cumberland, the potential maximum number of vehicles (24) that may be added daily to the beach environment as a result of Alternative 4 combined with the potential increase in pedestrian activity in areas currently having minimal human presence will likely adversely affect oystercatchers to a greater extent. Furthermore, an increase in vehicle activity on the beach increases the risk of chick mortality from collisions.

Black Skimmer

Black skimmers are observed on Cumberland throughout the year. While no skimmer nests have been documented on the island, there is suitable nesting habitat located all along the Georgia coast. Skimmers are routinely observed on the south beach area below the St. Marys Entrance jetty. It is common to see over 100 birds daily in this area during winter months (D. Hoffman, pers. obs.). While skimmers are observed feeding along the Cumberland beach, they typically do not rest on the beach except on the northern or southern tips of the island. Alternatives 2 and 3 "may affect, are not likely to adversely

affect” this species since both may lead to increased pedestrian use on the beach, but this use will have a negligible impact on foraging skimmers. The effect determination for Alternative 4 is “may affect, not likely to adversely affect” Black Skimmers on Cumberland. Beach driving tours under Alternative 4 would not traverse the northern or southern regions where skimmers are known to loaf and feed. Vehicle traffic is not expected to effect feeding skimmers along the remaining portion of the island’s beach.

Red Knot

Red knots are seen annually during winter months on Cumberland. Flocks of knots feed along the entire stretch of beach. Abundance and location are believed to be related to the presence of dwarf surf clams and coquinas, a preferred food source along the Georgia coast. Feeding behavior can best be described as sporadic since birds are not normally observed feeding in the same area consistently. Preferred resting areas are the south beach below the St. Marys Entrance jetty and the northern tip of the island beach at Christmas Creek. Alternatives 2 and 3 “may affect, are not likely to adversely affect” red knots since the potential increase in the numbers of pedestrians using some sections of the beach may temporarily disrupt feeding groups of knots. Alternative 3’s proposed south end beach shuttle service will result in an increased vehicle presence on the beach at Dungeness Beach Access with Little Greyfield and Stafford beach accesses being identified as alternate sites. Although the proposed activity consists of vehicles traversing only that amount of beach directly adjacent to the access point(s) to pick up/drop off visitors and turn around to return to the Main Road, it will increase the level of disturbance in these areas beyond what is currently experienced. Similarly, the effect determination for Alternative 4 is “may affect, not likely to adversely affect.” Beach driving tours may temporarily disrupt feeding groups of knots, but are not expected to displace this species from the island.

Gopher Tortoise

The known range of the gopher tortoise population on Cumberland extends from Stafford field southward to the Greyfield Inn property. Habitat types in this range include open field, open lawns associated with residential buildings, oak-pine forest, oak-palmetto forest, and a 50+ acre pine plantation. The Main Road bisects this area. Gopher tortoise movement patterns can be categorized as 1) daily feeding area or activity range, typically restricted to about 30m around the burrow being used; and 2) an annual range, including searches for mates, better food resources, winter burrows, etc. One study of a southwest Georgia population documented movement of up to 200 meters between summer and winter burrows (Landers, 1981). Based on these factors, it is likely that tortoises cross the Main Road on a regular basis. Park personnel have observed tortoises on the Main Road in the past (J. Fry, pers. comm.).

Several studies throughout the tortoise’ range have identified vehicle collisions as valid sources of mortality. One study cited vehicular traffic as the greatest mortality factor in their rural GA site (McRae et al., 1999). Implementation of Alternatives 2, 3, or 4 of the Transportation Management Plan EA would increase traffic along the Main Road by up

to 24 additional tour vehicles daily. Round trips involved in tours would project a maximum of 48 trips along the road in addition to the current level of traffic from Park personnel and private residents. This would significantly increase the risk of vehicle strikes to tortoises and other wildlife. The determination of “may affect, likely to adversely affect” is given to Alternatives 2, 3, and 4 of this EA relative to potential effects on gopher tortoises.

MITIGATION/CONSERVATION MEASURES

The following mitigation measures should be considered when NPS implements Alternative 3, the preferred alternative for this EA. These measures would reduce or eliminate the potential for adverse impacts on multiple species.

- Manage visitor activity adjacent to the Plum Orchard Mansion pond to prevent disturbance of wood storks and other wading birds based on Ogden’s (1999) recommended 500 to 1,000-foot buffer distances. Ideally, the number of visitors directly adjacent to the pond should be kept minimal. If necessary, fencing could be designed to complement the historical time period associated with the mansion and blend with the cultural landscape. If fencing is not feasible, then a screen/barrier using natural vegetation should be developed to prevent access to the pond.
- NPS resource management staff will monitor the two known bald eagle nest locations annually to determine if eagles are present. If visitor use patterns of these areas change significantly as a result of the Preferred Alternative the following actions should be considered. 1) Allow nest sites to go unregulated if human presence is outside the 330-foot buffer recommended by the USFWS National Bald Eagle Management Guidelines (U. S. Fish and Wildlife Service, 2007) for non-motorized recreation and human entry. 2) Install signs posting a no entrance zone if NPS determines substantial visitor activity is present in these areas. A 330-foot buffer would be used as recommended by the USFWS National Bald Eagle Management Guidelines for non-motorized recreation and human entry. Resource management staff must weigh the benefits of not posting nest sites and having these areas remain relatively unknown, versus the potential for drawing more attention by posting signs that may act to advertise the presence of nests and tempt visitors to locate (and thus disturb) the site(s).
- Develop an educational program for concession staff and park interpretive staff involved in tours that focuses on T & E species identification and proper actions when species are encountered. Provide refresher training for staff on a regular basis and ensure that new staff members receive training promptly.
- NPS resource management staff will monitor tour activities on a regular basis for compliance and potential impacts to T & E species and natural resources in general.

- Evaluate the need for a slower speed limit on the Main Road from the Greyfield Inn entrance to Stafford Mansion to reduce the potential for gopher tortoise strikes. The current island-wide speed limit is 25 mph. This may be sufficient for vehicle operators to identify tortoises and other wildlife in the road and take preventative measures before a collision occurs.
- NPS resource management staff will monitor visitor use of the beach at trail access points north of Stafford Campground. Accesses include Willow Pond Trail, Duck House Trail, South Cut Road, and North Cut Road. The beach adjacent to these access points contains valuable nesting, feeding, and loafing habitat for a variety of shorebirds, including Federal and State listed species, and should remain as undisturbed as possible.
- Prohibit north end tours from dropping off visitors at trail heads to be picked up on a later tour or running a “shuttle” service to pick up campers and hikers. This will help maintain a reduced level of disturbance on areas of the island’s interior and beach that currently have minimal human presence.
- NPS resource management staff will monitor the beach for nesting American oystercatcher pairs, Least tern colonies, and other T & E species. Informational signs and rope barriers will be used to identify nesting areas and restrict access.
- Staff involved in the annual sea turtle nest monitoring and protection project will continue to maintain records of disturbances to nest sites. A database will be developed to evaluate trends in human disturbance potentially related to implementation of the Preferred Alternative. Mitigation in the form of increased visitor education efforts and nest protection measures may be necessary to maintain a reduced pedestrian presence/disturbance around nest sites.

CONCLUSIONS

This document was prepared to evaluate potential environmental consequences of the three action alternatives considered for the “preferred alternative” for the Draft Environmental Assessment for Cumberland Island National Seashore’s North End Access and Transportation Management Plan. It is NPS policy to consider effects on both federally and state listed T & E species when preparing Biological Assessments. Based on the knowledge of species presence, distribution, biology, and available habitat on Cumberland Island, the following conclusions can be made regarding Alternatives 2, 3, and 4.

Implementation of Alternative 2, 3, or 4 would have the same level of impact on T & E species present in the interior habitats of the island. Specifically, the significant increase in visitors generated by daily tours to Plum Orchard Mansion and the north end of the island have the potential to adversely impact the wood stork roost at the mansion pond and bald eagle nesting sites in the wilderness without proper mitigation. Daily tours will

provide easier access to a portion of the island that historically has been accessed seasonally on foot by campers and hikers, significantly changing visitor use patterns of an area that is currently minimally impacted by human disturbance. An additional potential impact exists in the form of increased vehicle traffic on the Main Road creating an increased risk of vehicle strikes to gopher tortoises.

Alternatives 2 and 3 present the fewest potential adverse impacts to T & E species. Activities associated with both of these alternatives would primarily occur on the Main Road, Dungeness area, Plum Orchard Spur, and North Cut Road/Settlement area as motorized vehicles transport visitors on the island. As discussed earlier, the primary wildlife species located in the island's interior that would be affected include the wood stork roost site at Plum Orchard Mansion, two bald eagle nest sites in the Wilderness, and the gopher tortoise population. Alternatives 2 and 3 may also result in greater numbers of pedestrians on sections of the beach that historically have been accessed seasonally on foot by campers and hikers, significantly changing visitor use patterns of an area that is currently minimally impacted by human disturbance. This increase in pedestrian use on the beach has the potential to disturb listed species that use the beach for resting, foraging, or nesting. This disturbance is expected to be minimal due to the temporary nature of the pedestrian use and mobility or distribution of the species. As such, Alternatives 2 and 3 "may affect, are not likely to adversely affect" several federally listed species (piping plovers, loggerhead sea turtles, green sea turtles, and leatherback sea turtles), and several state listed species (bald eagles, peregrine falcons, gull billed terns, Wilson's plovers, least terns, American oystercatcher, black skimmers, and red knots).

Alternative 4, incorporating all aspects of Alternatives 2 and 3 plus beach driving tours, has the greatest potential to adversely impact numerous T & E species that utilize the Cumberland beach. Federal and state listed wildlife in this area include 10 bird species and three sea turtle species. Three listed bird species (Least tern, Wilson's plover, American oystercatcher) and one sea turtle species (loggerhead) are annual nesters on Cumberland. Cumberland Island National Seashore's unique and valuable qualities center on its remoteness and lack of human intrusion. Implementation of Alternative 4 would jeopardize the localized existence of numerous federally and state protected species on Cumberland Island.

The cumulative effects of beach driving as a result of additional traffic produced by Alternative 4 cannot be ruled out. Cumberland currently has 20 retained rights private residents with varying degrees of privileges, including driving on the beach. The Georgia Department of Natural Resources regulates beach driving on all coastal beaches. Records for Cumberland indicate approximately 350 beach driving permits are active currently, more than any other regulated site in the state. This number will change over time as permits expire and specific retained rights properties revert to Park Service ownership. Despite the large number of beach driving permits for this island, on average Cumberland's 17-mile beach experiences minimal human presence other than the normal daily use of the Dungeness and Sea Camp areas by day visitors and campers. Beach driving on Cumberland by residents is primarily seasonal and is associated with vacation

and recreational outings. There are a small number of year-round residents that access the beach regularly, but typically not daily. Greyfield Inn offers tours to its guests, resulting in an estimated annual average of one vehicle trip per day transporting up to twelve people. The NPS Ranger Division makes routine patrols of the beach at least once daily and the Resource Management Division may be present on the beach several days each week. Additional Resource Management activities in the form of the loggerhead sea turtle nest monitoring and protection project result in daily patrols of the beach from May 1st to October 31st annually.

There is little data available regarding vehicle beach use on Cumberland. A University of Georgia research project utilized vehicle counters placed at North Cut, Stafford, Little Greyfield, and Dungeness beach access points from June 16, 1999 to July 6, 1999 (Plauny, 1999). This data indicates number of vehicles on the beach ranged from 14 to 28 per day with an average of 19 for the study period. Based on the IDT's definition of a tour, Alternative 4 would result in a potential maximum number of 24 tour vehicles present on the beach daily as a result of the mandated "not more than 8 and not less than 5 round trips." This figure is in addition to vehicle activity already present in the form of NPS personnel and private resident use of the beach. Considering the current seasonality of beach driving, the transition to daily use of the beach by up to 24 park tour vehicles has the potential to impact not only federal and state listed species of shorebirds, but numerous unlisted bird species as well. Cumberland Island's undeveloped beach consistently harbors one of the largest populations and highest diversity of shorebirds annually along the Georgia coast. Results from mid-winter waterbird survey data from 2003 to 2008 recorded bird numbers on Cumberland's beach ranging from 3,075 to 41,919. The 2008 survey resulted in 41,919 birds counted and 40 different species of shore and wading birds identified. The lack of development and minimal human disturbance likely plays a significant role in this island's attractiveness to the diversity and number of birds noted.

Indirect effects of Alternatives 2, 3, and 4 are present in the form of a potential increase in pedestrian activity along areas of the beach that currently see negligible human presence. Current use of the beach by park visitors and campers is concentrated around a 2 mile stretch along the Dungeness and Sea Camp area. NPS campers also access the beach on a seasonal basis at Stafford campground and Duck House Trail, both located approximately center of the island. The Stafford and Duck House beach sites experience minimal human presence compared to the potential 200+ daily visitors in the Dungeness and Sea Camp area. While not specifically addressed in the EA, the potential exists for tours to drop off day-use visitors along the route to be picked up by a later tour. Again, considering the Interdisciplinary Team's definition of a tour, involving approximately 30 people per tour would constitute a potential maximum of 240 people accessing remote areas of the island and the beach daily. Any level of daily human presence in currently remote sections of beach would constitute a significant disturbance factor for wildlife nesting, feeding, or seeking refuge. Studies on human disturbance factors are well documented in the scientific literature. Sabine's (2005) graduate research project on Cumberland's American Oystercatchers found that pedestrian activity ≤ 137 meters of subjects reduced the proportion of time devoted to reproductive behavior during

incubation. A Florida study of 16 species of waterbirds concluded that a buffer distance of 100 meters should be sufficient to reduce human disturbance effects. Rodgers and Smith (1995, 1997) recommended set-back distances of 100 meters for wading bird nesting colonies and 140 meters for mixed tern-skimmer nesting colonies to adequately buffer the effects of pedestrians and motor boats.

No destruction or loss of critical habitat is anticipated as a result of Alternative 3. Determination of impacts associated with this alternative is based on both direct and cumulative effects of increased human and vehicle presence relative to current use patterns. Considering the known extent of the presence of T & E species in the proposed project area, it is feasible that implementation of the preferred alternative can be undertaken with minimal to no impact. Mitigation measures involving management of visitor use patterns, regulation of tour vehicle speeds, staff and visitor education, and direct resource protection efforts should minimize the potential for adverse impacts on the species and critical habitats discussed in this BA.

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PERSONS CONSULTED

Lisa Kruse, Ga. Dept. of Natural Resources, Nongame and Natural Heritage Section

Cindy Gregory, Ga. Dept. of Natural Resources, Coastal Resources Division, Habitat Management Program

Brad Winn, Ga. Dept. of Natural Resources, Coastal Resources Division, Nongame Conservation Section

Mark Dodd, Ga. Dept. of Natural Resources, Coastal Resources Division, Nongame Conservation Section

Adam Mackinnon, Ga. Dept. of Natural Resources, Coastal Resources Division, Nongame Conservation Section

Clay George, Ga. Dept. of Natural Resources, Coastal Resources Division, Nongame Conservation Section

Jim Ozier, Ga. Dept. of Natural Resources, Nongame and Natural Heritage Section

Kathy Chapman, U. S. Fish and Wildlife Service, Ecological Services

Sara Schweitzer, University of Georgia, Warnell School of Forestry and Natural Resources

Pauline Wentworth, National Park Service, Cumberland Island National Seashore

Dave Casey, National Park Service, Cumberland Island National Seashore

John Fry, National Park Service, Cumberland Island National Seashore

Doug Hoffman, National Park Service, Cumberland Island National Seashore

Timothy Pinion, National Park Service, Southeast Regional Office

Mike Byrne, National Park Service, Southeast Coast Inventory and Monitoring Network

Bernie Huber, National Park Service, Volunteer, Plum Orchard Mansion

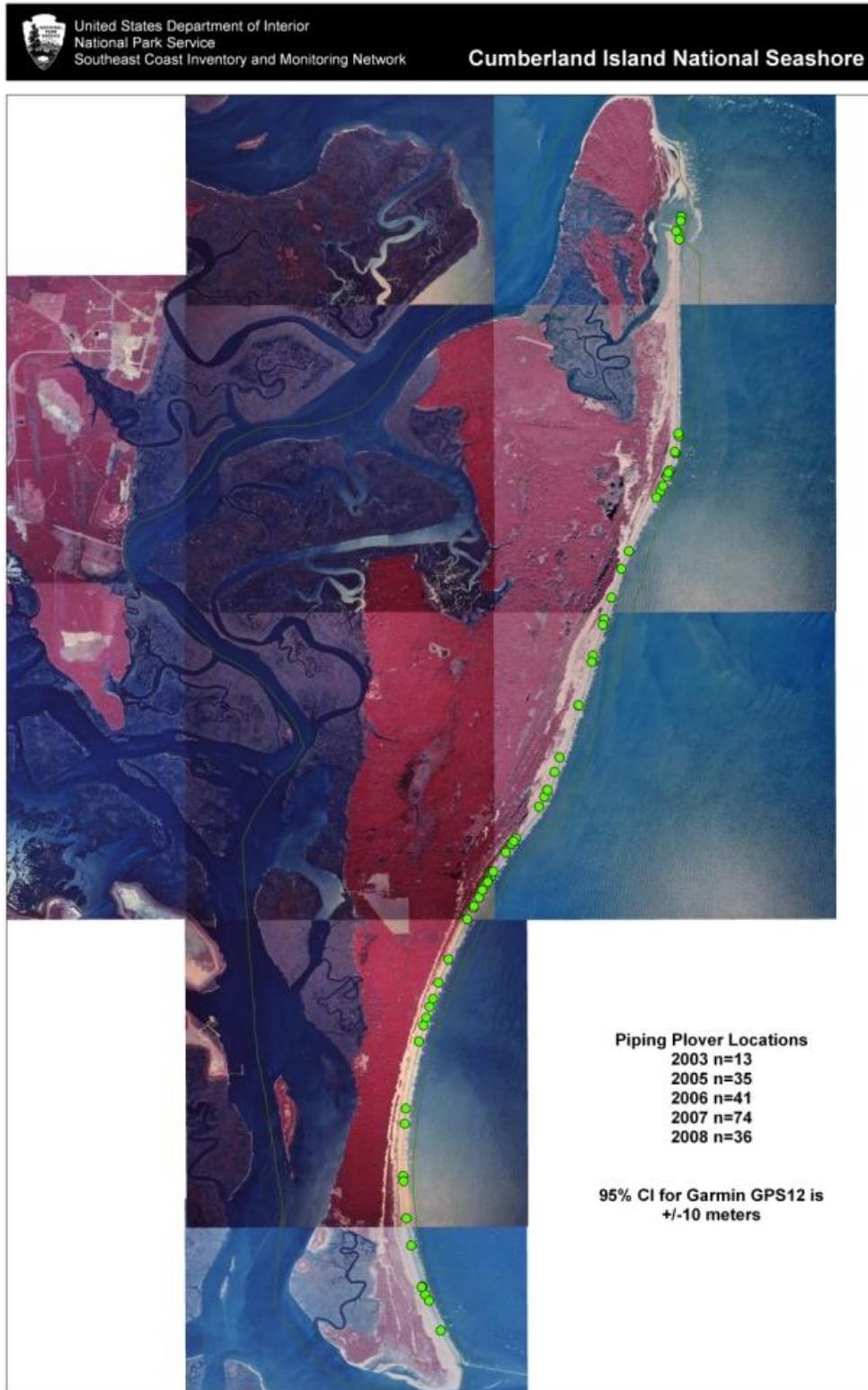
Patrick Leary, private entity conducting routine shorebird surveys on Cumberland and Amelia islands

Sheila Willis, Christmas Bird Count Coordinator, Cumberland Island/Kings Bay sites

Figure 1. Map of Cumberland Island National Seashore.



Figure 2. Location of Piping Plovers observed along the Cumberland Island beach during mid-winter waterbird surveys 2003 – 2008.



Appendix 1. Matrix summarizing effect determinations for Federal and State listed species known to occur in the Cumberland Island/Camden County, Georgia area as related to the North End Access and Transportation Management Plan Draft Environmental Assessment (EA) for Cumberland Island National Seashore.

Species	Alternative 2	Alternative 3	Alternative 4
Humpback Whale	No Effect – does not occur in project area	No Effect – does not occur in project area	No effect – does not occur in project area
Right Whale	No Effect – does not occur in project area	No Effect – does not occur in project area	No effect – does not occur in project area
Round-Tailed Muskrat	No Effect – does not occur in project area	No Effect – does not occur in project area	No effect – does not occur in project area
West Indian Manatee	No Effect – does not occur in project area	No Effect – does not occur in project area	No effect – does not occur in project area
Bachman’s Warbler	No Effect – believed to be extinct	No Effect – believed to be extinct	No effect – believed to be extinct
Bald Eagle	May Affect, Likely to Adversely Affect – potential disturbance to nesting adults from increased visitor use of Table Point and Willow Pond Trails	May Affect, Likely to Adversely Affect – potential disturbance to nesting adults from increased visitor use of Table Point and Willow Pond Trails	May Affect, Likely to Adversely Affect – potential disturbance to nesting adults from increased visitor use of Table Point and Willow Pond Trails; displacement of adult and young eagles using the beach in the Fall due to increased vehicle traffic
Peregrine Falcon	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding and resting falcons.	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding and resting falcons.	May Affect, Not Likely to Adversely Affect - beach driving tours may temporarily disrupt migrant falcons, but not expected to displace this species from the island
Gull-billed Tern	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Not Likely to Adversely Affect – although this species may frequent Cumberland on a seasonal basis, no documented sightings have occurred during annual shorebird surveys for the last 5 years
Piping Plover	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Likely to Adversely Affect – displacement of non-breeding migrants due to increased vehicle traffic on the beach
Wilson’s Plover	May Affect, Not Likely to Adversely Affect –	May Affect, Not Likely to Adversely Affect –	May Affect, Likely to Adversely Affect – impacts

	increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	on nest success from increased human presence; direct threats to chick survival from increased vehicle traffic on the beach
Least Tern	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Likely to Adversely Affect – impacts on nest success from increased human presence; direct threats to chick survival from increased vehicle traffic on the beach
American Oystercatcher	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Likely to Adversely Affect – impacts on nest success from increased human presence in the form of vehicles and pedestrians; direct threats to chick survival from increased vehicle traffic on the beach
Black Skimmer	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Not Likely to Adversely Affect – beach driving tours would not impact primary loafing and feeding sites; no effect is expected on skimmers feeding along the beach
Red Knot	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points may temporarily disrupt feeding, nesting, and resting birds.	May Affect, Not Likely to Adversely Affect – beach driving tours may temporarily disrupt feeding groups of knots, but is not expected to displace this species from the island
Red-cockaded Woodpecker	No Effect – does not occur in project area	No Effect – does not occur in project area	No Effect – does not occur in project area
Wood Stork	May Affect, Likely to Adversely Affect – increased disturbance of Plum Orchard Pond roost from tour activities	May Affect, Likely to Adversely Affect – increased disturbance of Plum Orchard Pond roost from tour activities	May Affect, Likely to Adversely Affect – increased disturbance of Plum Orchard Pond roost from tour activities
Easter Indigo Snake	No Effect – not known to occur in project area	No Effect – not known to occur in project area	No Effect – not known to occur in project area
Gopher Tortoise	May Affect, Likely to Adversely Affect – potential for incidental take of tortoises by tour vehicle collisions	May Affect, Likely to Adversely Affect – potential for incidental take of tortoises by tour vehicle collisions	May Affect, Likely to Adversely Affect – potential for incidental take of tortoises by tour vehicle collisions
Green Sea	May Affect, Not Likely	May Affect, Not Likely to	May Affect, Not Likely to

Turtle	to Adversely Affect – increased pedestrian use of beach at north end access points and resulting disturbance of beach surface may impede hatchlings’ ability to reach ocean.	Adversely Affect – increased pedestrian use of beach at north end access points and resulting disturbance of beach surface may impede hatchlings’ ability to reach ocean.	Adversely Affect – disturbance of beach surface from tour vehicles and increased pedestrian use of beach at north end access points may impede hatchlings’ ability to reach ocean.
Hawksbill Sea Turtle	No Effect – does not occur in project area	No Effect – does not occur in project area	No Effect – does not occur in project area
Kemp’s Ridley Sea Turtle	No Effect – does not occur in project area	No Effect – does not occur in project area	No Effect – does not occur in project area
Leatherback Sea Turtle	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points and resulting disturbance of beach surface may impede hatchlings’ ability to reach ocean	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points and resulting disturbance of beach surface may impede hatchlings’ ability to reach ocean	May Affect, Not Likely to Adversely Affect – disturbance of beach surface from tour vehicles and increased pedestrian use of beach at north end access points may impede hatchlings’ ability to reach ocean.
Loggerhead Sea Turtle	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points and resulting disturbance of beach surface may impede hatchlings’ ability to reach ocean	May Affect, Not Likely to Adversely Affect – increased pedestrian use of beach at north end access points and resulting disturbance of beach surface may impede hatchlings’ ability to reach ocean	May Affect, Not Likely to Adversely Affect – disturbance of beach surface from tour vehicles and increased pedestrian use of beach at north end access points may impede hatchlings’ ability to reach ocean.
Shortnose Sturgeon	No Effect – does not occur in project area	No Effect – does not occur in project area	No Effect – does not occur in project area
Climbing Buckthorn	No Effect – does not occur in project area	No Effect – does not occur in project area	No Effect – does not occur in project area
Hartwrightia	No Effect – does not occur in project area	No Effect – does not occur in project area	No Effect – does not occur in project area
Pondspice	No Effect – does not occur in project area	No Effect – does not occur in project area	No Effect – does not occur in project area
Wagner Spleenwort	No Effect – does not occur in project area	No Effect – does not occur in project area	No Effect – does not occur in project area