

REVISED DRAFT

Region 4
Template for Biological Opinions on
Beach Nourishment Activities that May Affect Sea Turtles

Updated May 15, 1997
Revision of Lighting Terms and Conditions - December 9, 1997
Revision of Critical Habitat Information - December 8, 1998

Revision of Incidental Take Statement - December 28, 1998
Deletion of Status of the Species Introductory Paragraph - October 20, 1999

[The following information has been developed to assist Fish and Wildlife Service (Service) field biologists in the preparation of non-jeopardy/non-adverse modification section 7 biological opinions for beach nourishment activities that may affect sea turtles in the continental U.S. These are general guidelines, and project specific activities or differences among the many sea turtle nesting beaches from Louisiana to Virginia may dictate the need for modification of the reasonable and prudent measures, terms and conditions, and conservation recommendations. (NOTE: Nourishment projects in Puerto Rico and the U.S. Virgin Islands are very rare, and this document would need to be greatly modified to address the differing conditions there.)]

[Bold text in brackets [] provides guidance and should not be included in the biological opinion. Project-specific information should be inserted where indicated by bold text underlined in brackets [__].]

[Although this template for biological opinions only addresses non-jeopardy/non-adverse modification situations, the Service has determined that sea turtle species occurring in the U.S. represent populations that qualify for separate consideration under section 7. What this means is that even though sea turtles are wide ranging and have distributions outside the U.S., a jeopardy finding could be made when a proposed action, along with cumulative effects, is likely to jeopardize a sea turtle species' U.S. nesting population. Nesting areas in Brevard County, Florida, south through Broward County, Florida, if altered, probably represent the most likely possibility for triggering a jeopardy call. In addition, genetic and population trend studies indicate that loggerheads that nest north of Cape Canaveral, Florida, may warrant protection as an endangered population. If this population becomes formally recognized for separate consideration under section 7, jeopardy opinions for this genetic population might be possible. However, all jeopardy/adverse modification situations will be dealt with on a case-by-case basis and are not the subject of this document.]

[This document incorporates the standardized format and language to be used in all biological opinions following guidance provided by the Washington Office in the Endangered Species Consultation Handbook. It is hoped that this effort will result in greater consistency across the Region. It is anticipated that this approach will assist field offices in crafting biological opinions for nourishment projects by providing a guide that is easily followed. However, this document was also created to provide increased consistency between Federal and State requirements for nourishment projects per a request from the U.S. Army Corps of Engineers. Because the majority of biological opinions on beach nourishment are produced in Florida, this document has been crafted to provide greater consistency between Service and

Florida Department of Environmental Protection requirements for minimizing incidental take. Therefore, those of you preparing biological opinions for projects occurring outside Florida may need to tailor your documents to ensure a measure of consistency with the requirements of the State where the nourishment will be occurring.]

[For nourishment projects in Brevard County, Florida, south through Broward County, Florida, nourishment will not be allowed during the main part of the nesting season (May 1 through October 31). This timing restriction has been agreed to by the U.S. Army Corps of Engineers Jacksonville District as documented in a December 22, 1994, letter from A.J. Salem, Chief, Planning Division. This restriction is essential in these high density nesting areas because relocation is not feasible. For nourishment projects outside this area, nourishment may be allowed throughout the nesting season, but should be decided on a case-by-case basis through discussions with the State conservation agency and the Corps. According to the recovery plans for the loggerhead, green, and leatherback sea turtles, the U.S. Army Corps of Engineers, Fish and Wildlife Service, and appropriate State agencies “should ensure beach nourishment and other beach construction activities are not permitted during the nesting season on local or regionally important nesting beaches.” When making a case-by-case determination, this should be kept in mind, as well as any requirements of the State where the nourishment will be occurring.]

[For example, in South Carolina, the Service and the South Carolina Department of Natural Resources have a policy to not allow construction activities on nesting beaches between May 15 and October 31, except on a very restrictive case-by-case basis, due to the declines in nesting observed in that State. In Georgia, where declines in nesting have also been observed, a Memorandum of Agreement (MOA) for Loggerhead Sea Turtle Management on Georgia’s Beaches was signed by representatives of nine State and Federal agencies and local governments and organizations, including the Service and the Georgia Department of Natural Resources. The MOA commits the parties to comply with a “Management Plan for the Protection of Nesting Loggerhead Sea Turtles and their Habitat in Georgia.” The plan requires that beach nourishment projects that affect an area with more than 5 percent of the State’s total nesting, based on a 5-year average, be allowed only during periods outside of the sea turtle nesting and hatching season. For biological opinions being prepared in Georgia, a copy of the MOA and Management Plan should be provided to the Corps if a nourishment window is to be required. In addition, the biological opinion should reiterate and cite information provided in the Management Plan explaining why the nourishment window is necessary.]

[For those cases where there is not sufficient justification to require nourishment to

occur outside the main part of the nesting season, during early discussions Service biologists should stress the Service's preference for this or for minimizing the amount of time the project would occur during the nesting season.]

[Even if a beach is nourished outside the sea turtle nesting season, a formal biological opinion will probably be needed. Beach compaction and escarpment formation may occur in later seasons as a result of the nourishment project and result in a "may affect" situation. However, in areas where surveys of beaches, particularly in the more western and northern states in the Southeast Region, indicate that sea turtles do not nest there, a formal biological opinion for sea turtles is not necessary.]

[One point of clarification should be mentioned. While this document uses the term "beach nourishment" exclusively, occasionally the Service is asked to review "beach restoration" and "inlet sand transfer" projects. Beach nourishment is the periodic replenishment of a restored beach to maintain a desired beach width for protection of coastal structures. Beach restoration is the placing of sand along the shoreline to rebuild a beach that has been totally lost to erosion. Inlet sand transfer involves removing sand from an inlet for navigational purposes and often involves disposal of the material onto a beach. If you are preparing a biological opinion on a project that uses the term "beach restoration" or "inlet sand transfer" you may want to conduct a global search of the generic biological opinion to replace the words "beach nourishment" and "nourished" with the appropriate terminology throughout the document.]

[Biological opinions should follow the format on the following pages. *A draft biological opinion should be provided to the Southeast Sea Turtle Recovery Coordinator for review at least 2 weeks prior to the due date of the biological opinion.* In addition, a copy of the final biological opinion also should be forwarded to the Southeast Sea Turtle Recovery Coordinator.]

[Insert Name of Agency Contact and Address]

[Insert salutation]

[Include the following two standardized introductory paragraphs.]

The U.S. Fish and Wildlife Service (Service) has reviewed the **[insert name of project plans, permit application, etc.]** for the following activity **[insert name or designation for the action]** located in **[insert name of County or State]**. Your **[insert date of request document]** request for formal consultation was received on **[insert date]**. This document represents the Service's biological opinion on the effects of that action on **[insert names of potentially affected sea turtle species]** in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This biological opinion is based on information provided in the **[insert date]** biological **[insert assessment or evaluation]**, the **[insert date]** **[insert draft environmental assessment or environmental impact statement]**, the **[insert date]** project proposal, telephone conversations of **[insert dates]** with **[insert names]**, field investigations, and other sources of information. A complete administrative record of this consultation is on file in the **[insert name of appropriate Field Office]**.

Consultation history

[This section outlines the history of the consultation request, including any informal consultation, prior formal consultations on the action, documentation of the date consultation was initiated, and a chronology of subsequent requests for additional data, extensions, and other applicable past or current actions. Conclusions reached in earlier informal and formal consultations on the proposed action also may be relevant.]

BIOLOGICAL OPINION

Description of the proposed action

[This section includes (1) a description of the proposed action, and (2) a description of the action area. Information should include the length and location of the beach to be nourished, amount of material, quality of material such as grain size and percent by size using soil classification series (clay, silt, fine sand, etc.), source of material, proposed timing of the project, and so on.]

Status of the species

[This section includes the status of the species across their entire known range. The following lead paragraphs and individual species descriptions should be included, as appropriate, for the project area under consideration.]

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, for at least two decades, several human-caused mortality factors have contributed 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, degradation of nesting habitat by coastal development, and marine pollution and debris. Therefore, human activities that affect the behavior and/or survivability of turtles on their remaining nesting beaches, particularly the few remaining high density nesting beaches, could seriously reduce our ability to conserve sea turtles.

Loggerhead Sea Turtle

[Include this species narrative, as appropriate, for projects in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana.]

The loggerhead sea turtle (*Caretta caretta*), listed as a threatened species on July 28, 1978 (43 FR 32800), inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. Loggerhead sea turtles nest within the continental U.S. from Louisiana to Virginia. Major nesting concentrations in the U.S. 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).

From a global perspective, the southeastern U.S. nesting aggregation is of paramount importance to the survival of the species and is second in size only to that which nests on islands in the Arabian Sea off Oman (Ross 1982, Ehrhart 1989, National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b). The status of the Oman colony has not been evaluated recently, but its location in a part of the world that is vulnerable to disruptive events (e.g., political upheavals, wars, catastrophic oil spills) is cause for considerable concern (Meylan *et al.* 1995). The loggerhead nesting aggregations in Oman, the southeastern U.S., and Australia account for about 88 percent of nesting worldwide (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b). About 80 percent of loggerhead nesting in the southeastern U.S. occurs in six Florida counties (Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties) (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b).

Recent genetic analyses using restriction fragment analysis and direct sequencing of mitochondrial DNA (mtDNA) have been employed to resolve management units among loggerhead nesting cohorts of the

southeastern U.S. (Bowen *et al.* 1993; B.W. Bowen, University of Florida, Gainesville, in litt., November 17, 1994, and October 26, 1995; Encalada *et al.* 1998). Assays of nest samples from North Carolina to the Florida Panhandle have identified three genetically distinct nesting populations: (1) northern nesting population - Hatteras, North Carolina, to Cape Canaveral, Florida; (2) South Florida nesting population - Cape Canaveral to Naples, Florida; and (3) Florida Panhandle nesting population - Eglin Air Force Base and the beaches around Panama City, Florida. These data indicate that gene flow between the three regions is very low. If nesting females are extirpated from one of these regions, regional dispersal will not be sufficient to replenish the depleted nesting population (Bowen *et al.* 1993, B.W. Bowen, University of Florida, Gainesville, in litt., October 26, 1995). **[Include the following sentence for projects occurring in North Carolina, South Carolina, Georgia, and the north Atlantic coast of Florida (Nassau, Duval, St. Johns, Flagler, and Volusia Counties) only.]** Therefore, impacts on loggerheads in the northern nesting population, in particular, become more significant because of the smaller total population, as well as observed population declines in Georgia and South Carolina (Frazer 1983, 1986; J. Richardson, pers. comm. cited in Dodd and Byles 1991; National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b).

Green Sea Turtle

[Include this species narrative, as appropriate, for projects in North Carolina, Georgia, Florida, and Alabama.]

The green sea turtle (*Chelonia mydas*) was listed under the ESA on July 28, 1978 (43 FR 32800). Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. The green turtle has a worldwide distribution in tropical and subtropical waters. Major green turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surinam.

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 (Florida Department of Environmental Protection, unpubl. data). 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 (North Carolina Wildlife Resources Commission, unpubl. data). The first documentation of green turtle nests in South Carolina were reported in 1996 (S. Murphy, South Carolina Department of Natural Resources, pers. comm., 1996). Unconfirmed nesting of green turtles in Alabama has also been reported (R. Dailey, Bon Secour National Wildlife Refuge, pers. comm., 1995).

Leatherback Sea Turtle

[Include this species narrative, as appropriate, for projects in Florida and Georgia.]

The leatherback sea turtle (*Dermochelys coriacea*), listed as an endangered species on June 2, 1970 (35 FR 8491), nests on shores of the Atlantic, Pacific and Indian Oceans. Non-breeding animals have been recorded as far north as the British Isles and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard 1992). Nesting grounds are distributed circumglobally, with the Pacific Coast of Mexico supporting the world's largest known concentration of nesting leatherbacks. The largest nesting colony in the wider Caribbean region is found in French Guiana, but nesting occurs frequently, although in lesser numbers, from Costa Rica to Columbia and in Guyana, Surinam, and Trinidad (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992, National Research Council 1990a).

The leatherback regularly nests in the U.S. in Puerto Rico, the U.S. Virgin Islands, and along the Atlantic coast of Florida as far north as Georgia (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992). Leatherback turtles have been known to nest in Georgia, South Carolina, and North Carolina, but only on rare occasions (B. Winn, Georgia Department of Natural Resources, pers. comm., 1996; S. Murphy, South Carolina Department of Natural Resources, pers. comm., 1996; R. Boettcher, North Carolina Wildlife Resources Commission, pers. comm., 1998). Leatherback nesting also has been reported on the northwest coast of Florida (LeBuff 1990; Florida Department of Environmental Protection, unpubl. data); a false crawl (non-nesting emergence) has been observed on Sanibel Island (LeBuff 1990).

Hawksbill Sea Turtle

[Include this species narrative, as appropriate, for projects in Florida (Volusia through Monroe Counties).]

The hawksbill sea turtle (*Eretmochelys imbricata*) was listed as an endangered species on June 2, 1970 (35 FR 8491). The hawksbill is found in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean. Within the continental U.S., hawksbill sea turtle nesting is rare and is restricted to the southeastern coast of Florida (Volusia through Dade Counties) and the Florida Keys (Monroe County) (Meylan 1992, Meylan *et al.* 1995). However, hawksbill tracks are difficult to differentiate from those of loggerheads and may not be recognized by surveyors. Therefore, surveys in Florida likely underestimate actual hawksbill nesting numbers (Meylan *et al.* 1995). In the U.S. Caribbean, hawksbill nesting occurs on beaches throughout Puerto Rico and the U.S. Virgin Islands (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1993).

Environmental baseline

[Provide a description of the status of the species and factors affecting the environment of the species in the proposed action area during the consultation. The baseline should include State, local, and private actions already affecting the species. Unrelated Federal actions that have completed formal or informal consultation should also be mentioned here. Federal actions within the action area that may benefit sea turtles should be mentioned also.]

[This section should also include information about the effects of the nourishment on sea turtles. The timing and duration of the nourishment are important. Direct effects are the activities that may directly harm, harass, or take sea turtles during the nourishment activity. It should be stated that relocation of sea turtle eggs results in take. Indirect effects, which are the effects caused by the proposed action but that occur later in time, also should be considered. For example, the nourishment may continue to affect sea turtle nesting on the beach for future years and should be stated as an indirect effect. The following sample text may be used or modified as appropriate.]

Status of the species:

[This section includes the status of the species within the action area. Sea turtle biological information as specific as possible to the beach being nourished should be used. This document identifies nesting and hatching season dates for each species based on general locations. However, more defined nesting periods should also be described using local data for nesting sea turtles when available.]

[The following individual species descriptions should be included, as appropriate, for the project area under consideration. For each species description included in the biological opinion, try to obtain and include information on nesting density in the direct project area. If not available, provide information from the nesting beach closest to the project area.]

Loggerhead Sea Turtle

[Include this species narrative, as appropriate, for projects in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana.]

The loggerhead sea turtle nesting and hatching season for **[select and fill in appropriate location from the following table]** extends from **[based on the location selected, fill in the corresponding dates]**. Incubation ranges from about 45 to 95 days.

[Select information from the following table, as appropriate, for inclusion in the

preceding paragraph.

<u>Location</u>	<u>Nesting and Hatching Season Dates</u>
Northern Gulf of Mexico beaches (includes Louisiana, Mississippi, Alabama, and Escambia through Pasco Counties in Florida)	May 1 through November 30
Southern Gulf of Mexico beaches (includes Pinellas through Monroe Counties in Florida)	April 1 through November 30
Southern Florida Atlantic beaches (includes Brevard through Dade Counties)	March 15 through November 30
Northern Florida Atlantic beaches (includes Nassau through Volusia Counties) and Georgia beaches	April 15 through November 30
South Carolina and North Carolina beaches	May 1 through November 30

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[Include a paragraph here on nesting density in the direct project area or the index nesting beach closest to the project area. For areas with low nesting density, it may be more appropriate to simply state the average number of nests laid in the project area each year.]

Green Sea Turtle

[Include this species narrative, as appropriate, for projects in North Carolina, South Carolina, Georgia, Florida, and Alabama.]

The green sea turtle nesting and hatching season for [select and fill in appropriate location from the following table] extends from [based on the location selected, fill in the

corresponding dates]. Incubation ranges from about 45 to 75 days.

[Select information from the following table, as appropriate, for inclusion in the preceding paragraph.

<u>Location</u>	<u>Nesting and Hatching Season Dates</u>
Northern Florida Gulf of Mexico beaches (includes Escambia through Pasco Counties)	May 15 through October 31
Southern Florida Gulf of Mexico beaches (includes Pinellas through Monroe Counties)	May 15 through October 31
Southern Florida Atlantic beaches (includes Brevard through Dade Counties)	May 1 through November 30
Northern Florida Atlantic beaches (includes Nassau through Volusia Counties) and Georgia beaches	May 15 through November 15
South Carolina and North Carolina beaches	May 15 through November 15

[Include a paragraph here on nesting density in the direct project area or the index nesting beach closest to the project area. For areas with low nesting density, it may be more appropriate to simply state the average number of nests laid in the project area each year.]

Leatherback Sea Turtle

[Include this species narrative, as appropriate, for projects in Florida and Georgia.]

The leatherback sea turtle nesting and hatching season for [select and fill in appropriate location from the following table] extends from [based on the location selected, fill in the corresponding dates]. Incubation ranges from about 55 to 75 days.

[Select information from the following table, as appropriate, for inclusion in the preceding paragraph.]

Location

Nesting and Hatching Season Dates

Northern Florida Gulf of Mexico
beaches (includes Escambia through
Pasco Counties)

June 1 through September 30

Southern Florida Atlantic beaches
15
(includes Brevard through Dade
Counties)

February 15 through November

Northern Florida Atlantic beaches
(includes Nassau through Volusia
Counties) and Georgia beaches

April 15 through September 30

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[Include a paragraph here on nesting density in the direct project area or the index nesting beach closest to the project area. For areas with low nesting density, it may be more appropriate to simply state the average number of nests laid in the project area each year.]

Hawksbill Sea Turtle

[Include this species narrative, as appropriate, for projects in Florida (Volusia through Monroe Counties).]

The hawksbill sea turtle nesting and hatching season for **[select and fill in appropriate location from the following table]** extends from **[based on the location selected, fill in the corresponding dates]**. Incubation lasts about 60 days.

[Select information from the following table, as appropriate, for inclusion in the preceding paragraph.

Location

Nesting and Hatching Season Dates

Monroe County, Florida

June 1 through December 31

**Southern Florida Atlantic beaches
(includes Brevard through Dade
Counties)**

June 1 through December 31

Volusia County, Florida

June 1 through December 31

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[Include a paragraph here on nesting density in the direct project area or the index nesting beach closest to the project area. For areas with low nesting density, it may be more appropriate to simply state the average number of nests laid in the project area each year.]

Effects of the action:

[This section includes information about the effects of the proposed action on sea turtles. The timing and duration of the nourishment are important.]

Beneficial effects

[Beneficial effects are those effects of an action that are wholly positive, without any adverse effects on a listed species. Add the following paragraphs, as appropriate, for the project under consideration.]

Placement of sand on a severely eroded beach can increase sea turtle nesting habitat in an area as long as protective measures are incorporated into the project. Also, a properly engineered and constructed beach may be more stable than the eroding one it replaces, thereby benefitting sea turtles.

Direct effects

Placement of sand on an eroded section of beach or an existing beach in and of itself may not provide suitable nesting habitat for sea turtles. Although beach nourishment may increase the potential nesting area, significant negative impacts to sea turtles may result if protective measures are not incorporated during construction. Nourishment during the nesting season, particularly on or near high density nesting beaches, can cause increased loss of offspring from human-caused 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 misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder 1994).

1. Nest relocation

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, Spotila *et al.* 1983, McGehee 1990). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. Water availability is known to influence the incubation environment of the embryos and hatchlings of turtles with flexible-shelled eggs, which has been shown to affect nitrogen excretion (Packard *et al.* 1984), mobilization of calcium (Packard and Packard 1986), mobilization of yolk nutrients (Packard *et al.* 1985), hatchling size (Packard *et al.* 1981, McGehee 1990), energy reserves in the yolk at hatching (Packard *et al.* 1988), and locomotory ability of hatchlings (Miller *et al.* 1987).

Comparisons of hatching success between relocated and *in situ* nests have noted significant variation ranging from a 21 percent decrease to a 9 percent increase for relocated nests (Florida Department of Environmental Protection, unpubl. data). Comparisons of emergence success between relocated and *in situ* nests have also noted significant variation ranging from a 23 percent decrease to a 5 percent increase for relocated nests (Florida Department of Environmental Protection, unpubl. data). A 1994 Florida Department of Environmental Protection study of hatching and emergence success of *in situ* and relocated nests at seven sites in Florida found that hatching success was lower for relocated nests in five of seven cases with an average decrease for all seven sites of 5.01 percent (range = 7.19 percent increase to 16.31 percent decrease). Emergence success was lower for relocated nests in all seven cases by an average of 11.67 percent (range = 3.6 to 23.36 percent) (A. Meylan, Florida Department of Environmental Protection, in litt., April 5, 1995).

A final concern about nest relocation is that it may concentrate eggs in an area resulting in a greater susceptibility to catastrophic events. Hatchlings released from concentrated areas also may be subject to greater predation rates from both land and marine predators, because the predators learn where to concentrate their efforts.

2. Equipment

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. They 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.

3. Artificial lighting

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 (Mrosovsky and Carr 1967, Mrosovsky and Shettleworth 1968, Dickerson and Nelson 1989, Witherington and Bjorndal 1991). Artificial beachfront lighting 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). Therefore, 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, 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.

Indirect effects

[Indirect effects, which are the effects caused by the proposed action but that occur later in time, also should be considered. For example, beach compaction and escarpment formation resulting from the beach nourishment project may continue to affect sea turtle nesting on the beach for future years and should be stated as an indirect effect. The following sample text may be used or modified as appropriate. Add the following paragraphs, as appropriate, for the project under consideration.]

1. Changes in the physical environment

Beach nourishment may result in changes in sand density (compaction), beach shear resistance (hardness), beach moisture content, beach slope, sand color, sand grain size, sand grain shape, and sand grain mineral content if the placed sand is dissimilar from the original beach sand (Nelson and Dickerson 1988a). These changes could result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings (Nelson and Dickerson 1987, Nelson 1988).

Beach compaction and unnatural beach profiles that may result from beach nourishment activities could 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 (i.e., false crawls occurred more frequently) have been documented on severely compacted nourished beaches (Fletemeyer 1980, Raymond 1984, Nelson and Dickerson 1987, Nelson *et al.* 1987), and increased false crawls may result in increased physiological stress to nesting females. Sand compaction may increase the length of

time required for female sea turtles to excavate nests and also cause increased physiological stress to the animals (Nelson and Dickerson 1988c). 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.

These impacts can be minimized by using suitable sand and by tilling the beach after nourishment if the sand becomes compacted. The level of compaction of a beach can be assessed by measuring sand compaction using a cone penetrometer (Nelson 1987). Tilling of a nourished beach may reduce the sand compaction to levels comparable to unnourished beaches. However, a pilot study by Nelson and Dickerson (1988c) showed that a tilled nourished beach will remain uncompacted for up to 1 year. Therefore, the Service requires multi-year beach compaction monitoring and, if necessary, tilling to ensure that project impacts on sea turtles are minimized. A root rake with tines at least 42 inches long and less than 36 inches apart pulled through the sand is recommended for compacted beaches. Service policy calls for beaches to be tilled if compaction levels exceed 500 psi.

A change in sediment color on a beach could change the natural incubation temperatures of nests in an area, which, in turn, could alter natural sex ratios. To provide the most suitable sediment for nesting sea turtles, the color of the nourished sediments must resemble the natural beach sand in the area. Natural reworking of sediments and bleaching from exposure to the sun would help to lighten dark nourishment sediments; however, the timeframe for sediment mixing and bleaching to occur could be critical to a successful sea turtle nesting season.

2. Escarpments

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 prolonged tidal inundation). This impact can be minimized by leveling any escarpments prior to the nesting season.

Cumulative effects:

[Include the following standardized paragraph to introduce the cumulative effects section.]

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 ESA. **[Provide specific information on future projects that are reasonably certain to occur in the action area (e.g., highlight those**

for which permits, grants, contracts, authority, obligations of expenditures, etc. have been initiated). If there are no known cumulative effects, include the following sentence.] The Service is not aware of any cumulative effects in the project area.

Conclusion:

[The standardized statement for introducing the conclusion section follows.]

After reviewing the current status of the **[insert names of potentially affected sea turtle species]**, 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 the beach nourishment project, as proposed, is not likely to jeopardize the continued existence of the **[insert names of potentially affected sea turtle species]** and is not likely to destroy or adversely modify designated critical habitat.

[There are no designated critical habitats for loggerhead or Kemp's ridley sea turtles. Marine and terrestrial critical habitat for the leatherback sea turtle has been listed for Sandy Point on St. Croix, U.S. Virgin Islands. Critical habitat for the green turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys. Critical habitat for the hawksbill sea turtle has been established for selected beaches and/or waters of Mona, Monito, Culebrita, and Culebra Islands, Puerto Rico. However, this document is only intended for use in reviewing projects being proposed in the continental U.S., and, therefore, there would be no destruction/adverse modification of critical habitat. Depending on the species being addressed, use one or both of the following sentences as appropriate.]

[For loggerhead sea turtles, use the following sentence.] No critical habitat has been designated for the loggerhead sea turtle; therefore, none will be affected. **[For leatherback and hawksbill sea turtles, use the following sentence.]** Critical habitat for the **[insert green, leatherback, and/or hawksbill sea turtle as appropriate]** has been designated at **[insert appropriate location(s) from the preceding paragraph]**; however, this action does not affect **[insert that area or those areas as appropriate]**, and no destruction or adverse modification of that critical habitat is anticipated.

INCIDENTAL TAKE STATEMENT

[The following two standardized paragraphs should be used in incidental take statements.]

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to

harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent 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 defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. 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 to be prohibited under the Act 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 **[insert name of action agency]** so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The **[insert name of action agency]** has a continuing duty to regulate the activity covered by this incidental take statement. If the **[insert name of action agency]** (1) fails to assume and implement the terms and conditions or (2) 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, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the **[insert name of action agency]** must report the progress of the action and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or extent of incidental take

[For nourishment projects in Brevard County, Florida, south through Broward County, Florida, nourishment will not be allowed during the main part of the nesting season (May 1 through October 31), and the following statement should be used.]

The Service has reviewed the biological information and other information relevant to this action. Based on this review, incidental take is anticipated for (1) all sea turtle nests that may be constructed and eggs that may be deposited from March 1 through April 30 and from September 1 through September 30 and missed by a nest survey and egg relocation program within the boundaries of the proposed project; (2) all sea turtle nests deposited from October 1 through February 28 (or 29 as applicable) when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project; (3) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; (4) disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (5) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and

(6) all nests destroyed as a result of escarpment leveling within a nesting season when such leveling has been approved by the Fish and Wildlife Service.

[For nourishment projects outside the area from Brevard County, Florida, south through Broward County, Florida, nourishment may be allowed throughout the nesting season, and, when this is the case, the following statement should be used. If it is determined that nourishment will not be allowed during the nesting season, the following statement should be tailored to reflect this.]

The Service has reviewed the biological information and other information relevant to this action. Based on this review, incidental take is anticipated for (1) 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; (2) all sea turtle nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project; (3) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; (4) disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (5) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (6) all nests destroyed as a result of escarpment leveling within a nesting season when such leveling has been approved by the Fish and Wildlife Service.

Effect of the take

[Include the following standardized sentence.]

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 following introductory sentence for reasonable and prudent measures is required.]

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of **[insert names of potentially affected sea turtle species]**.

[For nourishment projects in Brevard County, Florida, south through Broward County, Florida, nourishment will not be allowed during the main part of the nesting season (May 1 through October 31), and the following reasonable and

prudent measures should be used.]

1. Only beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence shall be used on the project site.
2. Beach nourishment activities shall not occur from May 1 through October 31, the period of peak sea turtle egg laying and egg hatching, to reduce the possibility of sea turtle nest burial or crushing of eggs.
3. If the beach nourishment project will be conducted during the period from March 1 through April 30, surveys for early nesting sea turtles shall be conducted. If nests are constructed in the area of beach nourishment, the eggs shall be relocated.
4. If the beach nourishment project will be conducted during the period from November 1 through November 30, surveys for late nesting sea turtles shall be conducted. If nests are constructed in the area of beach nourishment, the eggs shall be relocated.
5. Immediately after completion of the beach nourishment project and prior to the next three nesting seasons, beach compaction shall be monitored and tilling shall be conducted as required by March 1 to reduce the likelihood of impacting sea turtle nesting and hatching activities. The March 1 deadline is required to reduce impacts to leatherbacks that nest in greater frequency along the South Atlantic coast of Florida than elsewhere in the contiguous United States.
6. Immediately after completion of the beach nourishment project and prior to the next three nesting seasons, 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.
7. The applicant shall ensure that contractors doing the beach nourishment work fully understand the sea turtle protection measures detailed in this incidental take statement.
8. During the early and late portions of the nesting season, construction equipment and pipes shall be stored in a manner that will minimize impacts to sea turtles to the maximum extent practicable.
9. During the early and late portions of the nesting season, lighting associated with the project shall be minimized to reduce the possibility of disrupting and disorienting nesting and/or hatchling sea turtles.

[For nourishment projects outside the area from Brevard County, Florida, south through Broward County, Florida, nourishment may be allowed throughout the

nesting season, and, when this is the case, the following reasonable and prudent measures should be used. If it is determined that nourishment will not be allowed during the nesting season, the following reasonable and prudent measures should be tailored to reflect this; in addition, a justification for why the project area was determined to be of local or Regional significance to merit this should be provided here.]

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. If nests are constructed in the area of beach nourishment, the eggs shall be relocated.
3. Immediately after completion of the beach nourishment project and prior to the next three nesting seasons, 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 next three nesting seasons, 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 incidental take statement.
6. During the sea turtle nesting season, construction equipment and pipes shall be stored in a manner that will minimize impacts to sea turtles to the maximum extent practicable.
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

[The following standardized introductory paragraph for terms and conditions must be used.]

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

[For nourishment projects in Brevard County, Florida, south through Broward County, Florida, nourishment will not be allowed during the main part of the nesting season (May 1 through October 31), and the following terms and conditions should be used.]

1. All fill material placed shall be sand that is similar to that already existing at the beach site in both coloration and grain size distribution. All such fill material shall be free of construction debris, rocks, or other foreign matter and shall not contain, on average, greater than 10 percent fines (i.e., silt and clay) (passing the #200 sieve) and shall not contain, on average, greater than 5 percent coarse gravel or cobbles, exclusive of shell material (retained by the #4 sieve).

2. Beach nourishment shall be started after October 31 and be completed before May 1. During the May 1 through October 31 period, no construction equipment or pipes shall be stored on the beach.

3. If the beach nourishment project will be conducted during the period from March 1 through April 30, daily early morning surveys for sea turtle nests shall be conducted from March 1 through April 30 or until completion of the project (whichever is earliest), and eggs shall be relocated per the following requirements.

3a. 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 **[insert name of appropriate State conservation agency (e.g., Florida Department of Environmental Protection)]** permit. Nest surveys shall be conducted daily between sunrise and 9 a.m. Surveys shall be performed in such a manner so as to ensure that construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures.

3b. Only those nests that may be affected by construction activities shall be relocated. Nests requiring relocation shall be moved no later than 9 a.m. the morning following deposition 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 cease when construction activities no longer threaten nests. Nests deposited within areas where construction activities have ceased or will not occur for 65 days shall be marked and left in place unless other factors threaten the success of the nest. Any nests left in the active construction zone shall be clearly marked, and all mechanical equipment shall avoid nests by at least 10 feet.

4. If the beach nourishment project will be conducted during the period from November 1 through November 30, daily early morning surveys for sea turtle nests shall be conducted 65 days prior to project initiation and continue through September 30, and eggs shall be relocated

per the preceding requirements.

5. Immediately after completion of the beach nourishment project and prior to March 1 for 3 subsequent years, sand 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 5a and 5b 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 March 1. 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 surveys 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.

5a. 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 shall be 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.

5b. If the average value for any depth exceeds 500 psi for any two or more adjacent stations, then that area shall be tilled prior to March 1. 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.

6. Visual surveys for escarpments along the project area shall be made immediately after completion of the beach nourishment project and prior to March 1 for 3 subsequent years. 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 leveled to the natural beach contour by March 1. The Service shall be contacted immediately if subsequent reformation of escarpments that interfere with sea

turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service will provide a brief written authorization that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken shall be submitted to the Service.

7. The applicant shall arrange a meeting between representatives of the contractor, the Service, the **[insert name of appropriate State conservation agency]**, 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.

8. Visual surveys for escarpments along the project area shall be made immediately after completion of the beach nourishment project and prior to March 1 for 3 subsequent years. 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 leveled to the natural beach contour by March 1. The Service shall be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service will provide a brief written authorization that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken shall be submitted to the Service.

9. From March 1 through April 30 and November 1 through November 30, all on-beach lighting associated with the project shall be limited to the immediate area of active construction only and shall be the minimal lighting necessary to comply with safety requirements. Shielded low pressure sodium vapor lights are recommended to minimize illumination of the nesting beach and nearshore waters. Lighting on offshore equipment shall be minimized through reduction, shielding, lowering, and appropriate placement of lights to avoid excessive illumination of the water, while meeting all U.S. Coast Guard and OSHA requirements. Shielded low pressure sodium vapor lights are highly recommended for lights on offshore equipment that cannot be eliminated.

10. A report describing the actions taken to implement the terms and conditions of this incidental take statement shall be submitted to the **[insert name of appropriate 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 self-release beach sites, nest survey and relocation results, and hatching success of nests.

11. 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.

12. Upon locating a dead, injured, or sick endangered or threatened sea turtle specimen, initial notification must be made to the **[insert Fish and Wildlife Service Law Enforcement Office OR insert name of appropriate State conservation agency]** located in **[insert city and State where selected office is located]** at **[insert phone number for selected office]**. 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.

[Include the following summation paragraph.]

The Service believes that no more than the following types of incidental take will result from the proposed action: (1) 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; (2) all sea turtle nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project; (3) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; (4) disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (5) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (6) all nests destroyed as a result of escarpment leveling within a nesting season when such leveling has been approved by the Fish and Wildlife Service. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and 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.

[For nourishment projects outside the area from Brevard County, Florida, south

through Broward County, Florida, nourishment may be allowed throughout the nesting season, and, when this is the case, the following terms and conditions should be used. If it is determined that nourishment will not be allowed during the nesting season, the following terms and conditions should be tailored to reflect this.]

1. All fill material placed shall be sand that is similar to that already existing at the beach site in both coloration and grain size distribution. All such fill material shall be free of construction debris, rocks, or other foreign matter and shall generally not contain, on average, greater than 10 percent fines (i.e., silt and clay) (passing the #200 sieve) and shall not contain, on average, greater than 5 percent coarse gravel or cobbles, exclusive of shell material (retained by the #4 sieve).

2. Daily early morning surveys shall be required if any portion of the beach nourishment project occurs during the period from **[based on the location selected, fill in the corresponding nesting and hatching season dates from the following table]**. Nesting surveys shall be initiated 65 days prior to nourishment activities or by **[based on the location selected, insert the nesting beginning date from the following table]**, whichever is later. Nesting surveys shall continue through the end of the project or through **[based on the location selected, insert the nesting ending date from the following table]**, whichever is earlier. If nests are constructed in areas where they may be affected by construction activities, eggs shall be relocated per the following requirements. **[NOTE: In more northerly areas, such as the Florida panhandle, North Carolina, South Carolina, and Georgia where the average nesting incubation period is greater than 65 days, you may want to change the 65 days used in this document to a more appropriate number.]**

[Select information from the following table, as appropriate, for inclusion in the preceding paragraph.

Ending Location	Nesting and Hatching Season Dates	Nesting Beginning Dates	Nesting Dates
Northern Gulf of Mexico September 30 beaches (includes Louisiana, Mississippi, Alabama, and Escambia through Pasco Counties in Florida)	May 1 through November 30	May 1	
Southern Gulf of Mexico September 30 beaches (includes Pinellas through Monroe Counties in Florida)	April 1 through November 30	April 1	
Dade County, Florida, 30 beaches	April 1 through November 30	April 1	September
Northern Florida Atlantic September 30 beaches (includes Nassau through Volusia Counties) and Georgia beaches	April 15 through November 30	April 15	
South Carolina beaches 30(??)	May 1 through November 30(??)	May 1	September
North Carolina beaches	May 1 through November 25	May 1	August 31

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 [**insert name of appropriate State conservation agency (e.g., Florida Department of Environmental Protection)**] permit. Nest surveys shall be conducted daily between sunrise and 9 a.m. Surveys shall be performed in such a manner so as to ensure that construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures.

2b. Only those nests that may be affected by construction activities shall be relocated. Nests requiring relocation shall be moved no later than 9 a.m. the morning following deposition 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 cease when construction activities no longer threaten nests. Nests deposited within areas where construction activities have ceased or will not occur for 65 days shall be marked and left in place unless other factors threaten the success of the nest. Any nests left in the active construction zone shall be clearly marked, and all mechanical equipment shall avoid nests by at least 10 feet. **[NOTE: In more northerly areas, such as the Florida panhandle, North Carolina, South Carolina, and Georgia where the average nesting incubation period is greater than 65 days, you may want to change the 65 days used in this document to a more appropriate number.]**

3. Immediately after completion of the beach nourishment project and prior to [**based on the location selected, insert the nesting beginning date from the preceding table under term and condition #2**] for 3 subsequent years, sand 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 [**based on the location selected, insert the nesting beginning date from the preceding table under term and condition #2**]. 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 surveys 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 shall be 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 **[based on the location selected, insert the nesting beginning date from the preceding table under term and condition #2]**. 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 **[based on the location selected, insert the nesting beginning date from the preceding table under term and condition #2]** for 3 subsequent years. 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 leveled to the natural beach contour by **[based on the location selected, insert the nesting beginning date from the preceding table under term and condition #2]**. If the project is completed during the sea turtle nesting and hatching season, escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. The Service shall be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service will provide a brief written authorization that describes methods to be used to reduce the likelihood of impacting existing nests. 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 **[insert name of appropriate State conservation agency]**, 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 [**based on the location selected, fill in the corresponding nesting and hatching season dates from the preceding table under term and condition #2**], staging areas for construction equipment shall be located off the beach to the maximum extent practicable. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to 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 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 [**based on the location selected, fill in the corresponding nesting and hatching season dates from the preceding table under term and condition #2**], all on- beach lighting associated with the project shall be limited to the immediate area of active construction only and shall be the minimal lighting necessary to comply with safety requirements. Shielded low pressure sodium vapor lights are recommended to minimize illumination of the nesting beach and nearshore waters. Lighting on offshore equipment shall be minimized through reduction, shielding, lowering, and appropriate placement of lights to avoid excessive illumination of the water, while meeting all U.S. Coast Guard and OSHA requirements. Shielded low pressure sodium vapor lights are highly recommended for lights on offshore equipment that cannot be eliminated.

8. A report describing the actions taken to implement the terms and conditions of this incidental take statement shall be submitted to the [**insert name of appropriate 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 self-release beach sites, 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 [**insert Fish and Wildlife Service Law Enforcement Office or insert name of appropriate State conservation agency**] located in

[insert city and State where selected office is located] at **[insert phone number for selected office]**. 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.

[Include the following summation paragraph.]

The Service believes that no more than the following types of incidental take will result from the proposed action: (1) 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; (2) all sea turtle nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project; (3) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; (4) disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (5) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (6) all nests destroyed as a result of escarpment leveling within a nesting season when such leveling has been approved by the Fish and Wildlife Service. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and 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

[The following standardized introductory paragraph for conservation recommendations must be used.]

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.

[For nourishment projects in Brevard County, Florida, south through Broward

County, Florida, nourishment will not be allowed during the main part of the nesting season (May 1 through October 31), and the following conservation recommendations should be used.]

1. Appropriate native salt-resistant dune vegetation should be established on the restored dunes. The Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, can provide technical assistance on the specifications for design and implementation.
2. 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.
3. 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.

[For nourishment projects outside the area from Brevard County, Florida, south through Broward County, Florida, nourishment may be allowed throughout the nesting season, and, when this is the case, the following conservation recommendations should be used. If it is determined that nourishment will not be allowed during the nesting season, delete conservation recommendation #1.]

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. **[For projects occurring in Florida, include the following sentence.]** The Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, 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.

[The following standardized closing sentence for conservation recommendations must be used.]

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.

REINITIATION - CLOSING STATEMENT

[The following standard closing statement of the formal consultation package should be used.]

This concludes formal consultation on the action(s) outlined in the [**request/reinitiation request**]. 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.