

APPENDIX S

SECTION 404(B) EVALUATION

**SECTION 404(B) EVALUATION
ST. LUCIE COUNTY SOUTH BEACH AND DUNE RESTORATION PROJECT
ST. LUCIE COUNTY, FLORIDA**

I. Project Description

A. Location.

- (1) The proposed work will occur along the Atlantic Ocean shoreline of St. Lucie County, Florida. The Applicant's preferred plan includes excavation of sand from a borrow area approximately three miles offshore of St. Lucie County and placement of beach fill along about 3.4 miles of shoreline south of the Florida Power and Light Hutchinson Island Power Plant (FPL Plant), between FDEP reference monuments R-98 and R-115 +1,000 ft (St. Lucie/Martin County line).
- (2) In 2009, the applicant submitted a permit application to the USACE describing a project with a north segment from R-87.7 to R-90.3 and a south segment from R-98 to R-115. On January 5, 2012, after substantial completion of the EIS and the 404(B) analysis, the applicant submitted a letter to the USACE deleting the northern segment of the project. This change reduced the amount of sand required (from 610,000 cy to 485,900 cy) and reduced impacts of the applicant's preferred plan to 0.57 acre of hardbottom habitat requiring compensatory mitigation of 0.78 acre of hardbottom habitat. Those changes did not materially affect the analysis below and the evaluation remains unchanged (the same as presented in the DEIS).

B. General Description. The Applicant's preferred plan includes the following principal activities.

- (3) A hopper dredge will excavate beach-quality sand from the offshore borrow area (St. Lucie Shoal) located in state waters. The hopper dredge will transport dredged sand to a location in the Atlantic Ocean near the project site and pump the sand as slurry to the project beach. Placement of sand fill will occur within the dune and beach restoration template along the project beach. Depending on the location along the shoreline, the project fill will widen the beach from its 2008 surveyed position between about 50 ft and 150 ft, depending on location.

Renourishment for the fill placement will occur at approximately 10-year intervals after initial construction. Offshore borrow area dredging will occur on the same cycle.

- (4) Prior to beach fill activities, the Applicant's preferred plan includes construction of artificial reef in one or more nearshore locations along the project beach extent. Reef structure placement will occur within 1,000 ft of the

mean high water line in water depths up to 15 ft. The reef structures will consist of limestone rock 4 to 6 ft in diameter.

C. Authority. In November 2002, the U.S. Army Corps of Engineers (USACE) completed a Section 905(b) for the South St. Lucie County Beaches from Florida Department of Environmental Protection (FDEP) Reference Monument R-77 to R-115 +1,000 ft (St. Lucie/Martin County line). In 2004, the USACE initiated a shore protection project feasibility study of the same area. The feasibility study only partially advanced due to limited funding. In response, St. Lucie County has begun development of an initial non-federal project to address the severely eroding shoreline. The federal government provides no project sponsorship for the initial nourishment project. However, the USACE anticipates possible development of a Federal Shore Protection Project to sponsor future re-nourishments of the project beach.

D. General Description of Dredged or Fill Material.

- (1) General Characteristics of Material. . The native beach has a composite mean grain size of 0.49mm. South Hutchinson Island beach sand consists of light gray to very pale brown, moderately to poorly sorted, medium grained sand with 50.5% carbonate, 1% organic, 2.2% gravel and <1% fines content. The proposed borrow area for the initial project is estimated to have a composite mean grain-size of 0.42mm and a composite median grain size of 0.36mm, and less than 2% fines (material passing a #230 U.S. Standard Sieve). The borrow area for the initial project has an estimated overfill factor of 1.40; the long-term borrow area has an estimated overfill factor of 1.52.
- (2) Quantity of Material. The project will require an estimated 485,900 cy of sand to fill the project template. A survey immediately pre-construction will define the actual required amount. The Applicant has indicated that maintenance of the initial project will require a renourishment project about 10 years over the next 50 years (5 additional projects), and that each renourishment project will require about 177,000 cubic yards of sand. Therefore, the project would require about 1,370,900 cy of sand for a 50-year project life.
- (3) Source of Material. The proposed borrow area locates about 3 miles east of the project beach in state waters with water depths of about -40 feet NAVD88. The area has not previously experienced dredging activity. Sand from these sources will conform to State of Florida standards, including compatibility with the native beach sand, for use as beach fill. For material sources to support renourishment projects over the remainder of the project life, the Applicant has provided conceptual borrow areas farther to the northeast along the same shoal, but in federal waters. The conceptual borrow areas appear to contain more than sufficient sand for the projected renourishment projects. The applicant has also considered and in the future will also consider upland sand sources as alternatives to offshore sand dredging.

E. Description of the Proposed Discharge Site.

- (1) Location. The beaches on south Hutchinson Island, St. Lucie County Florida will receive the sand dredged from an offshore borrow site. Specifically, the project locates south of the FPL Plant, between FDEP reference monuments R-98 – R-115+1,000 ft (the St. Lucie/Martin County line).

The mitigation reef structures will locate in various locations along the 3.4-mile project shoreline, between about 300 and 1,000 ft seaward of the shoreline, in existing water depths roughly 15 ft or less.

- (2) Size. The beach nourishment area includes about 3.4 miles of shoreline, and the nourishment will widen the beach between 50 ft and 150 ft, depending on location. Mitigation reef may cover about 0.78 acres of sand bottom with a sand depth over rock of at least eight inches.
- (3) Type of Site. The beach nourishment site includes eroded recreational beach with naturally occurring hardbottom variously exposed between the approximate mean low water shoreline and about 1,000 ft offshore. The sand bottom sites where mitigation reef structures will locate consist of 2 feet or more of fine to coarse sand (similar to that on the beach) covering any hardbottom or subsurface rock substrate.
- (4) Type of Habitat. The beach fill disposal site comprises dune, supratidal, tidal, and subtidal beach zones. The placement site for the mitigation structures is a submerged, often turbid, relatively shallow, and energetic bare sand habitat.
- (5) Timing and Duration of Discharge. The Applicant desires dredging and sand placement activities to begin in late fall of 2011 (November 1 or later) and end before May 1, 2012, to avoid peak marine turtle nesting season. Construction of the mitigation reef will begin prior to the start of beach construction and end before construction start.

F. Description of Disposal Method. A hopper dredge will hydraulically pump sand from the ocean floor and transport the sand to a point offshore of the project beach. The hopper dredge will then hydraulically pump the sand from the ship through a pipeline lying on the ocean floor to the project beach. On the beach, the hydraulically pumped sand will discharge inside a shore-parallel berm, where the sand will settle and the water will flow back to the ocean. As the sand builds up, grading equipment will grade the sand into the desired template.

II. Factual Determinations

A. Physical Substrate Determinations.

- (1) Substrate Elevation and Slope. The final design will provide all signed and sealed engineering template details for construction. Schematic design of the Applicant's preferred plan view and cross section drawings area available in the EIS (Appendix B).
- (2) Sediment Type. Sand from the borrow areas is fine to coarse grained quartz sand with varying amounts of small broken shell. See also I.D.(1) above.
- (3) Dredge/Fill Material Movement. Cross-shore and longshore currents (principally to the south) will move some of the fill material.
- (4) Physical Effects on Benthos. The placement of sand on the beach face will result in the burial and loss of most of the beach infauna. Key components of these assemblages are surf clams, mole crabs, and polychaete worms. Assuming typical planktonic larval recruitment of these and other benthic species to the project site, surf zone infauna should recover within one or two years after completion of construction. Based on known characteristics of the dredged sand and the required quality control over the sand placed on the beach, the site should remain sufficiently similar in physical characteristics to recruit a similar infaunal community.

B. Water Circulation, Fluctuation, and Salinity Determination.

- (1) Water Column Effects. Fill placement will not have long-term or significant impacts on salinity, water chemistry, clarity, color, odor, taste, dissolved gas levels, nutrients, or eutrophication.
- (2) Current Patterns and Circulation. Currents in the project area are both tidal and longshore. Net movement of water due to the longshore current is typically north to south.
- (3) Normal Water Level Fluctuations and Salinity Gradients. Tides in the project area are semidiurnal. Elevations of mean high water and mean low water in St. Lucie County are approximately +0.4 ft NAVD88 and -3.0 ft NAVD88, respectively

C. Suspended Particulate/Turbidity Determinations

- (1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site. A temporary increase in turbidity levels will occur in the waters adjacent to the hopper dredge during dredging and in the vicinity of the beach shoreline near the sand slurry discharge point. Short-term, localized turbidity increases should have no significant adverse impacts. Construction activities should not result in exceedence of state turbidity standards outside of the approved beach mixing zone or at the borrow site.

(2) Effects on the Chemical and Physical Properties of the Water Column.

- (a) Light Penetration. The placement and spread of fill on the beach will increase turbidity in the nearshore area during construction. The immediate nearshore area is a high energy system, subject to naturally occurring turbidity fluctuations. Temporary turbidity increases due to project construction should not prove significant. The State of Florida requires a nearshore turbidity monitoring program during construction that includes a plume mixing zone of 150 meters from the sand discharge sites on the beach unless an exemption is applied for and granted. Turbidity during construction outside of the mixing zone will not exceed state numeric standards. A post-construction monitoring program will assess the nearshore hardbottom communities for potential secondary impacts due to turbidity and sedimentation adjacent to the equilibrium toe of fill.
- (b) Dissolved Oxygen. This project will not significantly alter dissolved oxygen levels.
- (c) Toxic Metals, Organics, and Pathogens. The project will release no toxic metals, organics, or pathogens.
- (d) Aesthetics. Construction activities (dredging and beach placement) will reduce aesthetic qualities during construction. The completed project will provide a long-term increase in aesthetic quality.

(3) Effects on Biota.

- (a) Primary Productivity and Photosynthesis. The level of suspended particles in the surf zone will temporarily increase during construction. During construction, suspended material will reduce the intensity of sunlight reaching existing algae, temporarily restricting photosynthesis and primary productivity in local areas. Post-construction monitoring of nearshore hardbottom communities will include assessment of potential project-related secondary impacts due to turbidity and sedimentation.
- (b) Suspension/Filter Feeders. Suspension feeders will experience short-term impacts during construction, but no long-term adverse impact.
- (c) Sight Feeders. Visual feeders will experience short-term impacts due to elevated turbidity, but no long-term adverse impact.
- (d) Contaminant Determinations. Deposited fill material will not introduce, relocate, or increase contaminants.

- (e) Aquatic Ecosystem and Organism Determinations. Grain size characteristics and composition of the proposed fill material closely match those of the existing beach sediments. Therefore, no sediment-related impacts are expected. The proposed fill material meets the exclusion criteria and therefore will require no additional chemical-biological testing.
1. Effects on Plankton. Although turbidity may result in short-term effects (e.g., clogging of feeding appendages) on plankton, no adverse long-term impacts to planktonic organisms are anticipated.
 2. Effects on Benthos. Non-motile benthic species unable to migrate away from the project area will be covered and lost. However, due to the high fecundity and turnover rates of benthic invertebrates, full recovery of the benthic community should occur within one to two years.
 3. Effects on Nekton. Elevated turbidity related to the proposed project should not affect these species due their motility and ability to avoid undesirable conditions. No long-term adverse impacts are anticipated.
 4. Effects on the Aquatic Food Web. The project will not likely create long-term adverse impacts to any trophic group in the food web.
 5. Effects on Special Aquatic Sites.
 - a. Hardbottom Communities. The Applicant's preferred plan includes beach fill that at equilibrium will cover 0.55 acres of nearshore hardbottom habitat. Burial of habitat will occur during initial placement and subsequent diffusion of the fill material onto the hardbottom habitat. An additional 0.02 acre of hardbottom impact may occur with impacts from pipelines running from the hopper dredge to the shore discharge point. Modeling suggests that impacts to the nearshore hardbottom should decrease between beach nourishment activities, estimated to occur at approximately 10-year intervals. Appropriate mitigation habitat (artificial reef) will create suitable replacement habitat for algae, epibiota, fish, and, marine turtle species. To mitigate for impacts to hardbottom habitat functions, project construction will include creation of low-medium relief artificial hardbottom. Exact required area is dependent upon comparison of pre- and post-construction field survey data of hardbottom exposure. Assessment of analogous mitigation reef structures placed in similar environments for nearby projects indicate that the mitigation structures may adequately compensate for losses in habitat function associated with impacts to the existing nearshore hardbottom. Physical and biological monitoring will assess the impacts to the existing nearshore hardbottom and compensatory effects of the mitigation reef. No hardbottom communities occur within the proposed offshore borrow area (dredge site).

- b. Sanctuaries and Refuges. No sanctuaries or wildlife refuges occur within the proposed dredge and disposal areas.
 - c. Wetlands. No wetlands occur within the proposed dredge and disposal areas.
 - d. Mud Flats. No mud flats occur within the proposed dredge and disposal areas.
 - e. Vegetated Shallows. No seagrass beds occur within or adjacent to the dredge, beach fill, or mitigation reef sites.
6. Endangered and Threatened Species. The proposed project will affect 3.4 miles of the approximately 1,400 miles of available sea turtle nesting habitat in the southeastern United States. Project construction will occur outside of the peak sea turtle nesting season (May 1 – October 31) and, therefore, will likely avoid impacts to nesting sea turtles during construction. The will not affect sea turtle critical habitat as the USFWS has not designated critical habitat within the continental United States.

Research has shown that the principal effect of beach nourishment on sea turtle reproduction is a reduction in nesting success, most often limited to the first year following project construction. (USFWS 2005). Nesting success decreases during the year following nourishment as a result of escarpments obstructing beach accessibility, altered beach profiles, and increased compaction. Research has also shown that the impacts of a nourishment project on sea turtle nesting habitat are typically short-term because a nourished beach will be reworked by natural processes in subsequent years, and beach compaction and the frequency of escarpment formation will decline (USFWS 2005).

St. Lucie County will follow the reasonable and prudent measures the recommended by the USFWS in its Biological Opinion. These measures will help minimize impacts to sea turtles. Widening of a critically eroded beach with beach-compatible sand will increase the amount of suitable nesting area available to sea turtles. This may aid in the population recovery of these protected species.

7. Other Wildlife. No significant adverse impacts to terrestrial foraging mammals, reptiles, wading birds, or other wildlife are expected. These highly motile organisms are able to actively seek favorable environmental conditions for foraging and nesting. Restoring the project beach and dune will have a long-term benefit by providing additional habitat.

8. Actions to Minimize Impacts. Implementing all practical safeguards during project construction to preserve and enhance aesthetic, recreational, and economic values in the project area. The environmental permits and contractor specifications will include these measures.

(f) Proposed Disposal Site Determinations.

1. Mixing Zone Determination. The fill material will not cause unacceptable changes in the mixing zone specified in the State Water Quality Certificate in relation to: depth, current velocity (speed and direction), current variability, degree of turbulence, stratification, or ambient concentrations of constituents.
2. Determination of Compliance with Applicable Water Quality Standards. The project will not violate state water quality standards outside of the established mixing zone. At no time will nearshore turbidity levels exceed 29 NTUs above background levels.
3. Potential Effects on Human Use Characteristics.
 - a. Municipal and Private Water Supplies. Project implementation will not affect municipal or private water supplies.
 - b. Recreational and Commercial Fisheries. The disposal of dredged material on the beach project will not permanently impact recreational and commercial fisheries. Minor adverse impacts to recreational fishing along the beach fill area may result from 0.57 acres of impact to the nearshore hardbottom immediately adjacent to the shoreline; however, this may likely occur as a seaward translocation of the fishing resource coincident with the addition of beach fill. The mitigation reef structures constructed in the project area nearshore waters may create increased or new opportunities for recreational fishing.
 - c. Water Related Recreation. Beach restoration will enhance beach recreation by increasing the area of beach for public use. Increased turbidity in the vicinity of fill sites may temporarily affect nearshore snorkeling/SCUBA and fishing. The presence of construction-related equipment will create public safety risks at the beach sites. The creation of nearshore low relief mitigation reef should provide alternate snorkeling/SCUBA habitat accessible from the beach. Given the narrow scale of beach fill that the project will place immediately along the beach face, landward of locations where swimming and surfing occur, adverse impacts to swimming and surfing will not likely occur. The presence of the mitigation reefs may result in minor effects to surf conditions associated with the structures' slight elevation of the seabed well seaward of the normal zone of wave breaking.

- d. Aesthetics. The stabilization of an eroding beach will improve aesthetics of the beach.
 - e. Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. The widening of an eroded beach will increase the area available for public recreation at the county parks within the project area. Additionally, the proposed restoration will provide storm protection for these parks.
 - f. Determination of Cumulative Effects on the Aquatic Ecosystem. The proposed beach restoration project should have any significant cumulative effects that would result in a major impairment of water quality of the existing aquatic ecosystem. Dredging at the borrow site should likewise result in no significant cumulative effects to the aquatic ecosystem. The construction of nearshore mitigation reef will compensate for the anticipated 0.57 acres of hardbottom impact along the project shoreline.
 - g. Determination of Secondary Effects on the Aquatic Ecosystem. Placement of the fill material will not likely cause adverse secondary effects on the aquatic ecosystem. Long-term monitoring will assess and document secondary impacts of turbidity and sedimentation upon adjacent hardbottom habitats (if any).
- III. Findings of Compliance or Non-compliance with the Restrictions on Discharge.
- A. No significant adaptations of the guidelines were made relative to this evaluation.
 - B. No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States.
 - C. After consideration of disposal site dilution and dispersion, the discharge of fill materials will not cause or contribute to, violations of any applicable State of Florida water quality standards for Class III waters. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
 - D. The St. Lucie County South Beach and Dune Restoration Project will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended.

- E. The placement of fill material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.
- F. On the basis of the guidelines, the proposed disposal site for the discharge of dredged material is specified as complying with the requirements of these guidelines.