

state threatened least tern, the most significant natural attributes on Buck Island are its intertidal marshes and accompanying ditches. The proposed project did not anticipate any impacts to these wetlands. Should salt marsh be impacted by additional spoil disposal operations related to the harbor deepening project, the Corps would be required to mitigate for the expected loss at a 1:1 ratio, preferably within the same watershed.

The Corps proposes to expand the disposal capacity at Buck Island in order to store material dredged from river mile three through eleven. The expansion would require removal of existing spoil and raising dike heights. The National Park Service has expressed concern that waterward spoil expansion on Buck Island would eliminate a fringe of upland vegetation that provides a visual buffer between the island and the Fort Caroline Memorial (Figure 55). Increasing dike height may have the same effect. The Park Service were also concerned about the aesthetic impacts from dump trucks traveling through the Memorial to reach Buck Island and possible adverse impacts to its roadway from the additional heavy traffic.

Based on the preceding analysis, the Service does not object to using Buck Island for spoil disposal from the harbor deepening project provided the appropriate measures are taken to avoid or mitigate for any on-site wetland impacts as well as potential impacts to the aesthetics and main roadway associated with the Fort Caroline Memorial. The Corps should coordinate any potential impacts to least terns with the Florida Game and Fresh Water Fish Commission.

The federally endangered wood stork (*Mycteria americana*) may occur within the meanders of the intertidal salt marshes associated with Buck Island.

Site 68. Beaches adjacent to Mayport Naval Station and Kathryn Abbey Hanna County Park.

Since the 1993 Planning Aid Letter, beaches within this area have been renourished. The extensive dune systems it described as adjacent to the beaches pertain primarily to the County Park. Dunes on Mayport Naval Station consist of lower foredunes and back dunes. Portions of the beach and dune habitat within the County Park were disturbed as a result of the production of a commercial movie there in 1996. These areas are currently being restored. In other areas, the sea oats and escarpment described in the PAL persist (Figure 56).

Disposal of beach quality spoil in these areas is not expected to adversely impact the existing dune system and may aid in their renewal. Impacts to mammals, shorebirds, crustacea, molluscs, and other invertebrates using the upper beach and littoral zones are expected to be temporary. The Least tern, *Sterna antillarum*, is a state threatened species which nests on sand and shell beaches mostly from May through June. The Corps needs to coordinate with the Florida Game and Fresh Water Fish Commission regarding potential project impacts to this species.

Based on the preceding analysis, the Service does not object to the proposed disposal of beach quality spoil produced from the harbor deepening project on beaches south of the mouth of the

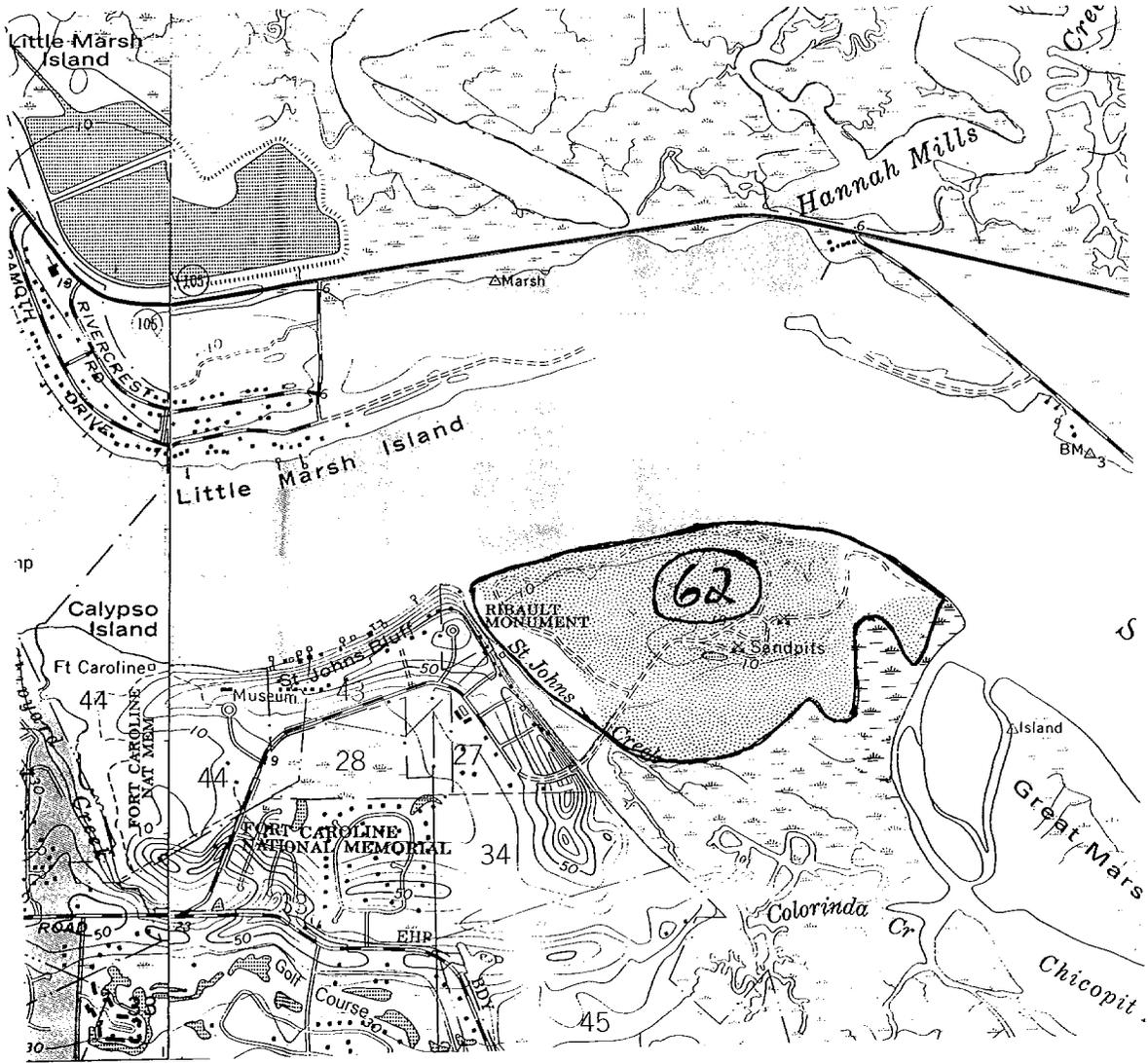


Figure 51. Site 62

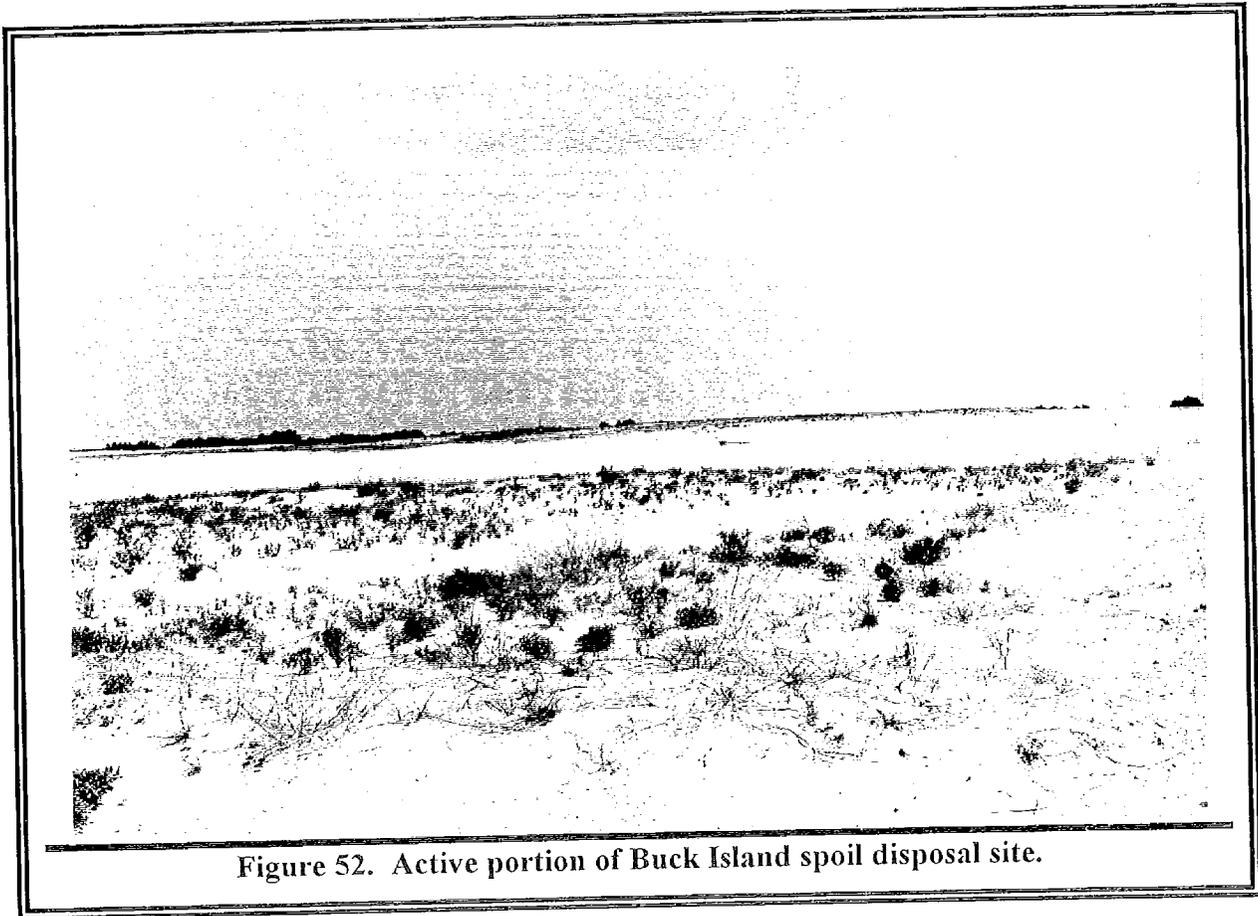


Figure 52. Active portion of Buck Island spoil disposal site.

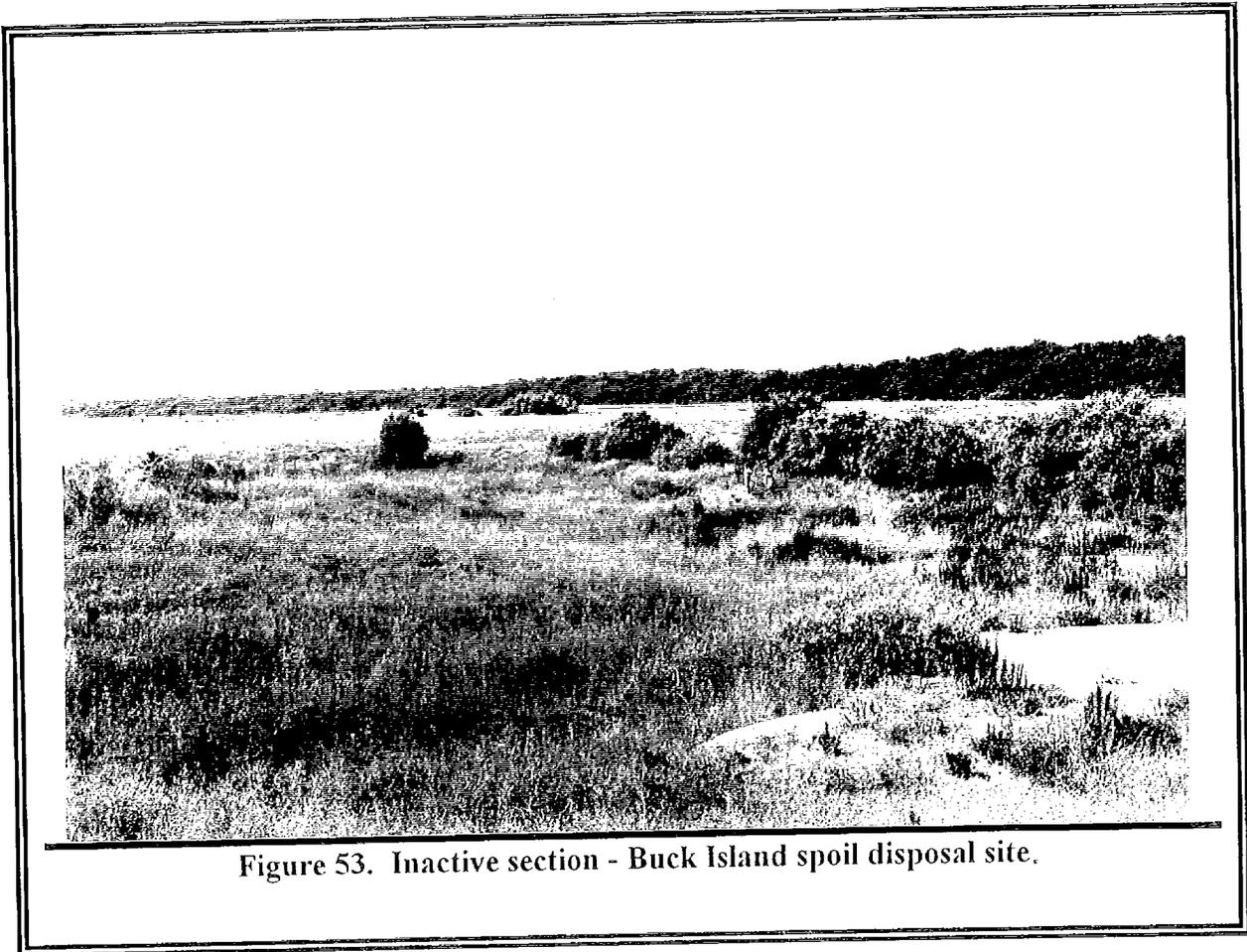


Figure 53. Inactive section - Buck Island spoil disposal site.



Figure 54. Salt marsh mitigation site adjacent to southeast corner of Buck Island.



Figure 55. Buck Island, St. Johns River, and Fort Caroline National Memorial on bluff.

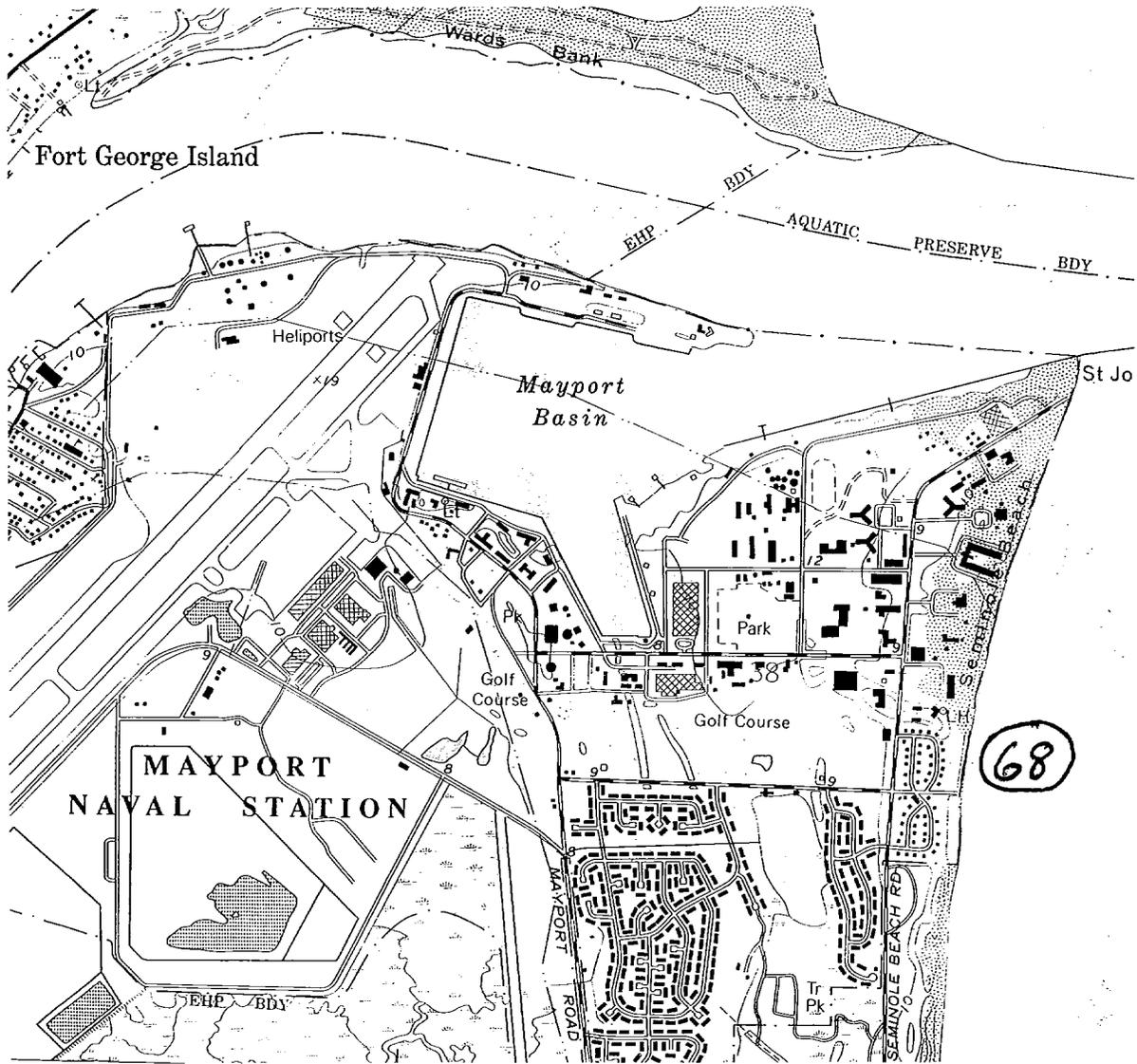


Figure 56. Site 68

St. Johns River.

Regarding federally listed species, there are no occurrence records from this area for the threatened piping plover, *Charadrius melodus*. The threatened loggerhead sea turtle, *Caretta caretta*, nests along this stretch of beach. Other sea turtles which may nest here include the green (*Chelonia mydas*) and leatherback (*Dermochelys coriacea*) sea turtles.

## 5.0

### Endangered Species Act

#### Section 7 Consultation

The Service has evaluated the proposed deepening of the main and Blount Island West ship channels within Jacksonville Harbor and disposal of the material on either one or several upland disposal sites or place the material on a reach of beach in Duval County. The following Federally listed threatened and endangered species were evaluated; manatee, wood stork, piping plover, eastern indigo snake, and loggerhead, green and leatherback sea turtles. The shortnose sturgeon has been documented to occur in the St. Johns River. The Corps should contact the National Marine Fisheries Service regarding this species.

#### Manatee

Aerial surveys of the lower St. Johns River and its tributaries within Clay, Duval, and St. Johns Counties have recorded manatees throughout the entire action area. The data indicate that manatees stay close to shore. Survey sightings also reveal a proportionally greater and denser distribution of animals south of the action area between the Fuller-Warren Bridge and Julington Creek. These observations appear related to the density and distribution of submerged aquatic vegetation, such as *Vallisneria americana*, *Ruppia maritima*, *Potamogeton pectinatus*, and *Ceratophyllum demersum*, which occur in shallow water. Emergent aquatics, such as smooth cordgrass (*Spartina alterniflora*) and black needlerush (*Juncus roemerianus*) predominate within the action area. Although sightings occur year round, they increase as ambient water temperatures exceed 70 degrees F and peak following the peak birth period in April through May.

Manatees are attracted to freshwater discharges as well as warm water outfalls during colder weather. Operations discharging warm water within the action area include the St. Johns River Power Park, Northside, and J. Dillon Kennedy Generating Stations, and Seminole Kraft and Jefferson Smurfit Containerboard Corporation paper mills. With the exception of some manatee use of occasional warm water effluent produced by the Kennedy Generating Station, operational reductions and outfall modifications at the other sites have virtually eliminated their attractiveness to manatees (J. Valade, U.S. Fish and Wildlife Service, pers. comm., 1997). Relatively few manatees therefore are likely to remain in the action area from late November through February.

Regional colony surveys conducted from 1991-1995 did not identify any rookeries within the action area. Breeding storks in south Florida may travel 60 miles to forage while 80% of the feeding sites for a colony in Jenkins County, Georgia were within 12 miles of the colony. In general, nesting storks use foraging sites that are within a 31-mile flight range of the colony. There are three active wood stork colonies within 31 miles of the action area. Post-breeding dispersing birds may also use the narrow tidal creeks and pools, drainage ditches, impoundments, and shallow freshwater ponds that occur within the action area.

Based on the Service's evaluation of this species, we believe the use of any of the proposed disposal sites is not likely to adversely affect the wood stork.

### Eastern Indigo Snake

There is a museum record of this species occurring in southeast Duval County. The sites within the action area north of the St. Johns River and proposed for spoil disposal generally consist of various upland habitats with some wetlands. Some of these sites are contiguous with each other or other undeveloped land. The sum of acreages, mosaic of habitats, and presence of the gopher tortoise in most sites suggests that the action area may support eastern indigo snakes; however, the likelihood of finding an eastern indigo snake is extremely remote. The Service, therefore, believes the use of any of the disposal sites is not likely to adversely affect this species.

Although this does not represent a Biological Opinion as described in Section 7 of the Act, it does fulfill the requirements of the Act and no further action is required. If modifications are made in the project or additional information becomes available on listed species, reinitiation of consultation may be required.

## Biological Opinion

### Loggerhead, Green and Leatherback Sea Turtles

#### Description of the Proposed Action

Refer to Section 3.0 of this report.

#### Status of the Species

The U.S. Fish and Wildlife Service has responsibility for regulating sea turtles when they come ashore to nest. The National Marine Fisheries Service has jurisdiction over sea turtles in the marine environment. For at least two decades, several factors appear to have contributed unevenly but increasingly to the decline of sea turtle populations along the Atlantic coast and in the Gulf of Mexico (National Research Council 1990a). These factors include commercial overutilization of eggs and turtles, incidental catches in commercial fishing operations, increased natural predation on eggs and hatchlings, degradation of nesting habitat by coastal development, and marine pollution and debris.

The reproductive strategy of sea turtles involves producing large numbers of offspring to compensate for the high natural mortality through their first several years of life. However, human perturbations have drastically reduced sea turtle populations from unnatural causes of mortality. Therefore, activities that affect the behavior and/or survivability of turtles on their remaining nesting beaches, particularly the few remaining high density nesting beaches, could have serious ramifications for the continued existence of U.S. populations.

### Loggerhead Sea Turtle

The loggerhead sea turtle which was listed as a threatened species on July 28, 1978; nests from Louisiana to Virginia with limited nesting known from Puerto Rico. Within the United States, major nesting concentrations of loggerhead sea turtles are found on the coastal islands of North Carolina, South Carolina, and Georgia and on the Atlantic and Gulf coasts of Florida (Hopkins and Richardson 1984). Total estimated nesting in the Southeast is approximately 50,000 to 70,000 nests per year (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b).

The nesting and hatching season for north Florida Atlantic beaches is April 15 through November 30. Incubation ranges from 50 to 70 days.

### Green Sea Turtle

The green sea turtle was listed on July 28, 1978 (endangered for breeding populations in Florida and along the Pacific coast of Mexico and threatened elsewhere). Within the U.S., green turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida, particularly in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a). Nesting also has been documented along the Gulf coast of Florida on Santa Rosa Island (Okaloosa and Escambia Counties) and from Pinellas County through Collier County (A. Meylan, Florida Department of Environmental Protection, in litt., October 17, 1994). Green turtles have been known to nest in Georgia, but only on rare occasions (Georgia Department of Natural Resources, unpubl. data). The green turtle also nests sporadically in North Carolina, where nesting has been reported on Masonboro Island (D. Webster, University of North Carolina, pers. comm., 1993) and Onslow Beach, Camp Lejeune (R. Warren, Camp Lejeune Marine Corps Base, in litt., July 20, 1995). The nesting and hatching season northern Florida Atlantic beaches is May 15 through November 15. Incubation ranges from 45 to 60 days.

### Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*), listed as an endangered species on June 2, 1970, regularly nests in Puerto Rico, the U.S. Virgin Islands, and along the Atlantic coast of Florida as far north as Georgia. The U.S. Caribbean (Puerto Rico and the U.S. Virgin

Concentrated freshwater sources associated with the action area include the upstream portions of tributaries and discharges from wastewater treatment plants and stormwater outfalls. As of 1995, there were roughly 200 permitted wastewater discharges in Duval County, most of which release into various tributaries in Jacksonville. There are also a number of storm water outfalls in the action area which discharge directly into the St. Johns River.

Between 1974 and 1996, 207 manatees died in Duval County. Approximately 34 per cent (70) of these were watercraft related, 27 per cent (56) were due to natural causes, and the cause of death for 32 per cent (67) could not be determined. During this same period, there were 114 manatee deaths within the action area. Of these, about 43 per cent (49) were watercraft related, 18 per cent (21) were due to natural causes, and 30 per cent (34) were undetermined. In both data sets, other human causes accounted for an additional 4 per cent mortality (Florida Department of Environmental Protection, unpubl. data).

The Service has evaluated the proposed project on the manatee, and determined that the dredging and disposal of the material either on one or several upland islands or the beach is not likely to adversely affect this species. We do recommend that the Corps include the manatee construction precautions in the contract, and that the work should be scheduled for the winter months. The Corps was not certain that blasting may be required; therefore, this consultation did not consider blasting as part of the project. If in the future the Corps decides that blasting is required, we recommend that the Corps reinitiate section 7 consultation.

#### Piping Plover

The International Piping Plover Censuses conducted in 1991 and 1996 revealed that Duval County supported the second highest number of wintering plovers on the east coast of Florida. Censuses observed nine and eight birds in 1991 and eight and two birds in 1996 at Little Talbot Island and Wards Bank, respectively. No additional birds were sighted at other survey locations. Little Talbot Island is a state-owned coastal barrier island located approximately one mile north of the mouth of the St. Johns River and outside of the action area. Wards Bank is located on the northern shore of the mouth of the St. Johns River west of the north jetty. It lies within the action area and is part of Huguenot Memorial County Park. It is also within the boundaries of the Timucuan National Ecological and Historical Preserve, Nassau River-St. Johns River Marshes State Aquatic Preserve, and the Talbot Island Complex (P02 Unit) of the National Coastal Barrier Resources System.

Based on the Service's evaluation of this species and the location of the proposed disposal sites, we believe the proposed action is not likely to adversely affect this species.

#### Wood Stork

Islands) may support nesting by 150 to 200 adult females per year, representing the most significant nesting activity of this species in the United States. In the U.S. Virgin Islands, nesting has been reported on the islands of St. Croix, St. Thomas, and St. John. In Puerto Rico, leatherbacks nest on the islands of Culebra, Vieques, and Mona. On the main island of Puerto Rico, leatherbacks nest on beaches all around the island. Leatherback nesting in Florida was once considered rare, but today the species is known to nest regularly on the south Atlantic coast of Florida (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992)., with more sparse nesting along the north Atlantic coast of Florida. Rare leatherback nesting also has been reported on the west coast of Florida. In 1974, a nest was reported on St. Vincent National Wildlife Refuge (LeBuff 1976); a false crawl (non-nesting emergence) was observed on Sanibel in July 1988 (LeBuff 1990); and four nests were laid on St. George Island in 1995 (T. Lewis, St. Vincent National Wildlife Refuge, pers. comm. 1995). Leatherback turtles have been known to nest in Georgia, but only on rare occasions (Georgia Department of Natural Resources, unpubl. data).

The nesting and hatching season for this species extends from April 15 through September 30. Incubation ranges from about 55 to 75 days.

#### Environmental baseline

##### Action Area

The action area, as defined for this opinion, is that reach of beach from Mayport Naval Station south to the south end of Hanna County Park, approximately 5.8 miles.

##### Status of the Species Within the Action Area

Within the action area, there have been no green or leatherback turtle nests. With reference to loggerhead turtles, in 1993, 2 nests were recorded, 1994, 15, 1995, 3, 1996, no data available, and for 1997 through July 22, 3.

##### Effect of the Action on the Listed Species

Although beach nourishment may increase the potential nesting area, there are significant negative impacts to sea turtles that may result if protective measures are not incorporated during consultation. Nourishment during the nesting season, particularly on or near high density nesting beaches, can cause increased loss of offspring from unnatural mortality and, along with other mortality sources, may significantly impact the long-term survival of the species. For instance, projects conducted during the nesting and hatching season could result in the loss of sea turtles through disruption of adult nesting activity and by burial or crushing of nests or hatchlings. While a nest monitoring and egg relocation program would reduce these impacts, nests may be inadvertently missed or misidentified as false crawls during daily patrols. In addition, nests may be destroyed by operations at night prior to beach patrols being performed. Even under the best of conditions, about 7 percent of the nests can be missed (Schroeder 1994).

Besides the potential for missing nests during a nest relocation program, there is a potential for eggs to be damaged by their movement or for unknown biological mechanisms to be affected. Nest relocation can have adverse impacts on incubation temperature (and hence sex ratios), gas exchange parameters, hydric environment of nests, hatching success, and hatchling emergence (Limpus *et al.* 1979, Ackerman 1980, Parmenter 1980, Mortimer 1982, Nelson and Dickerson 1989). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. In a study of hatching and emergence success of *in situ* and relocated nests at seven sites in Florida, hatching success was lower for relocated nests in five of seven cases by an average of 5.01 percent, and emergence success was lower for relocated nests in all seven cases by an average of 11.67 percent (Florida Marine Research Institute unpubl. data). Finally, relocating nests may concentrate eggs in an area resulting in a greater susceptibility to catastrophic events. Hatchlings released from concentrated areas may be subject to greater predation rates from both land and marine predators.

The placement of pipelines and the use of heavy machinery on the beach during a construction project may also have adverse effects on sea turtles. Even in a construction area that has been completely eroded and is devoid of dry sand, once sand is placed on the beach, turtles will attempt to use it. As a result, pipelines and heavy machinery can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls and unnecessary energy expenditure.

If the sand placed on the beach is different than the existing sand on the beach, there could be adverse impacts on nest site selection, clutch viability, and emergence by hatchlings (Nelson 1988). This impact can be minimized by making sure the nourishment sand matches the existing sand in grain size, shape, structure, moisture content, temperature, color, and density.

Beach compaction and unnatural beach profiles may result from beach nourishment activities and negatively impact sea turtles regardless of the timing of projects. Very fine sand and/or the use of heavy machinery can cause sand compaction on nourished beaches (Nelson *et al.* 1987, Nelson and Dickerson 1988a). Significant reductions in nesting success have been documented on severely compacted nourished beaches (Fletemeyer 1980, Raymond 1984, Nelson and Dickerson 1987, Nelson *et al.* 1987). Sand compaction may increase the length of time required for female sea turtles to excavate nests and thus cause increased physiological stress to the animals (Nelson and Dickerson 1988c).

On hard, nourished beaches, false crawls may occur more frequently than on natural beaches (Nelson *et al.* 1987), also resulting in increased physiological stress to nesting females. These impacts can be minimized by using suitable sand and by tilling the beach after nourishment if the sand becomes compacted. Nelson and Dickerson (1988b) concluded that, in general, beaches nourished from offshore borrow sites are harder than natural beaches, and while some may soften over time through erosion and accretion of sand, others may remain hard for 10 years or more.

On nourished beaches, steep escarpments may develop along their water line interface as they adjust from an unnatural construction profile to a more natural beach profile (Coastal Engineering Research Center 1984, Nelson *et al.* 1987). These escarpments can hamper or prevent access to nesting sites. Researchers have shown that female turtles coming ashore to nest can be discouraged by the formation of an escarpment, leading to situations where they choose marginal or unsuitable nesting areas to deposit eggs (e.g., in front of the escarpments which often results in failure of nests due to tidal inundation). This impact can be minimized by leveling the beach prior to the nesting season.

Another impact to sea turtles is disorientation (loss of bearings) and misorientation (incorrect orientation) of hatchlings from artificial lighting. Visual cues are the primary sea-finding mechanism for hatchlings (Carr and Ogren 1960, Ehrenfeld and Carr 1967, Mrosovsky and Carr 1967, Mrosovsky and Shettleworth 1968, Dickerson and Nelson 1989, Witherington and Bjorndal 1991). Artificial beachfront lighting from buildings and street lights is a well documented cause of hatchling disorientation and misorientation on nesting beaches (Philbosian 1976; Mann 1977; Florida Department of Environmental Protection, unpubl. data). In addition, research has also documented significant reduction in sea turtle nesting activity on beaches illuminated with artificial lights (Witherington 1992).

Construction lights along a project beach and on the dredging vessel may deter females from coming ashore to nest, disorient females trying to return to the surf after a nesting event, interrupt loggerhead and green sea turtle mating since those species copulate in nearshore areas, and disorient and misorient emergent hatchlings from adjacent non-project beaches. Any source of bright lighting can profoundly affect the orientation of hatchlings, both during the crawl from the beach to the ocean and once they begin swimming offshore. Hatchlings attracted to light sources on dredging barges may not only suffer from interference in migration, but may also experience higher probabilities of predation to predatory fishes that are also attracted to the barge lights. This impact could be reduced by using the minimum amount of light necessary (may require shielding) or low pressure sodium lighting during project construction.

This project will create or improve sea turtle nesting habitat, thereby attracting turtles into new areas where they may be impacted by existing artificial lighting. The project may also make the area more attractive to new development, thereby increasing the lighting problem. Impacts from lighting can be reduced by continued implementation and enforcement of the Brevard County (or nearby municipality) beach lighting ordinance during the nesting and hatching season each year.

Future erosion of nesting beaches is a potential indirect effect of nourishment projects on sea turtles. Dredging of sand offshore from a project area has the potential to cause erosion of the newly created beach or other areas on the same or adjacent beaches, which also serve as sea turtle nesting beaches, by creating a sand sink. The remainder of the system responds to this sand sink by providing sand from the beach to attempt to reestablish equilibrium (National Research Council 1990b).

## Cumulative Effects

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The Service has considered cumulative effects and determined they do not apply to this project.

### Conclusion

After reviewing the current status of the green, loggerhead and leatherback turtles, the environmental baseline for the action area, the effects of the proposed beach nourishment, and the cumulative effects, it is the Service's biological opinion that beach nourishment, as proposed, is not likely to jeopardize the continued existence of the loggerhead, leatherback, and green sea turtles. No critical habitat has been designated for these species; therefore, none will be affected. The Corps anticipates the work to begin in and it is possible that the contractor will have to work into the nesting season.

## INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

### Amount or extent of incidental take

The Service has reviewed the biological information and other information relevant to this action. Based on our review, incidental take is anticipated for all sea turtle nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the proposed project.

### Effect of the take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

### Reasonable and prudent measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the loggerhead, green, and leatherback sea turtles.

1. Only beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence shall be used on the project site.
2. If the beach nourishment project will be conducted during the sea turtle nesting season, surveys for nesting sea turtles shall be conducted within the project area, and eggs from all nests laid within the project area shall be relocated.
3. Immediately after completion of the beach nourishment project and prior to the onset of the nesting season for 3 subsequent years, beach compaction shall be monitored, and tilling shall be conducted as required to reduce the likelihood of impacting sea turtle nesting and hatching activities.
4. Immediately after completion of the beach nourishment project and prior to the onset of the nesting season for 3 subsequent years, monitoring shall be conducted to determine if escarpments are present, and escarpments shall be leveled as required to reduce the likelihood of impacting sea turtle nesting and hatching activities.
5. The applicant shall ensure that contractors doing the beach nourishment work fully understand the sea turtle protection measures detailed in this biological opinion.
6. During the sea turtle nesting season, no construction equipment shall be parked on the beach where it could hinder sea turtle nesting activities or hatching activities of relocated nests, and all construction pipes shall be located to minimize impacts to nesting sea turtles.

7. During the sea turtle nesting season, lighting associated with the project shall be minimized to reduce the possibility of disrupting and disorienting nesting and/or hatchling sea turtles.

### Terms and conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. All fill material placed shall be sand that is similar to that already existing on the site in both coloration and grain size. All such fill material shall be free of construction debris, rocks, clay, or other foreign matter and shall, in general, not contain greater than 5 percent fines (passing the #200 sieve) and be free of coarse gravel or cobbles.

2. A sea turtle nesting survey and conservation program is required if any portion of the beach nourishment activities occurs between April 15 through September 30. Nesting surveys shall begin 65 days prior to nourishment activities or by April 15, whichever is later. Nesting surveys shall continue through the end of the project or through September 30, whichever is earlier. Nests that may be affected by construction activities shall be relocated per the following requirements.

2a Nest surveys and egg relocations shall only be conducted by personnel with prior experience and training in nest survey and egg relocation procedures. Surveyors shall have a valid Florida Department of Environmental Protection permit. Nest surveys shall be conducted daily between sunrise and 9 a.m. These surveys shall be performed in such a manner so as to ensure that daily movement of the construction activity does not extend into any unsurveyed area.

2b. Only those nests that may be affected by construction activities are required to be relocated. Any nests requiring relocation shall be moved between sunrise and 10 a.m. each day to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Nest relocations in association with construction activities shall not be performed if construction activities are not anticipated to be initiated within 65 days of the date of a nesting event. Nest relocations in association with construction activities shall cease when construction activities no longer threaten nests.

3. Immediately after completion of the beach nourishment project and prior to April 15 of the next three nesting seasons, beach compaction shall be monitored in the area of restoration in accordance with a protocol agreed to by the Service, the State regulatory agency, and the applicant. At a minimum, the protocol provided under 3a and 3b below shall be followed. If required, the area shall be tilled to a depth of 36 inches.

All tilling activity must be completed prior to April 15. If the project is completed during the nesting season, tilling shall not be performed in areas where nests have been left in place or relocated. A report on the results of compaction monitoring shall be submitted to the Service prior to any tilling actions being taken. An annual summary of compaction and the actions taken shall be submitted to the Service. This condition shall be evaluated annually and may be modified if necessary to address sand compaction problems identified during the previous year.

3a. Compaction sampling stations shall be located at 500-foot intervals along the project area. One station shall be at the seaward edge of the dune/bulkhead line (when material is placed in this area); one station shall be midway between the dune line and the high water line (normal wrack line); and one station shall be located just landward of the high water line.

At each station, the cone penetrometer shall be pushed to a depth of 6, 12, and 18 inches three times (three replicates). Material may be removed from the hole if necessary to ensure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lay over less compact layers. Replicates shall be located as close to each other as possible, without interacting with the previous hole and/or disturbed sediments. The three replicate compaction values for each depth are then averaged to produce final values for each depth at each station. Reports shall include all 27 values for each transect line, and the final 9 averaged compaction values.

3b. If the average value for any depth exceeds 500 psi for any two or more adjacent stations, then that area shall be tilled immediately prior to the sea turtle nesting season. If values exceeding 500 psi are distributed throughout the project area but in no case do those values exist at two adjacent stations at the same depth, then consultation with the Fish and Wildlife Service shall be required to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling shall not be required.

4. Visual surveys for escarpments along the project area shall be made immediately after completion of the beach nourishment project and prior to April 15 of the 3 years following completion of the project. Results of the surveys shall be submitted to the Service prior to any action being taken. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet shall be mechanically leveled to the natural beach contour by April 15. If the project is completed during the main part of the nesting season (May 1 through October 31), escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. An annual summary of escarpment surveys and actions taken shall be submitted to the Service.

5. The applicant shall arrange a meeting between representatives of the contractor, the Service, the Florida Department of Environmental Protection and the permitted person responsible for egg relocation at least 30 days prior to the commencement of work on this project. At least 10 days advance notice shall be provided prior to conducting this meeting. This will provide an opportunity for explanation and/or clarification of the sea turtle protection measures.

6. From April 15 through November 30, no construction equipment shall be parked on the beach where it could hinder sea turtle nesting and hatching activities. In addition, all construction pipes that are placed on the beach shall be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system. Temporary storage of pipes shall be off of the beach to the maximum extent possible. Temporary storage of pipes on the beach shall be in such a manner so as to impact the least amount of nesting habitat and shall likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline is recommended as the method of storage).

7. From April 15 through November 30, all lighting associated with the project shall be limited to the immediate area of active construction only. Such lighting shall be the minimal lighting necessary to comply with U.S. Coast Guard and OSHA requirements and shall incorporate reduced wattage, downlights, special fixtures, and/or screens to minimize illumination of the nesting beach and nearshore waters. Lighting on offshore equipment shall be similarly minimized. Shielded low pressure sodium vapor lights are required for on-beach construction site illumination and recommended for all other lighting applications that cannot be eliminated.

8. A report describing the actions taken to implement the terms and conditions of this biological opinion shall be submitted to the Jacksonville Field Office within 60 days of completion of the proposed work for each year when the activity has occurred. This report will include the dates of actual construction activities, names and qualifications of personnel involved in nest surveys and relocation activities, descriptions and locations of hatcheries, nest survey and relocation results, and hatching success of nests.

9. In the event a sea turtle nest is excavated during construction activities, the permitted person responsible for egg relocation for the project should be notified so the eggs can be moved to a suitable relocation site.

10. Upon locating a dead, injured, or sick endangered or threatened sea turtle specimen, initial notification must be made to the nearest Fish and Wildlife Service Law Enforcement Office, 904-232-2580. Care should be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological materials in the best possible state for later analysis of

cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

11. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. With implementation of these measures, the Service believes that no more than those sea turtle nests and eggs that may be missed by a nest survey and egg relocation program will be incidentally taken. If, during the course of the action, this minimized level of incidental take is exceeded, such incidental take represents new information requiring review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

### **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Construction activities for this project and similar future projects should be planned to take place outside the main part of the sea turtle nesting and hatching season.
2. Appropriate native salt-resistant dune vegetation should be established on the restored dunes. The Florida Department of Environmental Protection, Division of Beaches and Shores, can provide technical assistance on the specifications for design and implementation.
3. Surveys for nesting success of sea turtles should be continued for a minimum of 3 years following beach nourishment to determine whether sea turtle nesting success has been adversely impacted.
4. Educational signs should be placed where appropriate at beach access points explaining the importance of the area to sea turtles and/or the life history of sea turtle species that nest in the area.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

This concludes formal consultation on the action(s) outlined in the . As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

## LITERATURE CITED

- Bowen, B., J.C. Avise, J.I. Richardson, A.B. Meylan, D. Margaritoulis, and S.R. Hopkins-Murphy. 1993. Population structure of loggerhead turtles (*Caretta caretta*) in the northwestern Atlantic Ocean and Mediterranean Sea. *Conservation Biology* 7(4):834-844.
- Carr, A.F. and L.H. Ogren. 1960. The ecology and migrations of sea turtles. The green turtle in the Caribbean Sea. *Bulletin of the American Museum of Natural History* 121:1-48.
- Coastal Engineering Research Center. 1984. Shore Protection Manual, Volumes I and II. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.
- Dickerson, D.D. and D.A. Nelson. 1989. Recent results on hatchling orientation responses to light wavelengths and intensities. Pages 41-43 in Eckert, S.A., K.L. Eckert, and T.H. Richardson (compilers). *Proceedings of the 9th Annual Workshop on Sea Turtle Conservation and Biology*. NOAA Technical Memorandum NMFS-SEFC-232.
- Dickerson, D.D. and D.A. Nelson. 1989. Effects of beach nourishment on sea turtles. Pages 125-127 in Eckert, S.A., K.L. Eckert, and T.H. Richardson (compilers). *Proceedings of the 9th Annual Workshop on Sea Turtle Conservation and Biology*. NOAA Technical Memorandum NMFS-SEFC-232.
- Dodd, C.K., Jr. and R. Byles. 1991. The status of the loggerhead, *Caretta caretta*; Kemp's ridley, *Lepidochelys kempii*; and green, *Chelonia mydas*, sea turtles in U.S. waters: a reconsideration. *Marine Fisheries Review* 53(3):30-31.
- Ehrenfeld, D.W. and A. Carr. 1967. The role of vision in the sea-finding orientation of the green turtle (*Chelonia mydas*). *Animal Behavior* 15:25-36.
- Ehrhart, L.M. 1989. A status review of the loggerhead turtle, *Caretta caretta*, in the western Atlantic. Pages 122-139 in Ogren, L., F. Berry, K. Bjorndal, H. Kumpf, R. Mast, G. Medina, H. Reichart, and R. Witham (eds.). *Proceedings of the 2nd Western Atlantic Turtle Symposium*. NOAA Technical Memorandum NMFS-SEFC-226.
- Fletemeyer, J. 1980. Sea turtle monitoring project. Report to Broward County Environmental Quality Control Board, FL. 88pp.
- Frazer, N.B. 1983. Survivorship of adult female loggerhead sea turtles, *Caretta caretta*, nesting on Little Cumberland Island, Georgia, USA. *Herpetologica* 39:436-447.

- Frazer, N.B. 1986. Survival from egg to adulthood in a declining population of loggerhead turtles *Caretta caretta*. *Herpetologica* 42(1):47-55.
- Hopkins, S.R. and J.I. Richardson, eds. 1984. Recovery plan for marine turtles. National Marine Fisheries Service, St. Petersburg, FL. 355pp.
- Limpus, C.J., V. Baker, and J.D. Miller. 1979. Movement induced mortality of loggerhead eggs. *Herpetologica* 35(4):335-338.
- Mann, T.M. 1977. Impact of developed coastline on nesting and hatchling sea turtles in southeastern Florida. M.S. thesis. Florida Atlantic University, Boca Raton. 100pp.
- Meylan, A., B. Schroeder, and A. Mosier. 1995. Sea turtle nesting activity in the State of Florida 1979-1992. Florida Marine Research Publications. Number 52. 51pp.
- Mortimer, J.A. 1982. Factors influencing beach selection by nesting sea turtles. Pages 45-51 in Bjorndal, K.A. (ed.). *Biology and Conservation of Sea Turtles*. Smithsonian Institution Press, Washington, D.C.
- Mrosovsky, N. and A. Carr. 1967. Preference for light of short wavelengths in hatchling green sea turtles (*Chelonia mydas*), tested on their natural nesting beaches. *Behavior* 28:217-231.
- Mrosovsky, N. and S.J. Shettleworth. 1968. Wavelength preferences and brightness cues in water finding behavior of sea turtles. *Behavior* 32:211-257.
- National Research Council. 1990. *Decline of the sea turtles: causes and prevention*. National Academy Press, Washington, D.C. 259pp.
- National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1991. Recovery plan for U.S. population of loggerhead turtle (*Caretta caretta*). National Marine Fisheries Service, Washington, D.C. 64pp.
- National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1992. Recovery plan for leatherback turtles (*Dermochelys coriacea*) in the U.S. Caribbean, Atlantic, and Gulf of Mexico. National Marine Fisheries Service, Washington, D.C. 65pp.
- Nelson, D.A. 1988. Life history and environmental requirements of loggerhead turtles. U.S. Fish and Wildlife Service Biological Report 88(23). U.S. Army Corps of Engineers TR EL-86-2 (Rev.).34pp.
- Nelson, D.A. and D.D. Dickerson. 1987 (abstract). Correlation of loggerhead turtle nest digging times with beach sand consistency. Seventh Annual Workshop on Sea Turtle Conservation and Biology, Orlando, FL.

- Nelson, D.A. and D.D. Dickerson. 1988a. Effects of beach nourishment on sea turtles. Proceedings of the Beach Preservation Technology Conference '88. Florida Shore & Beach Preservation Association, Inc., Tallahassee, FL.
- Nelson, D.A. and D.D. Dickerson. 1988b. Hardness of nourished and natural sea turtle nesting beaches on the east coast of Florida. Unpubl. report. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.
- Nelson, D.A., K. Mauck, and J. Fletemeyer. 1987. Physical effects of beach nourishment on sea turtle nesting, Delray Beach, Florida. Technical Report EL-87-15. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi. 56pp.
- Parmenter, C.J. 1980. Incubation of the eggs of the green sea turtle, *Chelonia mydas*, in Torres Strait, Australia: The effect of movement on hatchability. Aust. Wildl. Res. 7:487-491.
- Philbosian, R. 1976. Disorientation of hawksbill turtle hatchlings (*Eretmochelys imbricata*) by stadium lights. Copeia 1976:824.
- Raymond, P.W. 1984. The effects of beach restoration on marine turtles nesting in south Brevard County, Florida. M.S. thesis. University of Central Florida, Orlando. 121pp.
- Ross, J.P. 1982. Historical decline of loggerhead, ridley, and leatherback sea turtles. Pages 189-195 in Bjorndal, K.A. (ed.). Biology and Conservation of Sea Turtles. Smithsonian Institution Press, Washington, D.C.
- Schroeder, B.A. 1994. Florida index nesting beach surveys: Are we on the right track? Pages 132-133 in Bjorndal, K.A., A.B. Bolten, D.A. Johnson, and P.J. Eliazar (compilers). Proceedings of the 14th Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-351.
- Witherington, B.E. 1992. Behavioral responses of nesting sea turtles to artificial lighting. Herpetologica 48:31-39.
- Witherington, B.E. and K.A. Bjorndal. 1991. Influences of artificial lighting on the seaward orientation of hatchling loggerhead turtles (*Caretta caretta*). Biological Conservation 55:139-149.

## Background

The Coastal Barrier Resources Act (CBRA), first enacted in 1982 (16 U.S.C. 3502 et seq.), was reauthorized and amended by the Coastal Barrier Improvement Act (CIBA) of 1990 (16 U.S.C. 3501). Its purpose, as stated in section 2(b), is "...to minimize the loss of human life, wasteful expenditure of Federal revenues, and the damage to fish, wildlife, and other natural resources associated with the coastal barriers..." CBRA established the Coastal Barrier Resources System, (CBRS) a mapped series of undeveloped coastal barriers on the Atlantic and Gulf coasts, including the Great Lakes Region, Virgin Islands, and Puerto Rico. Areas within the system are designated as either "units" or "otherwise protected areas" (OPA's). Section 5(a) prohibits all new federal expenditures and financial assistance within unit boundaries, with some exceptions as determined through a process of consultation.

## Consultation

Section 6(a) of CBRA requires that the appropriate federal officer consult with the Secretary of the Interior (Secretary) prior to making commitments on Federal expenditures or financial assistance within CBRA units. The Secretary has delegated his consultation responsibility to the U.S. Fish and Wildlife Service (Service). The Service, therefore, offers the following comments on the proposed deepening of the Jacksonville Harbor ship channels within a portion of the Talbot Island complex (PO2), a designated CBRA unit, pursuant to Section 6.

The Jacksonville Harbor Deepening Project is located on Florida's northeast coast along the lowest 20 miles of the St. Johns River and its tributaries. The Phase I portion of the project, which covers from the river's mouth inland three miles, is also within a portion of the PO2 unit of the CBRS's Talbot Island complex (Figure ). The project action planned to occur within this unit is the hydraulic dredging of the federal ship channel.

Habitats found within the PO2 unit of the Talbot Island complex include open water and benthos associated with marine and estuarine environments, salt marsh, tidal mud and sand flats, beaches, rock jetties, coastal dunes, and some maritime hardwood hammock. These habitats not only support diverse communities of both resident plants and animals, but are also important for migratory birds, including waterfowl and neotropical migrants. The extensive coastal wetlands support both shellfish and the adults and juveniles of many commercially valuable finfish.

Section 6(a)(2) of CIBA provides an exception to Section 5, Limitations on Federal Expenditures Affecting the System, if the expenditure is for "the maintenance or construction of improvements of existing Federal navigation channels (including the Intracoastal Waterway) and related structures (such as jetties), including the disposal of dredge materials related to such maintenance or construction." Based on the preceding review, the Service concludes that the proposed harbor deepening project of the ship channel qualifies under this exception.