7. Disorientation
   Another effect 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documented cause of hatchling disorientation and misorientation on nesting beaches (Philbosian 1976, Mann 1977, FDEP unpublished data).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 effect could be reduced by using the minimum amount of light necessary, require shielding or use low pressure sodium lighting during project construction.

B. Indirect effects

Future erosion of nesting beaches is a potential indirect effect of nourishment projects on sea turtles. Dredging 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 by creating a sand sink. The remainder of the beach system responds to this sand sink by providing sand from the beach in an attempt to reestablish equilibrium (National Research Council 1990b).

C. 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 ESA.

Construction of all of the beach segments proposed in the Coast of Florida Study would have significant cumulative effects on sea turtle nesting in Region III. Approximately 60 miles of shoreline are proposed for construction out of a total of 93 miles. However, not all of the proposed project segments will be built at or near the same time. According to past construction schedules, four or five project segments could be constructed in a single year. As these constructed segments erode, other segments will be constructed. This cycle of erosion and renourishment will be repeated at various locations within the region resulting in little net gain of dry beach throughout the region. Some of the proposed projects may never be constructed. The net cumulative effect will be the additive incidental take of sea turtle nests and eggs due to relocation and burial of missed nests due to repetitive construction of beach projects. However, the annual rate of this incidental take, with precautions, should be low enough to remain within limits that are acceptable to the FWS.

## CONCLUSION

After reviewing the current status of the loggerhead, green, leatherback and hawksbill sea turtles, the environmental baseline for the action area, the effects of the proposed beach nourishments, and the cumulative effects, it is the FWS' biological opinion that the planned actions in the Coast of Florida Study, Region III, as proposed, are not likely to jeopardize the continued existence of the sea turtles listed above.

No critical habitat has been designated for the loggerhead or green sea turtles. Critical habitat has been designated for leatherback sea turtles (St. Croix, U.S. Virgin Islands) and for hawksbill sea turtles (Mona, Culebrita, and Culebra Islands, Puerto Rico). These proposed actions do not affect those areas, thus, there is no effect on designated critical habitat for these two species.

## 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 COE has a continuing duty to regulate the activity covered by this incidental take statement. If the COE (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**

*Broward County and Palm Beach County (excluding sand transfer plants)*

The FWS has reviewed the biological information and other information relevant to this action. Based on this review, incidental take is anticipated for 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 seventeen proposed fill projects. Incidental take is also anticipated for 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. Without the prescribed precautions, this take could equal 250 missed nests and 27,000 eggs rendered inviable through relocation annually.

*Dade County and Palm Beach County sand transfer plants*

The FWS has reviewed the biological information and other information relevant to this action. Based on this 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 projects. Incidental take is also anticipated for 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.

**Effect of the take**

In the accompanying biological opinion, the FWS determined that this level of anticipated take is not likely to result in jeopardy to the species.

**Reasonable and prudent measures**

*Broward County and Palm Beach County (excluding sand transfer plants)*

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of loggerhead, green, leatherback and hawksbill sea turtles in Broward and Palm Beach Counties.

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 these surveys find nests in a beach nourishment area, the eggs of those nests 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 these surveys find nests in a beach nourishment area, the eggs of those nests shall be relocated.

5. Immediately after completing a beach nourishment project and prior to the next three nesting seasons, beach compaction shall be monitored and tilling shall be conducted by March 1, as required, to reduce the likelihood of affecting sea turtle nesting and hatching activities. The March 1 deadline is required to reduce adverse effects 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 affecting sea turtle nesting and hatching activities.

7. The COE 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 effects 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.

*Dade County and all sand transfer plants*

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of loggerhead, green, leatherback, and hawksbill sea turtles in Dade County and at the site of all sand transfers.

1. Only beach-quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence shall be used on the project site.

2. If a beach nourishment project or sand transfer will be conducted during the sea turtle nesting season, surveys for nesting sea turtles shall be conducted. If these surveys find nests in the beach nourishment or sand transfer areas, including the area from which sand will be transferred, the eggs of those nests shall be relocated.

3. Immediately after completion of a nourishment or transfer of sand 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 affecting sea turtle nesting and hatching activities.

4. Immediately after completion of the beach nourishment or transfer of sand 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 affecting sea turtle nesting and hatching activities.

5. The COE shall ensure that contractors doing the beach nourishment or transfer 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 effects 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**

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

*Broward County and Palm Beach County (excluding sand transfer plants)*

1. Fill material placed on the beach shall be sand that is similar to that already existing at the beach site in both coloration and grain size. 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 a No. 200 sieve and shall not contain, on average, greater than 5 percent coarse gravel or cobbles, exclusive of shell material retained by a No. 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 within the period from March 1 through April 30 that the project is being conducted, and eggs shall be relocated per the following requirements.

    a. 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 FDEP permit. Nest surveys shall be conducted daily between sunrise and 9 a.m. Surveys shall be performed in such a manner that ensures that construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures.

    b. 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 in accordance with the requirements outlined above.

5. Immediately after completion of the beach nourishment project and prior to March 1 for three subsequent years, sand compaction shall be monitored in the area of restoration in accordance with protocol agreed to by the FWS, the FDEP, 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 FWS prior to any tilling actions being taken. An annual summary of compaction surveys and the actions taken shall be submitted to the FWS. This condition shall be evaluated annually and may be modified, if necessary, to address sand compaction problems identified during the previous year.

    a. 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 nine averaged compaction values.

b. If the average value for any depth exceeds 500 poundes per square inch (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 FWS 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 three subsequent years. Results of the surveys shall be submitted to the FWS 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 FWS shall be contacted immediately if subsequent reformation of escarpments that can 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 FWS will provide a brief written authorization that describes methods to be used to reduce the likelihood of affecting existing nests. An annual summary of escarpment surveys and actions taken shall be submitted to the FWS.

7. The COE shall arrange a meeting between representatives of the contractor, the FWS, the FDEP, 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. From March 1 through April 30 and November 1 through November 30, 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 affect 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).

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. Such lighting shall be shielded low pressure sodium vapor lights to minimize illumination of the nesting beach and nearshore waters. Red filters should be placed over vehicle headlights (i.e., bulldozers, front-end loaders). Lighting on offshore equipment shall be similarly 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 South Florida Ecosystem Office within 60 days of completion of the proposed work for each year when activity has occurred. Each report shall 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.

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 threatened or endangered sea turtle specimen, initial notification must be made to the FWS' Law Enforcement Office in Miami, Florida, at (305) 526-2789. 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.

*Dade County and all sand transfer plants*

1. Material placed on the beaches shall be sand that is similar to that already existing at the beach site in both coloration and grain size. 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 a No. 200 sieve and shall not contain, on average, greater than 5 percent coarse gravel or cobbles, exclusive of shell material retained by a No. 4 sieve.

2. Daily early morning surveys shall be required if any portion of the beach nourishment project occurs during the period from April 1 to November 30. Nesting surveys shall be initiated 65 days prior to nourishment activities or by April 1, whichever is later. Nesting surveys shall continue through the end of the project or through September 30, whichever is earlier. If these surveys find nests in areas where they may be affected by construction activities, the eggs of those nests shall be relocated per the following requirements:

    a. 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 FDEP 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.

b. Only those nests that may be affected by construction or sand transfer 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.

3. Immediately after completion of the beach nourishment project or sand transfer and prior to April 1 for three subsequent years, sand compaction shall be monitored in the area of restoration in accordance with a protocol agreed to by the FWS, the FDEP, 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 1. 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 FWS prior to any tilling actions being taken. An annual summary of compaction surveys and the actions taken shall be submitted to the FWS. This condition shall be evaluated annually and may be modified if necessary to address sand compaction problems identified during the previous year.

   a. 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 nine averaged compaction values.

   b. 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 April 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.

4. Visual surveys for escarpments along the project area shall be made immediately after completion of the beach nourishment project and prior to April 1, for three subsequent years. Results of the surveys shall be submitted to the FWS 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 April 1. 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 FWS 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 FWS will provide a brief written authorization that describes methods to be used to reduce the likelihood of affecting existing nests. An annual summary of escarpment surveys and actions taken shall be submitted to the FWS.

5. The COE shall arrange a meeting between representatives of the contractor, the FWS, the FDEP 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 1 to November 30, 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 affect 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 1 to November 30, all on-beach lighting associated with the project shall be limited to the immediate area of active construction only. Such lighting shall be shielded low pressure sodium vapor lights to minimize illumination of the nesting beach and nearshore waters. Red filters should be placed over vehicle headlights (i.e., bulldozers, front-end loaders). Lighting on offshore equipment shall be similarly 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 South Florida Ecosystem Office within 60 days of completion of the proposed work for each year when activity has occurred. Each 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 threatened or endangered sea turtle specimen, initial notification must be made to the FWS' Law Enforcement Office in Miami, Florida, at (305) 526-2789. 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.

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 FWS believes that no more than those sea turtle nests and eggs that may be missed by a nest survey and egg relocation program, or those laid during the period when an egg relocation program is not required, will be incidentally taken. The FWS estimates this annual take to be three nests which may be missed by surveyors and 270 eggs rendered inviable by relocation. 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 FWS 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.

*Palm Beach County and Broward County*

1. Appropriate native salt-resistant dune vegetation should be established on the restored dunes. The FDEP's 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 three years following beach nourishment to determine whether sea turtle nesting success has been adversely affected.

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.

*Dade County*

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 FDEP's 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 three years following beach nourishment to determine whether sea turtle nesting success has been adversely affected.

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

## REINITIATION

This concludes formal consultation on the action(s) outlined in the initiation 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.

Thank you for your cooperation in the effort to protect threatened and endangered sea turtles and their nesting habitat. If you any questions regarding this biological opinion, please do not hesitate to contact Chuck Sultzman of our office at (561) 562-3909.

Sincerely,

Craig Johnson
Supervisor, South Florida Ecosystem Office

cc:
FWS, Jacksonville, FL (Attn: Sandy MacPherson)
FDEP (OPSM), Tallahassee, FL
NMFS, St. Petersburg, FL

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PORT EVERGLADES
Hollywood/Ft. Lauderdale/Dania

Port Everglades
Department of Broward County
1850 Eller Drive
Fort Lauderdale, FL, U.S.A. 33316-4201
(954) 523-3404 · Fax (954) 468-3506

October 9, 1996

A.J. Salem, Chief, Planning Division
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-019

Dear Mr. Salem:

Port Everglades appreciates the opportunity to review and provide comments regarding the Draft Feasibility Report and Draft Environmental Impact Statement (DEIS) for the Coast of Florida Erosion and Storm Effects Study, Region III. The following are staff comments which are encouraged to be incorporated into the Final EIS.

Page 98, paragraph 205 and page 132, paragraph 273 of the Feasibility Report, together with page EIS-13, paragraph 2.4.2.3.2 of the DEIS, state that the only recommended modification to the John U. Lloyd project segment is a nearshore berm site as an alternative maintenance dredged material disposal site. It should be noted that there is an ongoing U.S. EPA study to locate an offshore dredged material disposal site to the east of the Port Everglades Entrance Channel. These reports should be consistent with this ongoing study.

Port Everglades Project, Map 20 of Appendix A, indicates an Army Corps of Engineers maintenance depth responsibility along the Intracoastal Waterway, south of the Turning Basin, 36-feet for a width of 400 feet. However, the current project depth for this area is 42 feet MLW for a width of 500 feet. In addition, the project depth of the outer entrance channel is 47 feet MLW for a width of 500 feet, while the map incorrectly shows a project depth of 45 feet. This map needs to reflect the current project depths for Port Everglades Harbor.

Page B-15, paragraph B-74 of Appendix B sites a study titled "Survey-Review Report on Port Everglades Harbor, Florida". It should be noted that this study is dated August 16, 1957 and includes data and recommended project depths which are no longer current.

Page D-191, paragraph D-383 of Appendix D states "Since 1931, the inlet has been designated as a Federal project, and is currently maintained to an outer depth of 47 feet MLW and a width of 500 feet." It should be noted that the project depth of the inner channel is 42 feet MLW and 450 feet wide, while the outer channel is 47 feet MLW and 500 feet wide.

Tables F-19, F-20, and F-21 of Appendix F describe Storm Damage Model Input data for a Port Everglades Sand Transfer Plant. They note that this project was eliminated during the initial screening of alternatives. It is generally agreed that the Port Everglades Channel Entrance is responsible for extensive and ongoing beach accretion to the north and beach erosion to the south of the entrance jetties, while shoalling naturally occurs both offshore and inside the harbor entrance. This is described in detail on pages D-194 through D-197 of Appendix D. The feasibility of a sand transfer plant alternative should therefore be revisited by the U.S. Army Corps of Engineers in order to restore the natural net littoral drift rates as recommended on Page D-197, paragraph D-398 of Appendix D. In addition, please refer to the Port Everglades Inlet Management Plan, dated March, 1994, prepared by Coastal Technology Corporation for the Broward County Department of Natural Resource Protection regarding this subject.

Page G-11, paragraph 6.b. of Appendix G, states that in Broward County, there are 150.76 Federally held acres of easement interest acquired in support of the Port Everglades Harbor project. If this refers to the portion of the Port Jurisdictional Area bounded by the Turning Notch to the north, the Dania Cutoff Canal to the south, the Intracoastal Waterway to the east, and McIntosh Road to the west, it should be noted that most of this 150 acre area has been developed by Port Everglades as the Southport Container Facility. There is presently an area within Southport totalling approximately 20 acres, which is designated as an on-shore dredge disposal site.

This concludes the comments of the Feasibility Report, DAIS and related Appendices prepared by the staff of Port Everglades. Feel free to direct any questions regarding these comments to Mitchell Harvey, Strategic Planning Manager or Allan Sosnow, Environmental Projects Manager.

Sincerely,

Maurice F. Canady, Jr., PE, Director
Construction Management and Planning Division

MFC:MNH

cc: James J. O'Brien, Port Director
Gene F. Ciccarelli, Deputy Port Director
Bob Flint, Director of Operations
Mitchell N. Harvey, AICP, Strategic Planning Manager
Allan D. Sosnow, Environmental Projects Manager
Steve Sommerville, Director, Broward County Department of Natural Resources

**RESPONSE TO COMMENTS FROM MAURICE F. CANADY, JR., PORT EVERGLADES, LETTER DATED OCTOBER 9, 1996.**

1. Paragraph 2. The primary focus of the Coast of Florida Erosion and Storm Effects Study is to protect the valuable resources along the coastline. Sand is a very valuable resource, especially in South Florida. As such, a keen study interest is to maintain all available sand within the nearshore environment. A nearshore berm site off of J.U. Lloyd Park has been identified and recommended by this study, for this purpose. If dredged material is suitable for nearshore disposal it is hoped that the material would be placed in this nearshore site. The referenced U.S. EPA study for an offshore site could be used for non-beach quality dredged material through the Operations and Maintenance (O&M) navigation project.

2. Paragraphs 3 and 5. The authorized Port Everglades Federal Navigation project is for the entrance channel to 45 to just inside the jetties. Initial construction of the entrance channel included an additional overdepth of 2 feet, since rock occurs near project depth. The entrance channel is authorized to be maintained to the 45 foot depth. The reference to the 47 foot depth on page D-191, paragraph D-383 includes a 2-foot allowable overdepth; however, the authorized maintained channel depth is 45 feet.

3. Paragraph 6. The feasibility and economic justification of a Sand Transfer Plant was assessed for Port Everglades Inlet during the Coast of Florida Erosion and Storm Effects Study. As identified in this study's sediment budget (Figure D-47, Page D-195), the net longshore sediment transport rate in the vicinity of Port Everglades Inlet is 42,000 cyds per year from the north. Of this amount, 30,000 cyds per year is deposited along the shoreline between monuments R-79 and R-85, to the north of the Inlet. It is estimated that approximately 5,000 cyds per year is lost to the system, to offshore transport, leaving only 7,000 cyds per year available for capture by a Sand Transfer Plant. The Port Everglades Inlet Management Plan basically confirms this sediment budget.

This small amount of material is not sufficient to economically warrant the investment in the development of a Sand Transfer Plant for Port Everglades. In the future, if the physical processes and/or the geomorphic/sediment transport responses change at Port Everglades resulting in increased volumes of available sand, the viability of a Sand Transfer Plant could be reassessed for economic justification.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
100 ALABAMA STREET, S.W.
ATLANTA, GEORGIA 30303-3104

OCT 8 - 1996

Mr. A.J. Salem
Chief, Planning Division
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232
Attn: Mr. Michael Dupes, CESAJ-PD-ER

Subject: Draft Environmental Impact Statement (DEIS) for the Coast of Florida - Erosion and Storm Effects Study, Region III, Palm Beach, Broward, and Dade Counties, FL

Dear Mr. Salem:

Under the authority of Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA), EPA, Region 4 has reviewed the subject document; an evaluation of the consequences of an array of projects and alternatives thereof which will attempt to modify natural coastal geomorphic processes on the southeastern coast of Florida. Specifically, these actions deal with the immediate construction of widened beach widths with fill material and/or metered processes such as building nearshore berms which in time should also widen the areal extent of the dry beach.

Sand transfer facilities are proposed for Lake Worth and South Lake Worth Inlets to provide operational efficiencies and militate the sand shadow created by the jetties associated with their navigation channels. There is a terrestrial component to the proposal, viz., efforts will be made to stabilize area dunes through the use of grass plantings.

We were pleased to see a single document used to evaluate the beach nourishment activities being pursued by the Jacksonville District in Region III. The number and scope of these projects will give decision-makers a much better perspective of their magnitude than would be the case were they presented singly. Further, the wide variation in their benefit/cost ratios will give these same officials a better sense of the amplitude of their societal importance. A review of our records indicates that we have commented on most of the these projects in the immediate past; hence, we have only provided general observations in this instance.

Interestingly, some of the beach fill may utilize a Bahamian sand source. Use of this foreign material would not put

local resources at risk from dredging activities, but there are also some potential negative ramifications which will require further investigation prior to its wide spread use on the subject reaches. However, given the lack of local material, there is a compelling need to examine any/all sand sources which could be used to widen the subject beaches. This need is serving as a powerful stimulus to complete the necessary studies, especially those regarding long-term consequences to nesting turtles.

It is anticipated that the addition of fill material will reduce damage to shoreline properties from small storm events and expand the recreational potential within the nourished reaches. A management strategy to lessen the inevitable impacts to the nearshore environment, especially inundation of hard bottom habitat, will be implemented. Mitigation of unavoidable adverse impacts will be accomplished after the extent of actual losses is determined by subsequent visual inspection and refinement of the equilibrium profile equation.

Purpose and Need Considerations

As we have repeatedly indicated to the District, EPA is equivocal regarding the issue of pumping sand onto an eroding shoreface. Generally, we have not opposed beach nourishment when it provided a disposal site for a proximate, already authorized navigation project. The key factor, however, was whether or not biologically sensitive resources would be adversely affected through the use of this disposal method. As is usually the case, the value of adjacent structures, declining width of the recreational beach, and the perceived need to provide continued economic potential to shorefront property serve as the rationale for beach nourishment. The dollar value assigned to these factors in the benefits/costs calculations almost always are deemed to subsume any environmental losses.

We are pleased to note that this document acknowledges how erosive marine processes are affecting the entire coastline of Florida. The cumulative costs, both environmental and economic, of providing shoreline protection to all these areas can only be realistically examined in this comprehensive manner. This is especially true as the text indicates that federal interest and more importantly funding available for these type projects is evolving. Our concerns in this regard center not on the overall economics, but rather on how these changes could affect potential mitigation (direct and indirect) monies available to lessen environmental impacts.

Necessary Ongoing Investigations

The noted mitigation measures can lessen to some greater/lesser degree certain issues which have fostered concerns about previous, similar proposals, e.g., direct/immediate loss of seagrass resources. However, we recommend that further coordination continue between involved

Corps technical staff sections to: more fully consider the impacts to the important biological resources present throughout the project area, especially as the deposited sand migrates during equilibrium processes; evaluate adjacent nearshore impacts of mining sand from the remaining borrow site in Palm Beach County; and better define the action's resultant physical and water quality characteristics/impacts after sand placement. Some qualitative discussion should be made regarding the impacts/consequences of mining sand from the Bahamian sites. Notwithstanding its relative proximity to the nourished beaches, some thought should be given to the potential of introducing exotics with this material. Similarity when a precise borrow location is established, the site should actually be examined for the presence of hazardous/toxic materials which may have been dumped there.

Additionally, from a practical standpoint staff should verify that the public will actually be able to access the upgraded beach after it has been constructed. It has been our experience that adequate, appropriately designed parking together with passage to the beach for non-shorefront residents has proven elusive. Since a major component of the purpose/need benefits associated with these action(s) accrue from overall recreational potential, sufficient entry to the beach is important. While we noted that there is total of 218 public access points, the average is every half mile rather every quarter mile which we understand is required.

Proposed Mitigation

Some of the environmental impacts of this proposal have been lessened via the noted management decisions, e.g., scheduling construction activities outside of the peak sea turtle nesting season. However, an undetermined amount of nearshore hardbottom communities will be buried by fill material for a period of time. Moreover, the deposition of dredged material from maintenance actions throughout the region will adversely affect biota in similar impacted nearshore habitats.

The consequences and overall significance of this functional loss of hard bottom habitat on both mobile and sessile species have historically been a matter of discussion among the resource agencies and the Jacksonville District. Because this remains a matter of contention, additional site specific monitoring and analysis should be conducted. These studies would isolate and define the level of mitigation necessary to compensate for the adverse consequences from this and associated actions throughout the project area.

Significant losses of important hard bottom/reef fishery habitat along the nourished beaches are anticipated/probable. These losses are of great interest to EPA. While no details are provided in this generic document, mitigation plans for the "permanent" inundation caused by broadening the beach have