

Broward County, Segment III, Shore Protection Project

**FDEP Permit #0163435-001-JC
FDEP Permit #0163435-009-JC
FDEP Permit #0226688-001-JC
USACE Permit 1999-5545 (IP-SLN)**

Physical Monitoring Plan

Submitted To:

Florida Department of Environmental Protection
Office of Beach and Coastal Systems.
Tallahassee, FL

Submitted By:

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1.0 INTRODUCTION

A Physical Monitoring Plan will be implemented as part of the Broward County Shore Protection Project Segment III. This Plan, which is a condition of the Florida Department of Environmental Protection (FDEP) Permits (Nos. 0163435-001-JC, 0163435-009-JC, and 0226688-001-JC) to construct the project, consists of elements that will track the performance of the Segment III project and the potential effects to adjacent shoreline in the vicinity of the sand fill and the offshore borrow areas. The Plan will also include proposals for alternatives to remediate accelerated erosion attributed to excavation of borrow areas I and II.

The Broward County Shore Protection Project Segment III involves hopper-dredging at least 1.54 million cubic yards of sand from five (5) offshore borrow areas (I, II, III, IV, and VI) and a sand shoal along the north side of the Port Everglades Entrance Channel. The sand will be used as fill to renourish 6.82 miles (36,000 feet) of shoreline between Port Everglades Inlet and the Broward/Miami-Dade County line. The project will also include the installation of two rock T-head groins and a rock spur at the northern end of John U. Lloyd Beach State Park (JUL).

The expect design life for the sand fill is 6 years. This projection is based upon US Army Corps of Engineers design guidance and procedures and is highly dependent upon the annual storm climate. This monitoring plan will assist Broward County in determining the need to initiate planning for future renourishment activities.

The FDEP Bureau of Beaches and Coastal Systems (BBCS) has provided a set of technical specifications for the collection and submittal of coastal monitoring data (BBCS, 2004). These technical specifications will be applied in the planning, collection, processing, and submittal of the monitoring data described herein. The Physical Monitoring Plan described herein meets or exceeds these requirements.

2.0 PROJECT LOCATION

Figure 1 depicts the location of the project elements. The shoreline to be nourished includes two reaches (1) in John U. Lloyd Beach State Park (FDEP reference monuments R-85.7 to R-92) and (2) in Dania Beach, Hollywood, and Hallandale Beach (R-99 to R-128). The two T-head groins and jetty spur will be constructed immediately south of the Port Everglades south jetty in the general vicinity of R-86. The five (5) offshore borrow areas are located off of the north central to north Broward County shoreline between FDEP reference monuments R-1 and R-50. The sand shoal to be dredged as an additional source of sand is located along the north side of the Port Everglades Entrance Channel immediate to the north jetty.

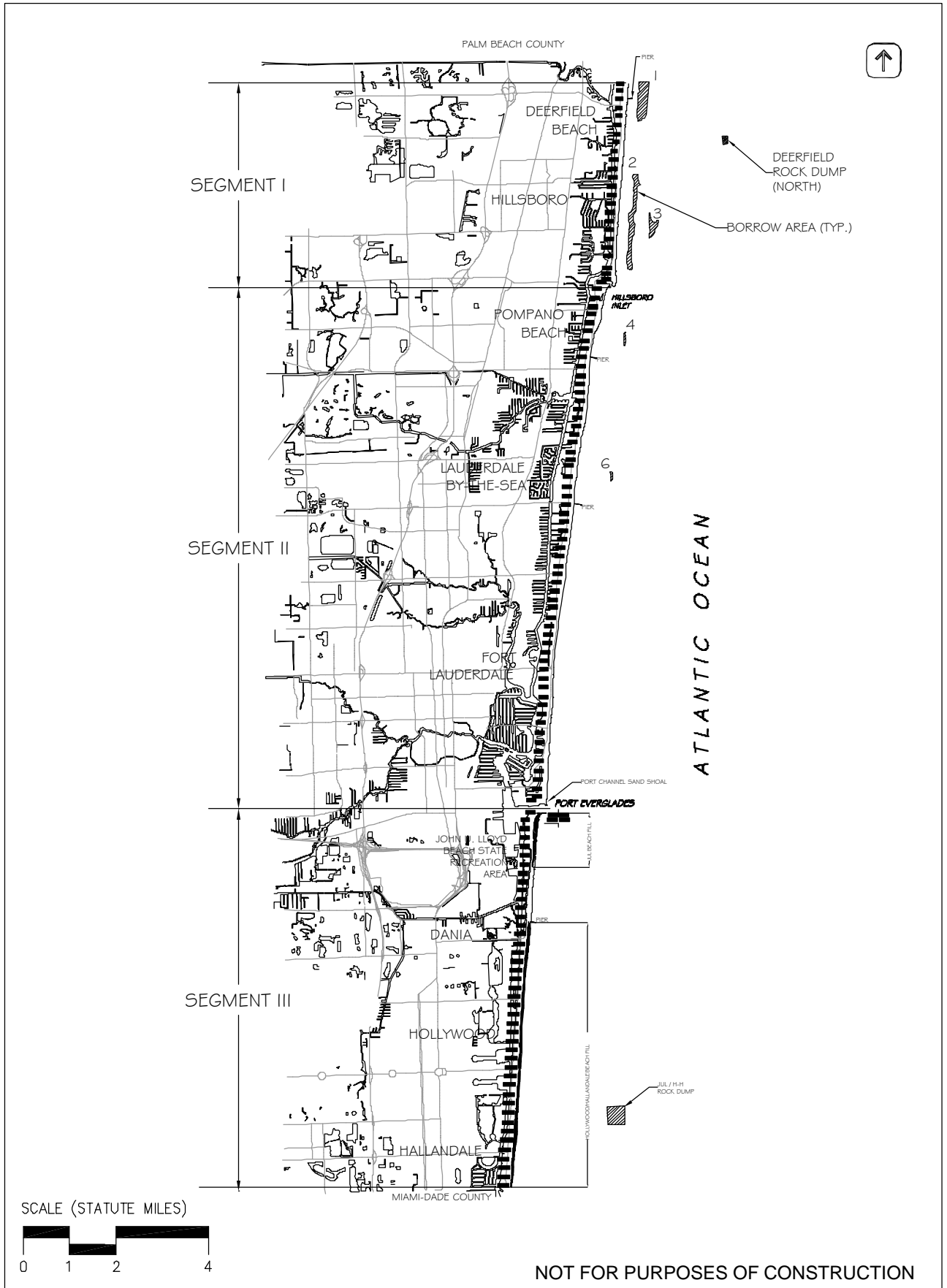


Figure 1: Location of project features associated with the Broward County Shore Protection Project - Segment III.

3.0 MONITORING PLAN

The Broward County Shore Protection Project – Segment III is a component of Florida’s Beach Restoration Management Plan for Beach Management Planning Districts III, IV, and V, adopted by the Governor and Cabinet on March 8, 1988. The Plan seeks to maintain a protective, publicly accessible and recreational beach berm which is likewise conducive to sea turtle nesting and other environmentally sensitive activities. Important design goals of the Shore Protection Project include the addition and maintenance of the storm protection beach berm, provision of a recreational beach, and the reduction or elimination of potential adverse impacts to the littoral system which result from the chronic sediment deficit caused by the Port Everglades jetties and inlet channel.

3.1 Purpose

The purposes of the Broward County Shore Protection Project Segment III Physical Monitoring Plan are to:

- meet the regulatory requirements of the Project Permits,
- evaluate the performance of the beach fill,
- evaluate the effects of the project upon the shoreline downdrift of the JUL groin field,
- evaluate the effects of the project borrow areas upon the shorelines of the City of Deerfield Beach and the Town of Hillsboro Beach,
- monitor County-wide beach conditions,
- make determinations with respect to the potential need for adjustments, modifications, or mitigative responses to documented project effects,
- function as an important database for future beachfront development, planning and/or management activities, and
- provide design guidance for future beach maintenance activities along the Segment III shoreline with specific emphasis on reducing the need for and costs of unnecessary work, as well as reducing environmental impacts.

3.2 Physical Monitoring Plan Elements

The Physical Monitoring Plan includes the following basic elements:

- Comprehensive beach profile surveys at all Broward County FDEP R-monuments,
- Hydrographic surveys of the five (5) borrow sites and the Port Everglades Entrance Channel shoal by a qualified hydrographic surveyor,
- Vertical stereoscopic color aerial photography,
- Analysis of annual beach, borrow area, and shoal changes and development of a cumulative comparative database,
- Evaluation of potential project related effects to County shoreline beyond the fill areas,
- Evaluation of shoreline landward of Borrow Areas I and II and formulation of a contingency plan to address project related impacts, and
- Formulation of a detailed *Annual Report of Findings* for consideration by the Broward County, State and Federal agencies, and the general public.

3.2.1 Surveys

3.2.1.1 Beach Profile Surveys. Topographic and bathymetric profile surveys will be conducted at each of the FDEP monuments along the entire Broward County shoreline (Segments I, II, and III) and along the northernmost 5,000 feet of the Miami-Dade County shoreline. The survey will include FDEP reference monuments R1 through R128 in Broward County, and FDEP monuments R1 through R5 in Miami-Dade County. In addition to the primary reference monuments intermediate profile will be surveyed at the following locations:

- Immediately North of Port Everglades. The nine (9) intermediate profiles, established as part of the Port Everglades Inlet Management Plan will be included in the survey.

- JUL Groin field. Twelve (12) intermediate wading survey lines will be surveyed in and immediately downdrift the JUL groin field to evaluate in detail the effects of this groin field upon that shoreline.

3.2.1.2 Beach profiles will extend approximately 2,000 feet from the control monument or - 30 feet NGVD, whichever is greater. Wading profiles will extend to at least -4 ft, NGVD. Groin field profiles will extend at least 200 ft seaward of the groins.

3.2.1.3 The beach profile surveys will be conducted within ninety (90) days prior to commencement of project construction, and within sixty (60) days following completion of project construction. Thereafter, monitoring surveys shall be conducted annually for a period of three (3) years, then biennially until the next beach nourishment event or the expiration of the project design life, which ever occurs first.

3.2.1.4 The surveys will be conducted during a spring or summer month and repeated as close as practicable during the same month of the year. If the time period between the immediate post-construction survey and the first annual monitoring survey is less than six (6) months, Broward County may elect to postpone the first monitoring survey until the following spring/summer.

3.2.1.5 All required data shall be provided in the following datum: HARN, NAD 83/90 State Plane Coordinates in feet, plus NGVD elevations in U.S. survey feet. Alternative datum's will be considered, but must be agreed upon by BBCS prior to commencing survey work.

3.2.1.6 Borrow Area/Port Shoal Surveys. Surveys shall be conducted of the project borrow sites and Port Everglades channel shoal used for beach fill construction on the basis of transects spaced at a maximum of 250 ft intervals. All transects shall extend

beyond the borrow site and port shoal limits by a minimum of 500 ft. All borrow area and port shoal surveys will be conducted on the same schedule and concurrently with the beach and nearshore surveys described above. Shoal map differencing will be performed for each borrow area and the port channel shoal comparing the post-dredge depths over time. For the post construction survey, the gross volume of material excavated from each borrow area and the port shoal will be estimated. Borrow area and port shoal refilling rates will be estimated in subsequent years. The technical specifications provided in BBCS (2004) for survey preparation, data accuracy and collection, and product submittal will be applied.

3.2.2 **Aerial Photography.** Controlled color aerial photography shall be flown concurrently with the post-construction survey and each annual survey, as close to the date of the beach profile surveys as possible, during low tide on that date. The limits of photography shall begin one mile north of the north County line and extend southward a distance of one mile into Miami-Dade County. The photography shall be color vertical photos with a 30% forward overlap, taken from an elevation of 3,000 feet (1:6000 negative scale) and centered on the local shoreline. The technical specifications provided in BBCS (2004) for survey preparation, data accuracy and collection, and product submittal will be applied. A digital scan of the color photos at a rate of 21 microns with a pixel size of 0.4 feet shall be made and submitted in TIF format (uncompressed) on CD-ROM.

3.2.3 **Geotechnical.** (not required by FDEP permits) Sand samples will be taken at approximately 5,000 ft intervals along the nourished beach at the time of the first annual survey (Sediments will be sampled and inspected continuously during project construction). Sampling stations will include the landward and seaward limits of the dry beach berm and the beachface. Percentage fines and shell content will be estimated and a grain-size distribution curve formulated for each sample in accordance with applicable ASTM standards.

Within the borrow sites, sand samples will be obtained during the period of each annual and biennial borrow site survey at four (4) selected sampling stations utilizing a Ponar Grab. Each sand sample shall be appropriately analyzed and the results included in the annual report-of-findings.

3.2.4 Analyses. An annual engineering report shall be formulated which includes plots of survey profiles and graphic presentations of temporal and cumulative volumetric and shoreline positions change for the entire monitoring area. Volumetric changes at each survey profile will also be presented in tabular form. Changes over time within and adjacent to the five (5) borrow sites and the Port Everglades sand shoal will be evaluated, quantified and discussed. Analyses shall discuss the data, shoreline change trends, and the performance of the beach fill project. The study will also seek to identify erosion and accretion patterns and any potential cause and effect relationships. Specific attention will be paid to the Deerfield Beach and Hillsboro Beach shorelines and potential cause and effect relationships between borrow area excavations and shoreline changes. In addition, the report will include a comparative review of project performance to performance expectations and identify any potential adverse shoreline impacts that may be attributable to the project.

Major report(s) of findings will be submitted annually approximately 90 days subsequent to each major monitoring survey. The purpose of each report shall be to summarize the annual as well as cumulative data base and to assess project performance and county-wide beach volume and shoreline patterns, changes, and trends. Survey data will likewise be submitted with the annual Report in a digital (ASCII) format consistent with FDEP formatting guidelines. Where applicable, the technical specifications provided in OBCS (2001) will be applied.

3.2.5 Borrow Area I and II Contingency Plan. In the event the City of Deerfield Beach and/or the Town of Hillsboro Beach determines from the County's Physical Monitoring results that excavation of Borrow Areas I and II, contributes to beach erosion along the

respective shorelines, the County must employ an independent coastal engineer to conduct an independent review of the monitoring data and findings. In the event the independent review reveals a significant impacts to the shoreline leeward of Borrow Areas I and/or II attributable to the excavation of those areas, Broward County will take corrective action by mitigating the adverse impacts through subsequent beach nourishment or by making a financial contribution to future beach nourishment project undertaken by either the City of Deerfield Beach or the Town of Hillsboro Beach.

3.2.6 **Deliverables.** Annually, the consultant shall provide the County with ten (10) bound copies of the annual report, one (1) set of 9" x 9" color aerials and scanned TIF images thereof, one (1) bound set of the beach profile surveys stamped by the surveyor, and one electronic copy of the beach profile and borrow site survey data in the appropriate formats. The consultant shall provide FDEP with two (2) copies of the annual report, one (1) set of the 9"x9" color aerials and scanned TIF images thereof, one (1) bound set of the beach profile surveys stamped by the surveyor, and one (1) electronic copy of the beach profile and borrow site survey data in the appropriate formats. The required documentation specified in the technical specifications (BBCS, 2004) will be supplied to FDEP BBCS. All survey related deliverables will be provided to FDEP within 90 days of each data collection event, starting with and including post-construction surveys. Data which are not specifically requested in the FDEP project permit (additional surveys, aerial photography, sand sampling) will be provided in the project monitoring reports or as separate submittals.

3.2.7 **Plan Schedule** The overall Physical Monitoring Plan Schedule for the first five years subsequent to construction is summarized in **Table 1**. It is anticipated that monitoring will continue beyond the five years on a bi-annual annual basis as required by Permit.

Table 1: Summary of Physical Monitoring Tasks and Schedules.

TASK	BEACH SURVEY	GROIN FIELD SURVEY	BORROW AREA SURVEY	AERIAL PHOTOGRAPHY	GEOTECH-NICAL	ANALYSES AND REPORT
PRE CONSTRUCTION	X	X	X	X		
POST CONSTRUCTION	X	X	X	X	X	
ONE-YEAR POST	X	X		X		X
TWO-YEAR POST	X	X	X	X		X
THREE -YEAR POST	X	X		X		X
FOUR-YEAR POST			X			X
FIVE-YEAR POST	X	X		X		X

4.0 REFERENCES

BBCS. (2004). "Monitoring Standards for Beach Erosion Control Project," Bureau of Beaches and Coastal Systems, Division of Water Resource Management, Department of Environmental Protection, State of Florida, Tallahassee, FL. March 2004.