

FINAL ENVIRONMENTAL IMPACT STATEMENT JUNE 2003

BROWARD COUNTY SHORE PROTECTION PROJECT SEGMENTS II AND III BROWARD COUNTY, FLORIDA

LEAD AGENCY: Jacksonville District, U.S. Army Corps of Engineers

COOPERATING AGENCY: Broward County Department of Planning and Environmental Protection

This Final Environmental Impact Statement describes the proposed plan and the alternatives evaluated for the Broward County Shore Protection Project. The proposed project involves placement of approximately 2.5 million cubic yards of material along 11.8 miles of Broward County's coastline. The authorized project includes two segments. In Segment II (Hillsboro Inlet to Port Everglades), fill will be placed in southern Pompano Beach, Lauderdale-By-The-Sea, and northern Fort Lauderdale. In Segment III (Port Everglades to the south County line), fill will be placed in John U. Lloyd State Park, Hollywood, and Hallandale. Two T-head groins and a jetty spur will be constructed along approximately 700 feet of shoreline immediately downdrift of Port Everglade Inlet to stabilize this erosional hot-spot. Fill will be obtained from five discrete borrow areas located offshore of the central and northern portions of the County. Two of the previously defined borrow areas were eliminated due to environmental and geotechnical concerns. The boundaries of the remaining five borrow areas were redefined to avoid small patch reef formations, rubble areas and seagrass beds, and increase buffer distances from adjacent, mature reef communities. Geotechnical analysis indicates that the sediments within the borrow areas are compatible with existing beaches and contain an average of 2.6% silt and 6.4% rock. Authorization for Federal participation in periodic nourishment of Segment II expires in 2020, and in Segment III, in 2026. Alternatives considered include no action, beach fill with periodic nourishment using alternative sand sources, modifications/reductions to beach fill amounts, widths, elevations, and/or extent, construction of groins and/or breakwaters, and beach fill/groin combination. Beach fill amounts have been modified to minimize coverage of nearshore hardbottom habitat and a mitigation plan has been developed to compensate for unavoidable impacts to nearshore hardbottom habitat/essential fish habitat. Biological, sedimentation, and turbidity monitoring during all phases of project construction will be implemented to assure protection of hardbottom resources within and adjacent to the fill and borrow sites.

For more information and comments, contact Ms. Terri Jordan, U.S. Army Corps of Engineers, Planning Division, P.O. Box 4970, Jacksonville, Florida 32232-0019, phone (904) 232-1817 or facsimile 232-3442. Comments must be received within 30 days of publication of the Final Environmental Impact Statement in the Federal Register.



**U.S. Army Corps
of Engineers**
JACKSONVILLE
DISTRICT

SUMMARY
FINAL ENVIRONMENTAL IMPACT STATEMENT
ON
BROWARD COUNTY SHORE PROTECTION PROJECT
SEGMENTS II AND III
BROWARD COUNTY, FLORIDA

Need or Opportunity. Broward County is located on the southeast coast of Florida and includes 24 miles of coastline and two coastal inlets, Hillsboro Inlet and Port Everglades Inlet. The coastal cities from north to south are Deerfield Beach, Hillsboro Beach, Pompano Beach, Lauderdale-By-The-Sea, Fort Lauderdale, Dania Beach, Hollywood and Hallandale. Hillsboro Inlet is located approximately 4 miles south of the north county line. This is an improved inlet designed for recreational and commercial navigation. Port Everglades channel is located approximately 10 miles south of Hillsboro Inlet, providing entrance to Port Everglades, the second largest commercial port in the State of Florida.

The coastline of Broward County is low-lying and vulnerable to storm surge and other storm event damages. Shoreline recession continues to be a problem. Sediment transport along the Atlantic coastline is generally from north to south with some localized reversals due to tidal inlets or bathymetric irregularities. Inlets interrupt the normal transport of sediments along the coastline, and the need to maintain inlet channels for commercial and recreational purposes while providing and protecting beaches often results in conflicting interests and competing needs. Previously, beach protection projects within these segments were considered on a project-by-project basis. With the development of new technology, new laws, regulations and requirements, the existing and proposed projects will be considered as two units with regard to cost effectiveness and more efficient coastal management.

The proposed Broward County Shore Protection Project involves placement of approximately 2.5 million cubic yards of material along 11.8 miles of Broward County's coastline. During development of an environmentally acceptable project design, total fill placement was reduced by approximately 530,000 cubic yards and 0.4 miles of shoreline were eliminated from fill placement. The authorized project includes two segments. In Segment II (Hillsboro Inlet to Port Everglades), fill will be placed along beaches in southern Pompano Beach, Lauderdale-By-The-Sea, and northern Fort Lauderdale. In Segment III (Port Everglades to the south County line), fill will be placed in John U. Lloyd State Park, Hollywood, and Hallandale. Fill will be obtained from five discrete borrow areas located offshore of the central and northern portion of the County. Authorization for Federal participation in periodic nourishment of Segment II expires in 2020, and in Segment III, in 2026. The total fill requirement for the remainder

of the authorized project life, including the proposed project, is approximately 5.4 million cubic yards of sand.

Major Findings and Conclusions. The proposed Broward County Shore Protection Project will be in the National interest and can be constructed while protecting the environment from unacceptable impacts. Federal and County objectives include (1) the reduction of expected storm damages through beach nourishment and other project alternatives; (2) reestablishing beaches as suitable recreational areas; (3) maintaining suitable beach habitat for nesting sea turtles, invertebrate species and shorebirds; and (4) maintaining commerce associated with beach recreation in Broward County. The EIS considers possible adverse impacts on coral reefs and nearshore hardbottom communities, protected species, health and safety, water quality, aesthetics and recreation, fish and wildlife resources, and essential fish habitat. Under the recommended plans, mitigation measures would be required for: (1) impacts to sea turtles due to nourishment activities; (2) impacts to sea turtles due to groin construction; (3) impacts to sea turtles, manatees and right whales associated with dredge operations; (4) impacts due to placement of sand fill adjacent to or on nearshore hardbottom; (5) impacts to hardbottom communities/essential fish habitat due to increased turbidity or sedimentation from nourishment activities; and (6) impacts to hardbottom communities/essential fish habitat by mechanical damage, increased turbidity and sedimentation adjacent to the borrow areas. A mitigation plan has been developed to compensate for unavoidable impacts to nearshore hardbottom and essential fish habitat. A biological monitoring plan has been developed to assess direct, secondary and long-term effects to nearshore hardbottom habitat associated with the proposed project. A sedimentation monitoring plan has been established to assess, avoid, and/or minimize impacts to reef communities adjacent to the proposed borrow areas during project construction. Additionally, the nearshore hardbottom monitoring plan incorporates sedimentation monitoring activities into the comprehensive construction phase environmental investigations that will be conducted during project implementation. The National Marine Fisheries Service (NMFS) and the Florida Fish and Wildlife Conservation Commission's (FWCC) comments regarding the Draft Environmental Impact Statement (DEIS) have been addressed and resolved in the updated construction monitoring plan and the Habitat Equivalence Analysis (HEA) (Appendix F and H, respectively).

Alternatives. Alternative selection process involves the identification and preliminary assessment of possible solutions. Several alternatives were not evaluated further than the initial screening due to a combination of economic viability, effectiveness, and/or political or social acceptance. Those alternatives deemed possible were compared with cost estimates and benefits, and discussion of potential environmental impacts. Suggested alternatives should include computation of cost code of account-level cost estimates, including costs of lands, easements, rights-of-way, and mitigation, as well as Federal and non-Federal cost allocations. With the exception of the no-action plan, all non-structural alternatives were eliminated from detailed evaluation. The structural alternatives for detailed evaluation include beach fill with periodic nourishment using offshore sand sources; beach fill with periodic nourishment using alternative sand

sources; beach fill with periodic nourishment and stabilization by groins in the erosional hot-spot immediately downdrift of Port Everglades Inlet; and modifications to beach fill amounts, widths, elevations, and extent based upon resources discovered during biological investigations in the summer/fall of 2001.

Preferred Alternative(s). The findings of 2001 biological investigations and subsequent avoidance/minimization efforts during project redesign have decreased the initial fill placement from 3.0 million cubic yards (proposed in January 2001 GRR) to 2.5 million cubic yards, and reduced the shoreline length proposed for fill placement from 12.2 to 11.8 miles. The preferred alternative involves beach fill with periodic renourishment with initial fill placement of approximately 2.5 million cubic yards of material onto the beaches of Broward County. In Segment II (Hillsboro Inlet to Port Everglades), fill will be placed along beaches in southern Pompano Beach, Lauderdale-By-The-Sea, and northern Fort Lauderdale. Fill placement was eliminated between FDEP monuments R-72 and R-74 in Ft. Lauderdale. In Segment III (Port Everglades to the south County line), fill will be placed in John U. Lloyd State Park, Hollywood, and Hallandale. Fill placement in Dania Beach between FDEP monuments R-92 and R-99 was eliminated from the proposed plan during impact minimization and fill redesign. Berm elevations will range from +7 feet (NGVD) to +10 feet (NGVD) depending upon location. The project will result in a design mean high water shoreline extension from the Erosion Control Line of 100 feet, 20 feet, 0 feet, and 50 feet in Pompano Beach and Lauderdale-By-The-Sea, Ft. Lauderdale, John U. Lloyd State Park, and Hollywood/Hallandale, respectively. Additional advanced nourishment, overfill, and terminal transition fill will be placed.

Fill will be obtained from five discrete borrow areas located between hardbottom areas offshore of the central and northern portion of the County. The borrow areas are located from 0.3 to 0.9 miles offshore in water depths ranging from 30 feet to 70 feet. Two of the original seven proposed borrow areas were eliminated during project redesign due to the discovery of significant biological resources within and adjacent to the proposed borrow areas. Rocks contained in the borrow material will be segregated on the hopper dredge and deposited in two offshore rock disposal areas that are located within permitted artificial reef disposal areas. The northern rock disposal area is located approximately 2 miles offshore of Hillsboro Beach in approximately 380 feet of water. The southern rock disposal area is located approximately 2 miles offshore of Hollywood in approximately 200 to 350 feet of water, east of an area previously utilized as a rock disposal site by Broward County. The rock disposal areas were investigated using a remotely operated vehicle (ROV), and do not contain any hardbottom biological communities. Geotechnical investigations have determined that the sediments in the borrow areas are generally compatible with existing beaches and contain an average of 2.6% silt and 6.4% rock.

Segment II of the Broward County, Florida Shore Protection Project extends from Hillsboro Inlet to Port Everglades. The proposed project will renourish south Pompano Beach and Lauderdale-By-The-Sea; and restore the beaches of northern Fort Lauderdale for the first time. Fill will be placed to establish a design protective beach

width of 100 feet in Pompano Beach and Lauderdale-By-The-Sea, and 20 feet in Fort Lauderdale.

The project is based on the Coast of Florida Study (USACE, 1996) updated to 2001 conditions. The project fill area, including tapers, is 4.9 miles long and extends from SE 6th Street in Pompano (FDEP monument R-36) to 1620 S. Ocean Blvd. (R-43), and from 300 feet south of Commercial Blvd. (R-51) to Auramar Street in Ft. Lauderdale (FDEP monument R-72). The new beach will have a berm elevation of 9.0 feet (NGVD) and will require 935,000 cubic yards of sand fill dredged from five offshore borrow sites. The borrow areas are located between Deerfield Beach and Lauderdale-By-The-Sea and are 0.3 to 0.9 miles offshore.

Segment III of the Broward County Shore Protection Project is located between Port Everglades and the Broward/Miami-Dade County line. The project fill area in Segment III is approximately 6.9 miles long. The area includes the John U. Lloyd State Park, Dania Beach, and Hollywood/Hallandale shorelines. To date, both the Hollywood/Hallandale shoreline and a portion of the John U. Lloyd State Park shoreline have been nourished. The Dania Beach shoreline and the southern section of the John U. Lloyd State Park shoreline have never been improved by direct sand placement. No beach fill will be placed between FDEP monuments R-92 and R-99 in John U. Lloyd State Park/Dania Beach.

The proposed project will provide for beach nourishment of the majority of the Segment III shoreline. Beach fill, including transitions to reduce end losses, will extend from Port Everglades (R-86) to R-92 within John U. Lloyd State Park, and from the Dania Beach pier (R-99) to the Dade County line (R-128). The estimated sand fill volume for Segment III is approximately 1.54 million cubic yards. The proposed source of the sand fill will be from borrow sites noted above. The resulting equilibrated beach width is expected to average about 60 feet at the mean high water line. It is noted that extensive areas of low-profile, nearshore hardbottom exist along the entire Segment III project shoreline. Project redesign has minimized impacts to these hardbottom areas, and biological characterizations of the impacted nearshore hardbottom communities have determined the mitigatability of this habitat. The project berm width and required advanced nourishment were designed to provide maximum storm damage benefits while minimizing coverage of nearshore hardbottom habitat.

The Segment III project will also include the construction of three shore stabilizing structures (two T-head groins and a jetty spur) along approximately 700 feet of shoreline immediately downdrift of the Port Everglades Inlet. Previously, two sand fill projects were constructed along the northern John U. Lloyd State Park shoreline. Due to localized high erosional forces along this shoreline, both of these projects have been unsuccessful in maintaining a suitable protective and recreational beach. The purpose of the groins is to maintain the design shoreline at this location and minimize sand losses to Port Everglades Inlet channel. The shore stabilizing effects of the structures reduce the advanced nourishment requirement necessary to maintain the design

beach. Therefore, only a limited volume of advance fill will be placed within the limits of the structure field.

The structures will be of rubble mound construction and will include a T-head at the seaward end. The spacing between the groin stems is approximately 280 feet, and the distance between the T-heads is about 150 feet. Once the sand fill between the structures equilibrates, the seaward limit of the structures will be situated about 60 to 80 feet eastward of the design mean high water shoreline. The structures and associated design beach are not expected to impact any nearshore hardbottom or seagrass areas.

An additional component of the Segment III project will be the future establishment of a sand bypassing facility at Port Everglades. A detailed study to evaluate the physical, economic, and socio-political feasibility of implementing sand bypassing at Port Everglades is currently being conducted by Broward County and will be completed in the spring of 2003. If determined feasible, sand bypassing at Port Everglades will be used as an alternate sand source for future maintenance of the Segment III Shore Protection Project. It is anticipated that the sand bypassing program will include at least the establishment of a sand collection area north of the inlet, and sand pumping and discharge infrastructure along the shoreline south of the inlet. The methods for collecting and transferring sand across the inlet will be evaluated in detail by the feasibility study. The principle methods that will be considered include (1) an interception system with a fixed plant with a dedicated pipeline and (2) a storage system with a deposition basin that will be maintained by conventional dredging equipment on a regular basis. It is anticipated that bypassed sand will be discharged along the south shoreline within 3,000 feet of the south jetty.

Issues Raised by the Public and Agencies. A Notice of Intent (NOI) to prepare the Draft Environmental Impact Statement was published in the Federal Register on October 29, 1999. In addition, the NOI was mailed to interested and affected parties by letter dated September 30, 1999. Coordination with relevant Federal, State, and local agencies has been conducted by Broward County. Issues of concern raised by respondents to the Notice of Intent were: use of buffer zones to protect dune systems; minimization of impacts to natural systems to the greatest extent feasible; and protection and/or mitigation of sensitive marine life and vegetative communities. Issues of concern raised by the State and Federal resource protection agencies relevant to the proposed renourishment project have been addressed in this Final Environmental Impact Statement. Requests made by the resource protection agencies included mapping and assessment inside the boundaries and within a 500 foot radius of the borrow areas; detailed evaluation of the biological communities associated with the nearshore hardbottom; biological surveys of the proposed rock dump sites; development of a detailed sedimentation monitoring plan for the reefs adjacent to the borrow areas to avoid/minimize damage during dredging operations; cumulative impact assessment which addresses the productivity loss of impacted communities for the projected lifespan of the project; and a proposal for a mitigation plan to fully compensate for unavoidable adverse impacts to nearshore hardbottom communities. Many of these concerns were addressed during extensive biological investigations performed during

the summer/fall of 2001, and the results of these investigations have been incorporated into a comprehensive Geographic Information System (GIS) for Broward County. The Draft Environmental Impact Statement was circulated to Federal, State, and local agencies including the public and special interest groups. Comments received in response to the Draft Environmental Impact Statement have been incorporated into this Final Environmental Impact Statement.

Areas of Controversy. At the time of production of the Draft Environmental Impact Statement, areas of controversy included the construction of T-head groin structures at John U. Lloyd State Park, the potential for offshore hardbottom impacts during dredging activities, and the potential for secondary impacts to nearshore hardbottom communities adjacent to the equilibrium toe of fill resulting from sedimentation and/or chronic turbidity. The Florida Department of Environmental Protection (FDEP), Division of Recreation and Parks, and Florida Fish and Wildlife Conservation Commission (FFWCC) expressed concern regarding the negative impact of the structures upon sea turtle nesting success and hatchling behavior, and the potential public safety hazard to recreational beach users. Since initial consultation with the FDEP, the groin field at John U. Lloyd State Park was modified from eleven (11) T-head groins to three (3) groins: two T-head structures and one spur. Appropriate sea turtle protection measures will be implemented in Broward County to minimize impacts to sea turtle hatchlings.

The FFWCC expressed concern that sand placement for the Broward County beach restoration project will result in the loss of nearshore hardbottom areas with dense coverage of marine macroalgae that has been identified as important foraging habitat for certain marine turtles. A mitigation monitoring plan has been developed and accepted by the FFWCC and FDEP that involves long-term monitoring of the mitigation reefs to determine the replacement habitat value compared to the natural nearshore hardbottom. A copy of the mitigation monitoring plan has been included in this Final Environmental Impact Statement.

Several measures will be implemented to minimize impacts to hardbottom areas adjacent to the borrow and fill sites. A detailed sedimentation monitoring plan, which includes biological stress indicators for stony and soft coral species, has been developed to assess and minimize impacts to adjacent reef communities during construction. Biological communities within the eight proposed pipeline corridors have been documented with DGPS integrated digital video. Bottom features were mapped from the video tracklines to identify the least impactful corridors feasible given the limitations of the dredging equipment. Prior to construction, Broward County DPEP staff will determine the least impactful routes through these corridors for pipeline placement and site the pipelines through these routes using buoys. Investigations of the pumpout terminal sites, located seaward of the pipeline corridors, have been conducted and significant marine resources in the vicinity have been delineated. Pumpout terminal anchors or spuds will be sited by Broward County DPEP SCUBA divers so that anchors or spuds are located entirely in sand bottom. Weekly monitoring of all pipelines to shore will be performed to check for sand movement and leaks.

Continuous leak monitoring will be required by the dredging contractor through fluctuations in pressure through the pipelines. A detailed mitigation plan (Appendix F) has been developed to compensate for unavoidable impacts to nearshore hardbottom habitat located inshore of the project equilibrium toe of fill.

The National Marine Fisheries Services (NMFS) expressed concern that several issues related to project siting; direct, indirect, and cumulative impact assessment; mitigation proposals; and economic analysis were not adequately addressed in the Draft Environmental Impact Statement. Extensive interagency coordination and additional field investigations were conducted to address the issues raised by the NMFS. A comprehensive description of the NMFS comments and measures taken to address each concern have been included in Section 4 of the Final Environmental Impact Statement. The NMFS has withdrawn their opposition to the project contingent upon the construction of 11.9 acres of mitigation reef and extensive project monitoring.

Unresolved Issues. The proposed Broward County Shore Protection Project does not involve any activities that have not been previously utilized during past renourishment activities performed in Broward County or along the South Florida Atlantic Coast. The U.S. Army Corps of Engineers and Broward County are committed to avoiding, minimizing, or mitigating for adverse effects during construction activities. Biological, sedimentation, and turbidity monitoring during all phases of project construction will be implemented to assure protection of hardbottom resources within and adjacent to the fill and borrow sites.