FINDING OF NO SIGNIFICANT IMPACT

PROPOSED SUBMERGED ARTIFICIAL REEF TRAINING (SMART) STRUCTURE SECTION 227/2038 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM FOR THE 63RD STREET "HOTSPOT" MIAMI BEACH MIAMI-DADE COUNTY, FLORIDA

I have reviewed the Environmental Assessment (EA) for the proposed action. Based on information analyzed in the EA, reflecting pertinent information obtained from other agencies and special interest groups having jurisdiction by law and/or special expertise, I conclude that the proposed action will have no significant impact on the quality of the human environment. Reasons for this conclusion are, in summary:

1. The work would be conducted as per the U.S. Fish and Wildlife Coordination Act Report of August 2005, which indicates no objection by the Department of the Interior and full compliance with the Endangered Species Act, the Coastal Barrier Resources Act and Fish and Wildlife Coordination Act. Measures to prevent or minimize impacts to sea turtles in accordance with the consultations conducted with the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) would be implemented during and after project construction. The proposed action will not jeopardize the continued existence of any threatened or endangered species or adversely impact any designated "critical habitat". The Corps reinitiated consultation with NMFS under the ESA for smalltooth sawfish and Acroporid corals under Section 7 of the ESA since they were listed after the concurrence documents included in Appendix B of the EA were completed and NMFS has concurred with the Corps' determination of May Affect, Not Likely to Adversely Affect for listed species under their jurisdiction. For FWS, the consultation documents are current and remain valid as they do not meet any of the reinitiation criteria under Section 7 of the ESA. USFWS concerns about sea turtles, littoral drift and manatees are addressed within the EA.

2. The State's concurrence with the Federal Coastal Zone Consistency Determination dated October 1, 2004 for the (Appendix B of the EA) finds the action is consistent with the State's Coastal Zone Management program. Changes in the project since 2004 have resulted in fewer impacts from the project, and as such, the project remains consistent with the Coastal Zone Management Act. FLDEP has issued a subsequent concurrence under CZMA for the project dated September 17, 2010.

3. In coordination with the Florida State Historic Preservation Officer, it was determined that the proposed SMART structure project will not impact any sites of cultural or historical significance.

4. Water Quality Certification (WQC), from the Florida Department of Environmental Protection is underway and will be obtained for the construction of the SMART structure.

5. Measures to eliminate, reduce, or avoid potential impacts to fish and wildlife resources include the following which will be undertaken during and after project construction: (1) Turbidity monitoring would be performed during installation of the SMART structure at the site of the project, (NE 63rd Street "Hotspot"), to ensure turbidity levels comply with State water quality standards, (2) Precision electronic positioning equipment would be used to ensure the vessels avoid damage to hardbottom habitat associated with vessel transit in those areas, (3) Visual inspection of hardbottom habitat in proximity of the SMART structure project would be routinely conducted to look for indicators of turbidity, sedimentation or mechanical impacts, (4) Any unanticipated, unavoidable impacts to the nearshore hardbottom habitat from the project would be appropriately mitigated as described in the EA Monitoring Plan (Appendix E), (5) The SMART structure segment design has been adjusted to provide 'sea turtle access lanes', every 10th segment, as per USFWS request on June 16, 2004, also the final structure design provides two 250-ft-wide gaps between the three SMART structure segments to provide unhindered ingress and egress of sea turtles and other fish and wildlife. (6) Under the authority of Section 227/2038 of the Water Resources Development Act of 2007, The National Shoreline Erosion Control Development and Demonstration Program provides for adjustment or removal of the SMART structure if project goals and objectives are not met. This is a basic element of the

SMART structure design. Project goals and objectives are specified in the monitoring plan which is included as Appendix E.

6. All public comments have been addressed in the final EA.

7. Benefits to the public and wildlife include the retention of the shoreline of an erosional "Hotspot" at Miami Beach, Florida, thus preventing or reducing loss of public beachfront to continuing erosional forces and preventing or reducing periodic damages and potential risk to life, health and property in the developed lands adjacent to the beach. The need for periodic renourishments, and their affects to natural resources would also be reduced.

An electronic copy of this EA can be accessed from the Jacksonville District Environmental Documents website - http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine_DadeCo_BchErCtrl.htm

In consideration of the information summarized, I find that the proposed action will not significantly affect the human environment and does not require an Environmental Impact Statement.

02/24/11
Date

Alfred A. Pantano
Colonel, U.S. Army
District Engineer

February 2011

Environmental Assessment

SECTION 227/2038 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM

SUBMERGED ARTIFICIAL REEF TRAINING (SMART) STRUCTURE MIAMI-DADE COUNTY, FLORIDA

U.S. Army Corps of Engineers
JACKSONVILLE DISTRICT

FINDING OF NO SIGNIFICANT IMPACT

PROPOSED SUBMERGED ARTIFICIAL REEF TRAINING (SMART) STRUCTURE SECTION 227/2038 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM FOR THE 63RD STREET "HOTSPOT" MIAMI BEACH MIAMI-DADE COUNTY, FLORIDA

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In consideration of the information summarized, I find that the proposed action will not significantly affect the human environment and does not require an Environmental Impact Statement.

____________________	______________________________
Date	Alfred A. Pantano Colonel, U.S. Army District Engineer

ENVIRONMENTAL ASSESSMENT ON THE PROPOSED SUBMERGED ARTIFICIAL REEF TRAINING (SMART) STRUCTURE SECTION 227/2038 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT PROGRAM FOR THE 63RD STREET "HOTSPOT" MIAMI BEACH MIAMI-DADE COUNTY, FLORIDA

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 PROJECT PURPOSE AND NEED

1.1 PROJECT AUTHORITY AND AUTHORIZATION

The proposed SubMerged Artificial Reef Training (SMART) structure project was first authorized under Section 227 of the Water Resources Development Act (WRDA) of 1996, and more recently authorized under Section 2038 of the WRDA 2007, H.R. 1495 of the 110th Congress, the National Shoreline Erosion Control Development Program of the U.S. Army Corps of Engineers (Corps).

The proposed SMART structure project was initially authorized under Section 227 of WRDA 1996 between 1998 and 2004, and due to the loss of funding was dropped in 2004. Section 227 authorities were extended for a 12-year period, and more recently the project was given authority under Section 227/2038, however this authority has not yet been implemented. The 1996 authority specified that the Secretary of the Army shall establish and conduct a national shoreline erosion control development and demonstration program for a period of six years beginning on the date that funds are made available to carry out this section; the 2007 authority was similar, but does not expire.

In July 2004, the Corps released a Draft Environmental Assessment (EA) for the SMART structures entitled “Final Environmental Assessment, Section 227 National Shoreline Erosion Control Development and Demonstration Program – 63rd Street “Hotspot” Submerged Artificial Reef Training (SMART) Structure Miami-Dade County, Florida”. Comments were received on that EA. The project then was placed on hold due to lack of funding and the Draft EA from July 2004 was not finalized with a Finding of No Significant Impact (FONSI) determination. WRDA 2007 reauthorized the 227 program under Section 2038 of the Act, funding for the existing program was put in place and for the newly authorized project. Since the original EA had not been finalized, the Corps and local sponsor updated the EA based on additional information and comments received on the 2004 EA, and then re-released the EA for additional review and comment prior to preparations of project plans and specifications or advertisement and award of a construction contract.

1.2 PROJECT LOCATION

Miami-Dade County is located along the southeast coast of Florida. Broward County (Fort Lauderdale) lies to the north, and Monroe County (Florida Keys) lies to the south of Miami-Dade County. The Miami-Dade County shoreline extends along two long peninsular barrier island segments and three smaller islands, each of which is separated from the mainland by Biscayne Bay. The city of Miami is located on the mainland, and a number of coastal communities are located along the barrier islands. These barrier islands vary in width from about 0.2 to 1.5 miles, with an average width of about 0.5 miles. Elevations along the entire coastal region (and much of the mainland) are low, generally less than 10 feet. Along the coastal region elevations are generally the highest along the coastline, sloping gradually downward toward the bay.

The Section 227/2038 proposed SMART structure project is proposed to be placed within Miami-Dade County in the vicinity of NE 63rd Street, near State of Florida DNR Monument R-46, northward to the proximity of DNR Monument R-45, in Miami Beach, FL (Figures 1 and 2).

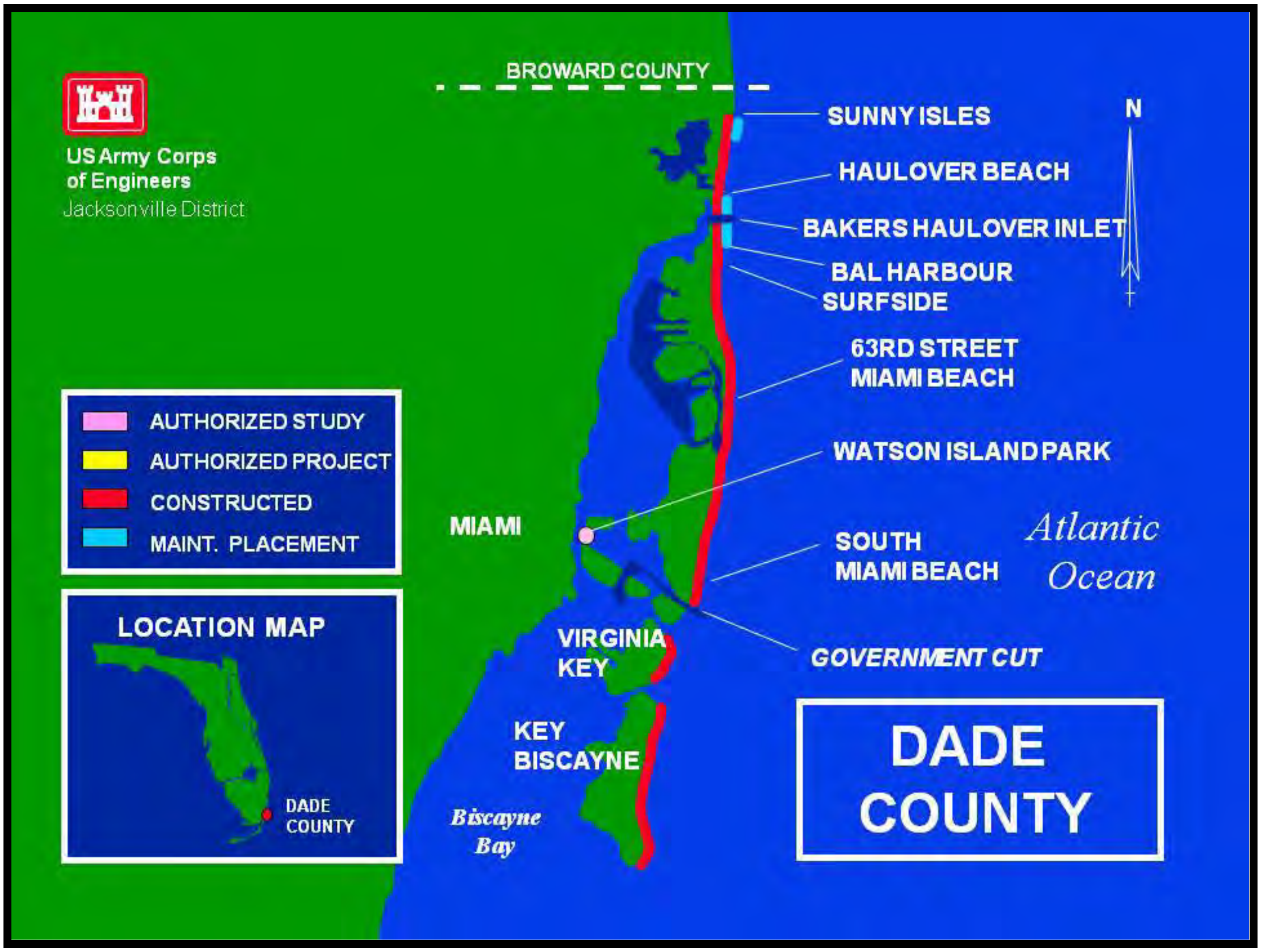


Figure 1 - Location Map of Dade County, Florida

Figure 1 - Plan view of the Dade 227/2038 proposed SMART Reef placement area.

Figure 2 - Detailed Location Map of Project Area

1.3 PROJECT NEED OR OPPORTUNITY

The proposed SMART structure is designed to help dissipate wave energy in order to stabilize the identified 'Hotspot erosion area' and help prevent storm damage. In 1985, between DNR-41 and DNR-46 (71st and 63rd streets), 110,000 cubic yards of sand were placed as part of an authorized renourishment of the Miami-Dade County Beach Erosion Control and Hurricane Protection Project (BEC&HP). The beach was then surveyed again in 1996 and showed net shoreline erosion with an average erosion rate of 10.25 ft/year. Between DNR-43 and DNR-47 the average volume change between adjacent monuments was 2,665cy/yr. Tables 1 and 2 are excerpts from the Miami-Dade County Regional Sediment Budget (RSB) produced in 1997 by Coastal Systems highlighting the erosional hotspot area.

Offshore borrow sources of beach quality sediment along the Miami-Dade County shoreline have been almost completely depleted, requiring innovative solutions to help prevent beach erosion and conserve beach quality sediment.

The intent of the SMART structure is to reduce wave energy in the identified hotspot area in an environmentally sustainable way. The Section 227/2038 Program provides an opportunity in cooperation with other Federal and non-Federal agencies to address national shoreline erosion control challenges with new innovative technological approaches. (USACE, 2000).

VOLUMETRIC CHANGES
BAKERS HAULOVER INLET to GOVERNMENT CUT
Survey Dates: 1980 and 1996

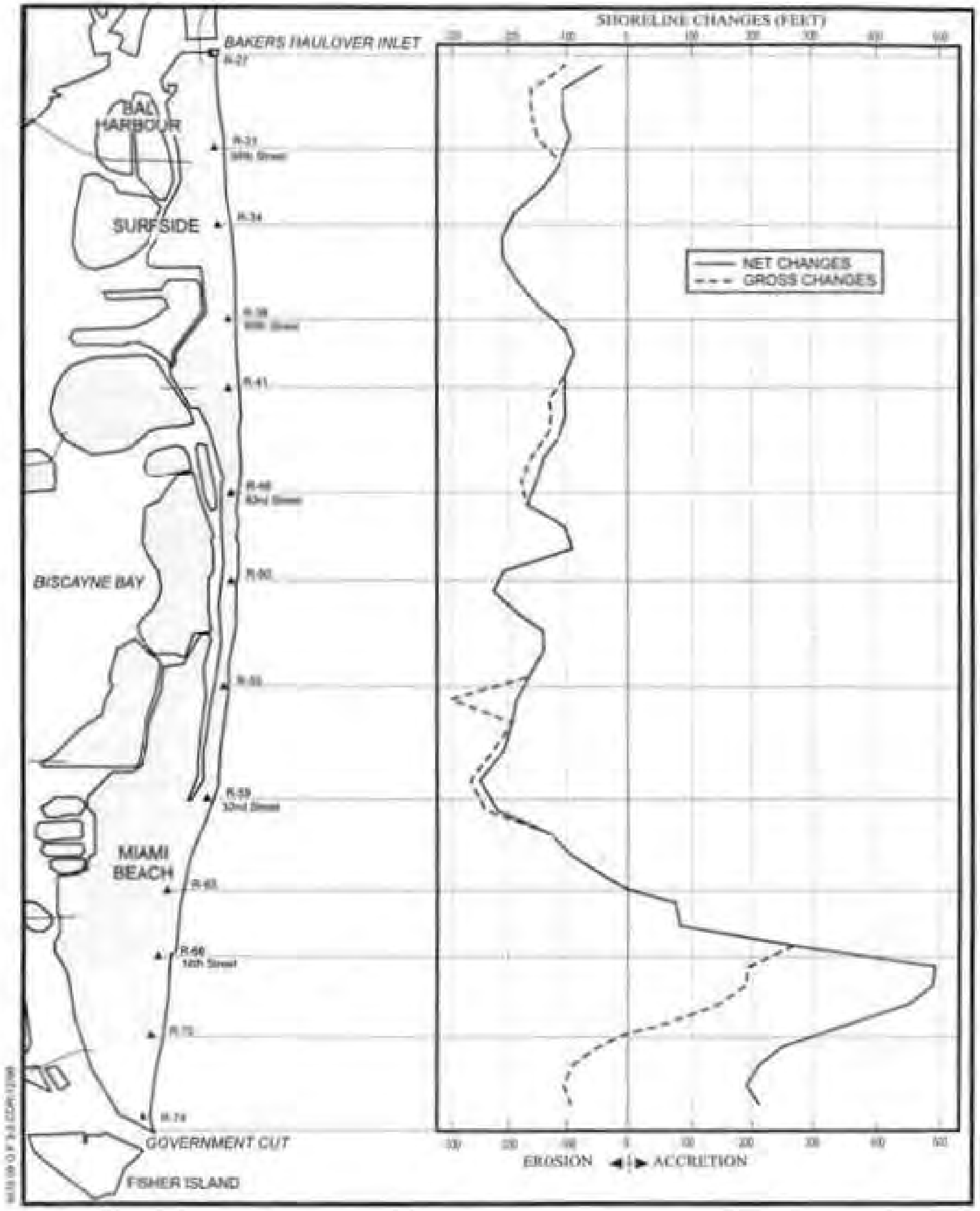
DEP Line	Total Volume Change NET (cy/yr)	Total Volume Change GROSS (cy/yr)	DEP Line	Total Volume Change NET (cy/yr)	Total Volume Change GROSS (cy/yr)
R 27 - 28	2,475	-983	R 51 - 52	-3,852	-3,852
R 28 - 29	-2,548	-5,995	R 52 - 53	-3,392	-3,392
R 29 - 30	-6,512	-9,744	R 53 - 54	-2,968	-2,968
R 30 - 31	-8,240	-12,165	R 54 - 55	-4,060	-4,060
R 31 - 32	-3,999	-3,999	R 55 - 56	-189	-7,689
R 32 - 33	-2,707	-2,707	R 56 - 57	4,861	4,861
R 33 - 34	-4,438	-4,438	R 57 - 58	2,025	950
R 34 - 35	-8,367	-8,367	R 58 - 59	-1,375	-2,448
R 35 - 36	-6,639	-6,639	R 59 - 60	834	-143
R 36 - 37	-4,889	-4,889	R 60 - 61	2,384	2,384
R 37 - 38	-2,497	-2,497	R 61 - 62	3,997	3,997
R 38 - 39	1,407	1,407	R 62 - 63	7,491	7,491
R 39 - 40	3,307	3,307	R 63 - 64	6,917	6,917
R 40 - 41	2,112	2,112	R 64 - 65	6,466	6,466
R 41 - 42	2,983	1,450	R 65 - 66	19,064	19,064
R 42 - 43	1,334	-218	R 66 - 67	28,210	12,018
R 43 - 44	-2,303	-3,520	R 67 - 68	29,300	12,223
R 44 - 45	-2,727	-4,040	R 68 - 69	29,439	11,505
R 45 - 46	-2,221	-3,481	R 69 - 70	25,647	5,855
R 46 - 47	-3,408	-3,408	R 70 - 71	16,811	-1,781
R 47 - 48	1,082	1,082	R 71 - 72	13,511	-3,791
R 48 - 49	1,156	1,156	R 72 - 73	18,390	-1,305
R 49 - 50	-5,332	-5,332	R 73 - 74	24,092	6,513
R 50 - 51	-4,517	-4,517	R 74 - GC	9,744	3,907

Table 1: Volumetric Changes (Excerpt Table 3.6 from Miami-Dade County RSB).

TOTAL AND AVERAGE GROSS SHORELINE CHANGES
DADE COUNTY

DEP Line	1980 and 1996 Surveys		1992 and 1996 Surveys		DEP Line	1980 and 1996 Surveys		1992 and 1996 Surveys	
	Total (feet)	Average (feet/year)	Total (feet)	Average (feet/year)		Total (feet)	Average (feet/year)	Total (feet)	Average (feet/year)
R 1 - 2	-19	-1.2	5	1.3	R 38 - 39	-102	-6.4	-46	-11.6
R 2 - 3	6	0.4	25	6.2	R 39 - 40	-85	-5.3	-40	-10.1
R 3 - 4	4	0.2	12	2.9	R 40 - 41	-106	-6.6	-33	-8.2
R 4 - 5	-4	-0.2	-2	-0.4	R 41 - 42	-134	-8.4	-24	-6.1
R 5 - 6	-6	-0.4	2	0.4	R 42 - 43	-130	-8.1	-8	-2.0
R 6 - 7	-3	-0.2	4	1.1	R 43 - 44	-139	-8.7	-18	-4.5
R 7 - 8	-158	-9.9	-2	-0.6	R 44 - 45	-166	-10.4	-34	-8.4
R 8 - 9	-148	-9.2	-34	-8.6	R 45 - 46	-179	-11.2	-39	-9.8
R 9 - 10	-148	-9.3	-77	-19.2	R 46 - 47	-171	-10.7	-27	-6.6
R 10 - 11	-114	-7.1	-78	-19.5	R 47 - 48	-102	-6.4	-6	-1.6
R 11 - 12	-77	-4.8	-47	-11.9	R 48 - 49	-90	-5.6	-6	-1.4
R 12 - 13	-56	-3.5	-34	-8.6	R 49 - 50	-208	-13.0	-29	-7.4
R 13 - 14	-41	-2.6	-29	-7.3	R 50 - 51	-230	-14.4	-51	-12.7
R 14 - 15	-27	-1.7	-22	-5.6	R 51 - 52	-185	-11.6	-32	-8.1
R 15 - 16	-41	-2.6	-30	-7.5	R 52 - 53	-149	-9.3	-17	-4.2
R 16 - 17	-62	-3.9	-32	-8.0	R 53 - 54	-144	-9.0	-19	-4.7
R 17 - 18	-74	-4.6	-18	-4.5	R 54 - 55	-172	-10.8	-19	-4.9
R 18 - 19	-97	-6.1	-25	-6.2	R 55 - 56	-309	-19.3	-150	-37.5
R 19 - 20	-57	-3.6	-25	-6.2	R 56 - 57	-193	-12.0	-40	-10.1
R 20 - 21	-122	-7.6	-21	-5.3	R 57 - 58	-232	-14.5	-62	-15.4
R 21 - 22	-127	-7.9	-24	-6.0	R 58 - 59	-270	-16.9	-69	-17.2
R 22 - 23	-139	-8.7	-7	-1.6	R 59 - 60	-240	-15.0	-33	-8.3
R 23 - 24	-113	-7.1	-7	-1.6	R 60 - 61	-136	-8.5	-4	0.9
R 24 - 25	-25	-1.6	-3	-0.8	R 61 - 62	-94	-5.8	18	4.6
R 25 - 26	-7	-0.4	0	0.0	R 62 - 63	-30	-1.9	32	8.0
R 27 - 28	-101	-6.3	-34	-8.5	R 63 - 64	73	4.6	46	11.5
R 28 - 29	-170	-10.6	-30	-7.6	R 64 - 65	83	5.2	50	12.4
R 29 - 30	-168	-10.5	-31	-7.7	R 65 - 66	261	16.3	49	12.1
R 30 - 31	-154	-9.6	-22	-5.5	R 66 - 67	196	12.3	35	8.8
R 31 - 32	-115	-7.2	-23	-5.6	R 67 - 68	189	11.8	14	3.5
R 32 - 33	-141	-8.8	-26	-6.4	R 68 - 69	143	8.9	23	5.7
R 33 - 34	-184	-11.5	-34	-8.4	R 69 - 70	49	3.1	21	5.3
R 34 - 35	-215	-13.4	-38	-9.4	R 70 - 71	-48	-3.0	-7	-1.8
R 35 - 36	-213	-13.3	-43	-10.8	R 71 - 72	-89	-5.5	-12	-3.1
R 36 - 37	-182	-11.4	-46	-11.6	R 72 - 73	-108	-6.7	-7	-1.7
R 37 - 38	-149	-9.3	-41	-10.1	R 73 - 74	-90	-5.6	6	1.4

Table 2: Gross Shoreline Changes (excerpt from Miami-Dade County RSB).



SHORELINE CHANGES
(Bakers Haulover Inlet to Government Cut, 1980 - 1996)

Figure 3 - Net Shoreline Changes in Hotspot Area (Bakers Haulover Inlet to Government Cut, 1980 – 1996) (Miami-Dade County RSB).

1.4 AGENCY GOAL OR OBJECTIVE

1.4.1 OBJECTIVE

The objective of this Section 227/2038 National Shoreline Erosion Control Development and Demonstration Program is for the planning, design, construction, and monitoring of prototype engineered shoreline erosion control devices and methods. This includes research and development of innovative structures or non-structural methods for shoreline erosion control and includes the demonstration of prototype-scale “innovative” or “non-traditional” methods for the design and building of research structures to abate erosion and retain placed fill material along shorelines. Objectives of the 63rd Street Hotspot Miami Beach, Florida, and Section 227 / 2038 project are to retain sand without causing impacts to adjacent shorelines, to maintain and preserve environmental habitat, and protect the shoreline when exposed to the combination of storm surge and design wave events. Another objective is for the structure to remain stable and not incur any damage if exposed to the combination of storm surge and design events with a 50-year return interval.

1.4.2 PROPOSED ACTION

The proposed Section 227/2038 SMART project would be located parallel to Miami Beach in the vicinity of NE 63rd Street (Figure 2) in a north/south orientation at approximately the -8.2 feet below the Mean Lower Low Water (MLLW) depth contour. The exact dimensions of the structure will be no greater than 1,250 feet in length, and 42 feet in width and the location of the structure is based on extensive modeling efforts. The SMART structure crest would be covered by approximately 1.5 feet of water at MLLW. The SMART structure would be placed at a the -8.2 ft MLLW contour, which as of March 2010 is located approximately 500 feet offshore of the mean shoreline (Figure 2). The specific location will be determined at the time of construction based on the -8.2 ft depth contour, which could change from the March 2010 location due to erosion from storms, etc prior to deployment of the modules. Final placement location will be determined based on the -8.2 ft MLLW contour.

The SMART structure would be constructed of numerous 41-foot long segments, which will be approximately 6.5 feet wide (Figures 5 through 7). The SMART structure will be placed parallel to the shoreline, with individual units having a 25 degree offset from shore perpendicular.

The SMART structure segments would be composed of Goliath Reef Balls; standard size 6 by 5 feet (1.82 by 1.52 m), and Bay Balls; standard size 2 by 3 feet (0.61 by 0.91m). Each reef ball will be molded to a square concrete slab attached to ARMORTEC Armorflex Concrete Block Mats (ABM) connected with cables in PVC pipe to form a continuous, articulated structure. The SMART structure units will be placed next to each other to efficiently absorb and diffuse wave energy in addition to mimicking a variable benthic landscape. Every 10th SMART segment would be comprised of an ABM without the Goliath Reef Balls and having only Bay Balls at the ends and one pair in the middle for weight to provide adequate sea turtle access lanes with a width of six feet and a depth of water above the Bay Ball of 4.5 feet at MLLW per a request from US Fish and Wildlife Service (USFWS) on June 16, 2004 (Figures 6 & 8), yielding adequate depth of water for adult sea turtle passage. In addition to having 6-foot wide turtle lanes every tenth segment, the final design of the SMART structure includes two 250-feet wide gaps between the three structural segments, which will also facilitate passage of marine life.

The Goliath Reef Balls are bell-shaped, constructed of concrete, and weigh approximately 9,800 pounds. Both the Goliath and Bay Balls are hollow with randomly perforated complex (piling and ventilation) holes (Figure 4). A solid Bay Ball would be attached to the concrete mat to anchor the oceanside segment of the mat and prevent scouring. The SMART design provides a significant mass with a low center of gravity that is cost-effective to install from the sea via barge and crane.

Figure 4 - Goliath and Bay Balls being assembled

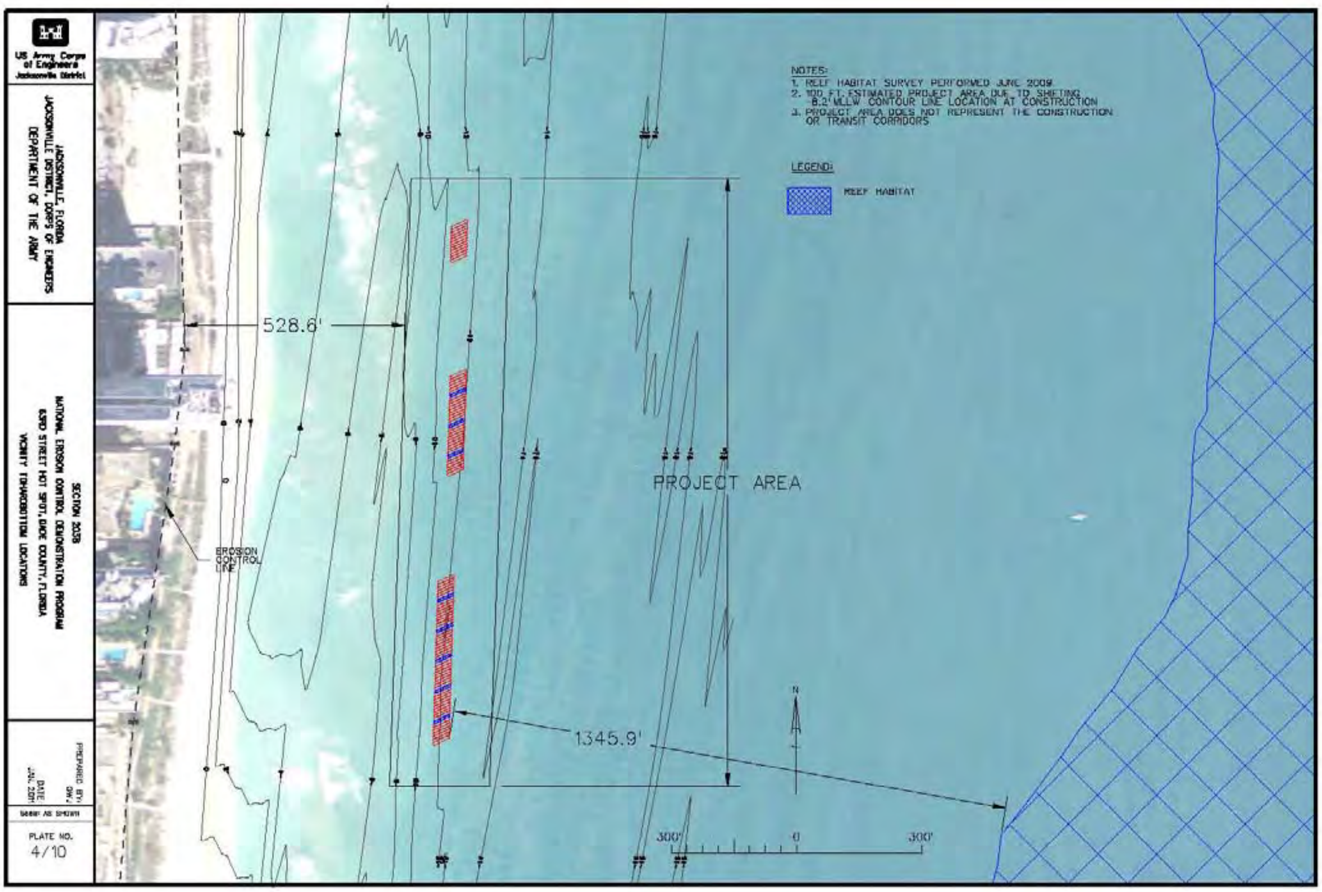


Figure 5 - Preferred Alternative Project Map, Maximum Extent

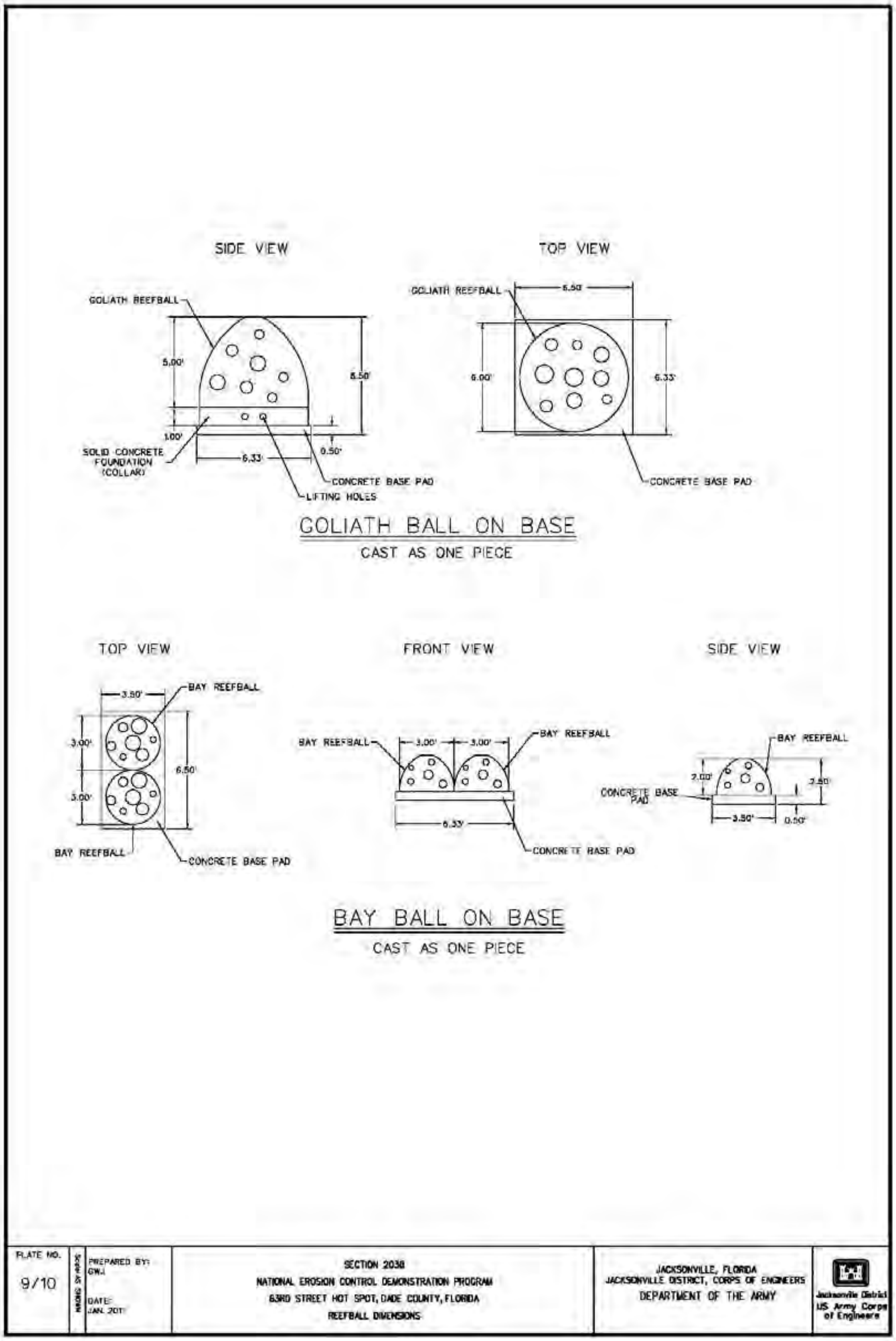


Figure 6 - Dimensions and Parameters of Reef Balls, Plan View and Profile View

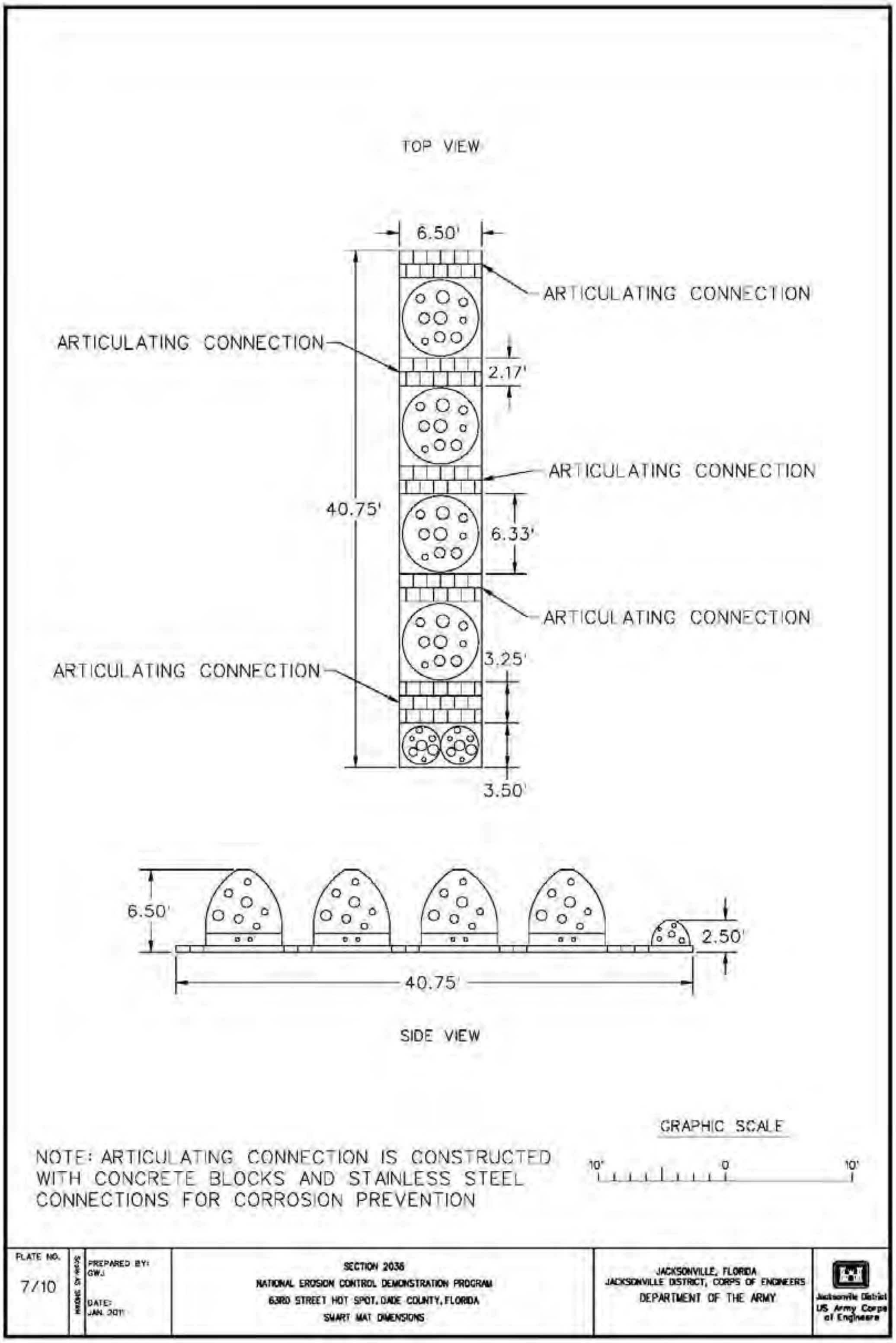


Figure 7 - Typical Reef Ball Configuration

1.5 RELATED ENVIRONMENTAL DOCUMENTS

The following is a list of related documents, many of which are available electronically from the Jacksonville District's environmental documents website (http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine_DadeCo_BchErCtrl.htm) documents available online are noted after the document name:

a. Dade County Beaches, Florida, Beach Erosion Control and Hurricane Surge Protection, General Design Memorandum, Phase I. U.S. Army Corps of Engineers, Jacksonville District, 1974.

b. Final Environmental Impact Statement, Beach Erosion Control and Hurricane Surge Protection Project, Dade County, Florida. U.S. Army Corps of Engineers, Jacksonville District, April 1975. (Online)

c. Beach Erosion Control and Hurricane Protection Study for Dade County, Florida, North of Haulover Beach Park, Survey Report and EIS Supplement. U.S. Army Corps of Engineers, Jacksonville District, June 1984.

d. Dade County Shore Protection Project, North of Haulover Park (Sunny Isles). Design Memorandum, Addendum II

e. Final Environmental Assessment, Second Periodic Nourishment, Sunny Isles and Miami Beach Segments, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. U.S. Army Corps of Engineers, Jacksonville District, May 1995.

f. Coast of Florida Study, Region III. Beach Erosion and Storm Effects Feasibility Study with Final Environmental Impact Statement. U.S. Army Corps of Engineers, Jacksonville District, October 1996.

g. Final Environmental Assessment, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Second Periodic Nourishment, Surfside and South Miami Beach Segments. U.S. Army Corps of Engineers, Jacksonville District, April 1997.

h. Final Environmental Assessment, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Second Periodic Renourishment, at Bal Harbour. U.S. Army Corps of Engineers, Jacksonville District, May 1998. (Online)

i. Final Environmental Impact Statement, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Modifications at Sunny Isles. U.S. Army Corps of Engineers, Jacksonville District, July 1998. (Online)

j. Final Environmental Assessment, Renourishment, at Miami Beach in the Vicinity of 63rd Street, Beach Erosion Control and Hurricane Protection Project, Dade

County, Florida. U.S. Army Corps of Engineers, Jacksonville District, November 2000. (Online)

k. Beach Erosion Control and Hurricane Protection Project. Dade County, Florida. Contract E, Beach Renourishment Project. Draft Environmental Assessment. December 2009. (Online)

1.6 DECISIONS TO BE MADE

This EA will evaluate whether to deploy the SMART structure adjacent to the 63rd street erosional hotspot. This EA will evaluate the use of the SMART structure technology to dissipate wave energy and retain sand while blending with the natural environment and providing a sustainable option for coastal shoreline erosion abatement.

1.7 SCOPING AND ISSUES

On May 15, 2003, the Corps published a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) in the *Federal Register* and distributed copies to federal, state and local resource agencies, as well as organizations and individuals that had expressed an interest in the project. Copies of the NOI were distributed to the appropriate Federal, State and local agencies, appropriate city and county officials, and other parties known to be interested in the project (Appendix B). Based on the responses received to the NOI, the Corps determined that an EA with a FONSI would be prepared, as the effects of the action were determined not to meet the significance criteria set forth under the National Environmental Policy Act (NEPA). A Notice of Withdrawal for the originally proposed EIS will be drafted and reviewed by the Jacksonville District and will be published in the *Federal Register,* should a FONSI determination be made on this EA. Scoping and information meetings with the resource agencies, Non-Governmental Organizations (NGOs) and public have continued since the original EA was released for public comment in July 2004 with subsequent meetings in Tallahassee, Bal Harbor, Miami Beach and Sunny Isles with resource agencies and interested parties. Additionally, the Corps and local sponsor held a site visit and phone conversations with leadership of the Miami chapter of the Surfrider Foundation to address their concerns prior to the preparation of this EA, as well as discussions with public works and environmental department representatives for the City of Miami Beach.

1.7.1 ISSUES EVALUATED IN DETAIL

The following issues were identified during scoping and by the preparers of this Environmental Assessment to be relevant to the proposed action and appropriate for detailed evaluation:

a. Downdrift littoral effects, turbidity and sedimentation impacts to offshore hardground/reef communities.
b. Potential effects to sea turtle access and nesting.
c. Potential effects on the beach benthic infaunal community.
d. Water quality.
e. Endangered Species.
f. Essential Fish Habitat (EFH).

g. Impacts on historic properties (i.e. historic shipwrecks).
h. Recreation/Public Safety.
i. Structure stability
j. Mitigation

1.7.2 ISSUES ELIMINATED FROM DETAIL ANALYSIS
No issues were specifically identified for elimination.

1.8 PERMITS, LICENSES, AND ENTITLEMENTS
If the Corps deploys the SMART structure, in accordance with Section 401 of the Clean Water Act (33 USC §1251 et seq.), as amended, a Water Quality Certification will be required from the Florida Department of Environmental Protection (FDEP) for the proposed construction activity. Additionally, the project is subject to the Coastal Zone Management Act (CZMA); National Historic Properties Act; the Endangered Species Act (ESA) and Magnuson Stevens Fisheries Act. Details on each of these permits and /or consultations can be found in Section 5 of the EA. Additionally, the project sponsor, Miami Dade Department of Environmental Resources Management (DERM), is responsible for obtaining any real estate easements and rights of way required for this project.

1.9 METHODOLOGY
This EA compiles information from a variety of sources including previous and current NEPA documents for the Miami-Dade BEC&HP project previously listed in Section 1.5 of this EA and specific shoreline and nearshore surveys conducted by the Corps and DERM to evaluate the potential for impacts from the proposed project. All of these NEPA documents relied on an interdisciplinary team using a systematic approach to analyze the affected area, to estimate the probable environmental effects, and to prepare the documents. This included literature searches, coordination with Federal, State and local resource agencies having expertise in certain areas, and on-site field investigations.

2 ALTERNATIVES

The alternatives section is the heart of this EA. This section describes in detail the no-action alternative and the proposed action. The beneficial and adverse environmental effects of the alternatives are presented in comparative form, providing a clear basis for choice to the decision maker and the public. A preferred alternative was selected based on the information and analysis presented in the sections on the Affected Environment and Environmental Effects.

As previously mentioned in Section 1.3, the alternatives to provide shore protection for Miami-Dade County beaches were evaluated in prior reports, which are listed in Section 1.5. This EA does not re-evaluate the alternatives for beach renourishment; instead it addresses the potential impacts associated with constructing a SMART structure. This alternative will be compared to the no action alternative.

2.1 DESCRIPTION OF ALTERNATIVES

2.1.1 CONSTRUCTION OF THE SUBMERGERED ARTIFICIAL REEF TRAINING (SMART) STRUCTURE – PREFERRED ALTERNATIVE

The proposed SMART structure would be constructed parallel to the shoreline between DEP monument R-45 and R-46 (approximately 0.7 acre footprint), approximately 500 feet offshore measured from the mean high water line, in -8.2 feet of water MLLW, to be covered by 1.5 feet of water at MLLW. It will be at a maximum 1,250 ft (381 m) in length (north-south) and 41 ft (12.5 m) in width (east-west). The structural components include two different reef ball unit types; the Goliath and the Bay ball. The structure will maintain an approximate width (east-west) of 41 feet, and consist of predominately hollow Goliath Balls. The Goliath Ball standard size is 6 x 5 ft (1.82m X 1.52m). The Bay Ball standard size is 2 x 3 ft (0.61m X 0.91m) (Figure 8). The breakwater configuration consists of both types of balls in an alternating manner to allow for safe mobility of marine animals in and around the structure. The components will be molded to articulated concrete mats prior to placement in the ocean; this will help stability and structural integrity of the breakwater system. The deployment of the reef balls will take place from a barge and may be diver assisted to ensure quality construction and placement of the reef balls/ABMs in a staggered manner to best fit the benthic landscape, minimize turbidity, and monitor environmental resources. The staggered placement would also more effectively attenuate wave energy and prevent shoreline erosion in an environmentally friendly manner. One segment equates to one row of four balls placed side by side (east to west) for a north south length of 6.5 feet, and an east-west width of 41 feet (Figures 5 and 6). The total number of segments in the structure is based on hydrodynamic GENSIS modeling (Appendix D). Figure 8 provides a conceptual overview of how the reefballs would be laid out in each segment.

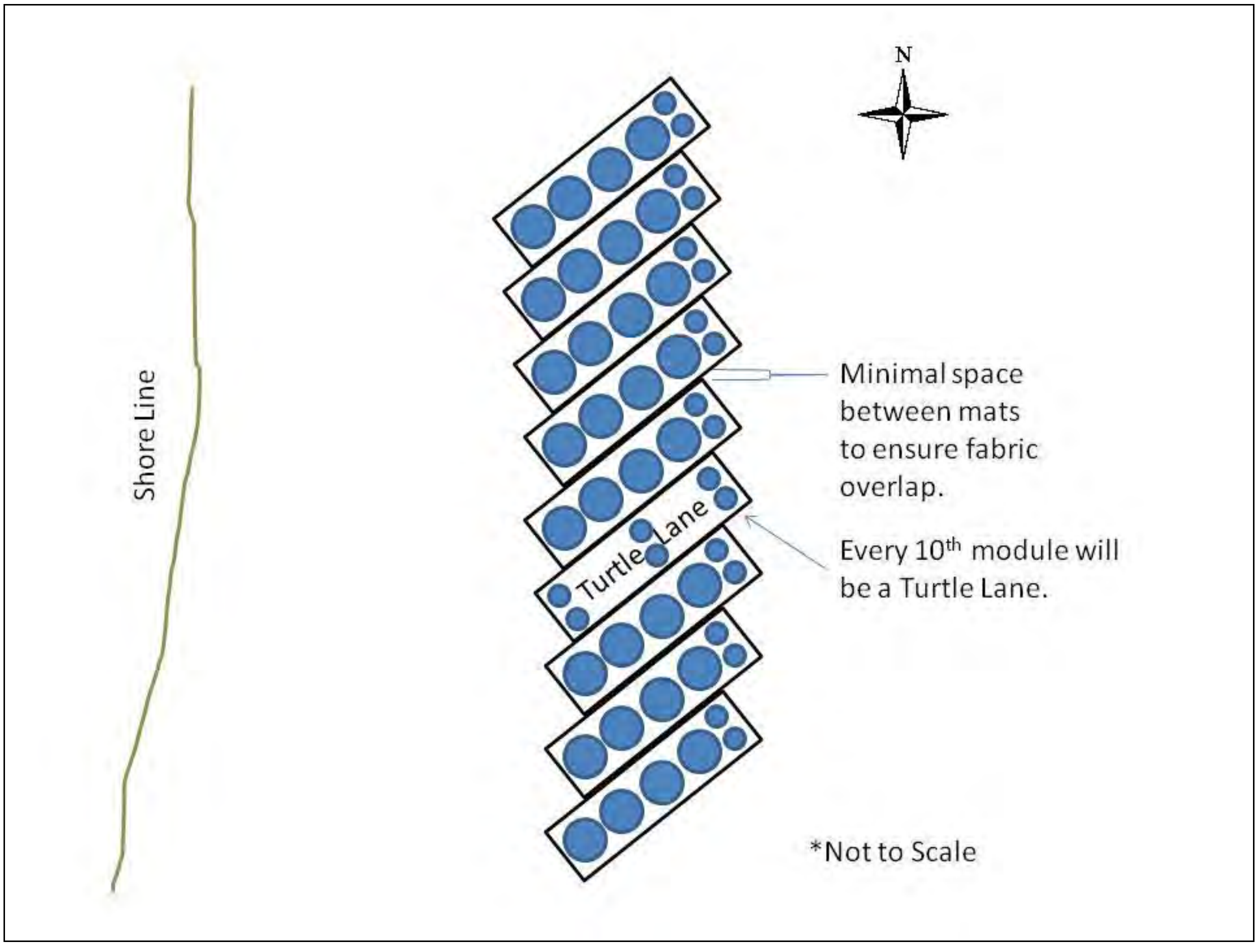


Figure 8 - Non-scale view of SMART structure layout

Construction activities would be restricted to in-water construction techniques from barges, with no construction activities taking place on the beach and without any dredging. The sand where the SMART structure will be placed may be smoothed with a device called a “bed-leveler” or “drag bar” prior to placement of the reefball modules to ensure the reefball modules are placed on as flat and level of ground as possible. A “bed-leveler” is considered to be any type of dragged device used to smooth sediment bottom irregularities. It is also referred to as a “mechanical leveling device or drag bar”. In various parts of the United States this process is known as “barring” or “knockdown” (Hales *et al.,* 2003). Use of bed-levelers is not a new technique and can be documented as far back as 1565 (Van de Graaf, 1987). Typically, a bed-leveler consists of a large customized plow, I-beam, or old spud that is slowly dragged across the sediment to smooth out peaks and trenches during the final cleanup phase of the dredging activity. Additionally, bed leveling is also permitted through the Regulatory program, often as a form of agitation dredging. The Corps has previously consulted with NMFS on the use of bed-levelers as part of construction activities under the ESA.

Under Section 2038 of WRDA of 2007, National Shoreline Erosion Control Development and Demonstration Program, the SMART structure could be altered or removed if it did not meet program goals and objectives.

In addition to Goliath Balls, smaller Bay Balls are incorporated into the structure every 10th segment (65 feet measuring north to south) for sea turtle access lanes through the structure as requested by USFWS on June 16, 2004. These sea turtle access lanes will allow 6.5 feet of distance between the larger Goliath Balls for the turtles to pass through. At a minimum (i.e. MLLW), these access lanes will have four feet of water depth above the Bay Ball (at the end and middle of the ACM for weight) for safe passage of sea turtles to and from the shoreline.

Figure 9 - Reef Balls molded to concrete blocks and connected into an articulated unit.

The SMART structure construction materials would be compatible to the proposed project area waters for the proposed SMART. The SMART reef modules would be hollow, rough textured finish with piling, coral transplant and ventilation holes to absorb and reduce wave energy that is currently eroding the proposed project "Hotspot" area. A reef module "Trial Mix Design" would consist of the following:

- Portland cement Type II to conform to American Society for Testing and Materials (ASTM) C-150.
- Fly Ash to meet ASTM C-618, Type F, as permitted by the Atlantic Marine Fisheries Commission adopted in artificial reefs.
- Fine aggregate to comply with ASTM C-33.
- Coarse aggregate to comply with ASTM C-33 #8 pea gravel (up to 1 inch – limestone aggregate preferred.
- Concrete admixtures to comply with ASTM C-494.

The following additives shall be required in all concrete mix designs:
- High range water reducer to comply with ADVA Flow 120 or 140 (or air entrained if ADVA not used – to comply with ASTM C-260).
- Silica Fume to comply with ASTM C-1240-93.

Optional Additives include:

- Fibers or microfibers 1 ½ inches or longer
- Concrete accelerators to comply with ASTM C-494 Type C or E.
- Concrete retarders to comply with ASTM C-494-Type D

All other admixtures are prohibited.

The proposed structure is designed to help slow the erosion rate and retain sand at Miami Beach between 63rd and 83rd. Optional sand sources for renourishment efforts are becoming increasingly limited, and innovative strategies for sand retention and stabilization are needed for long-term sustainability of these resources. Placement of the SMART structure would not preclude future renourishment events inshore of the structure as part of the larger Miami-Dade BEC&HP project.

2.1.2 NO-ACTION ALTERNATIVE

With the no-action alternative, the SMART structure would not be constructed and the Corps would continue to nourish the beach using available sand sources. The use of additional sources of sand to prevent shoreline erosion would be implemented without any preventative measures for retaining this sand source and further stabilizing the erosional hotspot. The current erosive condition would continue at its present rate, or may increase due to increased storm frequency or magnitude. The Corps expects minimal effect of sea level rise in the next 50-years based on trend data obtained from the National Oceanographic and Atmospheric Administration data located at http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml. Specifically for the Miami Beach area, "The mean sea level trend is 2.39 mm/year with a 95% confidence interval of +/- 0.43 mm/year based on monthly mean sea level data from 1931 to 1981 which is equivalent to a change of 0.78 feet in 100 years." The no-action alternative does not provide the benefits needed to protect the coast from the effects of erosion and storm damage over the long-term, nor the means for sustainable use of available sand sources. The no-action alternative may result in continued and possibly more frequent renourishment events within the footprint of the proposed SMART structure.

2.2 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

Limestone boulders were used in the Sunny Isles breakwater system, and were thus eliminated from consideration because the main initiative of the Section 227/2038 Program is to use new and innovative techniques for shoreline erosion control. The SMART structure utilizes concrete reef balls that have been modeled as an equally effective breakwater system to the limestone boulders, in addition to providing suitable pH balance for attracting environmental resources. For these reasons, limestone boulders were eliminated as an alternative.

2.3 ALTERNATIVES NOT WITHIN JURISDICTION OF LEAD AGENCY

To the Corps' knowledge, there are no alternatives that are not within the jurisdiction of the lead agency.

2.4 MITIGATION

Based on project review by federal and state resource agencies and nearshore hardbottom surveys, no mitigation is proposed, as there are no adverse impacts to significant habitats or species expected to occur as a result of the project. Some beneficial effects of the project are expected and are discussed in Section 4.0 of the EA. Modeling results from SBEACH and GENESIS programs have shown minimal shoreline loss effects post SMART structure construction. Modeling shows that once construction of the SMART structure has been completed, the longshore sediment drift will seek equilibrium, and the shoreline stabilization process will occur. See Appendix E- "Physical and Biological Monitoring Program for SMART structure objectives and measures for determining success" for additional information on proposed monitoring and plans for adaptive management responses to unintended impacts of the SMART structure. If the SMART structure does not perform as designed and modeled, it can be altered or removed under Section 2038 of WRDA of 2007. Additionally, a review of the Sunny Isles breakwaters installed in late 2001, has demonstrated no adverse downdrift beach impacts, as well as an increased ability of the beach behind the breakwater structure to hold sand. The Corps expects that the 63rd Street SMART structure will behave in a very similar fashion as the Sunny Isles breakwater.

Section 5.0 Environmental Commitments discusses other procedures that would be implemented to avoid or minimize any potential unintended adverse environmental impacts.

2.5 COMPARISON OF ALTERNATIVES

See Table 3 and Section 4.0 Environmental Effects for a discussion on the impacts of alternatives.

Table 3: Summary of Direct and Indirect Impacts for Alternative Project Plans Considered

ALTERNATIVE ENVIRONMENTAL FACTOR	NO ACTION	SUBMERGED ARTIFICIAL REEF TRAINING (SMART) STRUCTURE
PROTECTED SPECIES	Continued erosion could affect sea turtle nesting habitat, even resulting in a loss of habitat due to continued loss of nesting beach.	No impact on manatees, sea turtles, sawfish or whales expected –'sea turtle lanes' added to proposed structure. Potential beneficial affects to Acroporid corals as a result of added hard structure for adherence of juvenile coral polyps. If beach accretion occurs, increased habitat for sea turtle nesting.
HARDGROUNDS	Continued shoreline erosion could affect downdrift hardgrounds south of the project area.	Potential of temporary increase in turbidity w/in project area. No direct effects expected due to

		distance of project area from mapped hardbottoms in project vicinity.
FISH & WILDLIFE	Probable continued loss of beach & shoreline habitat	Potential temporary construction impacts of turbidity
VEGETATION	Continued erosion could affect dune/beach vegetation by loss of upland beach due to narrowing of beach and impacts of storm waves on dunes.	No impact – no upland construction proposed.
EFFECTS ON ADJACENT SHORELINES	Continued erosion of project shoreline & adjacent beach during storm events	Potential to stabilize shore line north & south of project, provide extended renourishment cycle
WATER QUALITY	Continued erosion of project shoreline & turbidity within 63rd Street "Hotspot" area	Probable temporary increase in turbidity & suspended sediment at project area
HISTORIC PROPERTIES	No impact	No impact (SHPO concurrence)
ENERGY REQUIREMENTS & CONSERVATION	Increase energy usage from more frequent renourishments or other efforts to control erosion & repair property damage	Lower when compared to beach renourishment cycle
SAND BENTHIC SUBSTRATE	As sand erodes from the beach, it will accrete in the nearshore directly off the beach at the 63rd Street "Hotspot" area	Conversion of approximately. 0.7 acres of sand substrate to hard substrate via SMART footprint
RECREATION	No significant impacts	No significant impacts expected – additional recreation potential due to increased beach stability and decrease in nourishment intervals.
AESTHETICS	Continued unsightly erosion & scarps	Improved aesthetics with protected/stabilized shoreline expected

3 AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that are at risk of being affected by either the proposed project or by the alternatives if implemented. This section, in conjunction with the description of the "no-action" alternative, forms the base line conditions for determining the environmental impacts of the proposed action and reasonable alternatives.

3.1 GENERAL ENVIRONMENTAL SETTING

The project area is located along the northernmost 0.85 miles of shoreline along the barrier island that extends from Government Cut (Miami Harbor) northward to Bakers Haulover Inlet. The shoreline is completely developed with high-rise condominiums, hotels and other commercial and municipal establishments. The shoreline consists of an open sandy coast, with dense vegetation planted by Miami-Dade County along the back-beach area. The project area is used extensively for recreation.

3.2 VEGETATION

The dune system in Miami-Dade County between Government Cut and Bakers Haulover Inlet is largely artificial and was built as part of the Dade County BEC & HP Project. Dominant plant species in the dune communities include sea grapes(*Coccoloba uvifera*); the beach morning glory (*Ipomoea pes-caprea*); beach bean (*Canavalia rosea*); sea oats (*Uniola paniculata*); dune panic grass (*Panicum amarulum*); bay bean (*Canavalia maritime).* The beach berry or inkberry (*Scaevola plumier*)*;* sea lavender (*Mallotonia gnaphalodes*); spider lily (*Hymenocalis latifolia*); beach star (*Remirea maritime*); and coconut palm (*Coco nucifera*) are also present.

Typical algal coverage on the offshore hardground areas in the county fluctuates seasonally. The most common algal species observed within southeast Florida offshore hardground areas are *Caulerpa prolifera*, *Codium isthmocladum*, *Gracillaria* sp., *Udotea* sp., *Halimeda* sp., and various members of the crustose coralline algae of the family Corallinaceae. Algal growth is most luxuriant from late July through late October or early November. There seems to be a particular burst or bloom in the macroalgal population in conjunction with the seasonal upwelling that occurs in late July or early August (Smith, 1981, 1983; Florida Atlantic University and Continental Shelf Associates, Inc., 1994).

Seasonally, there is extensive macroalgal growth in the offshore soft bottom areas, with species of green algae (*Caulerpa* sp., *Halimeda* sp., and *Codium* sp.) being particularly abundant in the summer and the brown algal species (*Dictionary* sp. and *Sargasso* sp.) being more abundant in the winter (Courtenay *et al*., 1974; Florida Atlantic University and Continental Shelf Associates, Inc., 1994).

3.3 THREATENED AND ENDANGERED SPECIES

3.3.1 SEA TURTLES

Sea turtles are present in the open ocean year-round offshore of Miami-Dade County because of warm water temperatures and hardbottom habitat used for both foraging and shelter. Five species of sea turtles occur within the waters of Miami-Dade County. These species are the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*) and hawksbill (*Eretmochelys imbricata*). Under the ESA the loggerhead sea turtles is currently listed as threatened, although a proposal to uplist to endangered was recently published by the National Marine Fisheries Service (NMFS) and USFWS, and the green; Kemp's ridley; hawksbill and leatherback sea turtles are listed as endangered.

Due to large-scale urbanization, Miami-Dade County hosts fewer sea turtle nests than many counties to the north. Three species of sea turtles nest on the beaches of Miami-Dade County: loggerhead, green and leatherback sea turtles. Loggerhead sea turtles establish the most nests, while green and leatherbacks nest on Miami-Dade beaches to a lesser extent (FWRI, 2008). The Kemp's ridley and hawksbill sea turtles are infrequent nesters along the east coast of Florida and have not been recorded as nesting on County beaches. From 2004-2008 within Miami-Dade County, over 95% of nests were identified as loggerhead sea turtle nests (FWRI 2008). Green and leatherback sea turtles constitute the remainder of nests documented from 2004-2008. In 2006 and 2008 no green sea turtle nests were documented on county beaches.

Florida Fish and Wildlife Research Institute (FWRI) reported false crawl data for Miami-Dade County in 2008, with 302 loggerhead sea turtle false crawls, two (2) leatherback sea turtle false crawls, and zero false crawls documented for green sea turtles. Although the cause of false crawls is not fully understood, causes cited include, obstructions, previously staked sea turtle nests, sea walls, sand castles, public benches, and trash cans. No identifying obstacles or reasons for the documented false crawls were reported.

Concerns were raised in regards to the SMART structure about sea turtle access to the beach for nesting and hatchling safety during their journey from the nest to open water. According to Wyneken & Salmon (1992), hatchlings undergo a state of frenzy swimming once they enter the water for the first time since emerging from their nests. Their study reveals that this frenzy can last up to 24 hours, a mechanism thought to help the hatchlings distance themselves from the shoreline and potential predators. The study also suggests that on average, the hatchlings swim within the top 1m of water, and rarely dive below 3 to 4m. Based on various sources, adult sea turtles range from 1.1m to 2.4m in carapace length (3 to 8 feet), with leatherback turtles being the largest. On average sea turtle widths are 1 to 1.5m (3 to 5 feet). Based on this information the proposed SMART structure is designed to accommodate the full size range of sea turtle species while still meeting its engineered purpose of shoreline erosion abatement. The SMART structure Goliath Ball segments are proposed to be covered at a minimum by 1.5-feet (0.4572 m) of water at MLLW, and 5.0 feet (1.524 m) at Mean High Water (MHW). The bay balls (sea turtle access lanes) are proposed to be covered at a minimum by 4.5 feet (1.372m) depth of water at MLLW, and 8.0 feet (2.438m) at MHW. The sea turtle access lanes will be located every 10th SMART segment, with 6.5 feet in width for passage. In addition to the designated sea turtle lanes, the final design of the SMART structure has incorporated two 250-foot gaps between the three structural members of the reef that will also facilitate passage of sea turtles. This would aid both adult female turtles swimming toward the beach and hatchling access through and over the SMART structure during nesting and hatching season (Figure 10).

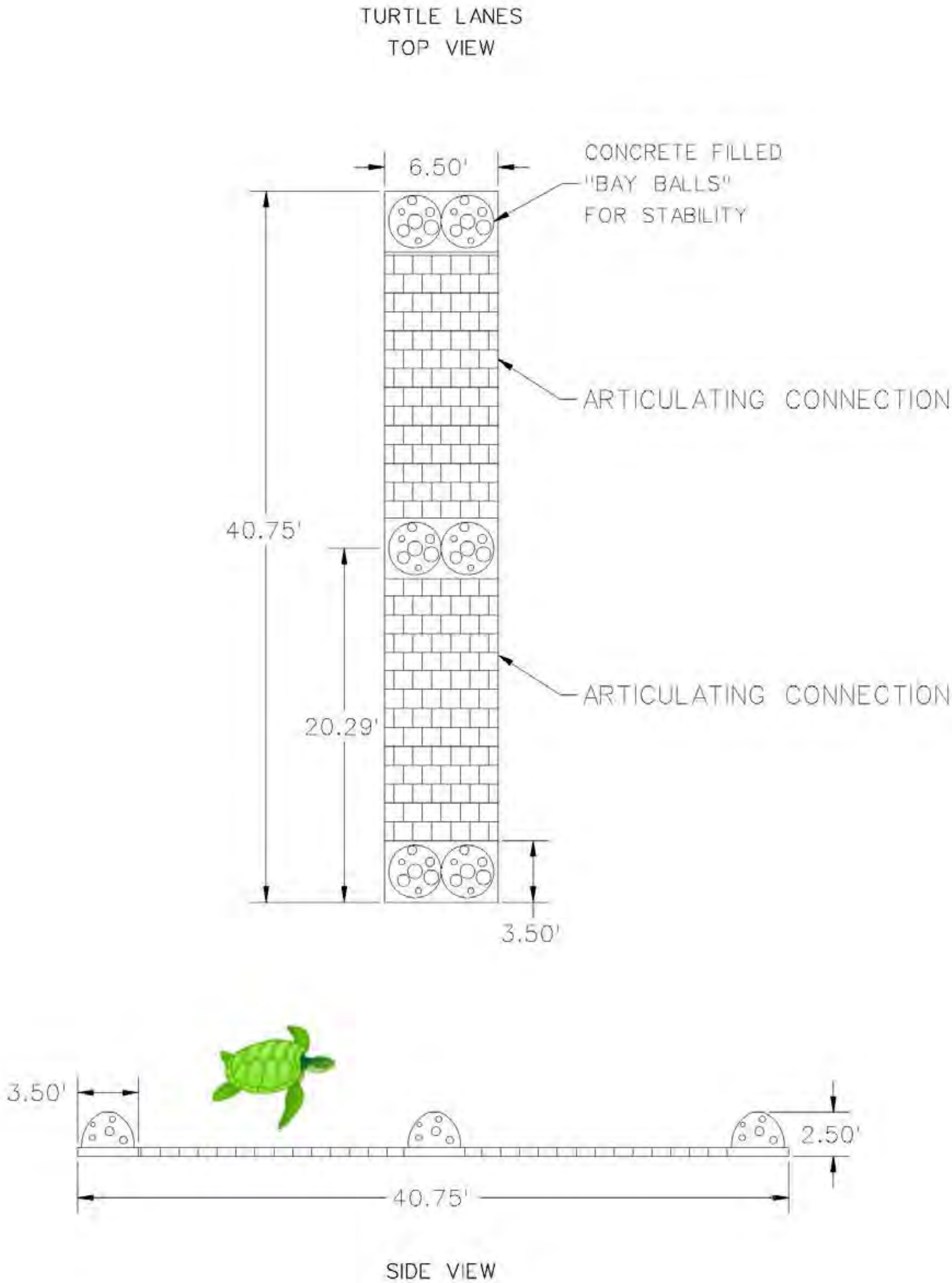


Figure 10 - Sea turtle Access Lanes through SMART structure (There will be two Bay Balls side by side at the end of each ACM and two Bay Balls in the middle of the ACM).

A seven year study conducted at Jupiter Island, Florida, suggests beach renourishment is a less desired nesting ground than a naturally accreting beach for sea turtles. The study showed that nesting females placed fewer nests on the renourished beach than the control beach. Researchers concluded that false crawls on the renourished beach correlated with greater surface hardness due to the sand used in the renourishment efforts. Females also tended to avoid the narrower portions of the beach that was observed during the natural erosion cycle before or after renourishment efforts. In addition, scarps tended to form after each renourishment effort, which potentially prohibited females from productive crawling to favorable nesting grounds, but the berms diminished over time (Steinitz, Salmon, and Wyneken 1998). A naturally accreting beach, similar to the one proposed using the SMART technology would help to stabilize the beach and remove the cyclic inconsistency of unfavorable nesting grounds caused by the eroding and accreting pattern.

Longshore drift concerns have also been discussed in conjunction with sea turtle nesting habitat. Some temporary longshore drift effects may be experienced after SMART construction. Once the ‘river of sand’ drift equilibrium is reached, down drift effects would return to historical conditions. The proposed SMART structure potential downdrift effects are thought to be very similar to the Sunny Isles submerged breakwater effects. The SMART structure is more porous, focuses on ‘holding the shoreline’ and would most likely be more benign than the Sunny Isles submerged breakwater.

Sea Turtle nesting is closely monitored along Miami-Dade County’s public beaches. Nests are not relocated unless in immediate danger from tidal or predation influences. Due to FWC requests, nests in the project area are left in their natural state as much as possible. The frequency of nesting along the beach at 63rd street has ranged from three nests in 2004 and 2007 to eight nests in 2003 and 2008 (Brost, 2004). The number of false crawls ranged from one in 2007 to nine in 2003. The loggerhead turtle accounts for the majority of the nesting in the county, and in the immediate area of 63rd street the only other turtle species recorded between 2001 and 2008 was a leatherback nest in 2007. Nesting trends in the project area, labeled by FWC as zones H, I, and J for the time period 2001 to 2008 can be found graphically presented in Figure 11. The annual number of nesting sea turtles on Miami Beach in zones H, I, and J are believed to be low due to the high level of anthropogenic effects in the proposed project area. Impacts of compaction and scarps are fairly well established and will be monitored. In addition, continued beach erosion would reduce available nesting habitat. Corrective and mitigative protocols have been established and are detailed in the Physical and Biological Monitoring plan found in Appendix E.

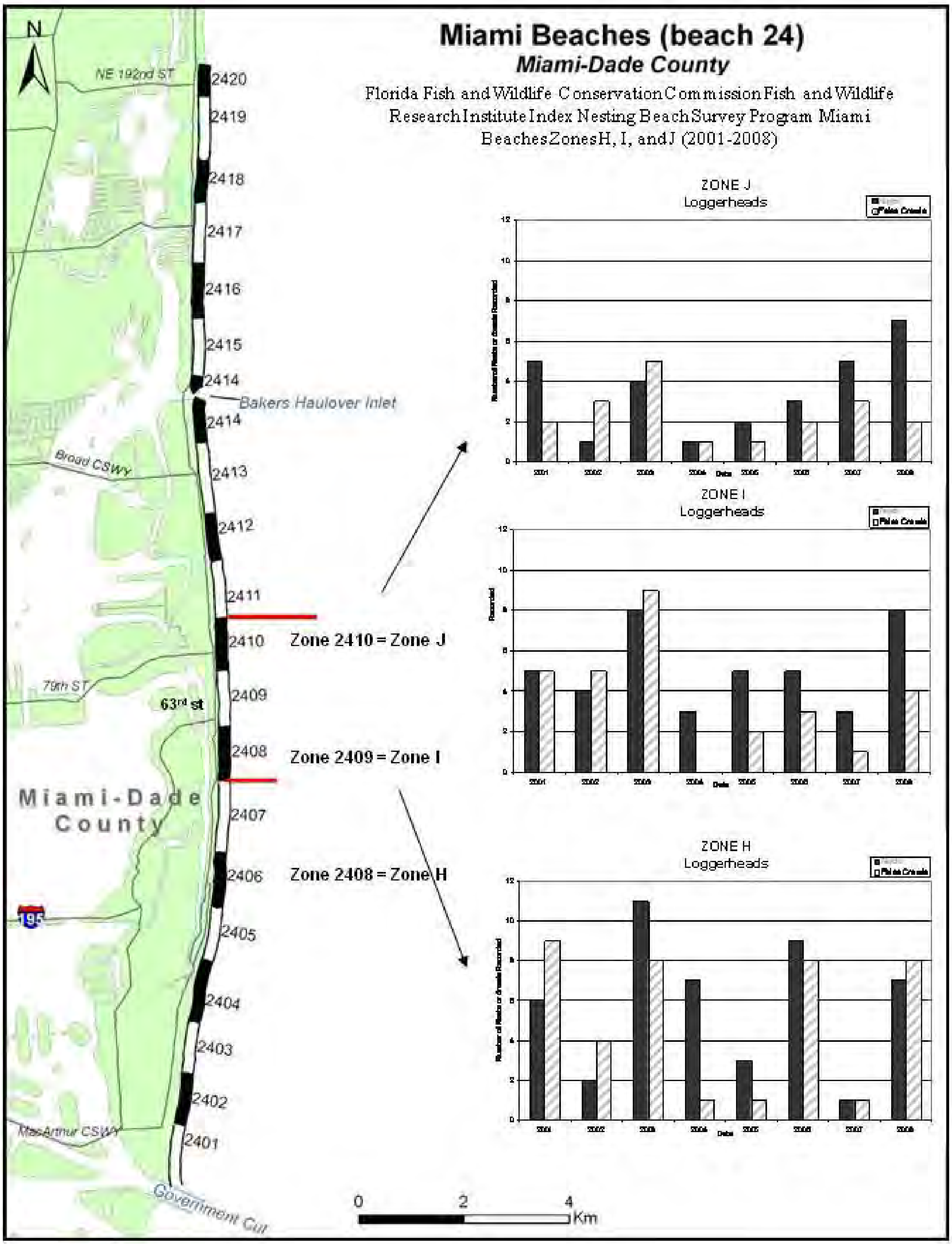


Figure 11 - Sea Turtle Nesting Trends in the 63rd Street Vicinity

3.3.2 WEST INDIAN MANATEE

The West Indian manatee (*Trichechus manatus*) is protected by Federal law (the ESA and the Marine Mammal Protection Act), and Florida state law. The manatee is generally restricted in range to the Georgia coast southward around the Florida peninsula. Manatees frequently inhabit shallow areas where seagrasses are present and are commonly found in protected lagoons and freshwater systems. Manatees occasionally use open ocean passages to travel between favored habitats (Hartman 1979). Manatees migrate seasonally. During the summer months manatees utilize habitats along the coast, while during the winter months manatees migrate to inshore warmer waters, including bays and springs.

Within Miami-Dade County, manatees are frequently found in Biscayne Bay, canals, the Miami River and the intra-coastal waterway. Although manatees have been observed in the open ocean, they feed and reside mainly in the estuarine areas and around inlets. Mortality data for the West Indian manatee in Florida is available from 1974-2009, through FWRI (FWRI 2009). Mortality data within one-mile of the project area reported the occurrence and cause of 2 manatee deaths between 1974 and 2009. No deaths were reported within the project footprint (FWRI 2009). In order to minimize and avoid potential impacts to manatees, the dredge contractor will be required to monitor for manatees under the ESA and Florida law.

No significant foraging habitat is known to exist in the areas around the project site, nor have manatees been known to congregate in the nearshore environment within the project area.

3.3.3 SMALLTOOTH SAWFISH

On April 1, 2003, NMFS published a final rule (68 FR 15674) listing the Distinct Population Segment (DPS) of smalltooth sawfish found in the US as an endangered species under the ESA. Smalltooth sawfish (*Pristis pectinata*) were once common in Florida as detailed by the Smallthooth sawfish recovery plan (NMFS 2009) and are very rarely reported in southeast Florida. NMFS designated critical habitat in September 2009 (74 FR 45353) and published a final recovery plan in January 2009. The Corps requested sighting information from the FWC's smalltooth sawfish sighting database on October 18, 2006 for the "area of North Dade County, near Baker's Haulover Inlet". In an email response dated October 31, 2006 FWC sawfish Biologist, Jason Seitz states, "There are no records of sawfish encounters in or near Bakers Haulover Inlet, separating Sunny Isles from Bal Harbor in North Miami. ***Miami-Dade County encounters are especially rare, and our combined database of several thousand United States encounters only lists eight records from this county, spread over more than a century (between 1895 and 2005)***(emphasis added). None of these records are known to be in the vicinity of Bakers Haulover Inlet. This certainly doesn't mean that *Pristis pectinata* does not utilize the inlet, as encounters with sawfish depend heavily on human usage of a given location. If low numbers of angling and diving are done in the area, it can be expected that little or no encounters will take place, even if sawfish frequent that area." While the smalltooth sawfish has designated critical habitat under the Act, none is present in the project area.

3.3.4 ELKHORN AND STAGHORN CORALS

On May 9, 2006, staghorn (*Acropora cervicornis*) and elkhorn (*Acropora palmata*) corals were listed as "threatened" under the ESA. On November 26, 2008, NMFS published a final rule in the *Federal Register* to designate critical habitat for elkhorn and staghorn corals. Designated critical habitat includes one specific area of the Atlantic-Ocean offshore of Palm Beach, Broward, Miami-Dade, and Monroe counties, Florida with defined parameters (Primary Constituent Elements or PCE) that must be present for the designated footprint to be considered critical habitat for the species. Elkhorn and staghorn corals are two of the major reef-building corals in the wider Caribbean. Staghorn coral is characterized by staghorn-antler-like colonies, with cylindrical, straight, or slightly curved branches. Elkhorn colonies are flattened to near-round, with frond-like branches that typically radiate outward from a central trunk that is firmly attached to the sea floor. Historically, both acroporid species formed dense thickets at shallow (<5 m) and intermediate (10 to 15 m) depths in many reef systems, including some locations in the Florida Keys, western Caribbean (e.g., Jamaica, Cayman Islands, Caribbean Mexico, Belize), and eastern Caribbean. Early descriptions of Florida Keys reefs referred to reef zones, of which the staghorn zone was described for many shallow-water reefs (Jaap 1984, Dustan 1985, Dustan and Halas 1987). As summarized in Bruckner (2002), however, the structural and ecological roles of Atlantic *Acropora spp*. in the wider Caribbean are unique and cannot be filled by other reef-building corals in terms of accretion rates and the formation of structurally complex reefs.

3.3.5 OTHER ENDANGERED AND THREATENED SPECIES

Other threatened or endangered species that may be found in the coastal waters off of Miami-Dade County during certain times of the year are the finback whale, (*Balaenoptera physalus*); humpback whale (*Megaptera novaeangliae*); north Atlantic right whale (*Eubalaena glacialis*); sei whale (*Balaenoptera borealis*); and the sperm whale (*Physeter macrocephalus catodon*). These are infrequent visitors to the area, remain offshore and are not likely to be impacted by project activities.

3.4 FISH AND WILDLIFE RESOURCES

3.4.1 BEACH AND OFFSHORE SAND BOTTOM COMMUNITIES

The beaches of southeast Florida are exposed beaches and receive the full impact of wind and wave action. Intertidal beaches usually have low species richness, but the species that can survive in this high-energy environment are abundant. The upper portion of the beach, or subterrestrial fringe, is dominated by various talitrid amphipods and the ghost crab (*Ocypode quadrata)*. In the midlittoral zone (beach face of the foreshore), polychaetes, isopods, and haustoriid amphipods become dominant forms. In the swash or surf zone, coquina clams of the genus Donax and the mole crab (*Emerita talpoida*) typically dominate the beach fauna. All these invertebrates are highly specialized for life in this type of environment (Spring, 1981; Nelson, 1985; and U.S. Fish and Wildlife Service, 1997).

Shallow subtidal soft bottom habitats (0 to 1 meters [0 to 3 feet] depth) show an increasing species richness and are dominated by a relatively even mix of polychaetes (primarily spionids), gastropods (*Oliva* sp., *Terebra* sp.), portunid crabs (*Arenaeus* sp., *Callinectes* sp., *Ovalipes* sp.), and burrowing shrimp (*Callianassa* sp.). In slightly deeper water (1 to 3 meters [3 to 10 feet] depth) the fauna is dominated by polychaetes, haustoid and other amphipod groups, bivalves such as *Donax* sp. and

Tellina sp. (Marsh *et al*., 1980; Goldberg *et al.*, 1985; Gorzelany and Nelson, 1987; Nelson, 1985; Dodge *et al*., 1991.

Offshore soft bottom communities are less subject to wave-related stress than are nearshore soft bottom communities. They exhibit a greater numerical dominance by polychaetes as well as overall greater species richness than their nearshore counterparts. Barry A. Vittor & Associates, Inc. (1984) reported polychaetes made up 68.9 percent of the macrobenthic community off Port Everglades, followed by mollusca (13.2 percent), arthropods (10.7 percent), echinoderms (1.2 percent), and miscellaneous other groups (6.0 percent). Goldberg (1985) reported polychaetes as the dominant taxon from his infaunal survey off northern Broward County. Dodge *et al.* (1991) found polychaetes to be the most abundant group in 18 meters (60 feet) of water off Hollywood, Florida. In March 1989, polychaetes made up 51.7 percent of the macrofaunal community at that location followed by nematodes (14.3 percent), smaller species of crustaceans (9.0 percent), oligochaetes (4.3 percent), nemerteans (3.6 percent), and bivalves (2.9 percent). The infaunal community species are generally very motile and rapid reproducers.

Larger members of the invertebrate macrofauna seen occasionally in these offshore soft bottom areas between the second and third reef lines include the queen helmet (*Cassia madagascariensis*); the king helmet (*Cassia tuberose*); Florida fighting conch (*Strombus alatus*); milk conch (*Strombus costatus*); Florida spiny jewel box, (*Arcinella cornuta*); decussate bittersweet (*Glycymeris decussate*); calico clam (*Macrocallista maculate*); tellin (*Tellina* sp.); and cushion star (*Oreaster reticulates*). Commercially valuable species, such as the Florida lobster (*Panulirus argus*) move through this area as they migrate from offshore to nearshore areas (Courtenay *et al*., 1974).

Surf zone fish communities are typically dominated by relatively few species (Modde and Ross, 1981; Peters and Nelson, 1987). Fish species that can be found in the surf zone include, Atlantic threadfin herring (*Opisthonema oglinum*); blue runner (*Caranx crysos*); spotfin mojarra (*Eucinostomus argenteus*); southern stingray (*Dasyatis Americana*); greater barracuda (*Sphyraena barracuda*); yellow jack (*Caranx bartholomaei*); and the ocean triggerfish (*Canthidermis sufflamen*), none of which are of local commercial value. Most of the fish making up the inshore surf community tend to be either small species or juveniles (Modde, 1980).

Fish species specifically associated with the sand flats and soft bottom areas between the first and second reefs off Palm Beach, Broward, and Miami-Dade counties include lizardfish (*Synodus* sp.); sand tilefish (*Malacanthus plumier*); yellow goatfish (*Mulloidichthys martinicus*); spotted goatfish (*Pseudupeneus maculates*); jawfish (*Opistognathus* sp.); stargazer (*Platygillellus (Gillellus) rubrocinctus*); flounder (*Bothus* sp.); and various species of gobies and blennies, none of which have significant local commercial value.

Based on the findings of Walker *et al*. (2002), the Corps expects the total numbers of fishes in the project area to increase as a result of SMART structure deployment. Walker *et al*.(2002) found that prior to deployment of artificial reefs in central Miami-

Dade county, offshore of South Beach, the mean total fish count was five (5) ± 1.4 versus a mean of 40.6 ± 10.1 fish post artificial reef structure deployment.

3.4.2 HARDBOTTOM COMMUNITIES

The classic reef distribution pattern described for southeast Florida reefs north of Key Biscayne consists of an inner reef in approximately 15 to 25 feet (5 to 8 meters) of water, a middle patch reef zone in about 30 to 50 foot (9 to 15 meters) of water, and an outer reef in approximately 60 to 100 foot (18 to 30 meters) of water. This general description was first published by Duane and Meisburger (1969) and has been the basis for most descriptions of hardground areas north of Government Cut, Miami since that time (Goldberg, 1973; Courtenay *et al*., 1974; Lighty *et al*., 1978; Jaap, 1984). Development of these three reef terraces into their present form is thought to be related to fluctuations in sea level stands associated with the Holocene sea level transgression that began about 10,000 years ago. An extensive sand zone lies between the shoreline and initial reef communities.

The composition of hardground biological assemblages along Florida's east coast has been detailed by Goldberg (1970, 1973), Marszalek and Taylor (1977), Raymond and Antonius (1977), Marszalek (1978), Continental Shelf Associates, Inc. (1984; 1985; 1987; 1993b), and Blair and Flynn (1989). Although there are a large variety of hard coral species growing on the reefs north of Government Cut, these corals are no longer actively producing the reef features seen there. The reef features seen north of Government Cut have been termed "gorgonid reefs" (Goldberg, 1970; Raymond and Antonius, 1977) because they support such an extensive and healthy assemblage of octocorals. Goldberg (1973) identified 39 species of octocorals from Palm Beach County waters. The U.S. Environmental Protection Agency (EPA) (1992) lists 46 species of shallow water gorgonids as occurring along southeast Florida. Surveys by Continental Shelf Associates, Inc. (1984; 1985) identified 33 sponge, 21 octocoral, and 5 hard coral species on offshore reefs off Ocean Ridge and 40 sponges, 18 octocoral, and 14 hard coral species on the offshore reefs off Boca Raton. Blair and Flynn (1989) described the reefs and hard bottom communities off Miami-Dade County and compared them to the offshore reef communities from Broward and Palm Beach counties. They documented a decrease in the hard coral species density moving northward from Miami-Dade County to Palm Beach County. Despite this gradual decrease in the density of hard coral species present, the overall hardground assemblage of hard corals, soft corals, and sponges seen along southeast Florida's offshore reefs remains remarkably consistent throughout the counties of Miami-Dade, Broward, and Palm Beach. Commercially, the most important invertebrate species directly associated with these hardground areas is the Florida lobster (*Panulirus argus*).

Common fish species identified with the reef/hardground communities include grunts (Haemulidae), angelfish (Pomacanthidae), butterfly fish (Chaetodontidae), damselfish (Pomacentridae), wrasses (Labridae), drum (Sciaenidae), sea basses (Serranidae) snapper (Lutjanidae) and parrotfish (Scaridae). Important commercial and sport fish such as black margate (*Ansiotremus surinamensis*), gag (*Mycteroperca microlepis*), red grouper (*Epinephelus morio*), red snapper (*Lutjanus campechanus*), gray snapper (*L. griseus*) Hogfish (*Lachnolaimus maximus*) and snook (*Centropomus undecimalis*) are also associated with these reefs. The precise composition of the fish assemblage associated with any given location along these hardground areas is dependent upon the structural complexity of the reef at that location.

Herrema (1974) reported over 300 fish species as occurring off southeast Florida. Approximately 20 percent of these species were designated as "secondary" reef fish. Secondary reef fish are fish species that, although occurring on or near reefs, are equally likely to occur over open sand bottoms. Many of these species, such as the sharks, jacks, mullet, bluefish, sailfish, and marlin (none of which have significant local commercial value), are pelagic or open water species and are transient through all areas of their range.

Based on extensive experience with projects within the Miami-Dade County and other Florida beaches, impacts to hardground and reefs can be predicted based on proximity, currents, nature of borrow material, buffer zones and other factors. The preferred alternative for selecting a shoreline stabilization alternative is to avoid or minimize impacts to these resources to the maximum extent practicable in consideration of other project requirements. Light Detection and Ranging (LIDAR) information overlaid on Laser Airborne Depth Sounder (LADS) data for the project area provided by DERM has located sandy bottom devoid of any sessile or epibenthic organisms. This was verified through review and evaluation of aerial photographs, recently completed LIDAR surveys, in addition to visual surveys conducted by DERM biologists along representative transects in the project area. A copy of the field survey, completed by DERM in March – April 2010, is included in Appendix B, Pertinent Correspondence. An area of rubble and algae was mapped at the shoreline, however the SMART structure will be placed oceanward of this area, and construction activities would be done from ocean-based vessels. Persistent hardgrounds (classified as colonized pavement by Walker, 2009) have been identified approximately 2,000-feet offshore of the proposed project area (Figure 12). Sufficient water depths exist within the project area so loaded barge and tug transit will not impact the previously described hardgrounds. As part of the Environmental Protection plan, the contractor will be required to develop an ingress/egress plan for barges and equipment in compliance with the recommendations included in the *BMPs for Coastal Construction* (PBS&J, 2008), to the maximum extent practicable and shall submit these routes to the contracting officer for approval. Factors the contractor shall consider in developing this plan include: mean tidal range; difference in draft between empty and full loaded vessel; width of the vessel and the proposed corridor, ensuring that the corridor has sufficient width to protect hardbottoms; turning radius of vessels and a method for vessel path tracking. The Contracting Officer will coordinate the routes with the resource agencies, as applicable.

The protection of any hardbottom resources discovered during deployment of the SMART structure would be undertaken with precision positioning equipment, Geographic Positioning System, vessel depth finder to determine existing water depths, and possibly diver assistance during deployment. Mitigation for hardground impacts are not proposed at this time, since no hardbottoms have been found in the project area or directly adjacent to the project area during surveys conducted for the project as determined by *in situ* surveys (Figures 12 & 13) (DERM 2010). If hard ground impacts caused by the SMART structure are discovered after construction, coordination with the appropriate resource agencies would be undertaken as directed in the monitoring plan in Appendix E. The proposed SMART structure surfaces are very rough and could provide substrate for infaunal species, as seen at other nearshore artificial structures, like the Sunny Isles breakwater, including hardbottom habitat for threatened Acrporid corals. The structures also have holes included in them to serve as transplant holes, if corals from other projects need to be relocated to the SMART structure in the future by Dade County DERM or other authorized entity. No coral transplantation is proposed as part of the structure deployment. The SMART structure will be staged and constructed on land, and then transported on barges to project area using an approved vessel corridor (Appendix E).

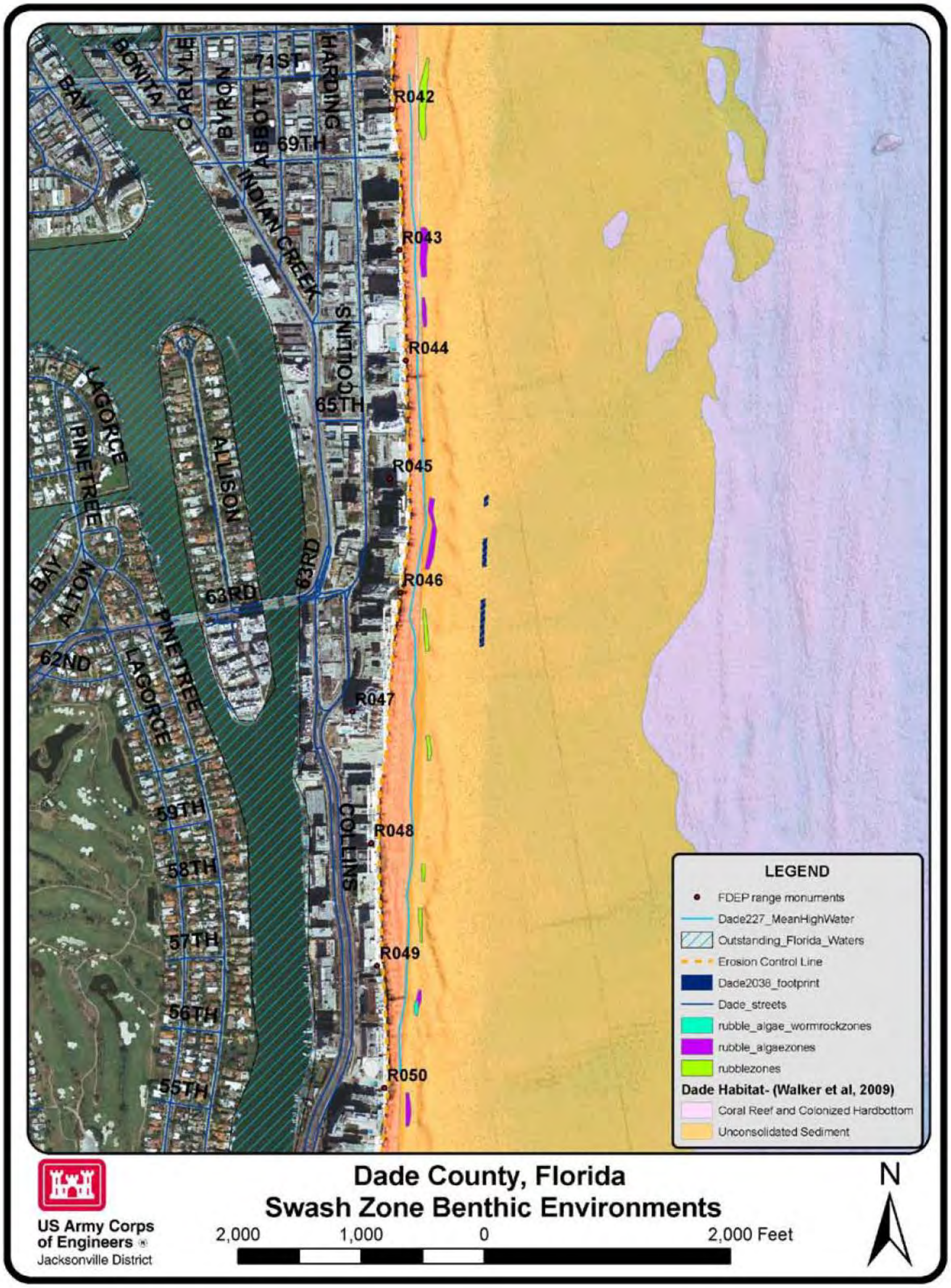


Figure 12: Location of hardbottom resources in relation to SMART structure location

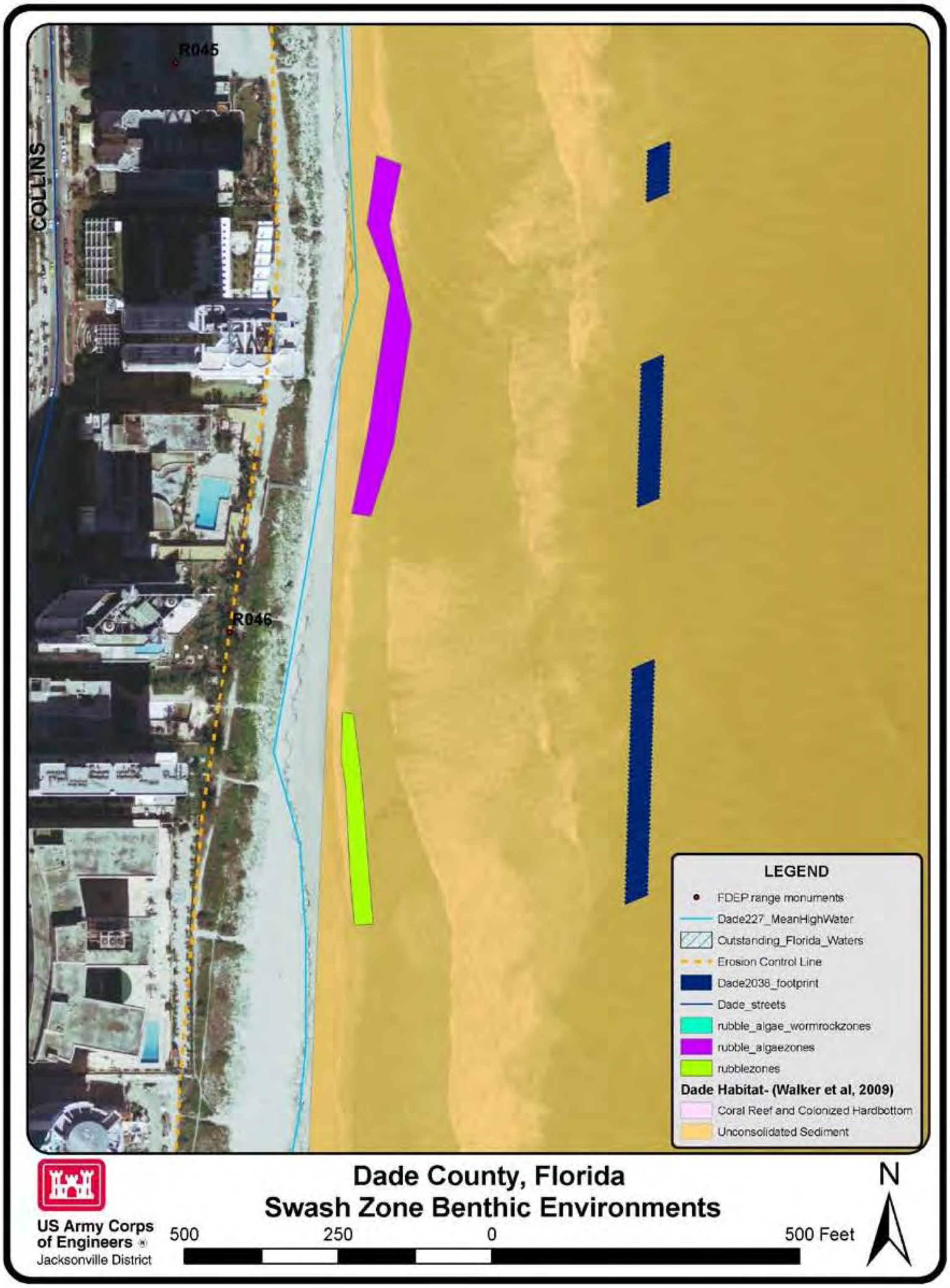


Figure 13: Resources mapped in the vicinity of the SMART structure

3.4.3 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH). This EA is prepared consistent with guidance provided by the NMFS Southeast Regional Office to USACE, Jacksonville District regarding coordinating EFH consultation requirements with NEPA (NMFS, 1999). EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, or growth to maturity" (SAFMC, 1998).

Habitats within the project area have been designated as EFH as defined in 1996 by amendment to the Magnuson-Stevens Fishery Conservation and Management Act (SAFMC, 1998). Categories of EFH that occur in Miami-Dade county and within the vicinity of the project area include water column, hardground, coral, and open sand habitat, some of which are Habitat Areas of Particular Concern (HAPC): hardground, coral and coral reef habitats. EFH for species within the project area include brown and pink shrimp, snapper-grouper complex (73 species), Spanish and king mackerel, spiny lobster. Various life stages of some of the managed species found in the project area include larvae, post larvae, juvenile and adult stages of red, gray, schoolmaster, mutton and yellowtail snappers, scamp, speckled hind and gag groupers, white grunt and spiny lobster. Coastal migratory pelagic species identified by the NMFS include nurse, bonnethead, lemon, black tip and bull sharks.

3.5 COASTAL BARRIER RESOURCES

There are no designated Coastal Barrier Resource Act Units located in the project area that would be affected by this project.

3.6 WATER QUALITY

Waters off the coast of Miami-Dade counties are classified as Class III waters by the State of Florida. Class III category waters are suitable for recreation and the propagation of fish and wildlife. Turbidity is the major limiting factor in coastal water quality in South Florida. Turbidity is measured in Nephelometric Turbidity Units (NTU), which quantitatively measure light-scattering characteristics of the water. However, this measurement does not address the characteristics of the suspended material that creates turbid conditions. According to Dompe and Haynes (1993), the two major sources of turbidity in coastal areas are very fine organic particulate matter and sediments and sand-sized sediments that become resuspended around the seabed from local waves and currents. Florida state guidelines set to minimize turbidity impacts from beach restoration activities confine turbidity values to less than 29 NTU above ambient levels outside the turbidity mixing zone for Class III waters.

Ambient turbidity data for South Florida coastal waters are largely non-existent except for several areas around the inlets. However, turbidity values are generally lowest in the summer months and highest in the winter months, corresponding with winter storm events and the rainy season (Dompe and Haynes, 1993; Coastal Planning & Engineering [CPE], 1989). Moreover, higher turbidity levels can generally be expected around inlet areas, and especially in estuarine areas, where nutrient and entrained sediment levels are higher. Although some colloidal material would remain suspended in the water column upon disturbance, high turbidity episodes usually return to background conditions within several days to several weeks, depending on the duration of the perturbation (storm event or other) and on the amount of suspended fines. Project area modeling studies completed with SBEACH and GENESIS indicated suspended littoral transport of sediments may initially be interrupted immediately after SMART structure construction but would most likely return to historical conditions once sediment transport equilibrium was reached, most likely within a year (Appendix D). Water quality and the littoral sediment budget are not likely to be adversely affected. Some temporary construction increase in turbidity may be expected. Historical conditions would return after construction completion.

3.7 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

The coastline within the project area is located adjacent to predominantly residential, commercial, and recreational areas. The areas within the project are high energy littoral zones and the materials used to construct the SMART structure are composed of construction materials that do not have contaminants associated with them. The nature of the work involved with the placement of the SMART structure segments is such that contamination by hazardous and toxic wastes is very unlikely. No contamination due to hazardous and toxic waste spills is known to be in the study area.

3.8 AIR QUALITY

Air quality within the project area is good due to the presence of either on or offshore breezes. Miami-Dade County is in attainment with the Florida State Air Quality Implementation Plan for all parameters except for the air pollutant ozone, for which the county is designated as a moderate non-attainment area for ozone.

3.9 NOISE

Ambient noise around the project area is typical to that experienced in recreational environments. Noise levels range from low to moderate based on the density of development and recreational usage. The major noise producing sources include breaking surf, beach and nearshore water activities, adjacent residential and commercial areas, and boat and vehicular traffic. These sources are expected to remain at their present noise levels.

3.10 AESTHETICS

The project area consists of light sandy beige beaches that contrast strikingly with the deep hues of the panoramic Atlantic Ocean. The eastern foreground consisting of dune vegetation is back dropped by condominium and hotel tropical landscape plantings in many areas. Coconut, sabal, and date palm trees provide vertical human scale transition between the structures and the beachfront. Beachfront plantings of sea oats, dune sunflower, seagrapes, morning glory vines and many other tropical beach plantings provide an aesthetic transition between the remaining dunes and the beach. The project segments consist of moderate to good aesthetic values with few exceptions throughout the entire project area.

3.11 RECREATION

Miami-Dade County is a heavily populated county on Florida's Atlantic coast, which receives a tremendous volume of tourists, particularly during the winter months. Those beaches that can be accessed by the general public are heavily used year round. Those beaches which are associated with condominiums, apartments and hotels have more restricted access for the general public, but receive use from the many visitors who frequent these facilities as well as those members of the general public who walk or jog along the beachfront.

Miami Beach has public access and receives heavy use by swimmers, sunbathers and surfers. Adjacent to the 63rd street beaches are many condominiums and hotels used by long-term and short-term visitors and residents of the area. Other water related activities within the project area include onshore and offshore fishing, snorkeling, SCUBA diving, windsurfing and recreational boating. Most of the boating activity in the area originates from either Bakers Haulover Inlet or Government Cut. Both offshore fishing and diving utilize the natural and artificial reefs located within and adjacent to the project area. As is required by Coast Guard regulations, to ensure vessel safety after the project is constructed; the SMART structure will be marked with buoys to demonstrate the potential navigational hazard. Commercial enterprises along the beach rent beach chairs, cushions, umbrellas, and jet skis. Food vendors can also be found along the beach areas. The revenue generated by beachgoers supports a resurgent Miami Beach business district in the project vicinity.

3.12 HISTORIC PROPERTIES

Historical documentation of transportation activities along the southeastern coast of Florida dates from the second half of the 16th century. As a consequence of over 400 years of navigation in the Bahamas Channel, several hundred shipwrecks have been documented in the waters off the southeast coast of the state. Remains of these and other unrecorded shipwrecks may be located offshore of the proposed SMART structure. The Corps consulted with the State Historic Preservation Officer who found that no historic properties will be affected by the project. (Appendix B - Pertinent Correspondence, SHPO letters August 26, 2010 and May 27, 2003).

4 ENVIRONMENTAL EFFECTS

This section is the scientific and analytic basis for the comparisons of the alternatives. See Table 1 in Section 2.0 Alternatives, for summary of impacts. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects.

4.1 GENERAL ENVIRONMENTAL EFFECTS

The placement of the SMART structure at 500-feet measured from the mean high waterline would aid in retaining sand on the shoreline and beach to provide protection against storms and tidal flooding. It would also enhance the appearance and suitability for recreation along the beach and would provide additional habitat for threatened and endangered species of nesting sea turtles. Hardgrounds have been located approximately 2,000-feet offshore of the proposed project area (Figure 12). Sufficient water depths exist within the project area so loaded barge and tug transit will not impact hardgrounds in the vicinity of the project area. Any unintentional adverse impacts to the hardground community would be appropriately mitigated (Appendix E). The proposed project is not likely to have significant adverse impacts on environmental resources within the project area.

Based on the historic erosion rate for this section of beach, if no action were taken, the beaches in the 63rd Street vicinity would continue to erode and recede. Local sand sources for renourishment efforts are diminishing at exponential rates, and are expected to be very limited in the near future. Innovative techniques for erosion control are needed in order to sustainably maintain this resource for generations to come.

4.2 VEGETATION

4.2.1 SMART STRUCTURE CONSTRUCTION

There is no submerged aquatic vegetation located in the area the SMART structure is proposed to be placed. No seagrasses or algal communities are present in the 0.7-acre footprint of the SMART structure or the adjacent nearshore areas (DERM, 2010). No work would be performed on vegetated upland or dune areas. No adverse impacts to either marine or terrestrial vegetation are expected.

4.2.2 NO ACTION ALTERNATIVE

Continued erosion may result in potential adverse effects to beach vegetation due to the loss of the dunes and upland vegetation on the dune face and crest as noted in the Dade County, Florida, Beach Erosion Control and Hurricane Protection Project, Evaluation Report (migrating ECL towards MLW, pg 93) (USACE, 2001).

4.3 THREATENED AND ENDANGERED SPECIES

4.3.1 SEA TURTLES

4.3.1.1 SMART STRUCTURE CONSTRUCTION

4.3.1.1.1 CONSTRUCTION IMPACTS

The National Marine Fisheries Service (NMFS, 1991; NMFS 1995; NMFS 1997; NMFS 2003) in the various versions of the South Atlantic Regional Biological Opinion (SARBO) and the 2003 (revised in 2005 and 2007) Gulf Regional Biological Opinion has previously assessed the impacts of dredging operations on sea turtles. Construction of the SMART structure will be done by crane on a barge that is very similar to a clamshell dredge in configuration and operation. The 1991 SARBO states "clamshell dredges are the lease likely to adversely affect sea turtles because they are stationary and impact very small areas at a given time. Any sea turtle injured or killed by a clamshell dredge would have to be directly beneath the bucket. The chances of such an occurrence are extremely low…" (NMFS, 1991). NMFS also determined that "Of the three major dredge types, only the hopper dredge has been implicated in the mortality of endangered and threatened sea turtles." This determination was repeated in the 1995 and 1997 SARBOs (NMFS, 1995 and 1997). As with the clamshell dredge scenario described by NMFS, the SMART structure would be deployed by barge, with diver guidance to the placement site, and unless a sea turtle was lying on the bottom, directly underneath the structure as it is being deployed, it is unlikely that a sea turtle would be impacted by project construction. Based on the determinations made and repeated by NMFS in several consultations since the early 1990's, the Corps believes that the use of a crane on a barge to construct the SMART structure may affect, but is not likely to adversely affect listed sea turtles.

The Corps initiated consultation with NMFS under the ESA with a Biological Assessment (BA) dated July 7, 2004, concluding that sea turtles "may be affected, but are not likely to be adversely affected (MANLAA) by the construction of the SMART structure". NMFS concurred with this determination on July 31, 2005. As required by section 7 of the ESA, the Corps reinitated consultation with NMFS for this project to address any potential impacts to three species added to the list of threatened and endangered species, *Acropora cervicornis* (staghorn coral), *Acropora palmata* (elkhorn coral) and smalltooth sawfish. The Corps prepared a biological assessment dated July 17, 2010 assessing any potential effects of the project, and making a determination that the project "May affect, but it not likely to adversely affect" them. In a letter dated September 16, 2010, NMFS concurred with the Corps' determination and reaffirmed its previous determination for endangered and threatened sea turtles. The Corps also initiated consultation with the FWS with a BA dated April 9, 2004, concluding that sea turtles "may be affected, but are not likely to be adversely affected by the construction of the SMART structure". After redesign of the SMART structure to include sea turtle access lanes and 250-ft wide gaps between the three sections of the SMART structure, FWS concurred with the Corps' determination in an April 19, 2005 stating:

> "The shoreline in the project area should equilibrate as sand builds at the breakwater then bypass the structure to the adjacent shoreline.

> Consequently, these effects are expected to be insignificant and the Service concurs with the Corps determination for the above listed sea turtles.”

In a letter to the FWS dated July 17, 2010, the Corps reaffirmed its previous MANLAA determination. In a September 9, 2010 email, the FWS responded that they had no additional comments to add. Correspondence for both consultations is located in Appendix B.

4.3.1.1.2 POST-CONSTRUCTION IMPACTS

The following is a list of potential effects of the SMART structure construction on sea turtles; however these impacts are not anticipated to occur due to mitigative measures included in the project design.

a. Littoral drift erosion of adjacent beaches due to SMART structure construction may affect nesting sea turtle habitat. Temporary effects may occur during SMART structure construction until littoral drift sediment patterns reach historical equilibrium conditions, but is not anticipated. Once historical conditions are reached, beach accretion is expected to occur which would improve nesting beach conditions by abating erosion.

b. Temporary disruption of nesting activities may occur during the proposed SMART structure construction but is not anticipated because construction activities are expected to occur over a 2-3 month period outside of the nesting season for sea turtles in the southeastern United States (April 15 – September 30) (USFWS, 2009). After construction is completed, the sea turtle access lanes constructed within the SMART structure will allow sea turtles access to the beach at all times, and thus no adverse impacts are expected to sea turtle nesting trends.

c. Disorientation or misorientation of hatchlings or adult sea turtles from construction activities (e.g. lighting or noise) is not anticipated because placement of the SMART structure is expected to occur over a 2-3 month period outside of the nesting season for sea turtles in Miami-Dade county (April 15 – September 30). If unanticipated delays occur that result in placement during nesting season, monitoring for sea turtle nests will be implemented under the Corps’ standard environmental protection specifications; construction activities will not occur at night; nor will any artificial lighting be used.

Artificial lighting along the beach is known to affect the orientation of hatchlings (Dickerson and Nelson, 1989; Witherington, 1991) and to affect the emergence of nesting females onto the beach (Witherington, 1992). Construction of the offshore breakwater SMART structure could help widen the beach-nesting habitat, creating a larger buffer between the anthropogenic lights of the Miami Beach community and the nesting sea turtles; this would be a beneficial effect of SMART structure construction.

The proposed SMART structure is designed to protect the shoreline, and thereby protecting the existing sea turtle nesting habitat. Based upon the results of the modeling specific to the 63rd street project and the results of the Sunny Isles breakwater, no net loss of beach is expected. Some beach gain may result, which would be considered an additional benefit for threatened and endangered sea turtles.

4.3.1.2 NO ACTION ALTERNATIVE

If no action is taken, the beach is expected to continue to erode resulting in loss of sea turtle nesting habitat and/or leading to poor nesting site selection due to the loss of the forebeach and dunes as noted in the Dade County, Florida, Beach Erosion Control and Hurricane Protection Project, Evaluation Report (migrating ECL towards MLW, pg 93) (USACE, 2001). If the SMART structure is not constructed, no impacts to hatchling turtles are expected.

4.3.2 MANATEES

4.3.2.1 SMART STRUCTURE CONSTRUCTION

The Corps and its contractors will abide by the Standard Manatee Construction Protocol to ensure no adverse impacts to any manatee that may venture into the project area during construction activities. By incorporation of this protocol, the Corps believes that manatees that may venture into the project area are not likely to be impacted by project construction. The FWS concurred with this determination in their September 25, 2005 biological opinion that was incorporated into the final Coordination Act Report (Appendix C).

4.3.2.2 NO ACTION ALTERNATIVE

No impacts are expected with the no action alternative.

4.3.3 SMALLTOOTH SAWFISH

4.3.3.1 SMART STRUCTURE CONSTRUCTION

The logic set forth about mechanical dredges in the 1991, 1995 and 1997 SARBO by NMFS for sea turtles (previously discussed in Section 4.3.1.1) holds true for sawfish and crane placement of the SMART structure as well. The 1991 SARBO states “clamshell dredges are the least likely to adversely affect sea turtles because they are stationary and impact very small areas at a given time. Any sea turtle injured or killed by a clamshell dredge would have to be directly beneath the bucket. The chances of such an occurrence are extremely low…” (NMFS, 1991).” The Corps believes that if this statement holds true for a species that is relatively abundant in south Florida like sea turtles, it should also hold true for a very rare species like sawfish. The probability of a sawfish being taken during placement of the SMART structure is so unlikely as to be discountable. The Corps will incorporate the standard NMFS sawfish protection construction protocols into the project plans and specifications. Based on the information included in the draft recovery plan, the census information from FWC and the proposed construction techniques, the Corps believes that the construction of the SMART structure may affect, but is not likely to adversely affect the endangered smalltooth sawfish as defined by the ESA.

As required by section 7 of the ESA, the Corps reinitated consultation with NMFS for this project to address any potential impacts to endangered smalltooth sawfish. The Corps prepared a biological assessment dated July 17, 2010 assessing any potential effects of the project, and making a determination that the project "May affect, but it not likely to adversely affect" them. In a letter dated September 16, 2010, NMFS concurred with the Corps' determination.

4.3.3.2 NO ACTION ALTERNATIVE

No impacts are expected to the smalltooth sawfish with the no action alternative.

4.3.4 ELKHORN/ STAGHORN CORAL & DESGINATED CRITICAL HABITAT

4.3.4.1 SMART STRUCTURE CONSTRUCTION

The Corps requested that DERM conduct a diver verified nearshore hardbottom and *Acropora* survey for all of Miami-Dade County nearshore between R-37 and R-61 in conjunction with the Contract E and Contract G renourishment events currently in planning. The survey was conducted in March and April 2010, and in the project area (between R-45 and R-46), the substrates were found to be sand with no exposed hardbottom. This confirms the mapping provided in Walker, 2009 for the Southeast Florida Coral Reef Initiative's Habitat Mapping program (This report is included in Appendix B.).

Although the goal of the SMART structure is not to create an artificial reef for habitat, placement of the SMART structure will provide clean hard substrate for colonizing hardcorals, soft corals, fleshy macroalgae and other hardbottom and coral reef species as has been commonly observed by artificial reef structures throughout southeast Florida including the breakwaters at Sunny Isles, just north of the proposed SMART structure.

The final rule designating Critical Habitat for *Acropora sp*. states "Substrate of suitable quality and availability" is defined as natural consolidated hardbottom or dead coral skeleton that is free from fleshy turf macroalgae cover and sediment cover" (NMFS 2008). Because the substrate in the project area is only sand, it does not meet the requirement to be classified as "substrate of suitable quality and availability" and therefore lacks the PCE to be classified as critical habitat for *Acropora sp*. under the ESA.

Since the species are not present, nor is designated critical habitat, the proposed construction of the SMART structure may affect, but it not likely to adversely affect Acroporid corals listed as threatened under the ESA nor adversely modify designated critical habitat. As required by section 7 of the ESA, the Corps reinitated consultation with NMFS for this project to address any potential impacts to threatened *Acropora cervicornis* (staghorn coral), *Acropora palmata* (elkhorn coral). The Corps prepared a biological assessment dated July 17, 2010 assessing any potential effects of the project, and making a determination that the project "May affect, but it not likely to adversely affect" them. In a letter dated September 16, 2010, NMFS concurred with the Corps' determination.

4.3.4.2 NO ACTION ALTERNATIVE

With the no-action alternative, the shoreline would continue to erode, however, given the distance of the nearest documented hardbottom habitats that have the potential to support *Acropora sp*. colonies, the impacts should be minimal or non-existent.

4.4 FISH AND WILDLIFE RESOURCES

4.4.1 SMART STRUCTURE CONSTRUCTION

During the construction of the SMART structure there may be some interruption of foraging activities for shorebirds that utilize the project area. This potential impact would be short-term and limited to the immediate area of shoreline shoreward (west) of the proposed project while under construction. There would be sufficient beach area north and south of the construction site that could be used by displaced birds while construction takes place. With the maintenance or accrual of sand shoreward of the SMART structure, a status quo or possible increase in foraging and nesting habitat for shorebirds would take place. This would also result in a decrease in the required frequency of renourishment events that may disrupt resting, nesting and foraging activities. This decrease, as demonstrated by the placement of the Sunny Isles breakwaters, results in a cumulative benefit to shorebirds that utilize the beach shoreward of the proposed SMART structure location.

Potential temporarily elevated turbidity levels within the immediate vicinity of the SMART structure placement may interfere with foraging by sight feeders such as the brown pelican (*Pelecanus occidentalis*). However, increased turbidity levels would be limited to a small portion of the project area and should not result in significant impacts to foraging activities. Water Quality monitoring of turbidity outside the mixing zone shall be monitored as to not exceed 29 NTU's above background.

The construction of the SMART structure could have temporary impacts to the macroinfaunal community. Some organisms may be permanently buried by the placement of the unit, but many organisms inhabiting the intertidal zone are motile and well adapted for burrowing and would be able to survive the temporary construction activities. The sediment transport budget along the project site shoreline would temporarily increase, but would return to normal after SMART structure equilibrium is achieved. Organisms inhabiting this zone would be impacted by the turbidity from the project construction area but are adapted for survival in such conditions and impacts should be minor. Dominant infaunal inhabitants of the intertidal zone, such as amphipods, isopods and polychaetes typically possess high fecundity and rapid turnover rates during their breeding season. Because of this, any losses due to construction activities would be replaced within a short time. No long-term adverse effects are anticipated to the intertidal macroinfaunal community due to SMART structure construction activities (Deis, et al. 1992, Nelson 1985, Gorzelany & Nelson 1987, USFWS 1997).

The communities found offshore of 63rd Street out to one-half mile from shore are described in Dodge et al. (1987). Dodge characterizes four community types within this area. (1) non-vegetated sand flats occurring; (2) soft coral communities in sand deposits of 3" to 6" or greater depth; (3) soft coral and attached algae on sand bottom; (4) hard coral community hardground "reefs". Of these community types, only the last one is characteristic of hardbottom reef areas (i.e., continuous rocky substrate with epibiotic growth). The other community types noted by Dodge et al. (1987) have developed and grown in these highly dynamic areas of sand movement, characterized by sporadic, episodic sand inundation and removal. The organisms that colonize these areas are more tolerant of the dynamic conditions that exist in these areas, and comprise a stable community adapted to sand movement of the nearshore system. The community types (2) and (3) above correlate to the hardbottom areas located closest to shore as interpreted by side scan sonar. The hardground areas (4) above noted by Dodge et al. (1987) were reported as being "never closer than 1500 feet and generally greater than 1800 feet from shore", and that "the hard coral coverage and diversity is greatest on the seaward portions of the transects" (greater than 3000 feet from shore). Because the communities nearest the shore (within 1500 feet) are adapted for periodic sand movement within the zone it is not expected that these communities would be affected by the placement of the SMART structure approximately 500-foot from the average shoreline at MHW by crane, barge and tug.

A minor and temporary impact on the microinfaunal community within the SMART structure area would occur during placement activities. Once placed the area within the SMART structure footprint would not be available for recolonization by benthic organisims. During placement, turbidity and sedimentation levels would be elevated within the immediate vicinity of the SMART structure footprint. These would be temporary and would return to normal once SMART structure placement is completed.

Although the goal of the SMART structure is not to create an artificial reef for habitat, placement of the SMART structure will provide clean hard substrate for colonizing hardcorals, soft corals, fleshy macroalgae and other hardbottom and coral reef species as has been commonly observed by artificial reef structures throughout southeast Florida, including those observed on the Sunny Isles breakwaters located north of the 63rd street project area. The Sunny Isles breakwaters were placed approximately 400 feet offshore in late 2001/early 2002. In a report entitled “Identification of Benthic Resources in the Nearshore zone Golden Beach and Sunny Isles Beach, Miami-Dade County, Fl (DNR Monuments: R-4 to R-15) July 2009”; DERM biologists found large corals, fleshy macroalgae, sponges, coralline algae and numerous fish species inhabiting the Sunny Isles breakwaters (Figure 14).

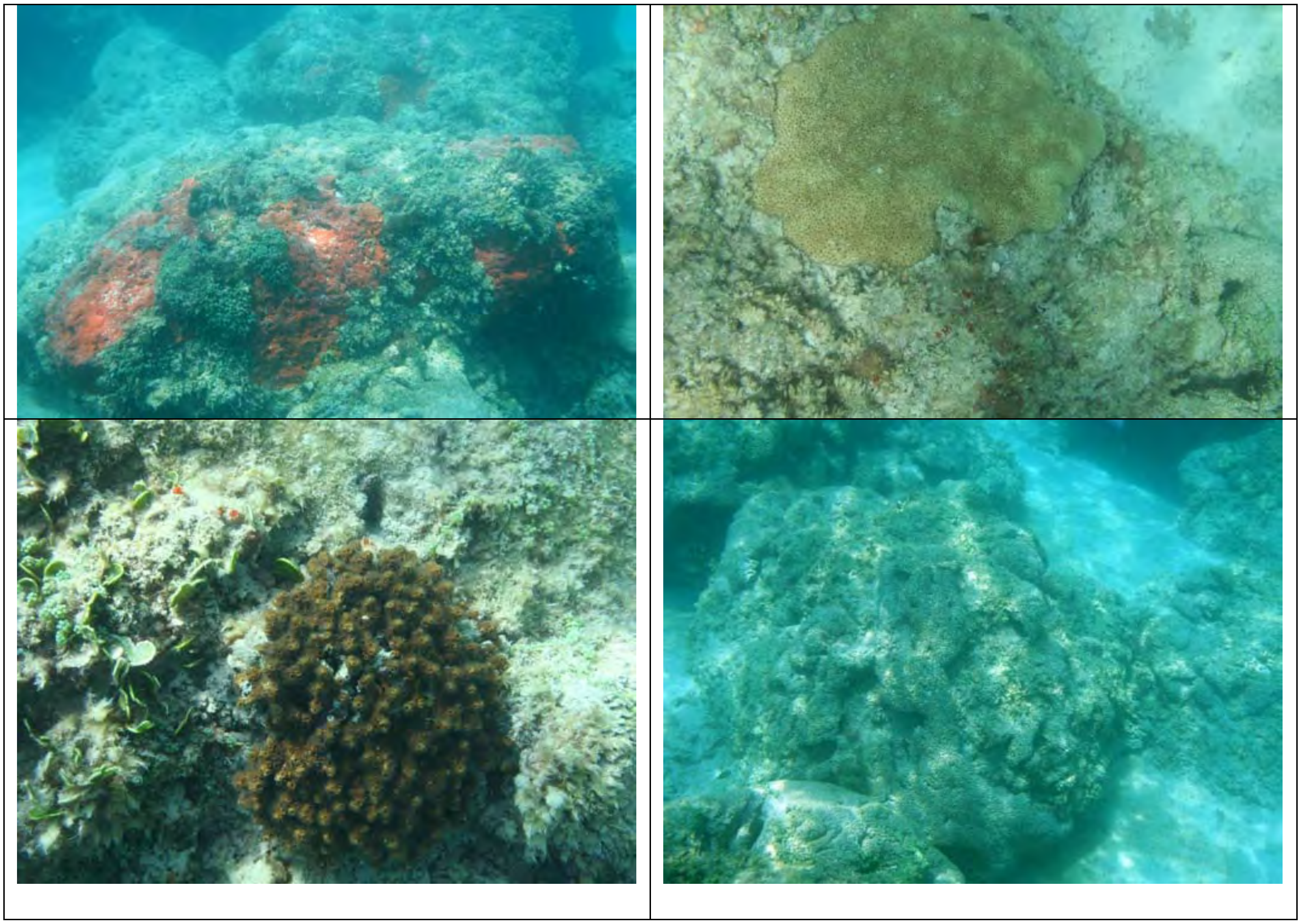


Figure 14 - Characteristic encrusting benthos on Sunny Isles submerged breakwater July 2010

4.4.2 NO ACTION ALTERNATIVE

With the no-action alternative, the shoreline would continue to erode, resulting in loss of habitat and eventual loss of vegetated dune habitat, poor sea turtle nesting, reduced shorebird activities and continued high project area turbidity. No direct adverse impacts are expected on listed species. Some cumulative effects would be expected.

4.5 COASTAL BARRIER RESOURCES

The purpose of the Coastal Barrier Resources Act is to minimize the loss of human life, wasteful expenditure of Federal moneys; and the damage to fish, wildlife, and other resources associated with the coastal barriers along the Atlantic coast by restricting future Federal expenditures and financial assistance, which have the effect of encouraging development of these coastal barriers. There are no designated Coastal Barrier Resource Act Units located within or adjacent to the project area.

4.6 WATER QUALITY

4.6.1 SMART STRUCTURE CONSTRUCTION

The proposed action would cause temporary increases in turbidity along and adjacent to the project placement area. The State of Florida water quality regulations require that water quality standards not be violated during Federal project operations. The standards state that turbidity outside the mixing zone shall not exceed 29 NTU's above background. Results from turbidity monitoring at previous submerged breakwater projects have shown that the turbidity did not exceed the standard. Diver assistance during deployment will be decided by the contractor. Turbidity measurements will be collected during any leveling or scraping activities prior to SMART structure deployment. These measurements will be collected 150m downstream of leveling activities and 300m upstream (background) of leveling activities twice daily, at four hours increments. These turbidity measurements will be analyzed to ensure that turbidity outside the mixing zone shall not exceed 29 NTU's above background. SMART structure deployment will include lowering the sections by boom crane into the water and is expected to produce a visual increase in turbidity; however it is not expected to increase turbidity levels significantly and therefore turbidity sampling is not necessary.

Should turbidity exceed State water quality standards as determined by monitoring, the contractor would be required to cease work until conditions returned to normal. A temporary disruption of the longshore drift 'river of sand' would be expected with the initial construction of the SMART structure. However, modeling with SBEACH and GENESIS has predicted the temporary effects would find equilibrium within a year after construction see Appendix D for more discussion. The proposed action has been evaluated in accordance with Section 404 of the Clean Water Act and a 404(b) evaluation report has been included as Appendix A to this EA.

4.6.2 NO ACTION ALTERNATIVE

With the no-action alternative, the shoreline would continue to erode. This would result in the loss of existing shoreline and increased turbidity in the area and reduce water quality.

4.7 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

4.7.1 SMART STRUCTURE CONSTRUCTION

There are no hazardous, toxic, or radioactive waste sites or producers in the project area that would be affected as a result of the preferred alternative. No impacts associated with the disturbance of such sites are anticipated from either the recommended or no-action alternatives.

With the use of construction equipment within the SMART structure placement area, there is the potential for hydrocarbon spills or other effluent releases. However, the likelihood of significant accidents and releases of this sort is very remote. The contract specifications would require the contractor to develop accident and spill prevention plans to prevent, avoid or minimize spill effects (Appendix E).

4.7.1 NO ACTION ALTERNATIVE
The no-action alternative should not allow conditions to develop that would increase accidents or releases of this sort

4.8 AIR QUALITY

4.8.1 SMART STRUCTURE CONSTRUCTION
Direct emissions from the proposed action would be confined to exhaust emissions of labor and material transport equipment (water vehicles), and construction equipment (barges, tugs, etc.). These emissions would likely be well under the *de minimus* levels for ozone non-attainment areas as cited in 40 CFR 91.853; that is, projects implemented cannot produce total emissions greater or equal to 100 tons per year of Volatile Organic Compounds (VOCs). Any indirect increase in emissions (indirect emissions), as a result of the proposed action is beyond the control and maintenance of the USACE. Consequently, a conformity determination with the Florida State Implementation Plan is inappropriate for increases of indirect emissions from the proposed action. As with the proposed action and alternatives, the no-action alternative would see continued development, which may cause marginal adverse impacts to air quality.

4.8.1 NO ACTION ALTERNATIVE
There would be no air quality related impacts associated with the no-action alternative.

4.9 NOISE

4.9.1 SMART STRUCTURE CONSTRUCTION
With the implementation of the proposed action there would be a temporary and slight increase in the noise level during SMART structure placement. The principle noise would stem from the vicinity of the SMART structure placement (crane operation). Construction equipment would be properly maintained to minimize the effects of noise. Increases from the current noise levels as a result of the proposed action would be localized and minor, and limited to the time of construction.

4.9.1 NO ACTION ALTERNATIVE
There would be no noise related impacts associated with the no-action alternative.

4.10 AESTHETICS

4.10.1 SMART STRUCTURE CONSTRUCTION
There would be a temporary increase in the noise level during construction, as mentioned above. Breezes would rapidly carry engine exhaust fumes away. Any temporary decrease in visible air quality caused by this work would subside once work is completed. Proposed project construction and equipment would have a temporary visual impact that would end once work was completed. The negative visual impacts of the equipment would be offset to an extent by the natural curiosity of some individuals to see what is going on and how work is progressing. There would also be a temporary

increase in turbidity during SMART structure placement. Turbidity levels would return to historical levels once SMART structure placement activities conclude. Once completed the proposed project would result in some improved changes to aesthetic quality within the proposed project area. The placement of the SMART structure would retain the natural shoreline appearance.

4.10.1 NO ACTION ALTERNATIVE

With the no-action alternative, the shoreline would continue to erode. This would result in the loss of existing shoreline and increased turbidity that would reduce the visual aesthetics of the area.

4.11 RECREATION AND SAFETY

4.11.1 SMART STRUCTURE CONSTRUCTION

4.11.1.1 EFFECTS DURING CONSTRUCTION

During SMART structure placement activities, the use of the beach in the vicinity of proposed project would drop or increase based on curious beachgoers. Many visitors would seek other areas for sunbathing, swimming, boating, kayaking, surfing or other water oriented-recreation activities as the proposed SMART structure placement area recreational access would be restricted. After the proposed SMART structure placement the public access to water resources for recreation purposes would resume.

There would be a temporary adverse effect on recreational fishing in the immediate area of proposed SMART structure due to construction activities and potential turbidity. Fishing would not be affected outside the area of immediate placement area.

Boat operations may be detoured during construction activities; however, the extent of these detours and time frame of operations render these impacts insignificant. Nearshore snorkeling and SCUBA diving activities may also be temporarily impacted by turbidity during SMART structure placement activities.

4.11.1.2 EFFECTS POST CONSTRUCTION

After construction is completed, the SMART structure will have buoys placed on it to mark it for safe navigation per US Coast Guard (USCG) safety regulations and it will be marked with buoys to alert the public that there is a submerged structure offshore of 63rd Street. There is a marked “swimming zone” at 63rd street, and some concern has been expressed that swimmers could be injured if they encounter the SMART structure. During the public comment period, the Corps became aware of a newspaper article discussing a drowning associated with an emergent breakwater near St. Petersburg Beach, Florida. The Corps reviewed the information concerning this drowning in relation to the proposed SMART structure to determine if the potential for a similar impact to occur was likely. Since the St. Pete Beach breakwater is an emergent rock breakwater and not a submerged reefball structure as proposed for Dade County, and the swimmers referenced in the comment encountered strong rip currents known to be in the area prior to the placement of the breakwater structure (per the St. Petersburg

Times, June 27, 1989), they did not become entangled in the breakwater structure. A better assessment of potential impacts for comparison is the Sunny Isles breakwaters (SI). SI is similar in deployment location and water depth to the SMART structure proposal. Swimmers (and snorkelers) often visit the SI breakwater in calm seas, but due to the distance from shore, it is rarely visited by swimmers/snorkelers in high seas/wave situations (B. Flynn, pers.comm) and there is no record of a swimmer or snorkeler becoming injured or requiring rescue at the SI breakwater. Additionally, regarding the potential entrapment of swimmers, the size of the holes in the individual Goliath ball units – the top holes are 64 inches in diameter. For a person to become trapped in a Goliath ball, they would have to have a waist diameter of approximately 60 inches. It may be possible to lodge an arm or leg in some of the larger side holes on the sides of the Goliath balls however; this could be prevented by designating the structure as being 'outside the swimming area'.

Additionally, after concerns were raised by the surfing community about potential effects on the surfbreak. After consultation with leadership of the Surfrider Foundation, Miami Chapter in February 2009, the project was shifted 500 feet to the south of the originally proposed location to minimize effects on surfing resources. Based on the history of the Sunny Isles submerged breakwater, long-term adverse impacts to water based activities are not anticipated, as these structures are in similar depths of water, a similar distance from shore and would create similar environments for in-water recreation activities.

4.11.2 NO ACTION ALTERNATIVE

With the no-action alternative, the shoreline would continue to erode. This would eventually reduce the amount of beach available for recreation and would result in the degradation or loss of shorefront property thus, adversely impacting beach recreational opportunities within the area. The no action plan could impact fishing, snorkeling, swimming, surfing and SCUBA diving with increased turbidity and potential rip currents based on continued shoreline erosion.

4.12 HISTORIC PROPERTIES

4.12.1 SMART STRUCTURE CONSTRUCTION

Archival research and field investigations have been completed for past Corps studies within the proposed SMART structure placement area (Renourishment at Miami Beach in the Vicinity of 63rd Street, USACE, Nov 2000 and Proposed Test Fill at Miami Beach Using a Domestic Upland San Source, USACE Aug 2002). In letters dated June 17, 1993, May 29, 1996 and January 15, 1999, the State Historic Preservation Officer's (SHPO) office concurred with the Jacksonville District's no effect determination for the beach fill area for these projects. In letters dated May 27, 2003 and August 26, 2010, the SHPO stated, "based Sections 3.13 and 4.14 of the *Draft Environmental Assessment of the Renourishment at Miami Beach in the Vicinity of 63rd Street for the Beach Erosion Control and Hurricane Protection Project*, we note that a previous magnetometer survey and side scan sonar survey was conducted". The SHPO concluded that no historic properties would be affected by the proposed SMART structure project. Documentation of this consultation is located in Appendix B.

4.12.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the shoreline would continue to erode, potentially requiring more frequent renourishment projects to protect upland structures.

4.13 ENERGY REQUIREMENTS AND CONSERVATION

The energy requirements for this construction activity would be confined to fuel for the tugboat, crane, labor, transportation, and other construction equipment. The expenditure of energy would be much less to construct the SMART structure than to renourish the 63rd Street Hotspot area every 6 to 8 years, at a minimum. The no-action alternative would allow conditions to develop that may endanger coastal property from storm surges and wave erosion during future storm events and/or potential hazards to recreational users. On-site preventive measures and post clean up under the no-action alternative would likely demand greater energy than that required of the proposed action.

4.14 NATURAL OR DEPLETABLE RESOURCES

In this case, the beach quality sand to be retained by the proposed SMART structure would help to conserve the depletable sand resource. Resource agency concern over accelerated shoreline erosion adjacent to the SMART structure has been expressed. Modeling runs with SBEACH and GENESIS have indicated the littoral transport of sediment would be temporarily interrupted until sediment equilibrium or historic conditions resume. Eventually the sand would be redistributed over nearshore areas. The gasoline and diesel fuel used by the tug, crane and other construction equipment is also a depletable resource.

4.15 CUMULATIVE IMPACTS

Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). The use of reef balls anchored to an ABM would impact species of relatively non-motile infaunal invertebrates (mollusks). However, based on previous project monitoring and published studies, many of the species that are not able to escape the SMART structure placement area are expected to recolonize the sand substrate adjacent to the SMART structure after project construction is completed. Construction of the SMART structure would provide shoreline erosion prevention within the 63rd Street Hotspot area, thus minimizing the need for future beach renourishments (dredges, pipelines, beach construction, etc.) or extending the timeframe between required renourishment events. Approximately 0.7 acres of nearshore sandy benthic habitat would be covered by the SMART structure, producing cumulative effects and permanently converting the sand substrate the structure is placed upon to hard substrate. Some minor and temporary construction turbidity effects may occur to nearshore hardground habitat within the project area caused by vessel transit. The proposed action would result in long-term benefits, which should outweigh any short-term environmental losses. The cumulative impact of shore protection projects along the Florida coast has been to restore and maintain many beaches which otherwise would have experienced severe erosion or would have totally disappeared, benefitting sea turtles and shorebirds that utilize the beach habitats, while also burying some nearshore hardbottom habitats that became exposed and available for colonization due to the scarcity of sand in the littoral system. In addition, these activities have reduced damage to infrastructure and property due to storms and helped maintain property value.

A separate project located adjacent to the SMART structure is the renourishment at Miami Beach in the Vicinity of 63rd Street, Miami-Dade BEC&HP, Miami-Dade County, Florida, which was authorized by the Flood Control Act of 1968. The project has a long history and has undergone significant review under NEPA as discussed in Section 1.5. Current activities taking place in the project area as part of the BEC&HP include two renourishment projects which are designated as Contract E and Contract G and are currently under development. A draft EA was prepared on Contract E and released for public review and comment in December 2009. Comments received on that EA are under review at this time. A draft EA for Contract G is in preparation and will be released to the public in the near future. Additionally, Section 69 of the 1974 Water Resources Act (P.L. 93-51 dated 7 March 1974) included the initial construction by non-federal interests of the 0.85-mile segment along Bal Harbour Village, immediately south of Bakers Haulover Inlet (USACE, 1997). The authorized project, as described in House Document 335/90/2, provided for the construction of a protective/recreational beach and a protective dune for 9.3 miles of shoreline between Government Cut and Baker's Haulover Inlet (encompassing Miami Beach, Surfside and Bal Harbour) and for the construction of a protective/recreational beach along the 1.2 miles of shoreline at Haulover Beach Park.

4.16 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.16.1 IRREVERSIBLE

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. One example of an irreversible commitment might be the mining of a mineral resource. The proposed SMART structure would alleviate beach and shoreline erosion and would conserve beach quality sand resources within the proposed project area. There would however, be some irreversible impacts to sandy benthic organisms which would be covered by the approximate 0.7-acre SMART structure footprint. These affects would be temporary as sandy benthic organisms generally reproduce rapidly. The energy and fuel used during construction would also be an irreversible commitment of resources.

4.16.2 IRRETRIEVABLE

An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. An example of an irretrievable loss might be where a type of vegetation is lost due to road construction. Benthic organisms within the SMART structure footprint (approximately 0.7 acres) that would be eliminated during construction would be irretrievably lost for a period of time. However, the high rate of repopulation expected from these organisms reduces the significance of the loss.

4.17 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Species of relatively non-motile infaunal invertebrates that inhabit the proposed SMART structure footprint would unavoidably be lost during project placement. Those species that are not able to escape the construction area are expected to recolonize after project completion. There may be a temporary, unavoidable reduction in water clarity, increased turbidity and sedimentation during construction operations. This would be limited to the immediate areas of the proposed SMART structure construction. This impact would be temporary and should disappear shortly after construction completion.

4.18 LOCAL SHORT-TERM USES AND MAINTENANCE/ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Protection of the shoreline is a continuous effort. No acceptable and permanent one-time fix has been identified to date. The installation of the proposed SMART structure is a developmental alternative being considered to help retain sand in a known 'Hotspot' erosional area. Monitoring will be conducted during and after the SMART structure installation to ensure the proposed objectives are being reached. The SMART structure can be removed if identified that it is not attaining its objectives. It is anticipated that the potential SMART structure impacts would not be substantial since there are no significant resources within the 0.7 acre structure footprint and littoral transport of sediments would return to historic conditions once stabilized within the proposed project area.

4.19 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

The preferred alternative is consistent with the state's Coastal Zone Management plan and with Federal, State and local laws, plans and objectives.

4.20 CONTROVERSY

Resource agencies, scientists and environmental organizations have expressed concern about impact of erosion control projects on nearshore and adjacent shoreline resources. The controversy tends to involve issues relating to the potential, duration or permanency of the impact and the capacity of the resource to recover from disturbances caused by civil work projects; and the cumulative effect of multiple but unrelated projects in a region of the coast.

In response to this controversy, the USACE has subjected the project development of the Section 227/2038, 63rd Street "Hotspot", Miami Beach, Florida Demonstration Program project to full review under NEPA. While public concern for impacts to nearshore habitats cannot be fully alleviated simply by analysis in this EA, the issues of concern have been more closely examined and the sufficiency of measures to avoid, minimize, and mitigate for impacts to resources can be better examined.

In addition, the proposed Section 227/2038 National Shoreline Erosion Control Development and Demonstration Program, 63rd Street "Hotspot", Miami Beach, Florida proposed SMART structure involves components not used in this region, in this manner. With diver quality assurance of SMART structure placement, DERM monitoring of structure performance and USCG safety markings the SMART structure should perform as designed in a safe and environmentally friendly manner. If the SMART structure does not fulfill its objectives, it can be altered or removed. Resource agency concerns of compliance with National and State Artificial Reef program guidance raised by NMFS; FWS; USCG: FDEP and FWC have been addressed even though the SMART structure is not an 'artificial reef', but a submerged breakwater.

4.21 UNCERTAIN, UNIQUE OR UNKNOWN RISKS

The purpose of the Section 227/2038 National Shoreline Erosion Control Development and Demonstration Program is to help prevent shoreline erosion and retain beach quality sand with the construction and placement of the SMART structure. It is a developmental project whose success would reduce expensive beach renourishment projects in the project area and surrounding vicinity as well as conserve beach quality sand resources that are becoming increasingly limited in availability. The means and methods for construction of the project, general performance and public safety are not uncertain, unique or unknown risks as similar project have been constructed around the world, just not at this specific location. Burial of sand habitats under the 0.7 acre SMART structure footprint is a clearly unavoidable impact if the shoreline erosion is to be corrected.

4.22 PRECEDENT AND PRINCIPLE FOR FUTURE ACTIONS

The SMART structure would be a new feature for the project area. Submerged breakwaters have been used at various places in Florida, including Miami-Dade County. Most have been hard structures such as stone or fabricated modules. Performance reviews of these have been mixed, based on reviews for maintenance of sand or growth of sand on the beach behind the structure. To date, no data concerning adverse human safety effects have been noted with submerged breakwaters. Placement, spacing, depth, and orientation are important factors to submerged breakwater success. If the proposed action performs as modeled and expected, further use of these features could be appropriate for Miami-Dade County and other similar coastal areas. Any new project that might implement the SMART structure technology in the future would be required to undergo a NEPA analysis before the project could move forward. The implementation of such a structure would either require a Section 10/404 permit from the Corps or would have federal funding and was being constructed by the Corps. If the SMART structure does not attain its objectives it can be altered or removed under Section 227 of the Water Resources Development Act of 1996.

5 ENVIRONMENTAL COMMITMENTS

The Corps and its contractors commit to avoiding, minimizing or mitigating for adverse effects during construction activities by including the following commitments in the contract specifications:

(1) Inform contractor personnel of the potential presence of threatened and endangered species (i.e. sea turtles and manatees) in the project area, their protected status, the need for precautionary measures, and the ESA prohibition on taking or harassment sea turtles, manatees and other threatened or endangered species.

(2) Take precautions during construction activities to insure the safety of the manatee by implementing the standard manatee protection measures. To insure the contractor and his personnel are aware of the potential presence of the manatee in the project area, their endangered status, and the need for precautionary measures, the contract specifications would include the standard protection clauses concerning manatees. The contractor would instruct all personnel associated with the construction of the project about the presence of manatees in the area and the need to avoid collisions with manatees. All vessels associated with the project shall operate at 'no wake' speeds at all times while in shallow waters, or channels, where the draft of the boat provides less than three feet clearance of the bottom. Boats used to transport personnel shall be shallow draft vessels, preferably of the light-displacement category, where navigational safety permits. Vessels transporting personnel between the landing and any workboat shall follow routes of deep water to the extent possible. All personnel would be advised that there are civil and criminal penalties for harming, harassing, or killing manatees, which are protected under the ESA and the MMPA (including all other marine mammals) or any manatee harmed, harassed, or killed as a result of the construction of the project. If a manatee is sighted within 100 yards of the project area, appropriate safeguards would be taken, including suspension of work, if necessary, to avoid injury to manatees. The contractor shall keep a log of all sightings, collision, injuries, or killings of manatees during the contract period. Any manatee deaths or injuries would be immediately reported to the Corps of Engineers and the USFWS (Vero Beach Office).

(3) Implement the following measures to minimize adverse effects to sea turtles:

a. During the sea turtle nesting and hatching window for Miami-Dade county as defined by the USFWS draft “Programmatic Biological Opinion for Shore Protection Activities Along the Coast of Florida” (FWS 2009) (April 15 through September 30) the contractor would be responsible to stop work if nesting or hatching sea turtles occur within 100 yards of the SMART structure construction equipment or personnel transport vessel.

b. A report describing the actions taken to minimize impacts to sea turtles shall be submitted to the USFWS within 60 days of completion of the proposed construction. The report shall include the dates of actual construction activities, names and qualifications of personnel involved in work stoppage due to nesting or hatching sea turtle occurrences that caused work stoppage.

c. Beaches would be surveyed for escarpments at the conclusion of SMART structure monitoring work for three subsequent years by Miami-Dade County. Any escarpments that exceed 18 inches in height and 100 feet length would be leveled by April 1.

d. Should construction activities take place at night; measures will be taken to reduce any nighttime beach directed construction lighting including: eliminating extraneous lighting to an amount necessary for safe operations and safety of personnel. However no construction activities are expected to occur at night.

(4) Monitor turbidity at the SMART structure construction site. Should monitoring reveal turbidity levels above State standards authorized in the Section 401 Water Quality Certification, outside the allowable mixing zone, work would be suspended until turbidity levels return to within those standards.

(5) Precautions will be implemented during construction to minimize potential vessel transit impacts to hardground communities offshore of the proposed SMART structure. Vessel transit would follow deep water that would provide adequate clearance, would be utilized to access the proposed project area.

(6) A biological monitoring program to assess possible impacts of the SMART structure construction to benthic and epibenthic communities will be conducted. SMART structure establishment of species variation would be conducted and reported.

(7) Should unanticipated damaged to hard bottom epibenthic organisms be documented, the damage would be mitigated for as outlined in the Biological Monitoring plan located in Appendix E.

COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

5.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Environmental information on the project has been compiled; this EA dated January 2011, was circulated for public review and comment as a draft in July 2010. Comments received on the draft EA were reviewed, responded to and incorporated into the final EA. The project is in compliance with the National Environmental Policy Act.

5.2 ENDANGERED SPECIES ACT OF 1973

On July 7, 2004, the Corps initiated consultation under Section 7 of the ESA with NMFS through the submittal of a Biological Assessment (BA) on the proposed SMART structure project with a determination that the project “may affect, but is not likely to adversely affect listed species under NMFS’ jurisdiction”. On October 7, 2004, NMFS responded to the submittal of the BA with a request for additional information, and the Corps provided answers to NMFS’ questions through email and phone conversations concluding with a summary letter on November 30, 2004. On January 31, 2005, NMFS concluded consultation under Section 7 of the ESA with a concurrence with the Corps’ determination. Since that determination, NMFS has listed three additional species and designated critical habitat for two of the species in the project area. As required by section 7 of the ESA, the Corps reinitated consultation with NMFS for this project to address any potential impacts to three species added to the list of threatened and endangered species, *Acropora cervicornis* (staghorn coral), *Acropora palmata* (elkhorn coral) and smalltooth sawfish. The Corps prepared a biological assessment dated July 17, 2010 assessing any potential effects of the project, and making a determination that the project “May affect, but it not likely to adversely affect” them. In a letter dated September 16, 2010, NMFS concurred with the Corps’ determination and reaffirmed its previous determination for endangered and threatened sea turtles.

On July 24, 2003, the USFWS responded to the Corps’ April 28, 2003 scoping letter and stated the federally threatened and endangered species that may occur within the project area (sea turtles and manatee). On April 9, 2004, the Corps initiated consultation under Section 7 of the ESA with FWS through the submittal of a BA on the proposed SMART structure project with a determination that the project “may affect, but is not likely to adversely affect listed species under FWS’ jurisdiction. In an email dated April 19, 2005, the FWS concluded consultation under Section 7 of the ESA with a concurrence with the Corps’ determination. Since the issuance of that determination, there have been no changes to the project or the species that would trigger reinitiation of consultation under Section 7 of the ESA (50 CFR §402.16).

This project was fully coordinated under the ESA and is therefore, in full compliance with the Act.

5.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

This project has been coordinated with the USFWS. A Final Coordination Act Report (CAR) dated September 28, 2005 was submitted by the USFWS (Appendix C). There has been no significant change in the project design since submittal of the CAR. This project is in full compliance with the Act.

5.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966

(PL 89-665, the Archeology and Historic Preservation Act (PL 93-291), and executive order 11593) Archival research, field investigations, and consultation with the Florida State Historic Preservation Officer (SHPO), have been conducted in accordance with the National Historic Preservation Act, as amended; the Archeological and Historic Preservation Act, as amended and Executive Order 11593. The project would not affect historic properties included in or eligible for inclusion in the National Register of Historic places. In letters dated May 27, 2003 and August 26, 2010, the SHPO stated, "based Sections 3.13 and 4.14 of the *Draft Environmental Assessment of the Renourishment at Miami Beach in the Vicinity of 63rd Street for the Beach Erosion Control and Hurricane Protection Project*, we note that a previous magnetometer survey and side scan sonar survey was conducted". The SHPO concluded that no historic properties would be affected by the proposed SMART structure project. The project is in compliance with each of these Federal laws.

5.5 CLEAN WATER ACT OF 1972

The project is in compliance with this Act. A Section 404(b) evaluation is included in this report as Appendix A. An application for a Section 401 water quality certification has been submitted to the FDEP. All State water quality standards would be met. A public notice will be issued by FDEP announcing their intent to issue a permit, thus satisfying the requirements of Section 401 of the Clean Water Act.

5.6 CLEAN AIR ACT OF 1972

Refer to Section 4.8 in the EA for a discussion on the compliance with the Clean Air Act General Conformity Rules. No air quality permits would be required for this project. This project has been coordinated with EPA through the distribution of the draft EA and is in compliance with Section 309 of the Act.

5.7 COASTAL ZONE MANAGEMENT ACT OF 1972

The Corps submitted a Consistency Determination (CD) in accordance with 15 CFR 930 Subpart C as part of the July 2004 Draft EA. The revised SMART structure project presented in this 2010 EA has fewer effects than what was originally reviewed and determined to be consistent with the Florida Coast Zone Management Program in their letter dated October 1, 2004. The effects of this project have decreased since the issuance of the state's concurrence with the Corps' CD. Per §930.39(b) of the Coastal Zone Management Act, as the original, more impactful project was determined to be consistent; the Corps has determined that the redesigned, less impactful project is also consistent. Although the Corps determined that a new Consistency Determination was not required, FLDEP provided a new consistency determination dated September 17, 2010 (Appendix B).

5.8 FARMLAND PROTECTION POLICY ACT OF 1981

No prime or unique farmland would be impacted by implementation of this project. This act is not applicable.

5.9 WILD AND SCENIC RIVER ACT OF 1968

No designated Wild and Scenic river reaches would be affected by project related activities. This act is not applicable.

5.10 MARINE MAMMAL PROTECTION ACT OF 1972

Incorporation of the safe guards used to protect threatened or endangered species during dredging and beach disposal operations would also protect any marine mammals in the area, therefore, this project is in compliance with the Act. The Corps does not anticipate the take of any marine mammal during any activities associated with the project. Appropriate actions will be taken to avoid listed and protected marine mammal species effects during project construction. If a marine mammal is identified within the project boundaries, they will be provided protections equal the ESA species that have had consultations completed, and as a result of this the project is in compliance with the Act.

5.11 ESTUARY PROTECTION ACT OF 1968

No designated estuary would be affected by project activities. This act is not applicable.

5.12 FEDERAL WATER PROJECT RECREATION ACT

The principles of the Federal Water Project Recreation Act, (Public Law 89-72) as amended, have been fulfilled by the fact that no effects to recreation resources are anticipated. The SMART structure is located within the recreation-swimming zone (extends 500-foot offshore) and will be marked as the Sunny Isles submerged breakwater, per the USCG.

5.13 FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976

The project has been coordinated with NMFS and is in compliance with the Act (refer to correspondence in Appendix B from NMFS).

5.14 SUBMERGED LANDS ACT OF 1953

The project would occur on submerged lands of the State of Florida. The project has been coordinated with the State and is in compliance with the Act.

5.15 COASTAL BARRIER RESOURCES ACT AND COASTAL BARRIER IMPROVEMENT ACT OF 1990

There are no designated coastal barrier resources in the project area that would be affected by this project. These Acts are not applicable.

5.16 RIVERS AND HARBORS ACT OF 1899

The proposed work would not obstruct navigable waters of the United States. The proposed action has been subject to a public notice and other evaluations normally conducted for activities subject to the act. The project is in full compliance with the Act.

5.17 ANADROMOUS FISH CONSERVATION ACT

Anadromous fish species would not be affected. The project has been coordinated with the National Marine Fisheries Service and is in compliance with the Act.

5.18 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

No migratory birds would be affected by project activities. Standard migratory bird protection is included in project specifications. The project is in compliance with these Acts.

5.19 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The Corps initiated coordination with NMFS under the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act through the June 26, 2003 NEPA scoping letter. Per the May 3, 1999 EFH Finding between NMFS and the Corps, the EFH Assessment for the project was integrated within the July 2004 draft EA. In a letter dated July 17, 2003, NMFS provided EFH Conservation Recommendations, and the Corps responded to the recommendations on April 20, 2004. On August 26, 2004, NMFS concluded its review of the Corps' responses and stated, "we believe that the COE has sufficiently addressed our recommendations, given that the overall purpose of the work is to abate shoreline erosion". Although this consultation was conducted in 2004, the EFH coordination regulations found at 50 CFR §600.920(k)(2)(1) state that "A Federal agency must reinitiate consultation with NMFS if the agency substantially revised its plans for an action in a manner that may adversely affect EHF or if new information becomes available that affects the basis for NMFS EFH Conservation Recommendations". The Corps has determined that the SMART structure project has not changed substantially since the project was originally coordinated, that the associated impacts have decreased and as a result, a new EFH consultation is not required. NMFS concurred with this determination by an email dated September 9, 2010 (Appendix B).

5.20 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

The term "dumping" as defined in the Act (3[33 U.S.C. 1402](f)) does not apply to the work that would be undertaken with the construction of the SMART structure.

Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project.

5.21 E.O. 11990, PROTECTION OF WETLANDS

No wetlands would be affected by project activities. This project is in compliance with the goals of this Executive Order.

5.22 E.O. 11988, FLOOD PLAIN MANAGEMENT

The project is in the base flood plain (100-year flood) and has been evaluated in accordance with this Executive Order. Refer to Dade County Beaches, Florida, Beach Erosion Control and Hurricane Protection, General Design Memorandum. Phase I, 1974. Project is in compliance.

5.23 E.O. 12898, ENVIRONMENTAL JUSTICE

The proposed action would not result in adverse human health or environmental effects, nor would the activity impact substance consumption of fish or wildlife. Project is in compliance.

5.24 E.O. 13112, INVASIVE SPECIES

The proposed action would not introduce invasive species and would comply with E.O. 13112 by observing the guidance in the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq*.), Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C. 4701 *et seq*.), Lacey Act, as amended (18 U.S.C. 42), Federal Plant Pest Act (7 U.S.C. 150aa *et seq*.), Federal Noxious Weed Act of 1974, as amended (7 U.S.C. 2801 *et seq*.), Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.), and other pertinent statutes for the prevention of the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

5.25 E.O. 13089, CORAL REEF PROTECTION

The proposed action is not likely to adversely affect coral reef ecosystems as defined in the Executive Order. Precautions would be implemented during construction to avoid, minimize or mitigate for unintended impacts of hardbottom habitats near the project area. Artificial reefs would be constructed to mitigate for any reef impacts associated with the heavy turbidity effects or vessel hull/keel/prop impacts. Refer to Sections 3.3.4 and 3.4.2 in the EA for additional information on hardottom/coral communities in Miami-Dade County.

6 LIST OF PREPARERS

This Environmental Assessment was prepared/reviewed by the following personnel:

Preparer	Discipline	Role
Terri Jordan-Sellers, USACE	Marine Biology	Principal Author/NEPA and ESA compliance
Laurel Reichold, USACE	Civil and Environmental Engineer	Contributing Author
Brian Flynn, DERM	Marine Biology	Monitoring Plan development
Grady Caulk, USACE	Archeology	Historic Properties
Troy Mayhew, USACE	Coastal Geology	Geotechnical Analysis
William Aley, USACE	Coastal Geology	Planner/Reviewer
Matthew Miller, USACE	Civil Engineer	Water Quality Certification
Tom Martin, USACE	Civil Engineer	Coastal Engineering
Donald Ward, PhD, ERDC	Research Engineer	SMART Physical Modeling
Kenneth Dugger, USACE	Asst. Environ. Branch Chief	Document Review
Jason Sprinning, USACE	Chief, Coastal Section	Document Review

7 PUBLIC INVOLVEMENT

7.1 SCOPING AND DRAFT EA

A NOI to prepare a DEIS appeared in the *Federal Register* on May 15, 2003 and the NOI was mailed to interested and affected parties on April 28, 2003. Based on the responses received, the Corps determined that an EA with a FONSI determination would be prepared, as the effects of the action were determined not to meet the significance criteria set forth under NEPA. Should a FONSI determination be made on this EA, a Notice of Withdrawal for the originally proposed EIS will be drafted by the Jacksonville District and published in the *Federal Register*.

In July 2004, the Corps released a Draft EA for the SMART structures entitled "Final Environmental Assessment, Section 227 National Shoreline Erosion Control Development and Demonstration Program – 63rd Street "Hotspot" Submerged Artificial Reef Training (SMART) Structure Miami-Dade County, Florida". After comments were received on that EA, the project was placed on hold due to lack of funding and the Draft EA from July 2004 was not finalized. WRDA 2007 reauthorized the 227 program under Section 2038 of the Act, funding for the existing program was put in place and for the newly authorized project. Since the original EA had not been finalized, the Corps and local sponsor determined that it should be updated and re-released for review and comment before being finalized. Any comments received on the July 2004 Draft EA were reviewed and incorporated into the revised EA, as appropriate.

Scoping meetings with the resource agencies, Non-Governmental Organizations and public continued after release of the original EA for public comment in July 2004, with meetings in Tallahassee, Bal Harbor, Miami Beach and Sunny Isles with resource agencies and interested parties. Since the project has regained funding and authorization via WRDA 2007, the Corps and local sponsor held a site visit and phone conversations with leaders of the Surfrider Foundation, Miami chapter, as well as discussions with Public Works and Environmental Department representatives for the City of Miami Beach. The draft EA was released for comment and review via a Notice of Availability dated July 17, 2010 and public comments were accepted for 60-days. Comments received on the draft EA were reviewed, responded to and changes as a result of the comments were incorporated into this final EA, as appropriate.

7.2 AGENCY COORDINATION

The proposed project has been coordinated with the following agencies: U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, Florida State Historic Preservation Officer, Florida Fish and Wildlife Conservation Commission, U.S. Coast Guard, Florida Department of Environmental Protection and Miami-Dade DERM.

7.3 LIST OF RECIPIENTS

A list of Federal, State, and local agencies, interest groups and individuals that received a copy of the draft EA/FONSI, and will receive a NOA of the FONSI or NOI for a Draft EIS can be found in Appendix B.

7.4 COMMENTS RECEIVED

Letters of comment received on the Draft July 2004 EA and additional comments received on this draft of the EA have been placed in Appendix B. Comments and responses are listed by agency or organization offering the comment, not by section of the EA that the comment addresses. The only comments received from a state or Federal agency were received from the Florida Department of Environmental Protection, Coral Reef Conservation Program. Additional comments were received from the public, specifically a letter from Jesse Bull, PhD and comments from the leadership and members of the Surfrider Foundation, Miami Chapter (Surfrider). The comments from Surfrider have been compiled into one set of responses, as the comments appeared to be duplicative.

Comments received from FLDEP coral reef conservation program:

1. "The EA states that, '... The contractor will develop accident and spill prevention plans to prevent, avoid or minimize spill effects (Appendix D).' However, a spill prevention plan is not provided. The DEP CRCP recommends the creation and submission of a plan that includes protocol(s) for immediately alerting the agencies of any impacts (specifically to natural resources) or accidents that may occur. The plan should also initiate, within 24 hours of any incident, the recovery and restoration of any damage to living coral in the event of unforeseen accidents. Please provide this plan for agency review once a contractor has been identified."

Response – As part of the Corps contracting process, after contract award, the contractor prepares an accident and spill prevention plan as part of the contractor's "Environmental Protection Plan" (EPP) as required under standard environmental protection specifications. This plan will be submitted to the Contracting Officer for review and approval; the Corps will send the EPP to FLDEP for review and comment during the Corps' review period, typically 30-days. Should an incident occur that results in damage to living coral resources, the Corps, not the contractor, will initiate discussions with the applicable state and federal agencies regarding the proper response.

The following is an excerpt from the Corps' standard plans and specifications regarding the spill prevention plan:

"SD-01 Preconstruction Submittals

Environmental Protection Plan; G|DO

Within 20 calendar days after the date of Notice of Award, the Contractor shall submit an Environmental Protection Plan for review and acceptance by the Contracting Officer. The Government will consider an interim plan for the first 30 days of operations. However, the Contractor shall furnish an acceptable final plan no later than 30 calendar days after receipt of Notice to Proceed. Acceptance of the Contractor's plan shall not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures. Acceptance of the plan is conditional and predicated on satisfactory performance during construction. The Government reserves the right to require the Contractor to make changes to the Environmental Protection Plan or operations if the Contracting Officer determines that environmental protection requirements are not being met. No physical work at the site shall begin prior to acceptance of the Contractor's plan or an interim plan covering the work to be performed. The Environmental Protection Plan shall include but not be limited to the following:...

i. Spill prevention. The Contractor shall specify all potentially hazardous substances to be used on the job site and intended actions to prevent accidental or intentional introduction of such materials into the air, ground, water, wetlands, or drainage areas. The plan shall specify the Contractor's provisions to be taken to meet Federal, [State] [Commonwealth][Territorial], and local laws and regulations regarding labeling, storage, removal, transport, and disposal of potentially hazardous substances.

j. Spill contingency plan for hazardous, toxic, or petroleum material."

2. "The FDEP CRCP suggests replacement of all occurrences of 'rock reef' and 'hardground' with either coral reef or nearshore hardbound communities, as appropriate.

Response – after a review of the EA, the Corps is unable to identify where these terms were used. If they are included in one of the documents prepared by other agencies (NMFS or FWS) and included in the Appendices to the EA, the Corps cannot change the terminology as the Corps did not write the documents in the Appendices.

3. "The FDEP CRCP recommends the creation and submission of an operational storm contingency plan that describes the actions to be taken in response to storm events (e.g. hurricanes, high-sea conditions and/or operational failures) a minimum of 30 days prior to the commencement of construction."

Response –The contractor's required submittals in the project plans and specifications include an operational storm contingency plan. This, as with all other contractor submittals, will be submitted to the Contracting Officer for review and acceptance.

4. "The EA states the need for a dredging permit (page number 13), but then states that, 'construction activities would be restricted to in-water construction… without any dredging' space (page 14). Space please clarify 1) space if there will be any dredging activities that require a permit, and if a permit is required, 2) what does activities include."

Response – This was an error in the EA. There are no dredging activities associated with the deployment of the modules, and as such a dredging permit is not required. This error has been corrected in the Final EA.

5. "The EA states that 'turbidity measurements will be collected during any leveling or scripting activities…' (Page 40). Describe the proposed leveling and scraping activities."

Response – Leveling or scraping activities would be utilized to ensure a flat zone of placement for the reefball mats, if needed. This will be determined by the contractor at the time of reefball placement, in consultation with the on-site construction representative. If this is done, it may utilize a device referred to as a "drag bar", which is a flat, heavy metal beam towed over the sand in the deployment location to flatten any large contours in the sand. The Corps has previously consulted with NMFS regarding any potential effects associated with the use of a drag bar under the ESA (USACE, 2006).

6. "The final US FWS report specifies you contribute any curtains during construction. (Page 17). Although appropriate in low-energy environments, the usage of any curtains in an offshore environment of this nature may not be suitable to the potential for them to be displaced by natural forces."

Response – The Corps agrees that turbidity curtains should not be utilized in a high energy environment, such as the project site, and does not plan on utilizing turbidity curtains as part of the project construction methodology.

7. "The construction plan does not provide information regarding the plan distance between reef ball units. Since unanticipated gaps between units could result in the project footprint covering more than the currently proposed area, please clarify the anticipated distance between units and how accurate placement will be assured."

Response – The Corps has added an additional graphic to the EA to demonstrate the layout of the SMART structure (Figure 8). Additionally, the mats have a fabric attached on the bottom to help prevent settling of the structure into the sediment. This fabric layer will overlap between each set of reefball modules. This required overlap will help ensure the minimum space between the modules is not more than 6-8 inches.

8. "The final Fish and Wildlife Coordination Act report states that, 'scuba divers will "micro-site" the installation of segments to avoid potential impacts to hard bottom resources.' (p6), but statements in EA are not in agreement [e.g. '… May dive up maybe diver assisted to ensure quality construction and placement… To best fit the benthic landscape' (p14),'… Possible driver assistance during deployment' (p27), and 'Divers assistance during fund will be decided by the contractor' (p40)."

Response – The final determination for utilization of divers will be with the contractor. If the contractor determines that it is not safe to have divers in the water during SMART structure deployment, he will confer with the Corps' on-site construction representative and document this decision. The 2004 EA, which the FWS CAR was based on, lacked the detailed nearshore surveys (included in Appendix B of the EA as part of the ESA consultation with NMFS) that have since been conducted, and as such, assumed that hardbottom resources were in the project area. The detailed in water surveys that have since been conducted clearly show that no hardbottom resources are in the project area, and as such, diver micro-siting, if it cannot be done for safety reasons, does not increase the potential for any adverse effects to hardbottom.

9. "The EA states that, 'the contractor will be required to develop an ingress / egress plan… in compliance with the recommendations included in the BMPs for Coastal Construction' (p26). Please provide the ingress and egress plan."

Response - As part of the Corps contracting process, after contract award, the contractor prepares an ingress/egress plan as part of the contractor's "Environmental Protection Plan" as required under standard environmental protection specifications. This plan will be submitted to the Contracting Officer for review and approval; the Corps will send the EPP to FLDEP for review and comment during the Corps' review period, typically 30-days.

10. "In a response letter to USFWS (June 2004), the USACE concurred with their recommendation to, 'develop and include a vessel anchoring plan, in addition to the vessel transit plan…' Please provide an anchoring plan for all the vessels associated with construction and monitoring."

Response - As part of the Corps contracting process, after contract award, the contractor prepares a vessel anchoring plan as part of the contractor's "Environmental Protection Plan" as required under standard environmental protection specifications. This plan will be submitted to the Contracting Officer for review and approval; the Corps will send the EPP to FLDEP for review and comment during the Corps' review period, typically 30-days.

11. "Prior to construction please submit names and qualification of all persons performing environmental surveys before, during, and following construction.

Response - As part of the Corps contracting process, after contract award, the contractor provides the resumes of all staff conducting surveys and/or monitoring associated with the project as part of the contractor's "Environmental Protection Plan" as required under standard environmental protection specifications. This plan will be submitted to the Contracting Officer for review and approval; the Corps will send the EPP to FLDEP for review and comment during the Corps' review period, typically 30-days.

12. "The physical monitoring plan states that the project will be deemed successful if settling of the structure is less than 2 feet. Please define 'structure' (i.e. is this one module or one plate within the module?)"

Response – The physical monitoring plan referenced in this comment was drafted as part of the 2004 EA and was included in the appendix to the FWS CAR, and in Appendix E of the draft EA. The physical monitoring plan has been revised and will be included in the final permit application to FLDEP as well as in Appendix E of this EA, however, subsidence of one set of modules, or the whole structure more than two feet does not equate to project failure. Although the level of wave attenuation would be reduced, there would still be some attenuation of the wave energy which could still provide a benefit in reducing the rate of erosion in the area. Based on the monitoring of the Sunny Isles breakwater as reported by DERM, there was very little settlement in the first few years following construction, but in later years some parts of the structure settled by up to 3 feet. Compared with the Sunny Isles structure, the SMART structure will have its weight distributed more evenly over concrete mats and therefore less prone to compaction of the underlying sand. The articulated concrete mattress foundation will be more impervious and likely more effective than the gabion-style foundation mattresses used at Sunny Isles. Based on these factors, the Corps expects less settlement of the SMART Structure. However, if the settlement limits are exceeded, shoreline response to Structure settlement will be the final deciding factor to determine whether or not the project is considered successful.

13. "The EA has contradicting criteria for structural success. In Appendix B and E, which are both denoted as the physical and biological monitoring plan, on pages 4-5 and 4-5 respectively, the percentages given vary. Please clarify success criteria."

Response – The physical monitoring plan referenced in this comment was drafted as part of the 2004 EA and was included in the appendix to the FWS CAR and Appendix E of the EA. The physical monitoring plan has been revised and is included in the final EA and permit application to FLDEP. Success criteria are addressed in the previous response.

14. "The EA states several times that '…the SMART structure would be altered of removed if it did not meet program goals and objectives' (p14). In the event the structure(s) do(es) not meet program goals and objectives, a specific alteration plan or removal and disposal plan must be created and approved prior to deployment. Please provide a plan for agency review once a contractor has been identified.

Response – A removal plan for the structure would only be developed by the Corps and the local sponsor after monitoring demonstrates that the project has failed to meet the stated goals, which may be years after deployment and would not be included in the construction contract. Should that occur, the Corps and local sponsor will engage FLDEP in plan development and review.

15. "This project and structure are experimental in nature, as such it is difficult to anticipate potential impacts it could have *in situ* to nearby hardbottom during construction and / or storm events. In the USFWS final report, the USACE admits '…structure fails or becomes destabilized, debris… may impact reef organisms or portions of the structure may collide with the reef' (p17). Please provide a mitigation plan in the event that nearby hardbottom habitat is impacted due to unanticipated construction related impacts or storm events."

Response – The 2004 EA, which the FWS CAR was based on, lacked the detailed nearshore surveys (included in Appendix B of the EA as part of the ESA consultation with NMFS) that have since been conducted, and as such, assumed that hardbottom resources were in the project area. The detailed in water surveys that have since been conducted clearly show that no hardbottom resources are in the project area. Based on the *in situ* survey results, the Corps disagrees with the FWS CAR's determination that the structures could collide with hardbottom habitat resulting in mitigation; as such a mitigation plan will not be developed in advance of the construction of the project. However, as required by Section 227/2038, the structure will undergo extensive monitoring, and should unanticipated impacts occur, a restoration and mitigation will be developed.

Comments received from Jesse Bull, PhD.

1. The proposal does not consider the impact on the nearby surf break, which is well-known and used by many. This project would likely destroy the surf break.

Response - The proposal does consider the impact on the nearby surf break. An on-site meeting was held in February 2009 with leadership from the local Surfrider Foundation chapter to obtain input from the local surfing community in regard to this project. As a result of this meeting, at the request of Mssrs Lozada and Porter-Brown, the SMART structure was relocated about 500-feet further south, to separate the structure from the area that they indicated as the primary surf break. Whereas the structure was originally centered on the 63rd St park area, the revised layout relocates the structure such that the northern end of the breakwater is adjacent to the southern end of the park.

2. The safety issues of submerging concrete structures so that the tops of the structures are 1.5 feet from the surface have not been adequately addressed. This seems to pose a very serious safety hazard and is also something that may be attractive to children and others who may then find themselves in trouble if there are waves breaking on the structure. Further, given the shape of the structures, it seems there is scope for someone becoming trapped in/on the structure. My understanding is that something similar has happened at a similar structure in St. Petersburg.

Response – The structure would be located approximately 500 feet seaward of the current shoreline position, in a water depth of -8.2 feet mean lower low water (mllw). As such it would be a) seaward of the point where waves would break during the normal relatively calm conditions, and b) at the edge of the permitted swimming area and out of reach of most swimmers. Because of its location at the seaward limit of the permitted swimming area, the immediate vicinity around the breakwater could be cordoned off for safety reasons if needed, with little or no impact to the adjacent swimming area. Regarding the potential entrapment of swimmers, the size of the holes in the individual Goliath ball units – the top holes are 64 inches in diameter. For a person to become trapped in a Goliath ball – they would have to have a waist diameter of approximately 60 inches. It may be possible to lodge an arm or leg in some of the larger side holes on the sides of the Goliath balls however; this could be prevented by designating the structure as being 'outside the swimming area'. The incident in St. Petersburg referenced in the comment took place at an exposed rock breakwater, not a submerged reefball structure and the swimmers referenced in the comment encountered strong rip currents known to be in the area prior to the placement of the breakwater structure (per the St. Petersburg Times, June 27, 1989), they did not become entangled in the breakwater structure.

3. The proposed project does not address downdrift erosion. Preventing erosion at 63rd street will likely lead to increased erosion south of the structures. This is troubling for many reasons, but especially because this project is being sold as a cost-saving measure. However, if the beach to the south faces an erosion problem, this is likely not the case.

Response - Preventing adverse downdrift impacts has always been a primary design consideration from the beginning of this project. More recently, numerical modeling was performed by the Engineering Research and Development Center to investigate performance of the final project design. This modeling effort resulted in the present 3-segment breakwater layout, and again the breakwater design was specifically formulated to allow adequate sediment bypassing to prevent any significant downdrift impacts. In addition, the area landward of the structure would be renourished prior to construction of the breakwater as part of the Dade County Contract E emergency project (as noted in Section 1.5(j) and Section 4.5 of the EA), in order to 'pre-fill' the region to approximate the final equilibrated shoreline position. Finally, an extensive shoreline/structure monitoring and mitigation plan has been developed to monitor for and offset any unanticipated adverse shoreline responses.

4. Downdrift erosion poses a threat to the habitat for marine life such as sea turtles.

Response - As previously stated in response to comment #3, no downdrift erosion is anticipated if the structure and beach fill are constructed as proposed in the EA. Additionally, the southern terminus of the structure was purposely located adjacent to an area of historically wide, stable beach that lies immediately to the south of the project area. Any unanticipated temporary downdrift erosion that may occur could easily be absorbed by this 150-foot+ wide stable berm. This project will result in a net benefit to sea turtle nesting, by increasing the width and stability of the beaches landward of the structure, and for some distance to the north, and decreasing the needed renourishment projects that have impacts to sea turtle nesting. The Corps has consulted with the US Fish and Wildlife Service (Service) concerning the project's effects to endangered and threatened sea turtles (see Appendix B for the Corps' letter and determination documentation). The Corps made a determination the project "may affect, but it not likely to adversely affect" listed sea turtles In their September 28, 2005 biological opinion and Coordination Act Report for the original larger project, the Service stated, "The shoreline in the project area should equilibrate as sand build at the breakwater then bypasses the structure to the adjacent shoreline. Consequently, these effects are expected to be insignificant and the Service concurs with the Corps' determination for the above listed sea turtles."(Appendix C). Based on the Service's expertise with endangered and threatened sea turtles and their nesting habitats, the Corps disagrees with this comment and believes that impacts to sea turtle nesting habitat of this project is in fact beneficial to the nesting turtles.

5. It's unclear how this area was identified as a "hotspot" while other areas on Miami Beach with similar amounts of sand are not considered "hotspots."

Response - This area was classified as an erosional 'hotspot' based analyses of over 30 years of monitoring data. The classification is not dependent on 'similar amounts of sand' as other areas, but is based on the high localized erosion rates and the difficulty of maintaining a useable beach for storm protection, recreation, sea turtle nesting, emergency vehicle access, etc. This area has been frequently renourished since initial construction in 1979, and in spite of frequent renourishments is currently well below design dimensions. The proposed project is simply a means to reduce the volume and frequency of beach fills placed along this reach of shoreline.

6. It is unclear that the proposed reef balls will actually address the causes of erosion. My understanding is that the input to the model is based on wind measurements and not actual wave measurements. Further, whether the erosion is primarily caused by large waves that occur during storms, etc. (which the proposed structures may be of less help against) or is primarily caused by smaller waves has not been adequately addressed.

Response - The entire purpose of this project, and the focus of the numerical modeling and other engineering efforts have all been to reduce erosion along this rapidly-eroding reach of shoreline without adversely impacting the adjacent areas. In addition to laboratory testing using scaled physical models of reefball units, numerical shoreline change modeling was conducted using long-term wave data from the Wave Information Study (WIS). The WIS represents wave conditions over a 20-year period extending from 1980-2000, and includes the effects of calms as well as storms. The structure is primarily formulated to stabilize the shoreline by providing a slight reduction (generally less than 10 percent) in wave energy under average, or 'typical' wave conditions. The structure is not designed to provide complete protection under infrequent, extreme storm conditions; to do so would impair the performance of the structure under the more typical low-energy wave environment of South Florida that occurs during the vast majority of the time.

7. The proposal does not adequately compare the proposed project to doing nothing other than re-nourishment. This is troubling because the proposed plan also entails re-nourishment so it would be nice to know how much of the projected sand in place is simply due to the re-nourishment.

Response - The Federal Shore Protection Project is currently eroded to the point where it is below the level of protection required to provide full project benefits. On average, the project has been renourished to some degree every seven years since project construction, and as borrow sources become depleted the cost of borrow material will increase dramatically. The proposed project was designed to mimic the performance of the Sunny Isles breakwater by reducing the magnitude and frequency of future beach renourishments. In the case of Sunny Isles, prior to construction of the breakwater beach renourishment was required approximately every two years in order to maintain even a minimal beach in front of the seawalls in that area. Following construction of a submerged breakwater in 2001 (similar in design to the proposed reefball structure) and the associated beach fill in 2002, no further renourishments of the area have been required, and berm width of about 100 feet remains in place to this day. No downdrift impacts were noted during the monitoring of that project, due primarily to the relative transparency of the structure to wave energy (which allows adequate sediment bypassing) and due to the placement of backfill to mimic the post-project stabilized shoreline.

8. A recent Environmental Impact Study has not been conducted. The draft EA is not adequate, in my view.

Response – The National Environmental Policy Act (NEPA) sets no threshold for what does and does not require an Environmental Impact Statement (EIS) to be prepared. This determination is highly subjective, and based on the best scientific data and methodologies available. Section 1502.24 of the NEPA implementing regulations states:

> "Agencies shall ensure the professional integrity, including scientific integrity, of all discussions and analyses in environmental impact statements. They shall identify any methodology used and shall make explicit reference to by footnote to the scientific and other resources relied upon for conclusions in the statement."

While this regulation speaks specifically to EIS development, it is applied to the development of all NEPA documents, including this EA. The Corps has published this Draft EA and based upon comments received from Federal, State and local resource agencies, has not received any comments documenting a significant adverse impact to the environment. Comments received from the public have raised concerns about perceived adverse impacts to the environment (downdrift shoreline erosion; endangered and threatened sea turtles and their nesting habitats) and impacts to cultural and/or social resources, specifically surfing at Miami Beach. The Corps has reviewed the comments to see if they present additional facts or data not previously considered in the EA. To date, additional facts or data that would contradict the determinations of the Corps and/or local, state or Federal resource agencies have not been provided or located. A final determination to develop an EIS shall be made by the District Engineer after reviewing all of the comments and additional data provided by all reviewers of the EA. This determination will result in either a Finding of No Significant Impact, referred to as a "FONSI" or the development of a Notice of Intent to prepare an EIS. Either determination will be publically noticed and sent to all interested parties and individuals that reviewed and provided comments on this EA. Should a FONSI be made, then the availability of the Final EA would be noticed at the same time as the FONSI and made available via the Corps' environmental documents website.

The remaining comments are a summary of those received from leaders and members of the Surfrider Foundation. Many of the letters and emails received from Surfrider appeared to be standardized "cut and paste" comments presenting the same statements. As such, all of the comments from those that identified themselves as Surfrider members, or comments received containing those same statements, were compiled into one set of comments and responses. Where a commentor provided unique substantive comments, as required by section 1502.19(d) of the NEPA implementing regulations, those are addressed individually.

1. As the Structure is intended to reduce wave energy in its lee, the Structure will alter the esthetic character of the beach including diminishment or elimination of recreational beach uses associated with natural breaking waves along a sandy beach - such as surfing, other wave riding activities, and the associated aesthetics of waves. The potential future applications of a comparable Structure would lead to significant cumulative adverse impacts in other locations. The draft Ea should recognize these cultural impacts.

Response - The beach in the area of 63rd St. is part of the larger Dade County Beach Erosion Control project (BECP) that runs from Sunny Isles south to Government Cut. The beaches suffer from erosion and require periodic renourishment. Some areas of the Federal BECP, such as near 63rd St., erode faster than others and thus require more frequent renourishment. It is the intent of the 63rd St. breakwater to reduce the rate of erosion in this localized erosional "hotspot." As such, the SMART structure is designed to be highly transparent to wave energy, blocking at most 10-15% of the wave energy. Reducing the rate of erosion will help to maintain the beach and minimize the cultural and environmental impacts that are associated with the loss of the beach. The stabilization of this area will allow for the formation of a stable berm for recreation, sea turtle nesting, and emergency vehicle access. The location of the proposed structure was modified to its present location under the recommendation of representatives from the local Surfrider Foundation (Mssrs Lozada and Porter-Brown) during an on-site meeting in 2009, in order to minimize impacts to the primary surfing area. Also, the formation of a more stable berm will also eliminate backwash off of the near-vertical dune face when the beach is in a severely-eroded condition, further improving surfing conditions. Sections 3.10, 3.11, 4.10 and 4.11 of the EA describe the area as a known surfing site on Miami Beach and reviews the potential effects of the project on the surfing, other recreational beach uses and overall area aesthetics.

2. "Miami Beach is a significant national destination for recreational beach use. The Structure is proposed close to shore – in close proximity to existing buoys that demark the customary limits of beach swimming. Due to the paucity of attractive snorkeling venues in the Miami Beach area, the proposed structure will attract swimmers and snorkelers to enter the waters around the Structure to view the sessile organisms and fish expected to colonize the Structure. Due to the shallow depth of the top of the structure (-1.5' MLLW), swimmer and snorkelers will be subject to the effects of waves and currents that may wash swimmers/snorkelers into the structure, where they can become battered, trapped and possibly injured or killed. This impact is not addressed in the Draft EA.

Response - The comment states that "Miami Beach is a significant national destination for recreational beach use". The project area, approximately 1,250 feet in length, makes up less than two percent (1.8%) of the thirteen mile long Miami-Dade County Beach Erosion Control Project (BECP). This 1.8% will remain open for recreational beach use after construction of the SMART Structure, as will the remaining 98.2% of the federal project. The Corps does not agree that this project results in a significant impact to recreational beach use by the public. The Corps believes that by slowing erosion on this particular stretch of Miami Beach, the recreational public will have more beach available for recreation more of the time, with less frequent closures due to erosion of the beach and/or subsequent renourishment events.

The structure is to be placed along the -8.2 ft depth contour, which lies about 500 feet offshore near the seaward limit of the permitted swimming zone. The submerged structure would be virtually invisible to the casual beachgoer and would be located a considerable distance from the beach, so large numbers of swimmers/snorkelers are not expected to congregate around the structure. This structure is similar in many respects to the Sunny Isles breakwater, although that structure was constructed 1.5 feet deeper. Interviews with Miami-Dade county personnel show that the Sunny Isles structures are utilized by snorkelers, when waters are calm and swimming out to the structures is easier. The Corps believes that the reefball structure would result in the same situation. Additionally, although the Sunny Isles structures are utilized by swimmers and snorkelers since it was constructed in 2001, Miami-Dade County public safety personnel report that no serious incidents or injuries have ever been reported from swimmers or snorkelers at the Sunny Isles structure. If serious swimmer safety issues persist the breakwater can be excluded from the permitted swimming area. This concern has been added to the EA in section 4.11.

3. Section 1.3 of the Draft EA ("PROJECT NEED OR OPPORUNITY") cites that: "The proposed SMART Structure is designed to help dissipate wave energy in order to stabilize the identified "Hotspot erosion area" and help prevent storm damage." However, in theory, along sandy beaches, long-term, erosion, such as at the reported "hot spot", is primarily caused by an increase in littoral drift along the shoreline, where less sand enters the "hot spot" beach segment than the amount of sand that leaves the beach segment – per the fundamental principle of the Conservation of Mass. Based on this principle, in theory, breakwaters:

    - Are intended to reduce littoral drift to trap or prevent erosion of a volume of sand causing accretion or reduced erosion along the updrift shoreline and/or in the lee of each breakwater, and
    - Increase erosion of the downdrift beach by preventing an equivalent volume of sand from moving into the downdrift beach.

   The expectations of downdrift erosion is reflected in the report titled "Letter Report: GENESIS Modeling Study of Reefball Breakwater, Miami Florida 227 Project" – obtained from the Florida Department of Environmental Protection (FDEP) per the FDEP permit application filed by the USACE. This report predicts updrift accretion and downdrift erosion as reflected in the figure (from the report) below for various potential wave transmission coefficients.

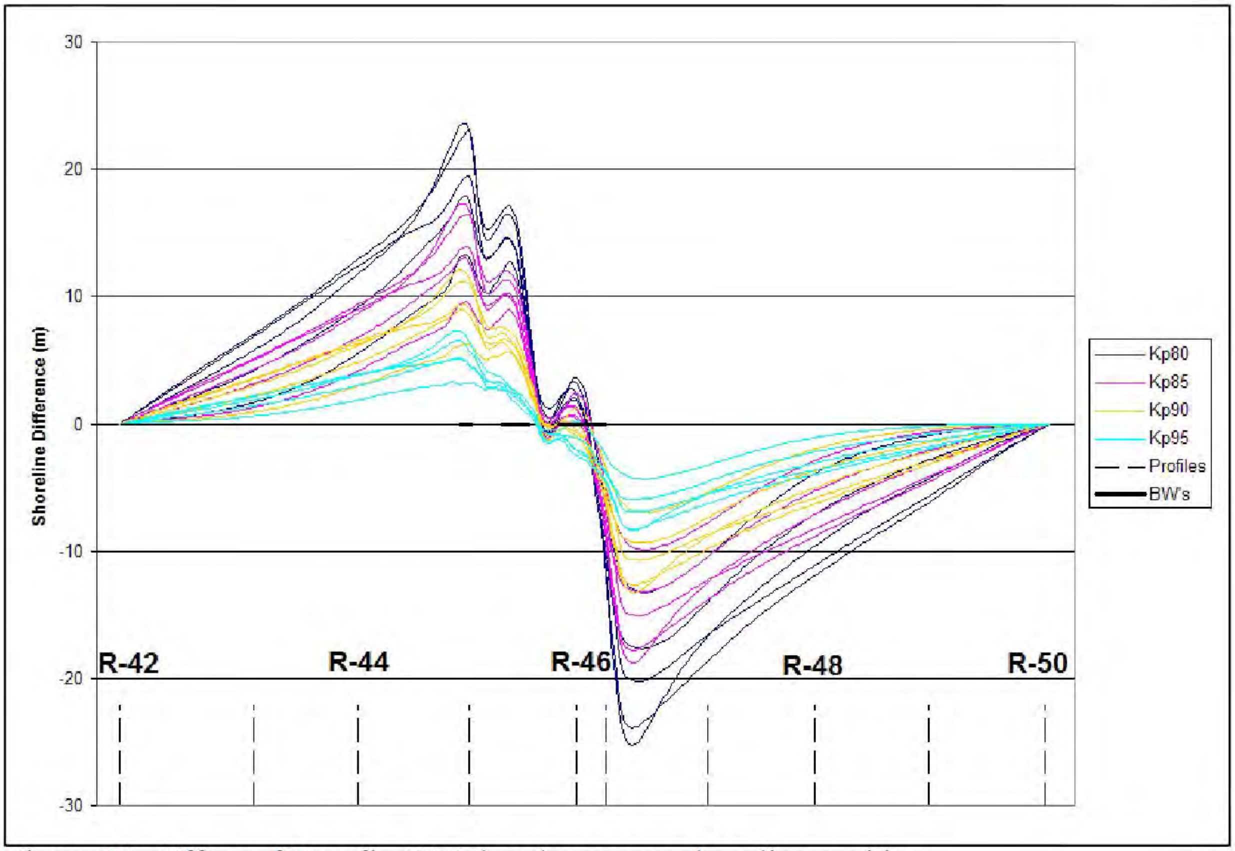


Figure 15. Effect of (Config S3-I) breakwater on shoreline position.

Also note that:

- The report employs the USACE model GENESIS, for which the predicted shoreline response (per the figure above) is predominately of a lesser magnitude than the accuracy of the mode as reflected in the "calibration" and "verification" cited in the report.
- The report states "…the shoreline is predicted to be in approximately the same position with the beach fill and breakwater as it would be without the fill and breakwater." This statement appears to reflect minimal expectations of the proposed structure and the potential for a similar outcome for the "No Action" alternative.

Response - Prior to placement of the SMART Structure, a separate, stand-alone beach renourishment project covering the reach from FL DNR survey markers R-42 to R46+250 is planned. This beach fill will supply significant new material that will nourish the downdrift beaches and offset any effects of the SMART Structure. The SMART Structure will not block the downdrift from this new source of material, but will reduce the localized erosion rate in a limited area. The structure has been purposely designed from the beginning to exert minimal changes on the longshore distribution of wave energy, in an effort calculated more to stabilize the existing shoreline leeward of the structure than to accrete 'new' material behind the structure. This 'soft touch' approach will allow existing longshore transport processes to continue with only slight modification, and is calculated to produce minimal downdrift impacts on the adjacent beaches. Furthermore, the structure was intentionally positioned in the proposed location to avoid impacting a surf area to the north, and due to the presence of a wide, stable shoreline adjacent to the south end of the structure. An examination of aerial photographs and 30 years of monitoring data show that berm widths in excess of 200 feet exist along the adjacent beach to the south. Any of the predicted shoreline fluctuations that may occur during post-construction equilibration can easily be absorbed by this wide stable beach.

This comment assumes that erosion in the 63rd St area is entirely due to a gradient in longshore transport. Previous numerical modeling efforts have shown that the accelerated erosion along this portion of the Dade County project is due to three factors: 1) due to the large-scale convex curvature of the shoreline, this site is located at the 'headland' of the barrier island, and there exists a slight bias for material to be transported out of the area in both directions. 2) under a wide variety of incident wave conditions, the incoming waves are refracted over the complex reef system, creating a series of areas of wave energy focusing and wave energy dissipation along this region of shoreline. These areas are constantly changing in location and magnitude in response to changing wave conditions. Accelerated erosion tends to occur in areas of wave energy focusing while accretion can occur in areas of wave energy dissipation. 3) Some gradient in alongshore transport rates can contribute to these processes under certain input wave conditions. In short, the processes contributing to erosion along this region of shoreline are more complex than a simple conservation of mass analysis, and are accounted for in the wave refraction and sediment transport numerical modeling contained in this analysis.

The comments pertaining to Figure 15 from the cited GENESIS modeling study performed by the USACE seem to indicate that the commentor expects greater shoreline erosion/accretion than is shown in the figure. This may be due to a misinterpretation of the figure, possibly because the color graph has been reproduced in black and white and some of the more pertinent data is nearly invisible. The color version of this graph is provided below. This figure shows a relatively wide range of wave transmission coefficients in order to demonstrate the effects on the shoreline of varying the transparency of the structure to incoming wave energy. The average wave transmission factor of the recommended structure is 0.9 , corresponding to the series of yellow lines in figure 15, which are invisible in the black and white version of this figure contained in the comments. The initial shoreline changes following construction fall within +/- 12 meters, relative to the pre-project shoreline. As shown in the graph these changes decrease to about +/- 6 meters over time, as the shoreline equilibrates to the structure and eventually stabilizes. The shoreline responses predicted by this GENESIS modeling effort are very similar to those predicted for the Sunny Isles breakwater; subsequent monitoring of that structure verified that the model predictions were valid.

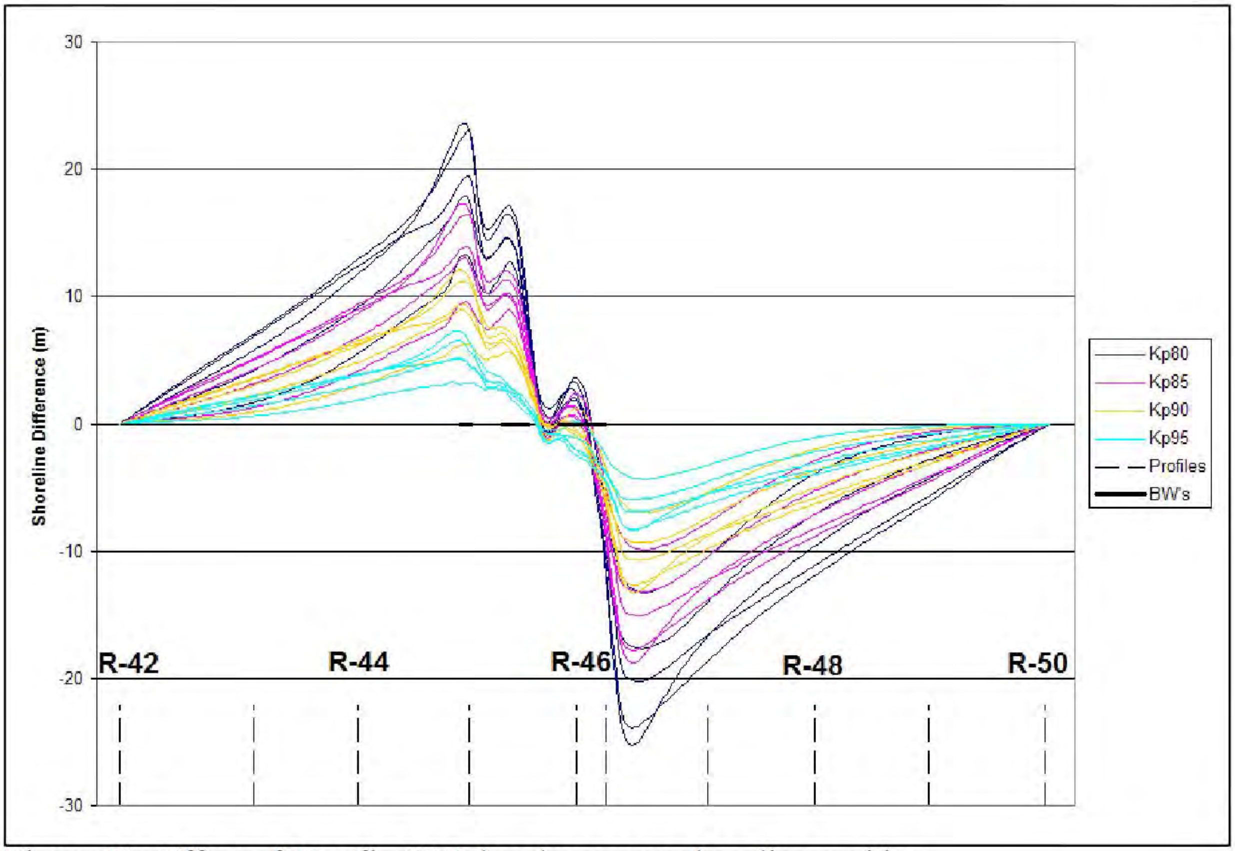


Figure 15. Effect of (Config S3-I) breakwater on shoreline position.

In summary, the net impacts from construction of this project are predicted to be overwhelmingly positive in terms of improvements to the human environment and to sea turtle habitat. Regions of the shoreline behind the structure and for several thousand feet to the north will be stabilized, and recreation and sea turtle nesting can then occur in areas that periodically erode to the dune line under existing conditions. The only predicted adverse impact on the shoreline to the south is a slight decrease along a limited portion of a historically wide, stable beach. Berm widths are expected to remain in excess of 150 feet along this downdrift shoreline, providing ample room for sea turtle nesting as well as recreational uses. A copy of the Letter Report for the results of the GENESIS model for the 227 project were included in Appendix D of the EA and made available via the EA distribution, both hard copy and electronic.

4. Economic Impacts: The Structure is proposed as an experimental project, but there appears to be no reasonable expectation of benefits from the project as indicated above. As a result, it is expected that the structure would result in the useless expenditure of federal funds that could more appropriately be used to benefit the U.S. economy and environment. The economic impact of a likely failed Structure – including the cost of construction and removal – should be included in the EA.

Response - The proposed project will result in a net economic gain to the region, in terms of a greatly reduced need for expensive periodic beach renourishments. The Sunny Isles breakwater can be used as an example, since project performance is expected to be similar: prior to construction of that structure, beach renourishment along northern Sunny Isles was required every two (2) years on average, resulting in costly mobilization of dredging equipment and the depletion of relatively scarce offshore borrow materials. Since construction of the Sunny Isles breakwater in early 2002, no renourishments have been required and the beach remains wide and stable, with no discernable adverse downdrift impacts. This reduction in the frequency of beach replenishment results in savings in terms of construction costs as well as in the disruptions that can be caused by frequent beach renourishment. This Section 227/2038 project was proposed under the authority of a nationwide "Innovative Technologies" program, and is being funded separately from normal project construction. Because of the small amount of resources required to construct each reefball and the small number of units to be placed in the water, the SMART Structure is expected to yield significant economic benefits relative to a conventional rubblemound offshore breakwater.

5. Cumulative Impacts: Section 4.22 of the Draft EA cited: "If the proposed action performs as modeled and expected, further use of these features could be appropriate for Miami-Dade County and other similar coastal areas." As indicated above, the expectations cited in the EA are inconsistent with the expectations cited in the GENESIS model Letter Report. The intended determination of the Structure performance appears to be identified in the document titled "Test Plan Section 227 National Shoreline Erosion Control Development and Demonstration Program 63rd Street "Hot Spot" Miami Beach, Dade County, Florida" – obtained from the FDEP website. This test plan does not appear to reflect assessment of updrift and downdrift beaches, but appears to provide a basis for a determination of structure "success" leading to the proliferation of similar structures (per Section 4.22 of the Draft EA) with corresponding cumulative significant impacts as cited above. These potential cumulative effects should be included in the EA.

Response – The comment expresses concern that if the reefball breakwater is proven successful, "…a proliferation of similar structures…" could result. In reality this structure (as with breakwaters in general) are suited mainly for areas with erosion rates as high as to be unmanageable using periodic beach renourishment alone. For over 30 years since original project construction, this region has experienced persistent, rapid beach erosion. It has not proven possible to maintain the authorized dimensions of the project using beach renourishment alone. Offshore breakwaters, when properly designed and constructed, have proven fully capable of stabilizing limited reaches of shoreline and eliminating the need for frequent beach replenishments in highly-erosive areas, but are not generally suited for placement along extended reaches of shoreline.

Contrary to the second part of this comment, the proposed monitoring plan does include two 'control' areas – regions removed from the immediate vicinity of the breakwater to gage updrift and downdrift effects on the shoreline. Specifically, as per Florida DEP recommendations the northern control area begins a mile north of the northern limit of the breakwater and extends along a 5,000 ft length of shoreline. The southern control area begins a mile south of the southern limit of the breakwater and extends along a 5,000 ft length of that shoreline. Long-line beach profiles will be surveyed along each control area, more tightly-spaced profiles will be surveyed in the vicinity of the breakwater, and additional profiles will be surveyed between the breakwater and the two control areas. In this manner shoreline changes along a 4+ mile region of shoreline will be monitored. The implementing NEPA regulations define a cumulative impact as:

> "**§ 1508.7 Cumulative impact.**
> *Cumulative impact* is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

The key phrase in these regulations is "reasonably foreseeable future actions", which the courts have determined to be those actions where a permit application has been submitted; a funding stream is in place; or an authorization for an action exists. None of these three criteria exist for any other submerged SMART structures in Miami-Dade County, South Florida or elsewhere in the country, to the Corp's knowledge. The belief that a technology might one day be implemented at a future project site, in a future area does not meet the criteria for analysis as a potential cumulative impact. Any new project that might implement the SMART Structure technology in the future would be required to undergo a NEPA analysis before the project could move forward since the implementation of such a structure would either require a Section 10/404 permit from the Corps or would have federal funding and was being constructed by the Corps.

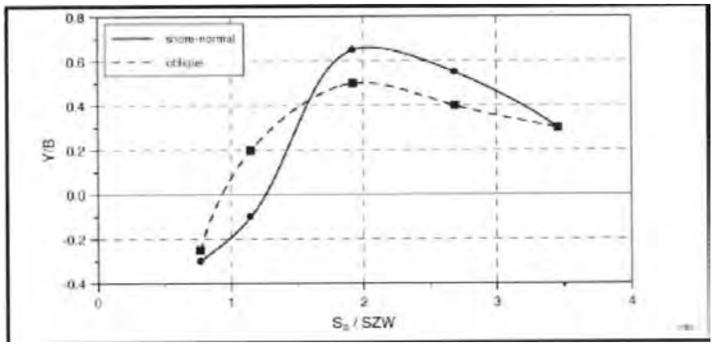
6. Structure: Section 1.4.1 of the Draft EA cites: "Objectives of the 63rd Street Hotspot Miami Beach, Florida, and Section 227 / 2038 project are to retain sand without causing impacts to adjacent shorelines, to maintain and preserve environmental habitat, and protect the shoreline when exposed to the combination of storm surge and design wave events with a 10-year return interval." However, (a) the GENESIS model Letter Report appears to indicate the Structure will cause impacts to adjacent shorelines – as described above, and (b) the EA appears to present no assessment of the structure effects during a 10-year storm event when storm surge is expected to result in elevated water or "freeboard" above the structure.

   In addition, during storm events, the proposed breakwaters have the potential to increase erosion in the lee of the breakwaters per periods of studies as identified in studies by Ranasingle et al, which indicates reefs of submerges breakwaters placed too close to shore can cause erosion [Ref: Ranasinghe, R., I. Turner and G. Symonds 2006. "Shoreline response to multi-functional artificial surfing reefs" A numerical and physical modeling study." Coastal Engineering, 53:589-611]. The figure below presents results of numerical and physical modeling tests conducted by Ranasingle et al – 'proposed as a preliminary engineering tool to evaluate the potrential shoreline response to submerged structures", where:

   S_a = Distance offshore to the Apex of Structure

SZW = Natural Surf Zone Width
B = Alongshore Structure Width
Y = Magnitude of Shoreline Response

As cited in the Ranasingle et al study and as reflected in the figure below: "Shoreline accretion (i.e. salient growth) can be expected when S_a/SXW>1.5, regardless of wave incidence direction. However, the width of the salient will be smaller under oblique wave incidence. Conversely, if the structure is very close to the shoreline (S_a/SZW<1), the shoreline will erode regardless of the direction of wave incidence." Both (a) effectiveness of the proposed structure during a 10-year storm event and (b) the potential to induce erosion in the lee – should be addressed in the EA.



Response - The concerns raised in this comment were mostly addressed in the response to comment (3) above. No significant downdrift impacts are anticipated. The maximum downdrift impact from the GENESIS shoreline modeling is a temporary reduction of the downdrift berm width from about 200 feet to about 170 feet. Even this slight narrowing of the wide downdrift effect is expected to recover to a large degree as the shoreline equilibrates during the years following construction. In regard to shoreline response during a 10-year storm surge/wave event, the breakwater will generally become less effective in terms of shoreline response as water levels over the structure increase. The proposed structure is much more porous to wave energy and current flow than the 'conventional' rubble-mound breakwater presented in the accompanying figure, and these results cannot be expected to translate well to the reefball structure. The GENESIS analysis presented in the USACE study contains a much more detailed analysis of predicted shoreline response than the simplified analysis presented in this comment, which represents more of a 'worst-case scenario' based on a series of simplified assumptions. The GENESIS model results are based on a time-series of wave events, including the effects of numerous storms of varying durations and magnitude. The resulting predicted shoreline positions shown throughout the report include these storm effects in far more detail than the Ranasinghe analysis. Experience at the Sunny Isles breakwater has shown that storm effects are highly transitory and the post-storm shoreline quickly recovers to its approximate pre-storm position.

7. Other Alternatives: Section 2.1.2 of the Draft EA cites: "The no action alternative does not provide the benefits needed to protect the cost from erosion and storm damage over the long-term, nor the means for sustainable use of available sand

resources. The no action alternative may results in more frequent renourishment events within the footprint of the proposed SMART Structure". These statements appear unfounded as the Draft EA does not appear to provide any quantitative assessment of these benefits with or without the Structure. Based upon the expected effects from the GENESIS model results – as identified above, it appears that the "No Action" may be a viable alternative. The EA does not appear to reasonably consider other alternatives to avoid or minimize the significant adverse impacts associated with the proposed Structure. Further evaluation of the "No Action" alternative and other alternatives appears warranted.

Response - The no-action plan has been discussed in the response to previous comments. To reiterate : 30+ years of monitoring data have allowed the existing conditions in the vicinity of 63rd Street to be defined in detail. The present conditions are identical to the "No-Action" plan, and consist of frequent renourishment of a highly-erosive beach. Should project renourishment not occur, the shoreline will erode into the dune line (which has occurred in the past). No dry berm would then exist for storm protection, recreational use, or sea turtle nesting. Damage to the dune and dune vegetation would occur progressively, resulting in eventual breaching. Surfing conditions would deteriorate due to wave reflection and backwash off of the resulting steep beach face and near-vertical dune scarp. I n the long term the shoreline could be expected to revert to a condition similar to the pre-project shoreline observed along virtually the entire Dade County shoreline : no dry beach in existence, with waves impacting directly onto seawalls along most of the length of the county. The hundreds of relic shoreline stabilization structures which are presently buried under the beach fill along the length of the county would eventually become exposed.

8. In summary, we contend that the proposed SMART Structure does not comply with the previsions of the National Environmental Policy Act (NEPA) in that the Structure:

   - Does not provide for preservation of the environment for future generations. The structure is expected to produce adverse impacts without any apparent net benefits
   - Does not assure safe, healthful, productive, and esthetically and culturally pleasing surroundings for all Americans. The structure is expected to diminish the cultural esthetics of the beach and be an attractive hazard (see number 6).
   - Does not attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences. The structure is expected to cause erosion and degradation of the downdrift beaches. The Draft EA does not reasonable address other alternatives which appear to have less impacts (see number 9).
   - Does not preserve important historical, cultural, and natural aspects of our heritage, and maintain an environment which supports diversity and variety of individual choice. The structure would alter the esthetic character of the beach and negatively impact cultural uses like surfing

(see number 5). Potential future application of a comparable structure would lead to significant cumulative adverse cultural impacts.

- Does not achieve a balance between population and resource use. The Draft EA does not adequately assess alternatives, nor does it reasonably characterize any balance between population and resource use.
- Does not enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources. The structure does not appear to provide for any reduction in the need to do beach renourishment, but rearranges the area where renourishment will be needed.

Response - Each of the following items have been addressed in previous sections of this document, but brief summaries of each major point are provided:

a. The proposed breakwater does provide for the preservation of the "environment of succeeding generations" in that the project will stabilize a broad reach of highly erosional shoreline, with no significant downdrift impacts, while helping to maintain the federally-mandated hurricane protection.

b. The structure will be submerged and virtually invisible to the public. Due to its location along the seaward boundary of the permitted swimming area, the structure could easily be posted 'off-limits' to swimmers in the interest of safety, if necessary.

c. Shoreline responses throughout the region have been adequately analyzed using proper numerical modeling techniques. Contrary to the statements contained in this comment, significant environmental benefits will accrue from the construction of this project, due primarily to the creation of stable habitat along a highly-erosive reach of shoreline.

d. The primary alteration to the aesthetic character of the beach will be the maintenance of a slightly wider and much more stable beach, as opposed to the existing narrow, shifting (occasionally non-existent) shoreline. In regard to surfing impacts, the structure is expected to result in about a 10 percent reduction in wave energy in the lee of the structure. During larger swells this zone may be one of the more favorable surf areas along Miami Beach, as other areas may tend to close out. In smaller conditions, waves can be expected to refract over the structure, creating several peaks where wave fronts intersect (similar to the effects observed at Sebastian Inlet caused by wave reflection). Widespread use of breakwaters in other locations is not anticipated, but similar structures may be of some benefit in limited, highly-erosive areas. Such applications would be examined on a case-by-case basis.

e. The primary alternative to the construction of the proposed stabilizing structure is the continued frequent renourishment of the area, or abandonment of the project. Neither of these alternatives provides the beneficial results and/or achieves project goals as adequately as the proposed design.

f. Contrary to the statement contained in this comment, the proposed project should greatly decrease the volume of material needed for future renourishment of this project. This factor becomes even more important as the volume of available borrow material decreases.

9. This project makes no reference to sea level rise, if reef balls are too deep they are ineffective, and if too shallow they are an ineffective eyesore.

Response - Although any rise in sea level would reduce the effectiveness of the breakwater, the breakwater would continue to provide some level of protection to the shoreline. Should this reduced level of protection be deemed insufficient at some point in time, one of the advantages of the SMART system is that there are only 99 mattresses in the entire breakwater. It is relatively easy to lift each mattress and move it shoreward a few feet to the original water depth, or additional breakwater units could be placed. A discussion of sea level rise for the area has been added to the EA in Section 2.1.2, the No Action Alternative.

The following comments were received from Surfrider months after the comment period closed (comments post-dated Nov 15, 2010), however the Corps has reviewed them and decided to include them in the comment and respond section of the EA.

1. A thriving coral community will not grow naturally on the reefballs in a modest period of time (less than 15 years) without transplanting coral clippings from other locations. *This would require additional experts, permitting, money and time* to get the outcome that is suggested by the USACE.

2. The current environment of our marine area will likely provide mainly algae, stinging nettles and fire coral to grow naturally on the reef balls. All are unintended and unwanted residents of a tourist attraction.

Response to comment #1 and #2 - The Draft EA did not suggest that a "thriving coral community" would grow naturally in a "modest period of time" as the comment contends. Section 4.4.1 of the EA states " Although the goal of the SMART structure is not to create an artificial reef for habitat, placement of the SMART structure will provide clean hard substrate for colonizing hardcorals, soft corals, fleshy macroalgae and other hardbottom and coral reef species as has been commonly observed on artificial reef structures throughout southeast Florida." Additionally, although the Corps does not plan to relocate corals from other locations to the SMART Structure, Miami-Dade County DERM, or other parties, may relocate corals to these structures as part of avoidance and minimization measures for other projects that may take place in the future. Miami-Dade DERM has documented small sponge growth typically within 6-months of structure placement and small coral recruits within 2 years depending on when the structure is placed. The Sunny Isles breakwaters were placed approximately 400 feet offshore in late 2001/early 2002. In a report entitled "Identification of Benthic Resources in the Nearshore zone Golden Beach and Sunny Isles Beach, Miami-Dade County, Fl (DNR Monuments: R-4 to R-15) July 2009"; DERM biologists found large corals, fleshy macroalgae, sponges, coralline algae and numerous fish species inhabiting the Sunny Isles breakwaters. No transplantations have occurred to this breakwater, all colonization has been natural recruitment. The Corps believes that a similar community will develop on the SMART structure.

3. Reefball artificial reefs deployed throughout the globe have mixed results. It seems in low wave energy environments that can work well. However in locations where there is at least occasional periods of higher energy wave action, like South Florida, the breaking waves over the reefballs act to scour sand behind the line of reefballs and create a trench behind this line. Also accumulating sand as designed for this project will steal sand from somewhere, and from someone else's beachfront property.

Response - As part of the development of the SMART Structure, the Corps reviewed available data from reefball projects throughout the world. The summary list of projects provided by Surfrider had previously been reviewed by the Corps in the analysis conducted for project design.

4. We would also suggest that the following literature is reviewed and incorporated prior to decision making:

    - Walker, B. K., Henderson, B., Spieler, R. E., 2002. Fish assemblages associated with artificial reefs on concrete aggregates of quarry stone offshore Miami Beach, Florida, USA. Aquat Living Resour 15, 95-105.

Response - The Corps has incorporated the findings of Walker et al, 2002 into the EA.

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APPENDIX A – SECTION 404(B) EVALUATION

APPENDIX A -SECTION 404(b) EVALUATION

SECTION 227 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM
63RD STREET "HOTSPOT"
MIAMI BEACH, FLORIDA

1 PROJECT DESCRIPTION

1.1 Location

The project is located on the southeast Florida coast within Miami-Dade County. The proposed location is within DNR monument range R-45 and R-46. The proposed work would be performed under Section 227 of the Water Resources Development Act (WRDA) of 1996 and Section 2038 of WRDA 2007. References to Figures are from the Environmental Assessment (EA).

1.2 General Description

The proposed Section 227/2038 SubMerged Artificial Reef Training (SMART) structure project would be located parallel to Miami Beach in the vicinity of NE 63rd Street (Figure 1 and 2) in a north/south orientation at approximately the -8.2 feet below the Mean Lower Low Water (MLLW) depth contour. The exact dimensions of the structure will be no greater than 1,250 feet in length, and 42 feet in width and the location of the structure is based on extensive modeling efforts. The SMART structure crest would be covered by approximately 1.5 feet of water at MLLW. The SMART structure would be placed at a the -8.2 ft MLLW contour, which as of March 2010 is located approximately 500 feet offshore of the mean shoreline (Figure 2). The specific location will be determined at the time of construction based on the -8.2 ft depth contour, which could change from the March 2010 location due to erosion from storms, etc prior to deployment of the modules. Final placement location will be determined based on the -8.2 ft MLLW contour.

The SMART structure would be constructed of numerous 41-foot long segments which will be approximately 6.5 feet wide. The SMART structure will be placed parallel to the shoreline, with individual units having a 25 degree offset from shore perpendicular, to form an overall crescent-shaped, continuous structure with the northern and southern structure terminus angled and narrowed (Figure 2 and 8).

The SMART structure segments would be composed of Goliath Reef Balls; standard size 6 by 5 feet (1.82 by 1.52 m), and Bay Balls; standard size 2 by 3 feet (0.61 by 0.91m). Each reef ball will be molded to a square concrete slab attached to ARMORTEC Armorflex Concrete Block Mats (ABM) connected with cables in PVC pipe to form a continuous, articulated structure (Figure 4 and 9). The SMART structure units will be placed next to each other to efficiently absorb and diffuse wave energy in addition to mimicking a variable benthic landscape. Every 10th SMART segment would be comprised of an ABM without the Goliath Reef Blass and having only Bay Balls at the ends for weight to provide adequate sea turtle access lanes with a width of six feet and a depth of water above the Bay Ball of 4.5 feet at MLW.

The Goliath Reef Balls are bell-shaped, constructed of concrete, and weigh approximately 9,800 pounds. Both the Goliath and Bay Balls are hollow with randomly perforated complex (piling and ventilation) holes. A solid Bay Ball would be attached to the concrete mat to anchor the oceanside segment of the mat and prevent scouring (Figure 7 and 8). The SMART design provides a significant mass with a low center of gravity that is cost-effective to install from the sea via barge and crane. No upland construction lands would be needed except at a local port for the loading of materials.

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1.3 Authority and Purpose

The proposed SMART structure project was initially authorized under Section 227 of WRDA 1996 between 1998 and 2004, and due to the loss of funding was dropped in 2004. Section 227 authorities were extended for a 12 year period, and more recently the project was given authority under Section 227/2038, however this authority has not yet been implemented. The 1996 authority specified that the Secretary of the Army shall establish and conduct a national shoreline erosion control development and demonstration program for a period of six years beginning on the date that funds are made available to carry out this section; the 2007 authority was similar, but does not expire.

Nourishment of Miami-Dade County Beaches has continues to be a necessity to provide storm protection. The purpose of the project is to prevent or reduce loss of public beachfront to continuing erosional forces and to prevent or reduce periodic damages and potential risk to life, health, and property in the developed lands adjacent to the beach.

1.4 General Description of Dredged or Fill Material

1.4.1 General Characteristics

The SMART structure would form a crescent shaped submerged breakwater approximately 1,250 feet long, 41.0-feet wide, parallel to the shoreline in approximately -8-feet of water at mean low water (MLW) approximately 500-foot from the mean shoreline. It would be constructed of Portland cement Type II, conforming to ASTM C-150.

The SMART structure is comprised of segments. The segments include four Goliath reef balls and one solid 'Bay Ball' each anchored to a 6-foot by 6-foot concrete slab. The SMART segments weigh about 30 tons each. The slabs are cabled to articulated concrete mats to provide flexibility for terrain change and wave force refraction/absorption. Approximate SMART structure footprint is 0.7 acres.

1.4.2 Quantity of Material

Approximately 364 - Goliath reef balls and 230 Bay Balls would be used to construct the SMART structure. SMART structure Installation would be done from barge in the Atlantic Ocean after the SMART structure segments are constructed offsite.

1.4.3 Source of Material

A local commercial source for the Type II Portland cement ASTM C-150 would be used to construct the reef balls, base slabs and articulated concrete mats that would be assembled and delivered to the installation site in segments.

1.5 Description of the Proposed Discharge Site

1.5.1 Location

The SMART structure would be placed along the Atlantic Ocean shoreline in northern Miami Beach within DEP monument range R-45 and R-46 approximately 500-foot from the mean shoreline in -8.2 feet of water at MLLW. Refer to Figure 4 of the EA.

1.5.2 Size

The proposed SMART structure would be approximately 1,250–feet long and 41.0-feet wide.

1.5.3 Type of Site

The SMART structure placement site would be proposed for a section of sandy offshore seabed of the Atlantic Ocean.

1.5.4 Type of Habitat

The SMART structure site would be shallow water sandy bottom of the Atlantic Ocean.

1.5.5 Timing and Duration of Dredging

The exact timing of the SMART structure installation is not known at this time. It is anticipated that construction would occur during 2011, require about 6 months to build and 2-3 months to install in the Atlantic Ocean.

1.6 Description of Disposal Method

The SMART structure would be installed from a barge in the Atlantic Ocean.

2 FACTUAL DETERMINATIONS

2.1 Physical Substrate Determinations

2.1.1 Substrate Elevation and Slope

The crest of the SMART structure would be at elevation –1.5-foot MLLW. Crest width would be 41.0-foot and the side slopes would be 1.5 horizontal to 1.0 vertical. Refer to Figures 5 and 6 in the EA.

2.1.2 Type of Fill Material

The SMART structure would be constructed of Portland Cement Type II, ASTM C-150.

2.1.3 Dredge/Fill Material Movement

Once placed the SMART structure would not move. Each 41-foot long by 6-foot wide segment would weigh approximately 30 tons.

2.1.4 Physical Effects on Benthos

The SMART structure footprint would cover approximately 0.7 acres of non-motile benthic organisms associated with the sandy bottom. The SMART structure would provide substrate for benthic organisms typically associated with hardbottom habitat, similar to those documented on the Sunny Isles breakwaters which are located in a similar distance from shore within five miles of the proposed SMARET structure deployment location.

2.2 Water Circulation, Fluctuation and Salinity Determination

2.2.1 Water Column Effects
During the placement of the SMART structure some temporary increase in turbidity may occur. The increased turbidity would be short-term; therefore 'fill' placement would have no long-term or significant impacts, if any, on salinity, water chemistry, clarity, color, odor, taste, dissolved gas levels, nutrients or eutrophication.

2.2.2 Current Patterns and Circulation
The project would have no significant impact on large-scale current patterns or velocities along the Miami-Dade county shoreline. Currents may be increased in the immediate vicinity of the SMART structure, and some localized scour may occur near the structure. The SMART structure's foundation design would prevent excessive settlement of the structure. Wave energy would be decreased slightly in the lee of the SMART structure, allowing sediment deposition to occur along the shoreline landward of the structure as modeled by SBEACH and GENESIS model runs.

2.2.3 Normal Water Level Fluctuations and Salinity Gradients

Mean tidal range in the project area is 3.5 feet with a spring tide range of approximately 4.1 feet. Salinity is that of oceanic water. Fill placement would not affect normal tide fluctuations or salinity.

2.3 Suspended Particulate/Turbidity Determinations

2.3.1 Changes in Suspended Particulates and Turbidity Levels

There may be a temporary increase in turbidity levels in the immediate vicinity of the SMART structure during construction. Turbidity would be short-term and localized and no significant adverse impacts are expected. State water quality standards for turbidity would not be exceeded.

2.3.2 Effects on the Chemical and Physical Properties of the Water Column
There would be no effects to the chemical and physical properties of the water as a result of placing of the SMART structure.

2.3.2.1 Light Penetration

Some decrease in light penetration may occur in the immediate vicinity of construction. This effect would be temporary, limited to the area of construction, and would have no adverse impact on the environment.

2.3.2.2 Dissolved Oxygen

Dissolved oxygen levels would not be altered by this project due to the high energy wave environment and associated adequate re-aeriation rates.

2.3.2.3 Toxic Metals, Organics, and Pathogens

No toxic metals, organics, or pathogens are expected to be released by the project.

2.3.2.4 Aesthetics

The aesthetic quality of the water in the immediate vicinity of construction may be affected during construction from increased turbidity. This would be a short-term and localized condition.

2.3.3 Effects on Biota

2.3.3.1 Primary Productivity and Photosynthesis
There would be no effects on the nearshore productivity or photosynthesis as a result of constructing the SMART structure.

2.3.3.2 Suspension/Filter Feeders
No adverse effects on suspension or filter feeders are expected during or after construction of the SMART structure.

2.3.3.3 Sight Feeders
No significant impacts on these organisms are expected as the majority of sight feeders are highly motile and can move outside the project area.

2.4 Contaminant Determinations

The SMART structure would be free of any contaminants.

2.5 Aquatic Ecosystem and Organism Determinations

2.5.1 Effects on Plankton

No adverse impacts on autotrophic or heterotrophic organisms are anticipated.

2.5.2 Effects on Benthos

The proposed SMART structure would cover benthic organisms associated with the sandy bottom within the structure footprint. The SMART structure would provide substrate for colonization by benthic organisms typically associated with hardbottom habitat. No significant adverse impacts to benthic organisms are anticipated.

2.5.3 Effects on Nekton

No adverse impacts to nektonic species are anticipated.

2.5.4 Effects on the Aquatic Food Web

No adverse long-term impact to any trophic group in the food web is anticipated.

2.5.5 Effects on Special Aquatic Sites

2.5.5.1 Hardground and Coral Reef Communities

Construction of the SMART structure would not adversely impact hardground or coral reef communities. The SMART structure segments used to construct the submerged breakwater would provide substrate for colonization by reef organisms.

2.5.6 Endangered and Threatened Species
There would be no significant adverse impacts on any threatened or endangered species or on critical habitat of any threatened or endangered species.

2.5.7 Other Wildlife

No adverse impacts to small foraging mammals, reptiles, or wading birds, or wildlife in general are expected.

2.5.8 Actions to Minimize Impacts

All practical safeguards would be taken during construction to preserve and enhance environmental, aesthetic, recreational, and economic values in the project area. Specific precautions are discussed elsewhere in this 404(b) evaluation and in the EA for this project.

2.6 Proposed Disposal Site Determinations

2.6.1 Mixing Zone Determination

Clean SMART structure constituents would only be used to construct the submerged breakwater. This would not cause unacceptable changes in the mixing zone water quality requirements as specified in the State of Florida's Water Quality permit procedures.

2.6.2 Determination of Compliance with Applicable Water Quality Standards

Because of the inert nature of the material to be to be used as the SMART structure, Class III water quality standards would not be violated.

2.6.3 Potential Effects on Human Use Characteristics

2.6.3.1 Municipal and Private Water Supplies

No municipal or private water supplies would be impacted by the implementation of the project.

2.6.3.2 Recreational and Commercial Fisheries

Fishing in the immediate construction area would be prohibited during construction. Otherwise, recreational and commercial fisheries would not be impacted by the implementation of the SMART structure.

2.6.3.3 Water Related Recreation

Beach/water related recreation in the immediate vicinity of construction would be prohibited during construction activities. This would be a short-term impact.

2.6.3.4 Aesthetics

The existing environmental setting would not be adversely impacted. Construction activities would cause a temporary increase in noise and air pollution produced by equipment and some temporary increase in turbidity. These impacts are not expected to adversely affect the aesthetic resources over the long term and once construction ends, conditions would return to pre-project levels.

2.6.3.5 Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

No such designated sites are located within the SMART structure project area.

2.7 Determination of Cumulative Effects on the Aquatic Ecosystem

There would be no cumulative impacts that result in a major impairment in water quality of the existing aquatic ecosystem resulting from the placement of SMART structure.

2.8 Determination of Secondary Effects on the Aquatic Ecosystem

There would be no secondary impacts on the aquatic ecosystem as a result of the installation of the SMART structure.

3 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 fill into waters of the United States. Further, no less environmentally damaging practical alternatives to the proposed actions exist.

C. After consideration of disposal site dilution and dispersion, the discharge of fill materials would not cause or contribute to, violations of any applicable State water quality standards for Class III waters. The discharge operation would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

D. The placement of the SMART structure would 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 the SMART structure would 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 would not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values would not occur.

F. On the basis of the guidelines, the proposed fill site for the installation of the SMART structure is specified as complying with the requirements of these guidelines.

Dade 227 EA Mailing List

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Environmental Protection Agency Region IV
NEPA Program Office
61 Forsyth Street, SW
Atlanta, Georgia 30303

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Biscayne Bay Environmental Center
1277 NE 79th Street Causeway
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Dr Janet Matthews
Div of Historical Resources - SHPO
500 South Bronough St
Tallahassee, FL 32399 0250

Florida Fish & Wildlife Conservation Commission
Attn: Mary Ann Pool
620 S Meridian St
Tallahassee, FL 32399 1600

Brian Flynn
Miami-Dade DERM
701 NW 1st Ct.
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Miami, FL 33136

Director
Metro Dade Parks & Recreation Department
275 NW 2nd St, 5th Floor
Miami, FL 33128

Mayor, City of Miami Beach
1700 Convention Center Dr
Miami Beach, FL 33139

Mayor, City of South Miami
6130 Sunset Dr
South Miami, FL 33143

Mayor, City of Miami
3500 Pan American Dr
Miami, FL 33133

Dr. Mark Kraus
Audubon of Florida
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Caribbean Conservation Corp
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Reefkeeper International
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Miami, FL 33133

Director
Tropical Audubon Society
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Surfrider Miami
c/o Mike Gibaldi
4780 Pine Tree Dr., #1
Miami Beach, FL 33140

Erika Davanzano
Florida regional Manager
Surfrider Foundation
660 NE Ocean Blvd.
Stuart, FL 34996

Dr. Jesse Bull
345 Ocean Drive
Apt 311
Miami Beach, FL 33139

Jean-Paul Lausell
1800 N. Bayshore Dr. #301
Miami, FL 33132

Michael Laas
101 Collins Ave #14
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1558 NE 172nd St
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Jerry Libbin
Commissioner
City of Miami Beach
1700 Convention Center Drive
Miami Beach, FL 33139

Robert Kahn
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Miami Beach, FL 33139

James Porter-Brown
58 NE 92nd Street
Miami Shores, FL 33138

Jason Biondi
1780 Lenox Ave
Miami Beach, FL 33139

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

JUL 17 2010

To Whom It May Concern:

Pursuant to the National Environmental Policy Act, this letter constitutes the Notice of Availability of the Draft Environmental Assessment and Finding of No Significant Impact (FONSI) for the Proposed Submerged Artificial Reef Training (SMART) Structure Section 227/2038 National Shoreline Erosion Contract Development Program for the 63rd Street "Hot Spot" Miami Beach, Miami-Dade County, Florida.

The Environmental Assessment (EA) and FONSI are available for viewing on the Corps' website under the project "Dade County Beach Erosion Control and Hurricane Protection" at http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine_DadeCo_BchErCtrl.htm

Please provide all comments under NEPA to the Draft EA within 60 days of the date of this letter.

A copy of the EA and FONSI can also be requested by contacting Mrs. Terri Jordan-Sellers at 904-232-1817.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Comments Received – July 2010 Draft EA

Jordan-Sellers, Terri SAJ

From: MBacc [mbacc@comcast.net]
Sent: Saturday, September 11, 2010 10:01 PM
To: Jordan-Sellers, Terri SAJ
Subject: Reef Balls

Ms. Jordan-Sellers,

As a homeowner, a Florida native and coastal resident for 46 years, I strongly oppose the Corps of Engineers plan to put a breakwater in the ocean off Miami Beach. Not only will this open up the possibility of more to come, but it simply won't work. You cannot beat Mother Nature. The ebb and flow of the ocean and its effect on our beaches is completely natural and has been going on for millions of years. How can one be so arrogant to think humans can change this. Your study and design is fundamentally flawed. Those barriers will simply divert the energy to the north or south depending on the wave action and cause increased erosion elsewhere. So then you build another to fix that problem, and then another, and then another. Is that really the plan? That is insanity! Stop the madness! Is your vision to fill the entire east coast with these massive eyesores. You will ruin the lives of thousands of surfers, windsurfers, kiteboarders, and beachgoers. Coastal residents, Surfrider Foundation, and many other organizations, both local and national, stand united and firmly opposed to this. Please do not consider this an option and let nature take it's course.

Thank-you,
Mike Bacchus
DJ WPBZ 103.1 The Buzz

From:	Bryan Berc
To:	Jordan-Sellers, Terri SAJ
Subject:	NO! Reef Balls on Miami Beach
Date:	Thursday, September 16, 2010 8:06:26 AM

Goo day Terri,
I am writing you because I believe in Natural processes and am strongly opposed to any artificial structures placed in the near coastal surf/swim/dive and fishing zone of Miami Beach Florida. I think any concrete object placed close to shore will be eventually washed ashore by waves, and is a danger to the environment and to recreational aspects of the near coastal ocean zone. Man cannot control nature 100 percent effectively! As an avid surfer this project is experimental and their is no proof it will work. What I do know is that it will destroy a local surf break that hundreds of surfers have frequented for years and this cannot happen. Also any object below surface is a hazard to local boaters and swimmers, people will get hurt and property damaged. There are alternatives!
Thank you for your time.
Captain Bryan Berc
USCG Master / Miami Beach Local surfer, diver & fisherman.

Jesse Bull, Ph.D.
345 Ocean Drive, Apt. 311
Miami Beach, FL 33139

Terri Jordan-Sellers
Planning Division
USACE Jacksonville
701 San Marco Blvd
Jacksonville, FL 32207

September 8, 2010

Re: Section 227/2038 National Shoreline Erosion Control Development Program – Submerged Artificial Reef Training Structure – Miami-Dade County, Florida

Dear Ms. Jordan-Sellers:

I'm writing to voice my opposition to the proposed reef ball structure at 63rd Street in Miami Beach. I feel that the proposed viability of the project is based on incomplete analysis, which disregards many important factors. I encourage you to abandon the proposed project. My concerns are the following.

1. The proposal does not consider the impact on the nearby surf break, which is well-known and used by many. This project would likely destroy the surf break.

2. The safety issues of submerging concrete structures so that the tops of the structures are 1.5 feet from the surface have not been adequately addressed. This seems to pose a very serious safety hazard and is also something that may be attractive to children and others who may then find themselves in trouble if there are waves breaking on the structure. Further, given the shape of the structures, it seems there is scope for someone becoming trapped in/on the structure. My understanding is that something similar has happened at a similar structure in St. Petersburg.

3. The proposed project does not address downdrift erosion. Preventing erosion at 63rd street will likely lead to increased erosion south of the structures. This is troubling for many reasons, but especially because this project is being sold as a cost-saving measure. However, if the beach to the south faces an erosion problem, this is likely not the case.

4. Downdrift erosion poses a threat to the habitat for marine life such as sea turtles.

5. It's unclear how this area was identified as a "hotspot" while other areas on Miami Beach with similar amounts of sand are not considered "hotspots."

6. It is unclear that the proposed reef balls will actually address the causes of erosion. My understanding is that the input to the model is based on wind measurements

and not actual wave measurements. Further, whether the erosion is primarily caused by large waves that occur during storms, etc. (which the proposed structures may be of less help against) or is primarily caused by smaller waves has not been adequately addressed.

7. The proposal does not adequately compare the proposed project to doing nothing other than re-nourishment. This is troubling because the proposed plan also entails re-nourishment so it would be nice to know how much of the projected sand in place is simply due to the re-nourishment.

8. A recent Environmental Impact Study has not been conducted. The draft EA is not adequate, in my view.

I appreciate the opportunity to voice my concerns. Again, I strongly encourage you to abandon this project.

Thank you,

Jesse Bull

From:	Eric
To:	Jordan-Sellers, Terri SAJ
Subject:	Reef Balls
Date:	Wednesday, September 15, 2010 9:21:08 AM

To whom it may concern,

I have been a water person in Miami for my whole life (the last 28 years) and I enjoy everything in the ocean including surfing and swimming. I am afraid what you are planning to do will completely destroy 2 of the things I and thousands of others enjoy regularly here in South Florida. The truth is if you did go through with this plan and ultimately destroy all the surf breaks here in South Florida and make it dangerous to swim I will be forced to move out of South Florida and trust me I am not the only one. I understand this plan is a cheaper alternative to save the sand but how often is the cheaper plan a better one. I really hope you reconsider your plans for the reef ball project and keep the waters safe for swimmers and surfers alike.

Sincerely,

Eric Crawford

Jordan-Sellers, Terri SAJ

From: Emerson-Smith, Leigh [LeighEmerson-Smith@miamibeachfl.gov]
Sent: Thursday, September 09, 2010 5:58 PM
To: Jordan-Sellers, Terri SAJ
Subject: 63 st experiment

Good day to you. I'm writing to express my opposition to the proposed experiment for controlling erosion at 63 street, Miami Beach.
As a 25+ year lifeguard, swimmer and boater in the waters of Miami Beach, the notion of hard structures situated just below the surface, within swimming distance from shore, and in such shallow water (approx 8 ft) gives me cause for serious concern. Navigational hazard; bathing hazard; at lunar and solstice low tides with a moderate chop, these "balls" can be exposed, creating a temptation for curious boaters & bathers to approach and investigate. They will create erosion downdrift, as this is a principle of physics I believe. They will alter the flow and interfere with the waves which are so precious to us who so enjoy that life-giving pursuit known as surfing. It also occurs to me that sea turtles may be disoriented, adversely affecting their nesting which no one intentionally wants to do.
I wish I had an alternative solution, although I don't believe there is a solution, only band-aids. An environmental impact assessment has surely brought all my concerns, and perhaps many more, to the attention of the Corps, the State, county and city of Miami Beach.
This experiment should not be conducted.
Respectfully submitted,

Leigh Emerson-Smith, Lieutenant
Ocean Rescue Miami Beach
1001 Ocean Dr Miami Beach FL 33139
305 6737714 Fax 786 3944491
LEmerson-Smith@miamibeachfl.gov

Jordan-Sellers, Terri SAJ

From: Emily Mack [adventuremack@yahoo.com]
Sent: Thursday, September 09, 2010 11:02 AM
To: Jordan-Sellers, Terri SAJ
Cc: Surfrider
Subject: Opposed to concrete reef balls

Dear US Army Corp Engineers:

Miami Beach has been my home since 1994. We have seen the coastline reinforced with concrete for years. Since about four years ago, bulldozers, tractors and vehicles of many types are being used on the beach. The other day, I was jogging on the beach near the sand dunes while a tractor leveled off the sand of foot prints. Nice, 10AM not peaceful and not natural, made running in nature more like running with a machine. I feel that authorities are taking over the natural beauty of the beach. I don't want more artificial experiments done in the waters.

There is too much measure for error and those who may suffer; live here; or come to visit. There is no guarantee that by putting these concrete structures in one area that it won't cause greater erosion in another area. I believe the money used for such a project could be better utilized.

Please do not put these structures in the coastline. Water sport enthusiasts enjoy surfing, paddle boarding, snorkeling and diving without obstruction of Mother nature. Please accept this letter to oppose the plans of concrete barriers.

Sincerely,
Emily Mack
305-672-3339
465 Ocean Drive, #223
Miami Beach, FL 33139
www.aerobeach.com <http://www.aerobeach.com/>

From:	Greg Gordon
To:	Jordan-Sellers, Terri SAJ
Subject:	Section 227/2038 National Shoreline Erosion Control Development Program – Submerged Artificial Reef Structure - Miami-Dade County Florida - comment letter
Date:	Wednesday, September 15, 2010 2:05:48 AM
Attachments:	seagrass-81st-street.jpg 6_09_surfrider_01.jpg jeanne-street.jpg wavehistogram.jpg bal-harbour-sand.jpg dune-barrier-63rd-street.jpg

To all concerned:

The Surfrider Foundation has brought up several concerns over the Proposed Reef Ball project to be installed near one of the best surf breaks in Miami Beach. I would like to add a few personal concerns and a solution that the ACOE should seriously consider.

First, I would like to point out that the cost of this project does not include estimates for an increase in the costs of materials, like the beach fill they have to do to accompany the project or gas prices for the dredge or trucks that bring the sand. Even though the reef balls will actually be to the south of where the wave is, the beach fill's goal is to show an immediate improvement, regardless of its long term effects on the surf or nearby erosion hot spots. The fill would destroy the break, and the reef balls will only serve to possibly accrete sand in front of them, while more than likely causing worse erosion to the south.

Another thing neglected to mention was the cost of having to remove the project if it didn't work and repairing damages to beaches that eroded further due to the project, and the time frame for doing that since man hours and more dollars are expended in a hopefully climate friendly time period.

If one life is taken by drowning, who is liable for their death? The contractor who installed them? The city of Miami Beach? The ACOE for approving the project? In the report it says Surfrider was consulted and that resulted in the reef balls being moved to the south. How many people in Surfrider were consulted? Two or three? The first time a DERM representative explained what was happening at a Surfrider meeting was at their August 26th meeting, less than three weeks before the comment deadline. Surfrider has over 200 active members in South Florida, over 5000 members in the state, over 50000 in the U.S. I'm sure if Surfrider was 'consulted', this project would have looked a lot differently. It would not destroy a surf break, endanger swimmers lives, or be installed without ANY peer review studies on if it works to stop erosion. The wave photo is from November 13th, 2009, from the surf spot. The location of the reef balls would be about 200 yards south of that breaking wave. With any north to south rip, after one or two waves, surfers or swimmers may be sucked right into the middle of the reef balls.

And where is the peer reviewed research showing how these reef balls actually prevent erosion on the East Coast? I've seen the brochures, the how it works video, but how can a beach in St. Petersburg or

Pensacola mimic Miami Beach? And the reef balls in the Dominical Republic I heard were taken out? Why? Where was the post installation monitoring? Of course it looked nice at the outset, along with the reef balls they also did a huge beach fill. But what about after 3 years, after 5 years, after one close call hurricane or six days of 25 mph winter gales. Where is the sand going to go? I think these questions need to be answered FIRST, and not after spending at least $1.2 million dollars.

A fifth issue is that in this report there is no mention of sea level rise, which I thought was a mandate for any project approved by the ACOE. If the depth of the balls is too deep, they probably won't work. And if it's too shallow, it appears above the water line during neap low tides and becomes and ineffective eyesore.

Overall, the BIGGEST problem with this entire idea of stopping sand with armoring is that THE ARMORING CAUSES THE EROSION TO GET WORSE! A beach in its natural state will accrete sand from storm waves bringing in sand, wind blown sand, and erosion from the dune which replenishes the supply of sand and maintains equilibrium. When you starve that supply of sand from the dune by putting in structures like seawalls and rock revetment, the erosion in front of it always will be worse. That is what caused this erosion 'hotspot' in the first place.

So the solution may be to put more sand on the dune and upland of the high tide line in as small of an amount to have a minimal effect on sea turtle habitat, and that happens naturally when sea grass and other plants trap the finer grains of sand in the wind. If a 20 year storm takes out a stretch of sand and dune, then spend just enough to truck haul sand from the Lantana, FL site to fill back in the beach to what it was before the storm and then rebuild the dune inland. I've checked the sand used from that site on Bal Harbour's northern beaches and that sand seemed to be 'good quality': the right grain size, color, and mass (see attached pic). And you can see in the other two photos that Surfrider is already working in other sections of Miami Beach to replant native sea grass and other plants to help secure the dune. The other wave photo shows how the dune acts as a natural barrier to erosion.

Let the ocean do its thing, don't put up an underwater fence of giant sharp concrete wiffle balls. Yes, it may trap some sand, but that sand was needed farther down the beach. If allowed to proceed naturally, some years the ocean will take some beach away and others it will come back, helped naturally from the dune. And that doesn't cost a penny.

If you do decide after all of these objections to approve the project, at least elevate it to needing an environmental impact statement to address the monitoring and removal issues.

Sincerely,

Greg Gordon
DadeCoSurf.com - South Florida Surfing Website with over 1500 members

Surfrider Member

From: Charlie Hand
To: Jordan-Sellers, Terri SAJ
Cc: miami@surfrider.org
Subject: No to Reef Balls
Date: Tuesday, September 14, 2010 4:21:55 PM

Dear Mr. Sellers,

I strongly oppose the construction of underwater structures in the nearshore waters off Miami Beach. I have lived in S Florida since 1967, and have seen numerous attempts to slow mother nature's progress at reducing our barrier island beaches. I have witnessed an absurd dumping of tax dollars towards the cause, just to see our reefs debilitated, and the beach sands quickly receding once again. Sorry to the property owners in close proximity to our shores. They (me) took that risk, by building on the edge of a barrier island. Yes, I own a property directly on a S Florida barrier Island, and as such, I have assumed that risk. I am lifelong coastal resident of South Florida, a USCG Master Mariner, surfer and fisherman. Please do not place these concrete balls off Miami Beach.

Charlie Hand
743 NW 7 St Rd
Miami, Florida 33136

From: robert kahn
To: Jordan-Sellers, Terri SAJ
Subject: Reference: Section 227/2038 National Shoreline Erosion Control Development Program – Submerged Artificial Reef Structure - Miami-Dade County Florida .
Date: Wednesday, September 15, 2010 7:00:30 AM

Dear Terri,

I strongly urge your agency to abandon the above referenced project or at the least conduct a thorough environmental
study of the impacts the proposed project will have on this stretch of beach and surrounding areas.

My family and I swim frequently in the ocean and the thought of all the rocks to be installed and the fishermen and that will be attracted thereto is very disheartening.

There is too much concrete in Miami as it is - now we are supposed to swim with concrete?
we are used to the natural smooth sand extending out to the deeper waters where eventually the 1st and 2nd reefs offer a natural habitat and a natural dissipation of the wave energy when large surf occurs, which is very infrequent.

I am concerned with the impact the proposed project will have on the natural habitat including the sea turtles that nest in the area and the impact upon the nearby natural reef.

I am also concerned with the safety issues of such a massive structure barely below the surface.

It also seems that this structure will affect the flow of sand and diminish sand on beaches to the south.

I am sure you would not want the natural environment of your backyard so severely altered with a massive concrete experiment and would ask for the same consideration from you.

Yours truly

Robert O. Kahn

Jordan-Sellers, Terri SAJ

From: Katya Bravo [KBravo@crec.com]
Sent: Thursday, September 09, 2010 10:25 AM
To: Jordan-Sellers, Terri SAJ
Subject: Section 227/2038 National Shoreline Erosion Control Development Program Submerged Artificial Reef Structure - Miami-Dade County Florida.
Attachments: image.jpg

Dear Ms. Jordan-Sellers:

I am writing to you as a resident of Surfside, Florida. We have been long time residents of Miami Beach and the surrounding areas. We have always lived near the ocean and have deep connection and respect for it. After reading the proposal for the Submerged Artificial Reef Training Structure I am writing to ask you please not to develop this on Miami Beach. My son just turned 6 years old today and has been learning to surf on the very waters that you want to develop on. I have never seen him happier and more fulfilled then when he is in the water. I have taught him since his birth to respect the water and cycle of nature. We should not intervene.

Thank you for your time

Katya & Maddox

U.S. Army Corps of Engineers
Jacksonville District
Attention: Planning Division
P.O. Box 4970
Jacksonville, Florida 32232-0019

Reference:
Section 227/2038 National Shoreline Erosion Control Development Program – Submerged Artificial Reef Structure - Miami-Dade County Florida.

Sir/Madam,

I am writing to you to express my opposition to your plans to install a wave energy break in the waters right off Miami Beach. I am opposed to this project for several reasons:

1. Preventing erosion in one spot will likely increase erosion downdrift based on the fundamental principle of the Conservation of Mass.
2. The structures could easily become a swimming hazard for swimmers.
3. Downdrift beach erosion would adversely affect human environment and sea turtle nesting.
4. As a resident and beach user I care that a local surf break would be destroyed.

Based on all thisI request that the USACE abandon the proposed structure, or, if not abandoned, elevate the proposed structure to the appropriate more thorough review of an Environmental Impact Statement.

Thank you,

Jean-Paul Lausell

1800 N. Bayshore Dr. #301
Miami, FL 33132
jplausell@hotmail.com

To Whom It May Concern:

My name is Richard Licursi and I am an avid waterman in the state of Florida. I oppose the idea of putting a 1,000 foot long segmented submerged breakwater structure approximately 500 feet offshore at the beach. Not only would you be affecting hundreds of surfers by destroying a local surf break where citizens like to enjoy their free time when there are waves, the idea of saving the beach from erosion is absurd. By reducing erosion in this 1,000 foot area you will be creating and INCREASING erosion downdrift past this area. This will not only affect humans but will also impede on the natural sea turtle population by disturbing their nesting habitats. Also, swimmers and snorkelers that would be attracted to these structures can become battered or trapped causing injury or death. This actually happened a few years ago with reef balls in St. Petersburg, Florida. Based on all this, Surfrider Foundation requests that the USACE abandon the proposed structure, or, if not abandoned, elevate the proposed structure to the appropriate more thorough review of an Environmental Impact Statement.

An active and concerned citizen of his community,

Richard Licursi

Terri Jordan-Sellers
Planning Division
USACE Jacksonville
701 San Marco Blvd.
Jacksonville, FL 32207
Terri.Jordan-Sellers@usace.army.mil

September 15, 2010

Judith Miller
2004 11th St. NW #439
Washington, DC 20001
judith.p.miller@gmail.com

RE: Draft Environmental Assessment
Section 227/2038 National Shoreline Erosion Control Development Program
Submerged Artificial Reef Training Structure – Miami-Dade County, Florida

Dear Ms. Jordan-Sellers:

I am writing to voice my personal opposition to the above-mentioned project of installing reefballs near 65th St. beach on Miami Beach. Preliminarily, I fully endorse and adopt the comments of the Surfrider Foundation as to this project.

I am also writing, however, to add to the Foundation's comments. I lived for one year in Miami Beach and went swimming or surfing almost every day I was not traveling. For those activities, I sought out parts of the beach with high levels of wave action. The so-called "hot spot" is one of the few places on Miami Beach with such waves.

It is simply not possible to surf without sufficiently powerful waves. Miami Beach has only a few locations with such waves, and it would be a significant loss to destroy one, as this project is intended to do. Moreover, in my swimming, I preferred swimming in areas of relatively high surf so as to train myself for swimming and surfing in areas of high surf. Again, without surf to swim in, I could not effectively train myself to swim in such areas. The destruction of the 65th St. surf break would also lead to further overcrowding of the few remaining parts of the beach with sufficiently powerful waves. In short, the reefballs would significantly impair surfers' ability to effectively use and enjoy the shore.

For the afore-mentioned reasons, I oppose the reefball project, and I respectfully request that it be cancelled. If it is not cancelled, I request, in the alternative, that a full Environmental Impact review be conducted.

Sincerely,

Judith Miller

To whom it may concern,

I am writing to share my concern for the proposed reef balls that are planned to be installed in the 63 rd Street block of Miami Beach. I am a long time resident of Miami Beach and have seen the problems caused by erosion but don't believe these to be the solution. I have watched how the rock walls that were built on 29th Street have not worked. They caused sand built up on the beaches North of them and then erosion on the South side. I believe the reef balls might cause a similar effect. Have the cost to remove them been considered in your proposal in case they don't work as planned?

I also believe the reef balls to be a danger to swimmers and snorkelers in their vicinity. I have heard of death caused by them in the west coast of Florida. Is it worth losing even one life for something that may or may not solve our erosion problem? I am also concerned on how they will affect the nesting of turtles in the area.

As a local surfer, it worries me how they will affect the waves we get in this area. Some of the best waves I have ever surfed in Miami Beach have been in this area and it pains me to hear I won't be able to experience them again if these structures are installed.

Please reconsider your plans. I for one do not want to see these structures installed in my Beach.

Thank you for your time.

Sincerely,

Karen Monteagudo

Miami Beach

Ref: 227/2038 National shoreline erosion control development program submerged artificial reef structure Miami-Dade County Florida

Jordan-Sellers, Terri SAJ

From: Alberto Morales [ajflaco@yahoo.com]
Sent: Saturday, September 11, 2010 1:36 PM
To: Jordan-Sellers, Terri SAJ
Subject: Please don't waste my tax dollars on Reef Balls!

U.S. Army Corps of Engineers
Jacksonville District
Attention: Planning Division
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Jordan,

I am writting you today to express my family's heartfelt opposition to the propose Reef Ball project being contemplated for Miami Beach. Based on the evidence below, I hope you realize that this is a waste of tax dollars, a threat to swimmers and not the needed solution for the problem you are trying to resolve.

Basics of the proposed project:

Miami-Dade County Dept. of Environmental Resources Management (DERM) and the USACE plan to install a 1,000-foot long segmented submerged breakwater structure approximately 500-feet offshore of the beach at an erosion 'hotspot' of Miami Beach. The reef ball www.reefball.org <http://www.reefball.org%29%20structure/> structure would be installed as an EXPERIMENT to control erosion and reduce wave energy. The 6.5 foot structures would be put in 8 feet of water right where the waves break on a North swell.

To dive deeper, check out the full 338-page environmental assessment (EA) document here:

http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine_DadeCo_BchErCtrl.htm
<http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine_DadeCo_BchErCtrl.htm> . (Scroll all the way down to the bottom to find the specific report.)

Why is Surfrider Miami opposed to this experimental project ? Use the following as talk points to form your own comments:

- A local surf break would be destroyed.

- Swimmers/snorkelers/surfers that will be attracted to the structures can become battered or trapped causing injury or death. This actually happened with reef balls in St. Petersburg, Florida a few years ago.

- Preventing erosion in one spot will INCREASE erosion downdrift based on the fundamental principle of the Conservation of Mass.

- Downdrift beach erosion would adversely affect human environment and sea turtle nesting.

- There is no real economic benefit thus the experimental structure would be a useless expediture of federal funds.

- If the structure is 'successful' as defined by the Army Corps of Engineers, further use of these type structures could happen in Miami Beach.

Based on all this, Surfrider Foundation requests that the USACE abandon the proposed structure, or, if not abandoned, elevate the proposed structure to the appropriate more thorough review of an Environmental Impact Statement.

Help Save Our Surf !

Aloha,

Surfrider Foundation Miami Chapter

Jordan-Sellers, Terri SAJ

From: matthew parkes [laramax@bellsouth.net]
Sent: Saturday, September 11, 2010 9:09 PM
To: Jordan-Sellers, Terri SAJ
Subject: Shoreline Erosion Control Development Program/Miami Beach

To Whom It May Concern:

This letter is in reference to:
Section 227/2038 National Shoreline Erosion Control Development Program – Submerged Artificial Reef Structure - Miami-Dade County Florida.

This is yet another ill-fated project designed to "tame " the ocean. The idea cannot be allowed to come to pass as a reality. The environmental impact sends chills down my spine. The ocean is a living entity and should be left as it is. Placing these cement structures is absurd. There is absolutely no guarantee that it will even help erosion of the beach, rather it is more likely to send it on down the beach. The Army Corps of Engineers had another great idea long ago, called Haulover Cut…that is when the problem began. By altering the natural erosion and deposition cycles of the sand in the Miami Beach area. Man has no business trying to control the ocean for the sake of the almighty dollar. I urge you to cease and desist from this irresponsible experiment or Shoreline Erosion Control Development Program.

The ocean is beautiful and our shoreline is precious and does not deserve this mistreatment. As an ocean lover and a conservationist, I cannot believe that in this time of great economic crisis, my own tax dollars are being spent so ridiculously. Spend it school programs that teach children to take care of the ocean, not on programs meant to control the wave action. The impact on the ecosystem here in Miami Beach will be devastating. Please do not commence with this project!

Sincerely,

Larissa Morosco

Fifth Grade Teacher

Lauren Ordway

2612 Taluga Dr.

Coconut Grove, FL 33133

Terri Jordan-Sellers

Planning Division

USACE Jacksonville

701 San Marco Blvd

Jacksonville, FL 32207

September 15, 2010

Re: Section 227/2038 National Shoreline Erosion Control Development Program – Submerged Artificial Reef Training Structure – Miami-Dade County, Florida

Dear Ms. Jordan-Sellers:

I am writing to express concerns over the proposed expenditure of federal funds to install the Submerged Artificial Reef Training Structure (Structure) cited in the referenced Draft Environmental Assessment (Draft EA) developed by the U.S. Army Corps of Engineers (USACEI), with insufficient analysis of the cumulative benefits of such an expenditure.

Shoreline-hardening structures and stabilization techniques have repeatedly proven to be ineffective solutions to coastal erosion and serve to interrupt natural shoreline processes. As a consequence of the fundamental principle of *Conservation of Mass*, such a structure may reduce littoral drift to trap sediment, or prevent erosion of a volume of sand causing accretion, or reduce erosion along the updrift shoreline and/or in the lee of each breakwater, while at the same time, ***increasing*** erosion of the downdrift beach by preventing an equivalent volume of sand from moving into the downdrift beach. As is the case, the project will fail to meet the objective stated in Section 1.4.1 of the DEA of "retain[ing] sand without causing impacts to adjacent shorelines, to maintain and preserve environmental habitat, and protect the shoreline when exposed to the combination of storm surge and design wave events with a 10-year return interval."

Moreover, the Draft EA (and GENESIS Modeling) does not adequately address the potential consequences of such a structure during frequent storm events, where said structures have been shown to fundamentally increase erosion, when placed too close to shore[1].

---

[1] Ranasinghe, R., I. Turner and G. Symonds 2006. "Shoreline response to multi-functional artificial surfing reefs: A numerical and physical modeling study." *Coastal Engineering*, 53: 589-611.

I propose that ACOE's Corps' "Proposed Post-Project Physical and Biological Monitoring Plan" not only set out parameters and metrics to identify accretion as compared to the Northward Control Area (as defined in Section 2.2.2 "Performance Metrics,") but also quantitatively assess the downdrift erosion as a result of the implementation of the structure. If all performance indicators are not successfully proven to have been met within the test period, such results should constitute project abandonment and removal of all hardening structures.

I appreciate your consideration of these concerns and anticipate their inclusion in a full Environmental Impact Assessment.

Thank you,

Lauren Ordway

From:	john parkerson
To:	Jordan-Sellers, Terri SAJ
Subject:	Reef Ball Break Water Miami Beach
Date:	Wednesday, September 15, 2010 11:02:39 AM

Dear, Terri Jordan-Sellers,

I am a Miami Beach resident and have been informed of the Army Corps of Engineer's plan to submerge reef balls at a mid beach location. It is belived that the reef balls will attract swimmers/snorkelers and possibly surfers that may be trapped in the structures ricking injusry and possibly death. Also the objective of preventing sand erosion would infact create erosion further down the beach.

Also as a surfer, there is concern that the wave making abilities of placing the structures at that beach would affected negatively.

I know im not offereing a solution but i believe that we should not creat more problems in an attempt to solve one.

I hope that these letters will help you all the re think the current plans.

thank you,

John

Jordan-Sellers, Terri SAJ

From: matthew parkes [laramax@bellsouth.net]
Sent: Saturday, September 11, 2010 9:59 PM
To: Jordan-Sellers, Terri SAJ
Subject: reference to: Shoreline Erosion Control Development Program/Miami Beach

September 11, 2010

To Whom It May Concern:

This letter is in reference to:
Section 227/2038 National Shoreline Erosion Control Development Program – Submerged Artificial Reef Structure - Miami-Dade County Florida.

I write to you in reference to above action proposed. The ‘reef-balls study’ proposed on Miami Beach is fated to fail. The problem of erosion and redistribution of sand from Baker’s Haulover inlet to Government Cut is the result of another Army Corps of Engineers’ solution. In 1925 the above mentioned entity altered the natural flow of sand from north to south with the creation of Baker’s Haulover Inlet, U.S.G.S. ID: 278055. Twice each day since 1925, millions and millions of tons of sand are first swept in to form a massive sand formation and navigational hazard, then swept far off coast as the tides move in and out. This is our situation. The sand that would normally replenish the beaches south of ID:278055 is moved elsewhere out to sea or in the intercoastal. The idea that you can somehow capture sand, using reef-balls is foolhardy, at best, if that sand is not there in the first place. I’m sure millions of dollars were spent in study of this problem. That they could overlook a basic fact, as mentioned above, is irresponsible. With no real data, they intend to ‘study’ the effect of the submerged artificial reef structure. They are admitting a question of whether this will work or not. I beg of you to reconsider the planned installation. We who live here, and love the ocean, don’t need to have our precious shores become a testing zone for how best to throw money into the sea.

Sincerely,

Matthew C. Parkes

From: dmsspecialist@yahoo.com
To: Jordan-Sellers, Terri SAJ
Subject: Miami Beach Reef Ball Project
Date: Wednesday, September 15, 2010 9:12:08 PM

Dear Mrs. Jordan-Sellers,

I am hereby voicing my opposition for the Miami Beach Reef Ball project. I am a lifelong resident of MB, and own property on said island. As a surfer, I can attest that surfable waves are a rarity of nature which must be protected. Your project will destroy the Miami Beach that I know. Rip currents will be enhanced by those concrete balls, mainly an underwater funnel effect in between reef balls which may contribute to additional drowning fatalities. If sand is in short supply, I am willing to pay higher taxes rather than run experiments on my beaches. Don't kill our waves.

Sincerely,

Renzo Rebagliati

Sent from my HTC on the Now Network from Sprint!

Pd 9/14/10

August 9th, 2010

To:
U.S. Army Corps of Engineers
Jacksonville District
Attention: Planning Division
P.O. Box 4970
Jacksonville, Florida 32232-0019

Re: Section 227/2038 National Shoreline Erosion Control Development Program – Submerged Artificial Reef Structure - Miami-Dade County Florida.

To Whom It May Concern,

As a resident of Miami Beach, I am opposed to the construction of the artificial reef structure. I believe it will create various new problems, such as safety problems for swimmers, surfers and snorkelers. In addition, it will create an absence of waves which will be esthetically displeasing and will create more erosion down-shore from where the structures are intended to be placed based on the principle of Conservation of Mass.

Please hold off on this project and have it reviewed by higher authorities.

SIncerely,

Hana Dolgin
2899 Collins Ave., Apt. 1043
Miami Beach, FL 33140

Rcd
9/17

U.S. Army Corps of Engineers
Jacksonville District
Attention: Planning Division
P.O. Box 4970
Jacksonville, Florida 32232-0019

RE: Section 227/2038 National Shoreline Erosion Control Development Program
Submerged Artificial Reef Structure - Miami-Dade County Florida

To Whom It May Concern:

As a resident and Commissioner for the City of Miami Beach, I am writing this letter in opposition to the proposed Submerged Artificial Reef Structure cited in the referenced Draft Environmental Assessment (Draft EA) developed by the U.S. Army Corps of Engineers (USACE).

I am against placing hundreds of concrete structures (reef balls) in the water, right offshore, at a popular mid-Miami Beach location for the following reasons:

- A local surf break would be destroyed.
- Swimmers/snorkelers/surfers that will be attracted to the structures can become battered or trapped causing injury or death. This actually happened with reef balls in St. Petersburg, Florida a few years ago.
- Preventing erosion in one spot will INCREASE erosion downdrift based on the fundamental principle of the Conservation of Mass.
- Downdrift beach erosion would adversely affect human environment and sea turtle nesting.
- There is no real economic benefit thus the experimental structure would be a useless expenditure of federal funds.

I respectfully request that the (USACE) abandon the proposed Submerged Artificial Reef structure until there is scientific proof that they produce the desired effect.

Sincerely,

Michael Laas
101 Collins Ave #14
Miami Beach, FL 33139

ROBERT O. KAHN
ATTORNEY AT LAW
1655 DREXEL AVE., #200
MIAMI BEACH, FL 33139

Tel 305/ 672-0469
Fax 305/ 672-3545
Email roklaw@bellsouth.net

9/15/10

U.S. Army Corps of Engineers
Jacksonville District
Attention: Planning Division
Attention: Ms. Terri Jordan- Sellers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Reference: Section 227/2038 National Shoreline Erosion Control Development Program – Submerged Artificial Reef Structure - Miami-Dade County Florida

Dear Ms. Jordan-Sellers,

I strongly urge your agency to abandon the above referenced project or at the least conduct a thorough environmental study of the impacts the proposed project will have on this stretch of beach and surrounding areas.

My family and I swim frequently in the ocean and the thought of all the rocks to be installed and the fishermen that will be attracted thereto is very disheartening.

There is too much concrete in Miami as it is. Now we are supposed to swim with concrete? We are used to the natural smooth sand extending out to the deeper waters where eventually the 1st and 2nd reefs offer a natural habitat and a natural dissipation of the wave energy when large surf occurs, which is very infrequent.

I am concerned with the impact the proposed project will have on the natural habitat including the sea turtles that nest in the area and the impact upon the nearby natural reef.

I am also concerned with the safety issues of such a massive structure barely below the surface.

It also seems that this structure will affect the flow of sand and diminish sand on beaches to the south.

I am sure you would not want the natural environment of your backyard so severely altered with a massive concrete experiment and would ask for the same consideration from your agency. At the very least the environmental impact of the proposed project should be thoroughly studied before-hand as the consequences on the environment will be significant.

Thank you for your consideration.

Yours truly,

Robert O. Kahn

Rk let army core engineers

CITY OF MIAMI BEACH
1700 CONVENTION CENTER DRIVE
MIAMI BEACH, FLORIDA 33139

JERRY LIBBIN
COMMISSIONER

September 13, 2010

Terri Jordan-Sellers
Planning Division
U.S. Army Corps of Engineers
701 San Marco Blvd.
Jacksonville, Florida 32207

RE: Section 227/2038 National Shoreline Erosion Control Development Program Submerged Artificial Reef Structure - Miami-Dade County Florida

Dear Ms. Jordan-Sellers:

As a resident and Commissioner for the City of Miami Beach, I am writing this letter in opposition to the proposed Submerged Artificial Reef Structure cited in the referenced Draft Environmental Assessment (Draft EA) developed by the U.S. Army Corps of Engineers (USACE).

I am against placing hundreds of concrete structures (reef balls) in the water, right offshore, at a popular mid-Miami Beach location for the following reasons:

• A local surf break would be destroyed.

• Swimmers/snorkelers/surfers that will be attracted to the structures can become battered or trapped causing injury or death. This actually happened with reef balls in St. Petersburg, Florida a few years ago.

• Preventing erosion in one spot will INCREASE erosion downdrift based on the fundamental principle of the Conservation of Mass.

• Downdrift beach erosion would adversely affect human environment and sea turtle nesting.

• There is no real economic benefit thus the experimental structure would be a useless expenditure of federal funds.

I respectfully request that the (USACE) abandon the proposed Submerged Artificial Reef structure until there is scientific proof that they produce the desired effect. If you need any further information please do not hesitate to contact my office at (305) 673-7106.

Sincerely,

Jerry Libbin
Commissioner

JL/sm

Rec'd 9/21/10

September 9, 2010

Terri Jordan-Sellers
Planning Division
USACE Jacksonville
701 San Marco Blvd
Jacksonville, FL 32207

Re: Draft Environmental Assessment
Section 227/2038 National Shoreline Erosion Control Development Program
Submerged Artificial Reef Training Structure – Miami-Dade County, Florida

Dear Ms. Jordan-Sellers,

I want to convey my opposition to the proposed Submerged Artificial Reef Training Structure (Structure) cited in the referenced Draft Environmental Assessment (Draft EA) developed by the U.S. Army Corps of Engineers (USACE).

As previously stated in a letter sent by the Miami Chapter of the Surfrider Foudnation, 'the Structure is intended to reduce wave energy in its lee, the Structure would alter the esthetic character of the beach including diminishment or elimination of the viability of recreational beach uses associated with the natural breaking of waves along a sandy beach - such as surfing, other wave riding activities, and the associated esthetics of waves. The potential future applications of a comparable Structure would lead to significant cumulative adverse impacts in other locations.' The Draft EA should recognize these cultural impacts!!!!!

Additionally, the expected downdrift beach erosion would adversely affect human environment and sea turtle nesting habitat! Also noted, during storm events the proposed breakwaters have the potential to increase erosion in the lee of the breakwaters placed too close to shore! How will this be good for our environment?

As a surfer living in Miami Beach, I would rather see effective and proactive efforts being put in cleaning our waters and protecting them from future accidents such as the recent BP oil leak!

Concerned,

Deborah Roif

617 Michigan Avenue Apt. #505, Miami Beach, Florida 33139

brickellkid@aol.com

Terri Jordan-Sellers
Planning Division
USACE Jacksonville
701 San Marco Blvd
Jacksonville, FL 32207

Re: Draft Environmental Assessment

Section 227/2038 National Shoreline Erosion Control Development Program

Submerged Artificial Reef Training Structure – Miami-Dade County, Florida

Dear Ms. Jordan-Sellers:

I am writing, as a concerned citizen, to convey my opposition to the proposed Submerged Artificial Reef Training Structure (Structure) cited in the referenced Draft Environmental Assessment (Draft EA) developed by the U.S. Army Corps of Engineers (USACE). We herein present our specific comments relative to significant impacts associated with the proposed Structure, and the alternatives evaluated in the Draft EA. Please consider the following:

Significant Impacts: Significant adverse impacts to the environment are expected due to the Structure creating the following:

Cultural impacts: As the Structure is intended to reduce wave energy in its lee, the Structure would alter the esthetic character of the beach including diminishment or elimination of the viability of recreational beach uses associated with the natural breaking of waves along a sandy beach - such as surfing, other wave riding activities, and the associated esthetics of waves. The potential future applications of a comparable Structure would lead to significant cumulative adverse impacts in other locations. The Draft EA should recognize these cultural impacts.

Attractive Hazard: Miami Beach is a significant national destination for recreational beach use. The Structure is proposed close to shore - in close proximity to existing buoys that demark the customary limits of beach swimming. Due to a paucity of attractive snorkeling venues in the Miami Beach area, the proposed structure will attract swimmers and snorkelers to enter the waters around the Structure to view the sessile organisms and fish expected to colonize the Structure. Due the shallow depth of the top of the Structure (-1.5' MLLW), swimmers and snorkelers will be subject to the effects of waves and currents that may wash swimmers/snorkelers onto the Structure where they can become battered or trapped - causing injury or death. This impact does not appear to be addressed in the Draft EA.

Downdrift Beach Erosion: Section 1.3 of the Draft EA ("PROJECT NEED OR OPPORTUNITY") cites that: "The proposed SMART structure is designed to help dissipate wave energy in order to stabilize the identified 'Hotspot erosion area' and help prevent storm damage." However, in theory, along sandy beaches, long-term erosion, such as at the reported "hot spot", is primarily caused by an increase in littoral drift along the shoreline, where less sand enters the "hot spot" beach segment than the amount of sand that leaves the beach segment – per the fundamental principle of the Conservation of Mass. Based on this principle, in theory, breakwaters:

- are intended to reduce littoral drift to trap or prevent erosion of a volume of sand causing accretion or reduced erosion along the updrift shoreline and/or in the lee of each breakwater, and
- increase erosion of the downdrift beach by preventing an equivalent volume of sand from moving into the downdrift beach

In summary, I contend that the proposed Structure does not comply with the provisions of the National Environmental Policy Act (NEPA) in that the Structure:

- does not provide for provide for preservation of the "environment for succeeding generations" in that the Structure is expected to unnecessarily produce adverse impacts without any apparent net benefit;

- does not "assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings" – in that the Structure is expected to be diminish the cultural esthetics of the beach and be an Attractive Hazard;

- does not "attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences" – in that the Structure is expected to cause erosion and "degradation" of the downdrift beaches, and the Draft EA does not reasonably address other alternatives, which appear to have less impacts and reasonably meet the overall objectives;

- does not "preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice" , in that the Structure would alter the esthetic character of the beach and adversely impact cultural uses such as surfing, and potential future applications of a comparable Structure would lead to significant cumulative adverse cultural impacts;

- does not "achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities" - in that the Draft EA does not adequately assess alternatives nor reasonably characterize any "balance between population and resource use", and

- does not "enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources" – in that the Structure does not appear to provide for any reduction in the need for beach nourishment but simply rearranges the area where future nourishment will be needed.

Based upon the above, I respectfully request that the (USACE) abandon the proposed Structure, or, if not abandoned, elevate the proposed Structure to the appropriate review of an Environmental Impact Statement. Thank you for considering the public interests represented by the Surfrider Foundation.

Sincerely,

Jason Biondi

1780 Lenox Ave.
Miami Beach 33139
786 897 7783

Referencing: Section 227/2038 National Shoreline Erosion Control Development Program – Submerged Artificial Reef Structure - Miami-Dade County Florida

I am opposed to the referenced project for the following reasons.

• A local surf break would be destroyed.

• Swimmers/snorkelers/surfers that will be attracted to the structures can become battered or trapped causing injury or death.

• Preventing erosion in one spot will INCREASE erosion downdrift based on the fundamental principle of the Conservation of Mass and proven by other breakwater projects installed on Miami Beach.

• Downdrift beach erosion would adversely affect human environment and sea turtle nesting.

• There is no real economic benefit thus the experimental structure would be a useless expenditure of federal funds.

• If the structure is 'successful' as defined by the Army Corps of Engineers, further use of these type structures could happen in Miami Beach

- There is NO peer review of the Reef Ball structures even though many have been installed (and removed) for over 5 years.
- There is no mention on the EA regarding scientific reasoning of effect on approach and exiting of nesting sea turtles.
- No review by FFW regarding effect on nesting sea turtle. I will bring this to the attention of FFW permitting department and reviewer in Jacksonville.

Thank you for your consideration.

James Porter-Brown

58 NE 92 Street

Miami Shores, FL

33138

Rcd { After comments closed.

November 12, 2010

Terri Jordan-Sellers
Planning Division
USACE Jacksonville
701 San Marco Blvd
Jacksonville, FL 32207

Re: Draft Environmental Assessment
Section 227/2038 National Shoreline Erosion Control Development Program
Submerged Artificial Reef Training Structure – Miami-Dade County, Florida

Dear Ms. Jordan-Sellers:

The Surfrider Foundation Miami Chapter would like to provide additional comments based upon information received by reaching out to coral scientists and researchers throughout the globe. This information continues to support our opposition to the proposed Submerged Artificial Reef Training Structure (Structure) cited in the referenced Draft Environmental Assessment (Draft EA) developed by the U.S. Army Corps of Engineers (USACE). Please consider the following prior to your finalization of the EA as the USACE is may not be accurately characterizing what it expects to see growing on the reef balls:

Types of marine life we could expect to naturally reside in a reefball reef here

1) A thriving coral community will not grow naturally on the reefballs in a modest period of time (less than 15 years) without transplanting coral clippings from other locations. *This would require additional experts, permitting, money, and time* to get the outcome that is suggested by the USACE.

2) The current environment of our marine area will likely provide mainly algae, stinging nettles and fire coral to grow naturally on the reef balls. All are unintended and unwanted residents of a tourist attraction.

3) Reefball artificial reefs deployed throughout the globe have mixed results. It seems in low wave energy environments that can work well. However in locations where there is at least occasional periods of higher energy wave action, like South Florida, the breaking waves over the reefballs act to scour out sand behind the line of reefballs and create a trench behind this line. Also, accumulating sand as designed for this project will steal sand from somewhere, and from someone else's beachfront property.

Additional Resources
We would also suggest that the following literature is reviewed and incorporated prior to decisionmaking:

Walker, B.K., Henderson, B., Spieler, R.E., 2002. Fish assemblages□associated with artificial reefs of concrete aggregates or quarry stone□offshore Miami Beach, Florida, USA. Aquat Living Resour 15, 95-105.
□
Brian K. Walker, Ph.D.□Research Scientist□National Coral Reef Institute□Nova Southeastern University□Oceanographic Center□8000 N Ocean Drive□Dania Beach, FL 33004□954-262-3675

Based upon the above additional information, we respectfully request that the (USACE) abandon the proposed Structure, or, if not abandoned, elevate the proposed Structure to the appropriate review of an Environmental Impact Statement. Thank you for considering the public interests represented by the Surfrider Foundation.

Sincerely,
Surfrider Foundation

Mike Gibaldi
Miami Chapter, Chairman

cc: Ericka Davanzo – *Surfrider Foundation*
Brian Flynn – Miami-Dade DERM
Steven MacLeod – FDEP Bureau of Beaches and Coastal System
Miami-Dade Commissioners.

NEPA Scoping Documents and Comments Received on July 2004 Draft EA

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

APR 2 8 2010

Planning Division
Plan Formulation Branch

TO ADDRESSEES ON THE ENCLOSED LIST:

The Jacksonville District, U.S. Army Corps of Engineers (Corps), is gathering information to define issues and concerns that will be addressed during the development of the 100% plans and specifications for the Section 227 National Shoreline Erosion Control Demonstration Project, 63rd Street, Miami-Dade County, Florida. Authority and funds for the project are provided by Section 227 of the Water Resources Development Act of 1996, as amended. The study area is located in Miami Beach between NE 63rd Street and NE 65th Street, Dade County, Florida (Figure 1 - Location Map).

The selection of the 30 percent Contractor submittals has been completed. The URS Group has been contracted to develop the 100 percent submittal for the nearshore Submerged Artificial Reef Training structure (SMART) proposal. SMART is proposed approximately 150-foot from the toe of fill for the Test Beach Renourishment at Miami Beach, in the Vicinity of 63rd Street, Miami Beach, Florida. The SMART design consists of groupings of reef modules in 200-foot by 40-foot segments, attached to an articulated armor concrete mat, parallel to the shoreline for a total length of 1,800-foot. The artificial reef modules would vary in size from 2,400 (4.5-foot high) pounds to 9,800 (6-foot high) pounds and be covered by a minimum of 1-foot of water at Mean Low Water. The reef modules would be anchored to the mats to prevent 'rolling'. Mat ends would be free of reef modules to help prevent scouring. The SMART design breakwater is proposed to protect the beach renourishment and provide environmental benefits (see ftp site ftp://ftp.saj.usace.army.mil/pub/uploads/k3cdstjv/URSMiamiHotSpotSection227/ for the 30 percent submittal). During the 100 percent submittal phase environmental considerations will be addressed in an Environmental Impact Statement.

We welcome your views, comments and information about environmental and cultural resources, study objectives and important features within the described study area, as well as any suggested improvements. If you are aware of any person, organization or agency that may have an interest or comments regarding this study, please inform them of this request. Letters of comment or inquiry should be addressed to the letterhead address to the attention of the Planning Division, Plan Formulation Section and received by this office within thirty (30) days of the date of this letter.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

Copy Furnished:

Ms. Trisha Adams, US Fish and Wildlife Service, 1339 20th Street, Vero Beach, FL 32960-3559

Ms. Joceyln Karazsia, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 11420 North Kendall Drive, Suite 103, Miami, FL 33176

Mr. Steve Blair, Dade County Department of Environmental Resources Management, 33 SW 2nd Avenue, Suite 1000m Miami, FL 33130

Mr. Steve Lau, Office of Environmental Services, FWC-OES Field Office 255 154th Avenue, Vero Beach, FL 32968-9041

Mr. Marty Seeling, Bureau of Beaches Wetland Resources, FDEP, 3900 Commonwealth Blvd, Mail Station 300, Tallahassee, FL 32399-3000

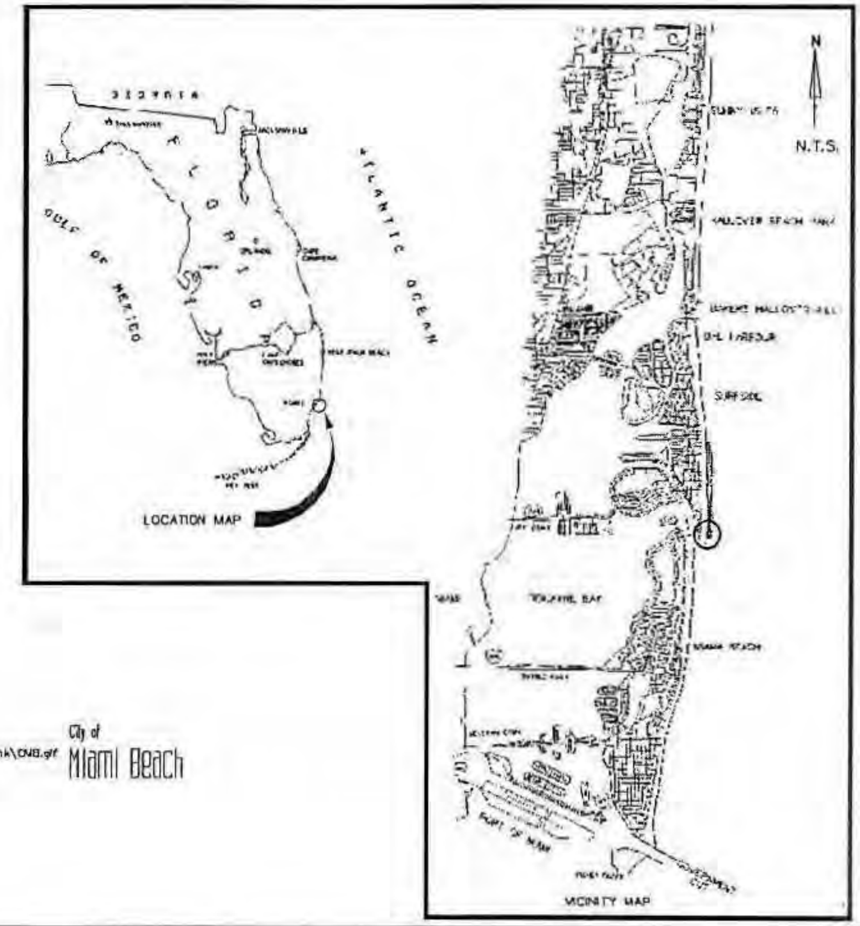
Mr. Paden Woodruff, Bureau of Beaches Wetland Resources, FDEP, 3900 Commonwealth Blvd, Mail Station 300, Tallahassee, FL 32399-3000

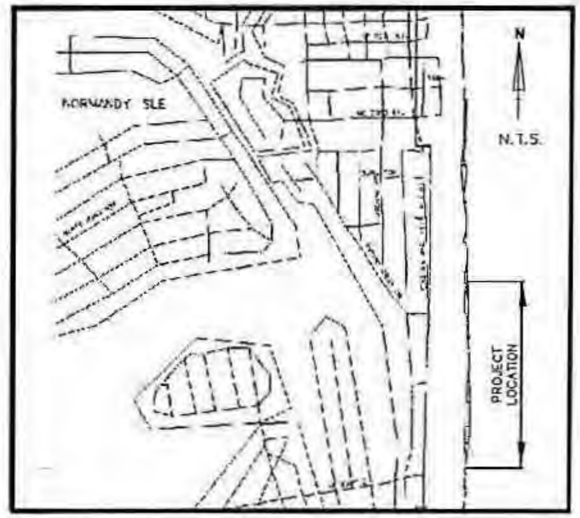
Mr. Russell Synder, Bureau of Beaches Wetland Resources, FDEP, 3900 Commonwealth Blvd, Mail Station 300, Tallahassee, FL 32399-3000

SECTION 227
NATIONAL SHORELINE EROSION
CONTROL DEMONSTRATION PROGRAM
63rd STREET HOT SPOT, DADE COUNTY, FLORIDA

MIAMI-DADE

US Army Corps of Engineers





City of Miami Beach

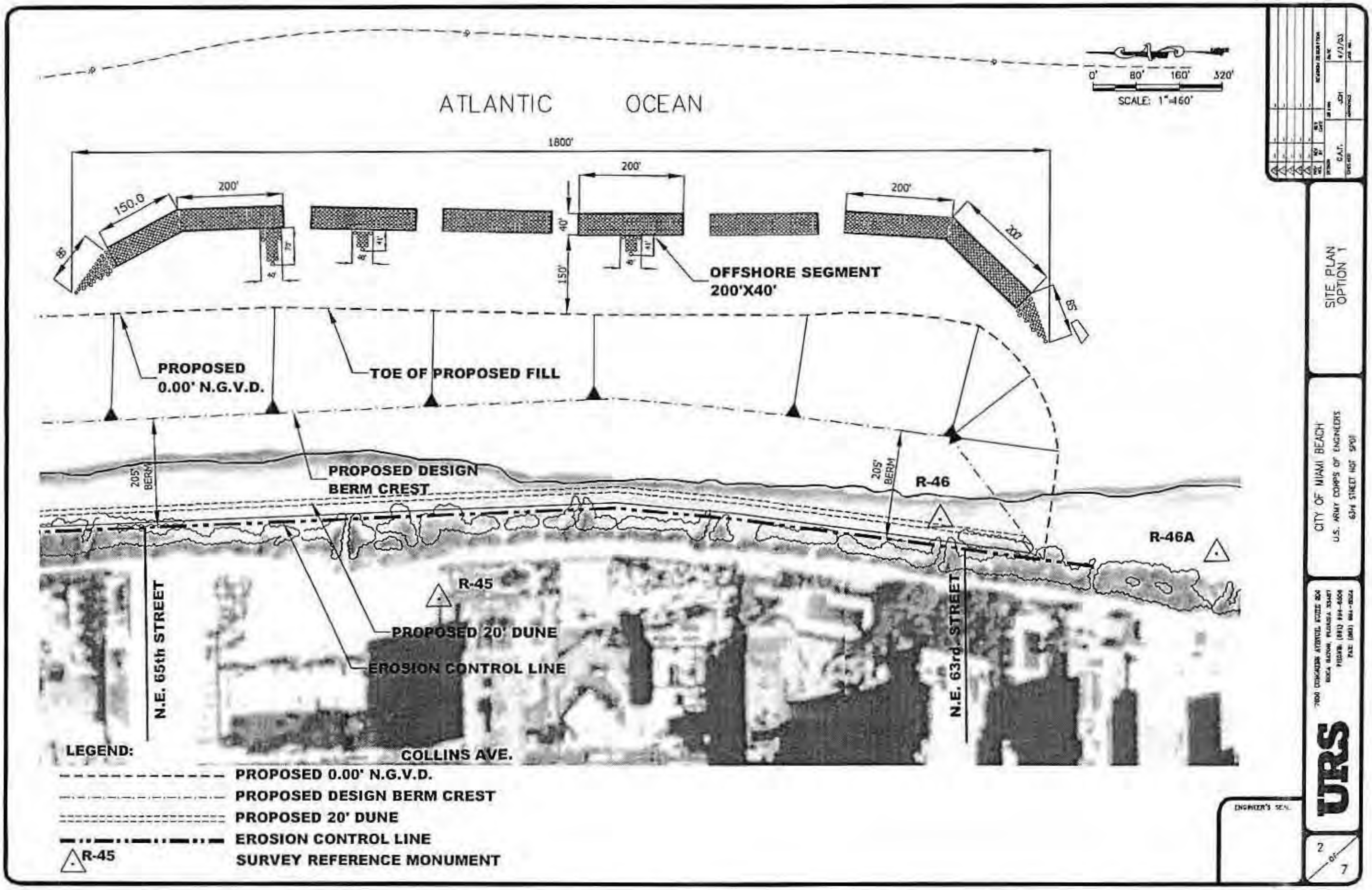
COVER SHEET

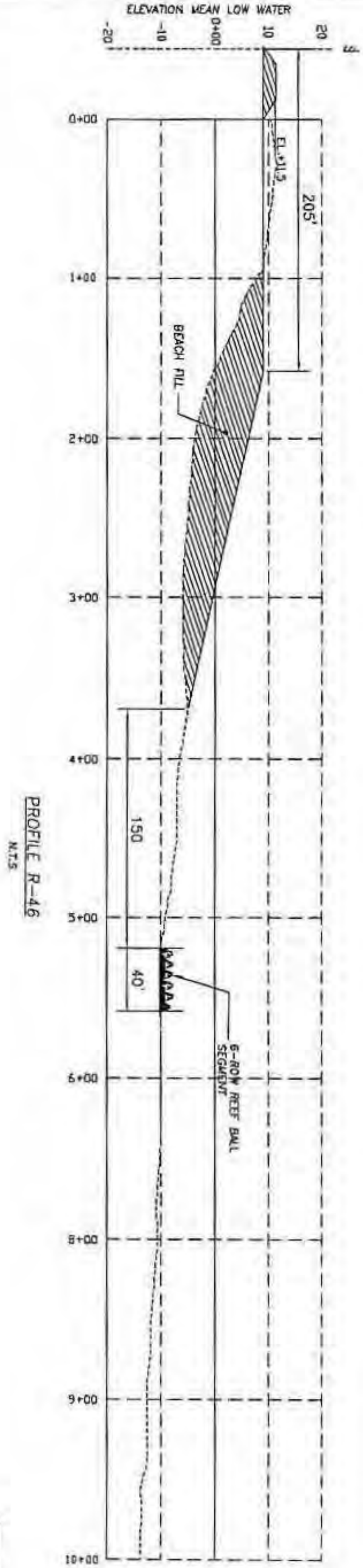
CITY OF MIAMI BEACH
U.S. ARMY CORPS OF ENGINEERING
63rd STREET HOT SPOT

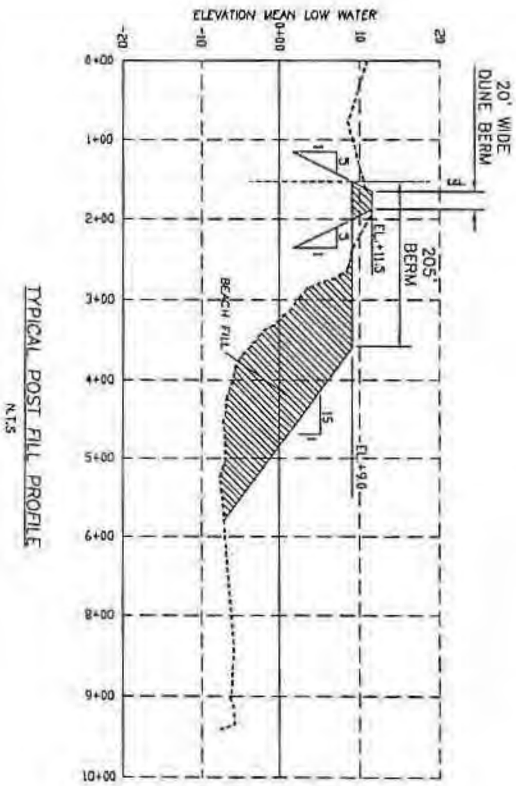
URS

ENGINEER'S SEAL

1 of 7


ATLANTIC OCEAN
SCALE: 1"=160'
0' 80' 160' 320'
1800'
200'
150.0
85'
40'
150'
OFFSHORE SEGMENT 200'X40'
PROPOSED 0.00' N.G.V.D.
TOE OF PROPOSED FILL
PROPOSED DESIGN BERM CREST
205' BERM
R-46
R-46A
R-45
PROPOSED 20' DUNE
EROSION CONTROL LINE
N.E. 65th STREET
N.E. 63rd STREET
COLLINS AVE.
LEGEND:
PROPOSED 0.00' N.G.V.D.
PROPOSED DESIGN BERM CREST
PROPOSED 20' DUNE
EROSION CONTROL LINE
R-45 SURVEY REFERENCE MONUMENT
SITE PLAN OPTION 1
CITY OF MIAMI BEACH
U.S. ARMY CORPS OF ENGINEERS
63rd STREET HOT SPOT
URS
ENGINEER'S SEAL
2 of 7





DESIGN C.A.T.	DRAWN JCH	DATE 4/3/03

URS
7650 CONGRESS AVENUE, SUITE 200
BOCA RATON, FLORIDA 33487
PHONE: (561) 994-6500
FAX: (561) 994-6524

CITY OF MIAMI BEACH
U.S. ARMY CORPS OF ENGINEERS
63rd STREET HOT SPOT

TYPICAL PROFILE

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

JUL 27 2004

Planning Division
Environmental Branch

To Whom It May Concern:

Pursuant to the National Environmental Policy Act and the U.S. Army Corps of Engineers Regulation (33CFR 230.11), this letter constitutes the Notice of Availability for the Draft Environmental Assessment (EA) and Preliminary Finding of No Significant Impact (FONSI) for the Section 227, National Shoreline Erosion Control Development and Demonstration Program, 63rd Street "Hotspot", Miami Beach, Miami-Dade County, Florida. The proposed submerged artificial reef training (SMART) structure would be located between DEP monument R-46A and R-44, approximately 400-from mean shoreline in 7-foot of water, with 1-foot of freeboard at Mean Low Water (MLW). SMART would be comprised of 42.8-foot long segments approximately 6-foot wide. Reef balls would attached to concrete mats placed perpendicular to the shoreline and next to each other to form a crescent-shaped submerged breakwater approximately 2,272-foot long located at the 63rd Street erosional "hotspot'. Northern and southern structure terminus would be angled and narrowed. The SMART structure would attenuate wave energy to protect the shoreline from erosional forces. If the SMART structure does not meet its objectives, it can be altered or removed. A copy of the draft EA, Preliminary FONSI, project summary and project maps are enclosed.

One copy of the Draft EA and Preliminary FONSI will be available at the City of Miami Beach Public Library, 2100 Collins Avenue, Miami Beach, Florida, 33139, by July 30, 2004. Library hours are Monday through Thursday 9:30 a.m. to 9 p.m., Friday and Saturday 9:30 a.m. to 6 p.m. The point of contact at the library is Mrs. Susan Shilane, Reference Supervisor, at 305-535-4219, extension. One copy of the Draft EA and Preliminary FONSI will be available at the City of Miami Beach Public Library, Northshore Branch, 7501 Collins Avenue, Miami Beach, Florida, 33141, by July 30, 2004. The library hours are 9:30 a.m. to 6 p.m. on Monday, Tuesday, Thursday and Saturday, and 11:30 a.m. until 8 p.m. on Wednesday. The library is closed on Friday and Sunday. The point of contact at the library is Mrs. Pam Jefferson, Master Librarian, at 305-864-5392. An electronic copy of the EA/FONSI is available at http://planning.saj.usace.army.mil/envdocs/envdocsb.htm.

Questions concerning the EA that led to the FONSI should be directed to Mr. Paul Stevenson, Planning Division, at the letterhead address, via telephone at 904-232-2130, fax 904-232-3442 or email paul.c.stevenson@usace.army.mil.

Sincerely,

James C. Duck

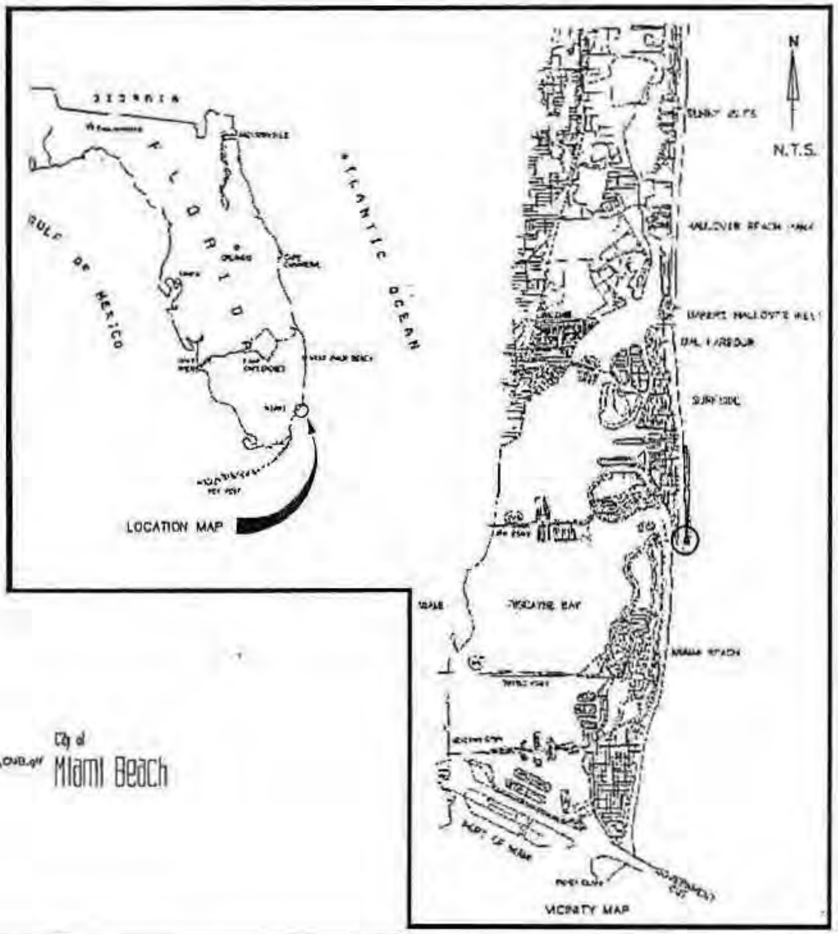
James C. Duck
Chief, Planning Division

Enclosures

SECTION 227
NATIONAL SHORELINE EROSION
CONTROL DEMONSTRATION PROGRAM
63rd STREET HOT SPOT, DADE COUNTY, FLORIDA

MIAMI-DADE

US Army Corps of Engineers



City of Miami Beach

COVER SHEET

CITY OF MIAMI BEACH
U.S. ARMY CORPS OF ENGINEERING
63rd STREET HOT SPOT

URS

1 of 7

Figure 1

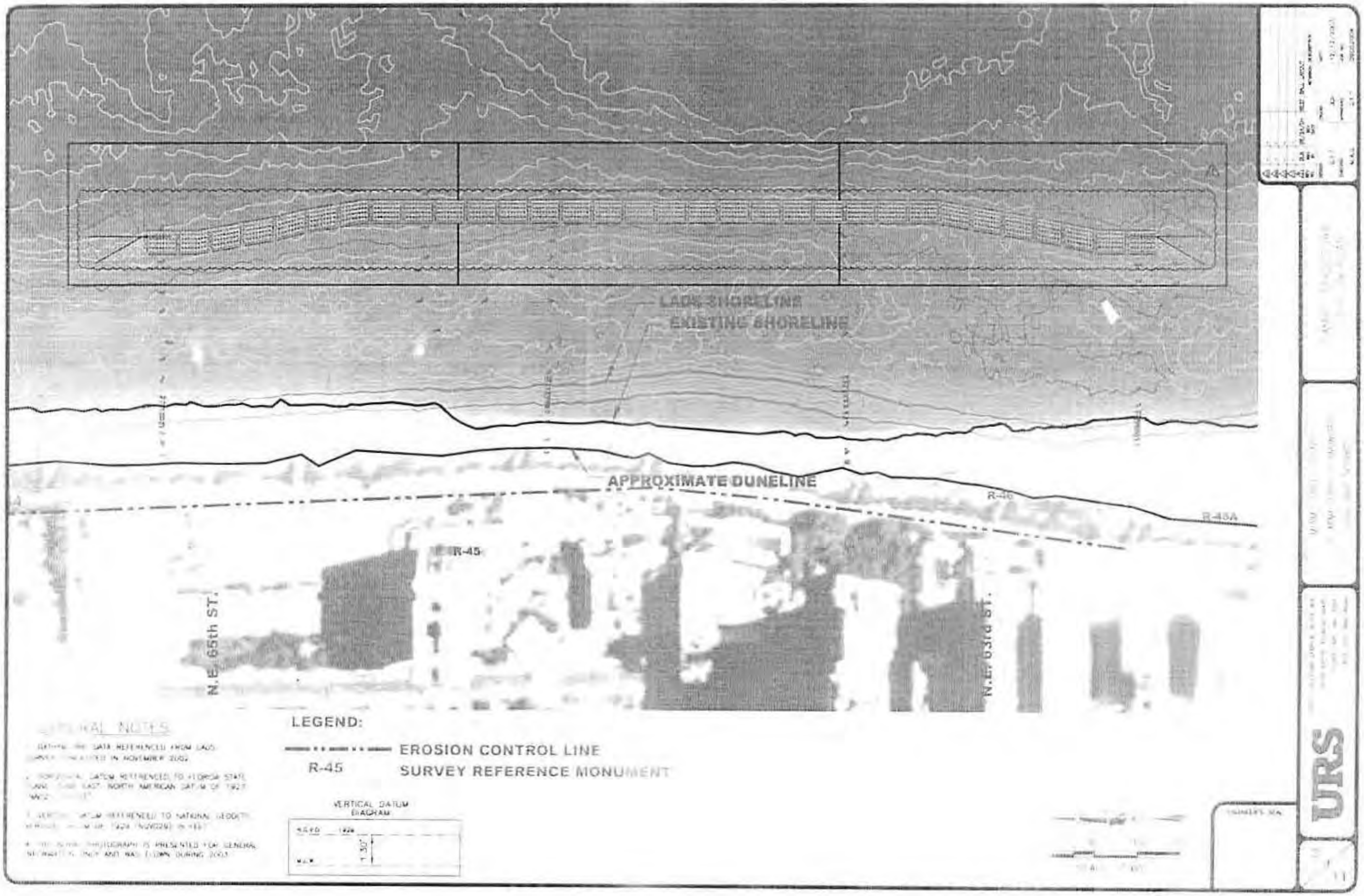

LADS SHORELINE
EXISTING SHORELINE
APPROXIMATE DUNELINE
R-45
R-46
N.E. 65th ST.
N.E. 63rd ST.
LEGEND:
EROSION CONTROL LINE
R-45
SURVEY REFERENCE MONUMENT
VERTICAL DATUM DIAGRAM
1.30'
URS

Figure 2

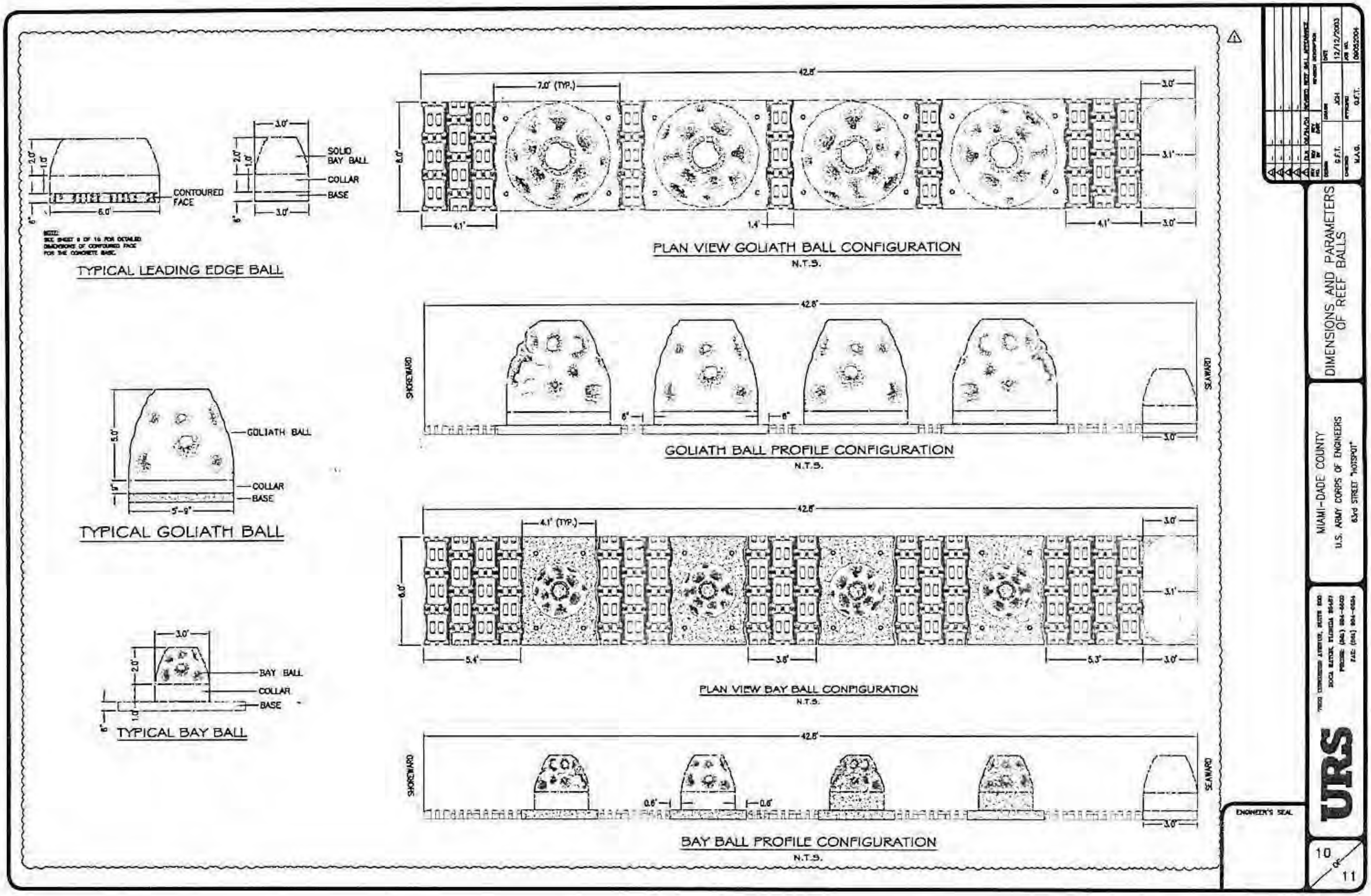

TYPICAL LEADING EDGE BALL
CONTOURED FACE
SOLID BAY BALL
COLLAR
BASE
TYPICAL GOLIATH BALL
GOLIATH BALL
TYPICAL BAY BALL
BAY BALL
PLAN VIEW GOLIATH BALL CONFIGURATION
N.T.S.
GOLIATH BALL PROFILE CONFIGURATION
PLAN VIEW BAY BALL CONFIGURATION
BAY BALL PROFILE CONFIGURATION
SHOREWARD
SEAWARD
42.8'
7.0' (TYP.)
4.1' (TYP.)
ENGINEER'S SEAL
DIMENSIONS AND PARAMETERS OF REEF BALLS
MIAMI-DADE COUNTY
U.S. ARMY CORPS OF ENGINEERS
63rd STREET "HOTSPOT"
URS
12/12/2003
10 of 11

Figure 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

AUG 03 2004

District Engineer, Jacksonville
P.O. Box 4970
Jacksonville, FL 32232

Attn: Mr. James C. Duck
Chief, Planning Division

Subject: Draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Construction of the 63rd Street Submerged Artificial Reef Structure, Dade County, FL [dated July 2004]

Dear Sir:

Pursuant to Section 309 of the Clean Air Act, EPA, Region 4 has reviewed the subject document, an evaluation of the environmental consequences of installing a broad-crested, multi-row breakwater [2,272' long] parallel to this reach of eroding shoreline. It is anticipated that this concrete device [comprised of almost 2,000 individual elements] will diminish wave energies within the breaker zone and by extension reduce erosion on the adjacent beach. Modeling predicts that this design should be able to stabilize the shoreline without adversely affecting the surrounding hard bottoms and/or local sand budget. Moreover, the articulated/interconnected design should lessen the subsidence which frequently affects dense structures placed on a sandy substrate.

While these *reef balls* and adjacent armored mats will cover 2.1 acres of sandy habitat, it was suggested that they would provide additional substrate for species associated with hard grounds. All major construction activities would be accomplished via barge operation without infringing on the adjacent beach/dune community. A three-year monitoring plan conducted by the Department of Environmental Management will determine the effectiveness of this system. In the event the system proves ineffective in trapping sand and/or fails, there is provision for its removal.

On the basis of the information provided in the document, EPA has no significant objections to the use of an EA for this evaluation in lieu of the more comprehensive environmental impact statement format [and by extension the "Finding of No Significant Impact" determination].

Thank you for the opportunity to comment. If we can be of further assistance in this matter, Dr. Gerald Miller (404-562-9626) will serve as initial point of contact.

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

July 24, 2003

James C. Duck
District Engineer
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Service Log No.: 4-1-03-I-2890
Date: April 28, 2003
Project: Section 227 National Shoreline Erosion Control Demonstration Project
County: Miami-Dade

Dear Mr. Duck:

The Fish and Wildlife Service (Service) has reviewed the plans, maps, and other information provided by U.S. Army Corps of Engineers (Corps) in the letter dated April 28, 2003, for the proposed construction of an experimental erosion control structure under Section 227 of the Water Resources Development Act of 1996, as amended. This letter is provided in accordance with section 7 of the Endangered Species Act of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act of 1958, as amended (48 Stat.401; 16 U.S.C. 661 *et seq.*).

Project Description

The Corps proposes to construct a nearshore Submerged Artificial Reef Training (SMART) structure offshore of the erosional "hot-spot" near 63rd Street on Miami Beach, Florida. The structure will be constructed approximately 150-foot from the equilibrium toe-of-fill associated with construction of the federally authorized Miami Beach Shoreline Protection Project. The SMART structure design includes the placement of eight groups of concrete reef modules in 200-foot by 40-foot segments, which are attached to an articulated armor concrete mat and oriented parallel to the shoreline. The artificial reef modules will range in height from approximately 4.5 to 6 feet and range in weight from approximately 2,400 pounds to 9,800 pounds. The Corps anticipates that the structures may be within 1-foot of the surface at mean-low water. To minimize movement and scouring, the structures will be anchored to the concrete mats and the mats will extend beyond the bottom edge of the structure. According to the information provided, the submerged breakwater is designed to enhance the performance of beach renourishment projects and increase protective habitat for juvenile marine organisms.

Threatened and Endangered Species

Within the project area, the federally listed threatened loggerhead sea turtle (*Caretta caretta*), endangered green sea turtle (*Chelonia mydas*), endangered hawksbill sea turtle (*Eretmochelys imbricata*), endangered leatherback sea turtle (*Dermochelys coriacea*), and the endangered West Indian manatee (*Trichechus manatus*) are known to occur. Specifically, suitable nesting habitat for listed sea turtle species occur on the shoreline adjacent to the project. The manatee is known to utilize offshore waters during various time of the year, particularly during seasonal migration to warmer waters.

The suitable sea turtle nesting habitat located adjacent to the proposed SMART structure may be adversely affected after construction as a result of the change in hydrological conditions related to the structures. This may cause an increased risk of erosion of suitable sea turtle habitat in the vicinity of the structures. Therefore, the Service recommends that a thorough analysis of the effects of the structures on adjacent beaches be conducted prior to construction to determine if the shoreline will be affected and if so, to what extent. After construction, if it is determined that the structure has caused significant erosion of adjacent beaches, the Service recommends that the structure is removed.

In addition, the Service is concerned with the long term durability of the SMART structure and the articulated concrete mat, including the material with which the reef structures will be connected to the concrete mat. If a portion or all of the SMART structure fails, it is possible that the material may be washed onto the beach and adversely affect the ability of sea turtles to nest. The Service recommends: (1) annual inspections of the structure's integrity are conducted; (2) repairs are made as necessary to minimize the threat of structure failure; (3) a contingency plan is developed in the event of structure failure; and (4) any debris related to the SMART structure should be removed from the beach as soon as possible.

Since the manatee may be present in project area, the Service recommends that the Corps incorporate the *Standard Manatee Construction Protection Measures* to minimize possible adverse affects to the manatee during construction.

Fish and Wildlife Resources

In a letter dated May 23, 2003, the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries), provided several comments and recommendations to the Corps related to fish and wildlife resources, in particular, Essential Fish Habitat. Specifically, NOAA Fisheries requested that the Corps: (1) demonstrate how the SMART structure will provide enhanced marine fishery habitat; (2) demonstrate consistency with the National Artificial Reef Plan and the State of Florida's Artificial Reef Plan; (3) demonstrate how the SMART structures will not threaten natural habitats within the area (*e.g.*, hardbottom, corals, seagrass, and macroalgae); (4) identify the coral seed source or discuss coral relocation proposed; (5) demonstrate the financial integrity for the long-term liability related to the deployment, monitoring, and maintenance of the SMART structure; and (6) identify the amount of sand overburden in the SMART structure footprint to support the determination that subsidence will not occur. In addition, NOAA Fisheries recommends that a minimum of a 30-foot buffer is established between the proposed structure and natural habitats within the project area. The Service fully supports NOAA Fisheries's comments and recommendations.

Thank you for your cooperation and effort in protecting fish and wildlife resources. Should you have additional questions or require clarification, please contact Trish Adams at 772-562-3909, extension 232.

Sincerely yours,

Allen D Webb for

Linda S. Ferrell
Assistant Field Supervisor
South Florida Ecological Services Office

cc:
FWS, Jacksonville, Florida (Sandy MacPherson)
FWC, Bureau of Protected Species Management, Tallahassee, Florida (Robbin Trindell)
NMFS, Protected Species Division, St. Petersburg, Florida
NMFS, Habitat Conservation Division, Miami, Florida
DEP, Office of Beaches and Coastal Systems, Tallahassee, Florida

Coastal Zone Management Act Consistency Concurrence

Florida Department of
Environmental Protection
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

September 17, 2010

Mrs. Terri Jordan-Sellers, Biologist
Planning Division, Jacksonville District
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers – Draft Environmental Assessment, Section 227/2038 National Shoreline Erosion Control Development Program – NE 63rd Street "Hotspot" Submerged Artificial Reef Training (SMART) Structure – Miami Beach, Miami-Dade County, Florida.
SAI # FL201007215347C (Reference SAI # FL200408038541C)

Dear Mrs. Jordan-Sellers:

The Florida State Clearinghouse has coordinated a review of the referenced Draft Environmental Assessment (EA) under the following authorities: Presidential Executive Order 12372; Section 403.061(40), *Florida Statutes*; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321-4347, as amended.

As noted in the Draft EA, the Florida Department of Environmental Protection's (DEP) Bureau of Beaches and Coastal Systems confirms that staff are currently reviewing a Joint Coastal Permit/Water Quality Certification application from the Corps of Engineers for the Miami-Dade Submerged Reef Ball Breakwater Project (DEP File No. 0219199-002-JC). Please continue to coordinate with DEP staff to provide the information requested to complete their review of the proposed shoreline erosion control project. For further information on the DEP's application review or a copy of the latest Request for Additional Information, please contact Mr. Martin Seeling at (850) 414-7728 or Mr. Steven MacLeod at (850) 414-7806.

The DEP Coral Reef Conservation Program (CRCP) has provided a number of comments, recommendations and suggested edits on the Draft EA. The CRCP's comments emphasize the importance of developing contractor accident and spill prevention plans, operational storm contingency plans in response to storm events, diver assistance during reef ball deployment, vessel anchoring plans and the implementation of other best management practices and monitoring activities to ensure protection of benthic resources. Please refer to the enclosed CRCP memorandum and contact Ms. Joanna Walczak at (305) 795-2111 or Joanna.Walczak@dep.state.fl.us for additional information and assistance.

Based on the information contained in the Draft EA and enclosed state agency comments, the state has determined that, at this stage, the proposed federal action is consistent with the Florida Coastal Management Program (FCMP). To ensure the project's continued consistency with the FCMP, the concerns identified by our reviewing agencies must be addressed prior to project implementation. The state's continued concurrence will be based on the activity's compliance with FCMP authorities, including federal and state monitoring of the activity to ensure its continued conformance, and the adequate resolution of issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting process in accordance with Section 373.428, *Florida Statutes*.

Thank you for the opportunity to review the proposed project. Should you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Yours sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm
Enclosures

cc: Roxane Dow, DEP, BBCS
Penny Isom, DEP, CAMA
Joanna Walczak, DEP, CAMA-CRCP

Project Information	
Project:	FL201007215347C
Comments Due:	08/30/2010
Letter Due:	09/17/2010
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - DRAFT ENVIRONMENTAL ASSESSMENT, SECTION 227/2038 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT PROGRAM - NE 63RD STREET "HOTSPOT" SUBMERGED ARTIFICIAL REEF TRAINING (SMART) STRUCTURE - MIAMI BEACH, MIAMI-DADE COUNTY, FLORIDA.
Keywords:	ACOE - NE 63RD ST HOTSPOT SMART STRUCTURE - MIAMI BEACH, MIAMI-DADE CO.
CFDA #:	12.101

Agency Comments:

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

No Comments Received

STATE - FLORIDA DEPARTMENT OF STATE

The DOS has determined that no historic properties eligible for listing in the National Register of Historic Places will be adversely affected. Therefore, the DOS finds the proposed project consistent with Florida's Coastal Zone Management Program.

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP's Bureau of Beaches and Coastal Systems confirms that staff are currently reviewing a Joint Coastal Permit/Water Quality Certification application from the Corps of Engineers for the Miami-Dade Submerged Reef Ball Breakwater Project (DEP File No. 0219199-002-JC). Please continue to coordinate with DEP staff to provide the information requested to complete their review of the proposed shoreline erosion control project. For further information on the DEP's application review or a copy of the latest Request for Additional Information, please contact Mr. Martin Seeling at (850) 414-7728 or Mr. Steven MacLeod at (850) 414-7806. The DEP Coral Reef Conservation Program (CRCP) has provided a number of comments, recommendations and suggested edits on the Draft EA. The CRCP's comments emphasize the importance of developing contractor accident and spill prevention plans, operational storm contingency plans in response to storm events, diver assistance during reef ball deployment, vessel anchoring plans and the implementation of other best management practices and monitoring activities to ensure protection of benthic resources. Please refer to the enclosed CRCP memorandum and contact Ms. Joanna Walczak at (305) 795-2111 or Joanna.Walczak@dep.state.fl.us for additional information and assistance.

For more information or to submit comments, please contact the Clearinghouse Office at:

3900 COMMONWEALTH BOULEVARD, M.S. 47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

Visit the Clearinghouse Home Page to query other projects.

Memorandum

Florida Department of Environmental Protection

DATE: September 14, 2010

TO: Lauren Milligan
Office of Intergovernmental Programs

FROM: Joanna Walczak, Assistant Manager
Coral Reef Conservation Program

THROUGH: Stephanie Culp, Assistant Director
Office of Coastal and Aquatic Managed Areas

SUBJECT: FDEP CRCP Comments on the draft Environmental Assessment (EA) for national shoreline erosion control development program submerged artificial reef training (SMART) structure Miami-Dade County, Florida.

The FDEP Coral Reef Conservation Program (CRCP) has reviewed the draft EA document dated July 17, 2010, for the proposed construction of an experimental erosion control structure. Based upon this review, the CRCP offers the following comments and recommendations:

General

- The EA states that, "…the contractor [will] develop accident and spill prevention plans to prevent, avoid or minimize spill effects (Appendix D)." However, a spill prevention plan is not provided. The FDEP CRCP recommends the creation and submission of a plan that includes protocol(s) for immediately alerting the agencies of any impacts (specifically to natural resources) or accidents that may occur. The plan should also initiate, within 24 hours of any incident, the recovery and restoration of any damage to living coral in the event of unforeseen accidents. Please provide this plan for agency review once a contractor has been identified.
- The FDEP CRCP suggests replacement of all occurrences of "rock reef" and "hardground" with either coral reef or nearshore hardbottom communities, as appropriate.
- The FDEP CRCP recommends the creation and submission of an Operational Storm Contingency Plan that describes the actions to be taken in response to storm events (e.g. hurricanes, high-sea conditions and/or operational failures) a minimum of thirty days prior to the commencement of construction.

Construction

- The EA states the need for a dredging permit (p13), but then states that, "Construction activities would be restricted to in-water construction…without any dredging" (p14). Please clarify 1) if there will be any dredging activities that require a permit, and if a permit is required, 2) what those activities include.
- The EA states that "Turbidity measurements will be collected during any leveling or scraping activities…" (p40). Describe the proposed leveling and scraping activities.
- The final USFWS report specifies using turbidity curtains during construction. (p17). Although appropriate in low energy environments, the use of turbidity curtains in an offshore environment of this nature may not be suitable due to the potential for them to be displaced by natural forces.
- The construction plan does not provide information regarding the planned distance between reef ball units. Since unanticipated gaps between units could result in the project footprint covering more than the currently proposed area, please clarify the anticipated distance between units and how accurate placement will be assured.
- The Final Fish and Wildlife Coordination Act Report states that, "SCUBA divers will 'micro-site' the installation of the segments to avoid potential impacts to hardbottom resources."(p6), but statements in the EA are not in agreement [e.g. "…may be diver assisted to ensure quality construction and placement…to best fit the benthic landscape"(p14), "…possibly diver assistance during deployment" (p27), and "Diver assistance during deployment will be decided by the contractor"(p40).] The FDEP CRCP supports the U.S. Fish and Wildlife Service's recommendation that divers should be in the water during deployment of units for quality assurance of structural placement, and avoidance and minimization of impacts to natural resources.
- The EA states that, "the contractor will be required to develop an ingress/egress plan…in compliance with the recommendations included in the BMPs for Coastal Construction" (p26). Please provide the ingress and egress plan.
- In a response letter to USFWS (June 2004), the USACE concurred with their recommendation to, "develop and include a vessel anchoring plan, in addition to the vessel transit plan…" Please provide an anchoring plan for all vessels associated with construction and monitoring.

Monitoring/Success Criteria/Mitigation

- Prior to construction please submit names and qualification of all persons performing environmental surveys before, during, and following construction.
- The physical monitoring plan states that the project will be deemed successful if settling of the structure is less than 2 feet. Please define "structure" (i.e. is this one module or one plate within the module?).
- The EA has contradicting criteria for structural success. In Appendix B and E, which are both denoted as the physical and biological monitoring plan, on pages 4-5 and 4-5 respectively, the percentages given vary. Please clarify success criteria.
- The EA states several times that "…the SMART structure would be altered or removed if it did not meet program goals and objectives" (p 14). In the event the structure(s) do(es) not meet program goals and objectives, a specific alteration plan or removal and disposal plan must be created and approved prior to deployment. Please provide a plan for agency review once a contractor has been identified.
- This project and structure are experimental in nature, as such it is difficult to anticipate potential impacts it could have *in situ* to nearby hardbottom during construction and/or storm events. In the USFWS final report, the USACE admits "…structure fails or becomes destabilized, debris…may impact reef organisms or portions of the structure may collide with the reef" (p17). Please provide a mitigation plan in the event that nearby hardbottom habitat is impacted due to unanticipated construction related impacts or storm events.

RECEIVED
AUG 3 0 2010
DEP Office of
Intergovt'l Programs

FLORIDA DEPARTMENT OF STATE
Dawn K. Roberts
Interim Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Lauren P. Milligan
Florida State Clearinghouse
3900 Commonwealth Blvd., M.S. 47
Tallahassee, Florida 32399-3000

August 26, 2010

Re: DHR Project File No.: 2010-3507 / Received: July 21, 2010
SAI No.: FL201007215347C
Submerged Artificial Reef Training
Dade County

Dear Ms. Milligan:

Our office received and reviewed the project in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended and the National Environmental Policy Act of 1969. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties (archaeological, architectural, and historical resources) listed, or eligible for listing, in the National Register of Historic Places, assessing the project's effects, and considering alternatives to avoid or minimize adverse effects.

Because of the nature of the project, it is the opinion this agency that no historic properties eligible for listing in the National Register will be adversely affected. Therefore, this agency finds the proposed project to be consistent with Florida's Coastal Zone Management Program.

If you have any questions concerning our comments, please contact Michael Hart, Historic Sites Specialist, by phone at 850.245.6333, or by electronic mail at mrhart@dos.state.fl.us. Your continued interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Pc: Eric Summa/ USACE

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

June 25, 2003

Mr. James C. Duck, Chief
Planning Division, Jacksonville District
U. S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

RE: Department of the Army – Jacksonville District Corps of Engineers – Section 227 National Shoreline Erosion Control Demonstration Project for the NE 63rd Street "Hotspot" - Miami Beach, Miami-Dade County.
SAI # FL200305021926C

Dear Mr. Duck:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16, U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4231, 4331-4335, 4341-4347, as amended, has coordinated a review of the referenced Section 227 project report.

The Department's (DEP) Bureau of Beaches and Wetland Resources continues to have serious concerns regarding the chosen project site and potential project success, structural stability and public safety risks. In accordance with Rule 62B-41.0075, *Florida Administrative Code*, staff advises the applicant to develop and submit an Experimental Coastal Construction project test plan and report to fully evaluate the effects of the erosion control project. Please refer to the enclosed DEP memorandum for further information.

Department of State (DOS) staff note that a previous magnetometer and side scan survey was conducted of the borrow areas. Although four potentially significant anomalies were identified during the survey, the proposed 250' buffer should ensure that no historic properties will be affected by project activities. Please see the enclosed DOS comments.

Based on the information contained in the public notice and enclosed comments, the state has determined that, at this stage, the allocation of federal funds for the above-referenced project is consistent with the Florida Coastal Management Program (FCMP). The applicant must, however, address the concerns identified by DEP staff as described in the attached comments. All subsequent environmental documents must be reviewed to determine the project's continued consistency with the FCMP. The state's continued concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews.

Thank you for the opportunity to review this project. If you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2161.

Sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm

Enclosures

cc: Roxane Dow, DEP, BBWR
Sarah Jalving, DOS

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Colleen M. Castille
Secretary

October 1, 2004

Mr. James C. Duck, Chief
Planning Division, Jacksonville District
U. S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers – Section 227 National Shoreline Erosion Control Development and Demonstration Program, NE 63rd Street "Hotspot" Submerged Artificial Reef Training (SMART) Structure – Miami Beach, Miami-Dade County, Florida.
SAI # FL200408038541C

Dear Mr. Duck:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16, U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4231, 4331-4335, 4341-4347, as amended, has coordinated a review of the draft environmental assessment (EA) for the referenced Section 227 project.

The Department's (DEP) Bureau of Beaches and Coastal Systems is currently reviewing an application for a Joint Coastal Permit/Water Quality Certification from the Corps of Engineers for the Dade County Reef Ball Breakwater Section 227 Project (DEP File No. 0219199-001-JC). Please continue to coordinate with DEP staff to provide the information requested to complete their review of the proposed shoreline erosion control project. For further information on the DEP's concerns or a copy of the latest Request for Additional Information, please contact Mr. Martin Seeling at (850) 487-4471, ext. 104.

The Florida Fish and Wildlife Conservation Commission (FWC) notes that the Corps of Engineers should reinitiate consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service to obtain an updated incidental take authorization for impacts to marine turtles. FWC recommends that the project design be modified to minimize impacts to nesting sea turtles and hatchlings, as the current design may form a barrier under certain conditions. In addition, there is evidence that the reef balls themselves may entrap turtles. Please see the enclosed FWC letter for further details and information.

Based on the information contained in the draft EA and the enclosed comments provided by our reviewing agencies, the state has determined that the allocation of federal funds for the above-referenced project is consistent with the Florida Coastal Management Program (FCMP). The applicant must, however, address the concerns identified by DEP and FWC staff as described herein and detailed in the attached comments. All subsequent environmental documents must be reviewed to determine the project's continued consistency with the FCMP. The state's continued concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews.

Thank you for the opportunity to review this project. If you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2161.

Sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm

Enclosures

cc: Roxane Dow, DEP, BBCS
Brian Barnett, FWC

ENV1-3-2

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

BRIAN S. BARNETT, DIRECTOR
OFFICE OF POLICY AND STAKEHOLDER COORDINATION
(850)488-6661 TDD (850)488-9542
FAX (850)922-5679

September 15, 2004

Ms. Lauren Milligan
Environmental Consultant
Florida State Clearinghouse
Department of Environmental Protection
3900 Commonwealth Blvd., Mail Station 47
Tallahassee, FL 32399-3000

Re: SAI #FL200408038541C (formerly #FL200305021926C), Department of the Army, Jacksonville District Corps of Engineers, Section 227 National Shoreline Erosion Control Development and Demonstration Program, NE 63rd Street "Hotspot" Submerged Artificial Reef Training (SMART) Structure, Miami Beach, Miami-Dade County

Dear Ms. Milligan:

Staff in the Florida Fish and Wildlife Conservation Commission (FWC) has reviewed this proposal to place reef balls, 5.9 feet in height and diameter, along approximately 2,272 feet of marine turtle nesting beach (R-46A and R-44). These structures will be placed in approximately 7 feet of water at 400 feet from the Mean High Water Line, with approximately 1 foot of freeboard at Mean Low Water (MLW). Reef balls would be attached to ~43-foot-long, 6-foot-wide concrete mats. Every 10th segment, shorter reef balls, only 3-feet high, would be placed to create a potential "corridor" for marine turtle movement to the beach.

This project is currently being reviewed by the Florida Department of Environmental Protection under the Joint Coastal Permit program. FWC staff will provide a final agency position as part of that process. The Corps of Engineers should be notified at this time that this project will require updated incidental take authorization from the U.S. Fish & Wildlife Service and the National Marine Fisheries Service, Protected Species Section, for impacts to marine turtles. To facilitate the state's approval process, the Corps should reinitiate consultation with both agencies as soon as possible. The information currently included in the referenced documents will not be sufficient for the FWC to finalize recommendations on the issuance of a state permit (e.g., water quality certificate).

In addition, we recommend that the project design be modified to minimize impacts to nesting sea turtles and hatchlings. The long, shallow reef ball structure has the potential to interfere with female turtles attempting to access the beach to nest. While the exact width of the corridors proposed is not clear, previous projects have required gaps up to 25 feet wide (e.g., the PEP reef in Vero Beach) between structures. The very narrow corridors proposed do not appear to be justified for this pilot project and could preclude female turtles from reaching the beach to nest under certain conditions.

In the event nests did occur landward of the proposed structures, the reef balls would also create a barrier to hatchling turtles attempting to migrate offshore. Hatchlings released landward of the PEP reef in Vero Beach "hesitated" (that is, stopped swimming) before crossing the structure during low tide. Such hesitations could increase the potential for predation by carnivorous fishes that will ultimately colonize the reef ball structures.

Finally, the structures should be engineered to minimize entrapment of juvenile or adult turtles in the interior of the reef balls. Unfortunately, there is evidence of marine turtle mortality in other structures similar to the reef balls. While the exact mortality source could not be determined, skeletal remains of more than one turtle from such structures suggests that individuals may enter such structures and then be unable to exit.

Thank you for the opportunity to comment on this project. If you have any questions regarding these comments, please contact me or Dr. Robbin Trindell at (850) 922-4330.

Sincerely,

Brian Barnett

Brian S. Barnett, Director
Office of Policy and Stakeholder Coord.

BSB/rnt
ENV 7-3
A:\sai 8541c.doc
cc: Ms. Trish Adams, FWS-Vero
Ms. Sandy McPherson, FWS-Jax
Mr. Erik Hawk, NMFS- St. Pete
Mr. Stephen Blair, DERM
Mr. Matt Miller, ACOE-Jax

COUNTY: MIAMI-DADE
SAI - CORPS
2004-9085

DATE: 8/3/2004
COMMENTS DUE DATE: 9/2/2004
CLEARANCE DUE DATE: 10/2/2004
SAI#: FL200408038541C
Due Sept. 4

MESSAGE:
REFERENCE SAI # FL200305021926C

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS		ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
X STATE			

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The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

_ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

_ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

_ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - SECTION 227 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM, NE 63RD STREET "HOTSPOT" SUBMERGED ARTIFICIAL REEF TRAINING (SMART) STRUCTURE - MIAMI BEACH, MIAMI-DADE COUNTY, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA

☑ No Comment
☐ Comment Attached
☐ Not Applicable

Federal Consistency

☑ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☐ Not Applicable

From:

Division/Bureau: Division of Historical Resources, Bureau of Historic Preservation
Reviewer: Janice Maddox   Laura A. Kammerer, Deputy SHPO
Date: 9/25/04   9.24.2004

04 AUG -5 PM 2:30
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Florida
Department of Environmental Protection
"More Protection, Less Process"

Categories

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Project Information	
Project:	FL200408038541C
Comments Due:	September 02, 2004
Letter Due:	October 02, 2004
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - SECTION 227 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM, NE 63RD STREET "HOTSPOT" SUBMERGED ARTIFICIAL REEF TRAINING (SMART) STRUCTURE - MIAMI BEACH, MIAMI-DADE COUNTY, FLORIDA.
Keywords:	ACOE - SHORELINE EROSION CONTROL, NE 63RD ST. HOTSPOT - MIAMI BEACH
CFDA #:	12.101

Agency Comments:
COMMUNITY AFFAIRS - FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS
Released Without Comment
ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
No Final Comments Received
FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
2-PAGE LETTER BY BRIAN BARNETT DATED 9/15/2004.
STATE - FLORIDA DEPARTMENT OF STATE
No Final Comments Received
ENVIRONMENTAL POLICY UNIT - OFFICE OF POLICY AND BUDGET, ENVIRONMENTAL POLICY UNIT
No Final Comments Received
SOUTH FL RPC - SOUTH FLORIDA REGIONAL PLANNING COUNCIL
The project should be consistent with the goals and policies of the Miami-Dade County comprehensive plan and its corresponding land development regulations. Staff recommends that impacts to natural systems be minimized; the extent of sensitive wildlife, marine life, and vegetative communities be determined; and protection and/or mitigation of disturbed habitat be required.
MIAMI-DADE -

For more information please contact the Clearinghouse Office at:

3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

Visit the Clearinghouse Home Page to query other projects.

South
Florida
Regional
Planning
Council

September 16, 2004

Ms. Lauren Milligan
Clearinghouse Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, Mail Station 47
Tallahassee, FL 32399-3000

RE: SFRPC #04-0820, SAI#FL200408038541C, Request for comments on the Draft Environmental Assessment regarding Section 227 National Shoreline Erosion Control Development and Demonstration Program, 63rd Street Submerged Artificial Reef Training Structure, Department of the Army-Corp of Engineers Hotspot/SMART, Miami Beach, Miami-Dade County.

Dear Ms. Milligan:

We have reviewed the above-referenced Advanced Notification and have the following comments:

- The project must be consistent with the goals and policies of the Miami-Dade County comprehensive development master plan and its corresponding land development regulations. It is important for the permit grantor to coordinate its permit with the local government granting permits for development at the subject site.

- Staff recommends that 1) impacts to the natural systems be minimized to the greatest extent feasible and 2) the permit grantor determine the extent of sensitive wildlife, marine life, and vegetative communities in the vicinity of the project and require protection and or mitigation of disturbed habitat. This will assist in reducing the cumulative impacts to native plants and animals, wetlands and deep-water habitat and fisheries that the goals and policies of the *Strategic Regional Policy Plan for South Florida* (SRPP) seek to protect.

- The project is located over Biscayne Bay, natural resource of regional significance designated in the SRPP. The goals and policies of the SRPP, in particular those indicated below, should be observed when making decisions regarding this project:

GOAL

16. Enhance and preserve natural system values of South Florida's shorelines, estuaries, benthic communities, fisheries, and associated habitats, including but not limited to, Florida Bay, Biscayne Bay, tropical hardwood hammocks, and the coral reef tract.

Policies

16.1 Restore and improve marine and estuarine water quality by:

a. improving the timing and quality of freshwater inflows;
b. reducing turbidity, nutrient loading, and bacterial loading from wastewater facilities, septic systems, and vessels;
c. reducing the number of improperly maintained stormwater systems; and
d. requiring port facilities and marinas to implement hazardous materials spill plans.

16.2 Protect the Biscayne Bay Aquatic Preserve (BBAP) through such measures as:

a. discontinuing all untreated stormwater discharges to the Bay;
b. requiring stormwater treatment systems to meet the required non-degradation water quality standards for this Class III, Outstanding Florida Water body;
c. discouraging development that proposes to fill within the Bay or discharge contaminants to its waters; and
d. connecting developments that are served by septic tanks within the watershed of the BBAP to central sanitary waste treatment facilities to treat pathogens and remove nutrients from the wastewater effluent.

16.3 Enhance and preserve coastal, estuarine, and marine resources, including but not limited to tropical hardwood hammocks, mangroves, seagrass and shellfish beds, and coral habitats.

16.4 Enhance and preserve commercial and sports fisheries through monitoring, research, best management practices for fish harvesting, education, and protection of nursery habitat.

Thank you for the opportunity to comment. Please do not hesitate to call should you have any questions or comments.

Sincerely,

Carlos Andres Gonzalez
Senior Planner

CAG/kal

cc: Robert M. Carpenter, Colonel, U.S. Army District Engineers

Section 106 Consultation with SHPO

FLORIDA DEPARTMENT OF STATE
Dawn K. Roberts
Interim Secretary of State
DIVISION OF HISTORICAL RESOURCES

RECEIVED
AUG 30 2010
DEP Office of Intergov't'l Programs

Ms. Lauren P. Milligan
Florida State Clearinghouse
3900 Commonwealth Blvd., M.S. 47
Tallahassee, Florida 32399-3000

August 26, 2010

Re: DHR Project File No.: 2010-3507 / Received: July 21, 2010
SAI No.: FL201007215347C
Submerged Artificial Reef Training
Dade County

Dear Ms. Milligan:

Our office received and reviewed the project in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended and the National Environmental Policy Act of 1969. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties (archaeological, architectural, and historical resources) listed, or eligible for listing, in the National Register of Historic Places, assessing the project's effects, and considering alternatives to avoid or minimize adverse effects.

Because of the nature of the project, it is the opinion this agency that no historic properties eligible for listing in the National Register will be adversely affected. Therefore, this agency finds the proposed project to be consistent with Florida's Coastal Zone Management Program.

If you have any questions concerning our comments, please contact Michael Hart, Historic Sites Specialist, by phone at 850.245.6333, or by electronic mail at mrhart@dos.state.fl.us. Your continued interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Pc: Eric Summa/ USACE

gm PD-E

FLORIDA DEPARTMENT OF STATE
Glenda E. Hood
Secretary of State
DIVISION OF HISTORICAL RESOURCES

May 27, 2003

Mr. James C. Duck, Chief
Jacksonville District Corps of Engineers
Planning Division, Plan Formulation Branch
P.O. Box 4970
Jacksonville, Florida 32232-0019

RE: DHR No. 2003-3727
Received by DHR: April 30, 2003 5/28/03
Project Name: SMART Proposal
Dade County, Florida

Dear Mr. Duck:

Our office received and reviewed the above referenced project in accordance with *National Environmental Policy Act of 1969*, and Section 106 of the *National Historic Preservation Act of 1966*, as amended. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties listed or eligible for listing, in the National Register of Historic Places, assessing the project's effects, and considering alternatives to avoid or reduce the project's effect on such properties.

Based on sections 3.13 and 4.13, both dealing with Historical Properties, of the *Draft Environmental Assessment of the Renourishment at Miami Beach in the Vicinity of 63rd Street for the Beach Erosion Control and Hurricane Protection Project,* we note that a previous magnetometer and side scan survey was conducted of the borrow areas. Four potentially significant anomalies were identified during the survey. However, a 250' buffer will be in place around the anomalies during project activities. Therefore, based on the information provided, it is the opinion of this office that no historic properties will be affected by this undertaking.

If you have any questions concerning our comments, please contact Samantha Earnest, Historic Sites Specialist, at searnest@dos.state.fl.us or (850) 245-6333. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Barbara E. Mattick
DSHPO for Survey & Registration

for Janet Snyder Matthews, Ph.D., Director, and
State Historic Preservation Officer

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office (850) 245-6300 • FAX: 245-6435
☐ Archaeological Research (850) 245-6444 • FAX: 245-6436
☑ Historic Preservation (850) 245-6333 • FAX: 245-6437
☐ Historical Museums (850) 245-6400 • FAX: 245-6433
☐ Palm Beach Regional Office (561) 279-1475 • FAX: 279-1476
☐ St. Augustine Regional Office (904) 825-5045 • FAX: 825-5044
☐ Tampa Regional Office (813) 272-3843 • FAX: 272-2340

Essential Fish Habitat Coordination Documentation

From:	Jocelyn Karazsia
To:	Jordan-Sellers, Terri SAJ
Cc:	Robin Wiebler
Subject:	SMART draft EA
Date:	Wednesday, September 01, 2010 12:42:47 PM
Attachments:	SMART_NMFS EFH 26 Aug 2004.pdf Jocelyn_Karazsia.vcf

Hi Terri,

This responds to the Jacksonville District's letter dated July 17, 2010 regarding the Draft EA for the Submerged Artificial Reef Training Structure (SMART) in Miami-Dade County. NMFS finalized consultation on this project via letter dated August 26, 2004 (attached). We have no additional comments to offer on this project.

Please note the project proposes actions in areas where threatened or endangered species under NMFS purview could be present. Because these species are protected under the provisions of the Endangered Species Act, the Corps of Engineers should contact the NMFS Southeast Region, Protected Resources Division, if the Corps determines that this action would affect a listed species.

Jocelyn

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

JUL 1 7 2010

Miles Croom
Asst. Regional Administrator
NMFS-SERO-HCD
9721 Executive Center Dr N
St. Petersburg, FL 33702

Pursuant to the National Environmental Policy Act (NEPA), this letter constitutes the Notice of Availability of the Draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for the Proposed Submerged Artificial Reef Training (SMART) Structure Section 227/2038 National Shoreline Erosion Contract Development Program for the 63rd Street "Hot Spot" Miami Beach, Miami-Dade County, Florida.

The EA and FONSI are available for viewing on the Corps' website under the project "Dade County Beach Erosion Control and Hurricane Protection" at http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine_DadeCo_BchErCtrl.htm

The Corps initiated coordination with NMFS under the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act through the June 26, 2003 NEPA scoping letter. Per the May 3, 1999 EFH Finding between NMFS and the Corps, the EFH Assessment for the project was integrated within the July 2004 draft EA. In a letter dated July 17, 2003, NMFS provided EFH Conservation Recommendations, and the Corps responded to the recommendations on April 20, 2004. On August 26, 2004, NMFS concluded its review of the Corps' responses and stated "we believe that the COE has sufficiently addressed our recommendations, given that the overall purpose of the work is to abate shoreline erosion". Although this consultation was conducted in 2004, the EFH coordination regulations found at 50 CFR §600.920(k)(2)(1) state that "A Federal agency must reinitiate consultation with NMFS if the agency substantially revised its plans for an action in a manner that may adversely affect EHF or if new information becomes available that affects the basis for NMFS EFH Conservation Recommendations". The Corps has determined that the SMART structure project has not changed substantially since the project was originally coordinated, that the associated impacts have decreased and as a result, a new EFH consultation is not required.

Please provide all comments under NEPA to the Draft EA within 60 days of the date of this letter.

A copy of the draft EA and FONSI can also be requested by contacting Mrs. Terri Jordan-Sellers at 904-232-1817 or Terri.Jordan-Sellers@usace.army.mil.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Plan Formulation Branch

JUN 2 6 2003

Mr. Frederick C. Sutter III
Deputy Regional Administrator
National Marine Fisheries Service
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Sutter:

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, 16USC 1801 et seq. Public Law 104-208, reflects the Secretary of Commerce and Fishery Management Council authority, the following constitutes the U.S. Army Corps of Engineers, Jacksonville District (Corps) Essential Fish Habitat (EFH) Assessment. The EFH Assessment was requested in your May 27, 2003 (enclosed), responding to the Corps April 28, 2003 Scoping Letter for the *Section 227 National Shoreline Erosion Control Demonstration Project, 63rd Street, Miami-Dade County, Florida*. With this letter we are initiating EFH consultation with your agency.

The proposed study will consider the No Action Plan and the Submerged Artificial Reef Training Structure (SMART) alternatives. The SMART project footprint would be approximately 1,800-feet long and 40-feet wide (about 1.65 acres) from NE 63rd Street to NE 65th Street. It would consist of reef modules attached to an articulated concrete mat anchored to the solid substrate beneath the sandy bottom in 200-foot long segments, with six, 50-foot gaps between segments. The SMART structure would be placed in 10 feet of water approximately 150-feet from the toe of beach fill. SMART would be covered by 1-foot of water at mean low water.

The proposed project is within the jurisdiction of the South Atlantic Fishery Management Council (SAFMC) and is designated EFH for shrimp, red drum, snapper-grouper complex, Spanish and king mackerel and coastal migratory pelagic species. Spiny lobster and coral habitat is more than 500-feet east of the proposed SMART footprint. The project area is within the offshore soft bottom communities that are less subject to wave related stress and are home to polychaetes, mollusca, arthropods, echinoderms and other miscellaneous groups that make up the macro faunal community. Various life stages of some of the managed species found in the project area include larvae, post larvae, juvenile and adult stages of red, gray, lane, school-master, mutton and yellowtail snappers, scamps, speckled hind, red yellow edge, gag groupers and white grunt. Categories of EFH include water column and open sand habitat. No Habitat Areas of Particular Concern (HAPC) are within the proposed project area.

The Corps has determined that the proposed erosion control alternative, SMART, is not likely to adversely affect designated EFH (sandy substrate, water column) or the SAFMC managed species associated with the EFH habitats. Spiny lobster may benefit from the proposed project. The SMART alternative would cover a small percentage of sandy bottom within the region and would provide substrate for many plankton, algae, fish, invertebrates, sponges, coral and epi-biota that could be transported within the water column. SMART would increase biomass within the project area and provide an 'edge effect' for small fish as well as habitat for fish correlated to module opening size. The different sized reef modules, openings, vertical walls, flow patterns and light levels would cater to a diverse benthic community structure. Although some current change is anticipated with the SMART alternative, it is determined not likely to adversely affect EFH.

Increased turbidity and disturbance during construction may temporarily hinder feeding and migration of fishes within these habitats. Due to the relatively small habitat being impacted during the proposed project construction, and the available adjacent habitats, fishes should be able to utilize these adjacent habitats until construction is complete. Impacts associated with the proposed project are expected to be temporary in nature and do not present any long-term significant adverse affects to EFH. Cumulative impacts to EFH would be minimal, if any.

The proposed submerged breakwater, for erosion control purposes, would not pose a navigation hazard, would be constructed of concrete and would be designed and constructed to be stable given the wave climate and water depth environment.

Initial research indicates the SMART alternative complies with the State of Florida, Department of Environmental Protection, National Marine Fisheries Service and US Army Corps of Engineers artificial reef criteria. Monitoring of the SMART alternative is proposed. Collected data would be available for comparison with the submerged lime rock breakwater in nearby Sunny Isles. If the SMART structure does not perform it's intended purpose it can be removed under Section 227 of the Water Resources Development Act of 1996.

We request your EFH Conservation Recommendations pursuant to MSFMCA within 30 days. If you have any questions or need further information, please contact Mr. Paul Stevenson at 904-232-3747, fax at 904-232-3976 or e-mail at paul.c.stevenson@usace.army.mil.

Sincerely,

James C. Duck

James C. Duck
Chief, Planning Division

Copies Furnished:

Mr. David H. Rackly, National Marine Fisheries Service, 219 Fort Johnson Road, Charleston, South Carolina 29412-9110

Ms. Jocelyn Karazsia, National Marine Fisheries Service, 11420 North Kendall Drive, Suite 103, Miami, Florida 33176

Mr. Steve Blair, Dade County Department of Environmental Resources Management, 33 SW 2nd Avenue, Suite 1000, Miami, Florida 33130

Commanding Officer, US Coast Guard Civil Engineering Unit Miami, 15608 SW 117th Ave, Miami, FL 33177-1630

Mr. Ron Miedema, US Environmental Protection Agency, 400 North Congress Avenue Suite 120, West Palm Beach, FL, 33401-2912

Ms. Patricia Adams, US Fish & Wildlife Service, 1339 20th Street, Vero Beach, Florida 32960-3559

Mr. Keith Mille, Division of Marine Fisheries - Artificial Reef Program, Fish and Wildlife Conservation Commission, 620 South Meridian Street, Box MF-MFM Tallahassee, FL 32399-1600

Mr. Paden Woodruff, Bureau of Beaches, Wetland Resources, FDEP 3900 Commonwealth Blvd, Mail Station 300, Tallahassee, FL 32399-3000

Mr. Marty Seeling, Bureau of Beaches, Wetland Resources, FDEP 3900 Commonwealth Blvd, Mail Station 300, Tallahassee, FL 32399-3000

Bcc: (wo/encl)
CESAJ-DP-C (Stevens)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

July 17, 2003

Mr. James C. Duck
Chief, Planning Division
Plan Formulation Branch, Jacksonville Branch
Department of the Army, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Duck:

The National Marine Fisheries Service (NOAA Fisheries) has reviewed your letter dated June 26, 2003, which initiated Essential Fish Habitat (EFH) consultation for development of the Section 227 National Shoreline Erosion Control Demonstration Project at 63rd Street for the nearshore Submerged Artificial Reef Training Structure (SMART) proposal in Dade County, Florida. The proposed structure would be located approximately 150-foot from the toe of fill for the Test Beach Renourishment, in the vicinity of 63rd Street, in Miami Beach, Florida. The SMART design consists of 200-foot by 40-foot reef module segments, attached to an articulated concrete mat and positioned parallel to the shoreline for a total length of 1,800 feet. The artificial reef modules would vary in size from 2,400 (4.5 feet high) pounds to 9,800 (6 feet high) pounds and would be covered by a minimum of one foot of water at mean low water. The reef modules would be anchored to the mats to prevent rolling and the mat ends would be free of reef to help prevent scouring. According to the information provided, "the SMART design breakwater is proposed to protect the beach renourishment and provide environmental benefits." The primary benefit of the SMART is sand retention; however, the Corps of Engineers (COE) expects the artificial reef will provide increased habitat for juvenile marine organisms.

By letter dated April 28, 2003, the COE requested that NOAA Fisheries define issues and concerns that would be addressed during the development of the "100 percent plans and specifications" for the Section 227 National Shoreline Erosion Control Demonstration Project at 63rd Street in Dade County, Florida. The URS Group, on behalf of the COE, is developing the 100 percent submittal for the SMART proposal. By letter dated May 27, 2003, NOAA Fisheries acknowledged the COE's effort to provide additional marine habitat and recreational benefits and we requested additional information [see Essential Fish Habitat (EFH) Conservation Recommendations, below].

The project is located in an area identified as EFH by the South Atlantic Fishery Management Council (SAFMC). Categories of EFH currently found within the project area include the water column. In addition, artificial/manmade reefs are designated EFH. The marine water column has been designated as EFH due to its importance as the medium of transport for nutrients and for movement of living marine resources between essential habitats. Managed species associated with the marine water column include eggs and sub-adult brown and pink shrimp; gag and yellowedge grouper; gray, mutton, lane, and schoolmaster snappers; and white grunt. In addition, NOAA Fisheries has identified EFH for highly migratory species that utilize the water column including nurse, bonnethead, lemon, black tip, and bullsharks. Artificial reefs have been designated EFH because they provide suitable substrate for the proliferation of live bottom (e.g., coral) and habitat for managed species. Hardbottom/coral reef habitats have been identified as EFH for juvenile and adult gag and yellowedge groupers, and gray and mutton snappers. Detailed information on shrimp, the snapper/grouper complex (containing ten families and 73 species), and other Federally managed fisheries and their EFH is provided in the 1998 generic amendment of the Fishery Management Plans (FMP) for the South Atlantic region prepared by the SAFMC. The 1998 amendment was prepared as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). Finally in this regard, we note that the SAFMC has designated hardbottom habitat and coral as a Habitat Area of Particular Concern (HAPC) for the snapper/grouper complex and spiny lobster. HAPCs are subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area.

NOAA Fisheries supports the creation of properly designed artificial reefs as fishery management tools to attract fish and, in some situations, mitigate for anthropogenic and natural damage to coral and hard bottom reefs, when coupled with additional fishery management measures (for example the designation of no-take zones). NOAA Fisheries also concurs with leading artificial reef researchers in this region (see Bohnsack 1989) that artificial reefs are unlikely to benefit heavily exploited or overfished populations without other management actions. Additionally, we are concerned that the newly created hardbottom would create habitat that is conducive to use by predatory organisms (see EFH Consrvation Recommendation #1A) and that juvenile fish numbers could be significantly reduced by predation. To address this, predation could be reduced through reef structure designs that use stable materials and increased cover for juvenile fish (see EFH Conservation #1B). We further note that, if not properly sited, the reefs may have only minimal habitat value and could even degrade existing hard bottom and other local habitats. Accordingly, it would be desirable to perform and evaluate a benthic survey of the overall project area (see EFH Conservation Recommendation #2).

According to the information you provided, it is expected that the SMART will provide substrate for coral growth. We note that by letter dated April 28, 2003, addressed to the COE Planning Division, NOAA Fisheries provided comments on the Miami Harbor Draft Environmental Impact Statement (DEIS) and General Reevaluation Report (GRR) for the proposed Port of Miami dredging and expansion project. We recommended the COE develop a plan to relocate hard corals that comprise the high-relief hardbottom/coral reef, if dredging in areas that support coral cannot be avoided. NOAA Fisheries recommended that, at a minimum, all hard coral colonies larger than 12 inches in diameter be relocated by experienced personnel and using established methods, to suitable nearby hardbottom substrate. NOAA Fisheries would support a coral relocation effort within the SMART project area and we request that the COE evaluate the feasibility of this.

The National Artificial Reef Plan (Plan) is a guide for artificial reef program managers and policy makers regarding how to access and understand the many facets of artificial reef development and use. The Plan was developed by the Secretary of Commerce under direction of the National Fishing Enhancement Act of 1984. Under this Act, the Secretary of the Army, when issuing a permit for artificial reefs, shall consult with and consider the views of appropriate local, state, and federal agencies and other interested parties; ensure that the provisions for siting, constructing, monitoring, and managing artificial reefs are consistent with established criteria and standards; and ensure that the title to the artificial reef construction material is unambiguous and that responsibility for maintenance and the financial ability to assume liability is clearly established. NOAA Fisheries recommends the COE demonstrate full consistency with provisions of the *National Artificial Reef Plan* (1985) and the draft plan revision (2001), including: (1) Demonstrated consistency with the State of Florida's Artificial Reef Plan; (2) Have a specific objective for fisheries management or other purpose stated in the goal of the statewide, or site-specific plan; (3) Have biological justification relating to present and future fishery management needs; (4) Have minimal negative effects on existing fisheries, and/or conflicts with other uses, and have minimal negative effects on other natural resources and their future use; (5) Use materials that have long-term compatibility with the aquatic environment; and (6) Conduct monitoring during and after construction to determine whether reefs meet permit terms and conditions and are functioning as anticipated. This monitoring plan should be provided for our review (see EFH Conservation Recommendations #3 and #4). In addition, we note that, artificial reefs should be placed in areas that will support the structures. We note that artificial reefs have been subject to partial burial and lowered habitat quality in some areas of Palm Beach County due to reef subsidence. Please also provide geotechnical information that documents the sand depth below the reef and supports the determination that the SMART will not subside (see EFH Conservation Recommendation #5).

Given the limited information provided, additional information is warranted to evaluate the expected benefits of the proposed work on fishery resources. In view of the unforeseen effects that this project may have on EFH and NOAA trust resources, NOAA Fisheries recommends that the following additional information be submitted for our review:

EFH Conservation Recommendations

1. It should be demonstrated that the project will provide enhanced marine fisheries habitat. In connection with this, the following information should be provided:
   A. Identification of the specific fisheries and life history stages that would be enhanced by the proposed activity.
   B. Demonstrating that the structural design of the reef will provide suitable cover for juvenile fish and that populations of these fish will not be susceptible to unacceptable levels of predation.

2. The COE should prepare a benthic survey of the overall project area to ensure the proposed artificial reef structures will not threaten the integrity of natural habitats in the area, including live/hard bottoms, corals, seagrasses, and macroalgae. NOAA Fisheries recommends a 30-foot-wide or greater buffer between the proposed structures and natural habitats that occur within the project area.

3. The COE should demonstrate full consistency with the *National Artificial Reef Plan* (1985) and the draft plan revision (2001), including, but not limited to, the following provisions:
   A. Demonstrated consistency with the State of Florida's Artificial Reef Plan. Through this, the COE should:
      1. have a specific objective for fisheries management or other purpose stated in the goal of the statewide, or site-specific plan;
      2. have biological justification relating to present and future fishery management needs;
      3. have minimal negative effects on existing fisheries, and/or conflicts with other uses;
      4. have minimal negative effects on other natural resources and their future use;
      5. use materials that have long-term compatibility with the aquatic environment; and
      6. conduct monitoring during and after construction to determine whether reefs meet permit terms and conditions and are functioning as anticipated (note that this monitoring plan shall be provided for NOAA Fisheries review);

4. The COE should demonstrate the capability of assuming long-term financial liability for the deployment, monitoring, and maintenance of the project; and

5. Please provide geotechnical information that documents the sand depth below the reef and supports the determination that the SMART will not subside.

We appreciate the opportunity to provide these comments. Related correspondence should be addressed to the attention of Ms. Jocelyn Karazsia at our Miami Office. She may be reached at 11420 North Kendall Drive, Suite #103, Miami, Florida 33176, or by telephone at (305) 595-8352.

Sincerely,

David H. Rackley

for Frederick C. Sutter III
Deputy Regional Administrator

cc:
EPA, WPB
FWS, Vero
DEP, Tallahassee
FFWCC, Tallahassee
F/SER45-Karazsia

Literature Cited

Bohnsack, J. A. 1989. Are high densities of fishes at artificial reefs the result of habitat limitation or behavioral preference? Bulletin of Marine Science 44(2): 631-645.

National Artificial Reef Plan (revised 2001). National Marine Fisheries Service. Available on-line at: http://www.nmfs.noaa.gov/irf/Revised_PLAN_11_16.pdf

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

APR 2 0 2004

Planning Division
Environmental Branch

Mr. Frederick C. Sutter III
Deputy Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Sutter:

Thank you for the Essential Fish Habitat Conservation Recommendations in your May 27, 2003 letter (enclosed) for the Section 227 National Shoreline Erosion Control, Development and Demonstration Program, 63rd Street "Hotspot" project, Miami-Dade County, Florida. Section 227 of the Water Resources Development Act of 1996 directs the Secretary of the Army to conduct a program that implements innovative technologies in an environmentally friendly manner to abate shoreline erosion as cost-effectively as possible.

A detailed reply to the 6 EFH recommendations is enclosed. We intend to comply with the EFH recommendations that are within the Section 227 authority objectives (2,4,5,6). The remaining recommendations are not within our authority or are economically infeasible to implement. This letter constitutes our response to your conservation recommendations of May 27, 2003. Please inform this office if NMFS-HCD plans to elevate to the Department of Army Headquarters in accordance with 50 CFR 600.920(j)(2).

If you have any questions, please contact Paul Stevenson at 904 232-3747.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

August 26, 2004

Mr. James C. Duck
Chief, Planning Division
Plan Formulation Branch, Jacksonville Branch
Department of the Army, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Duck:

The National Marine Fisheries Service (NOAA Fisheries) has reviewed the Draft Environmental Assessment (DEA) for the Section 227 National Shoreline Erosion Control Demonstration Project for the nearshore Submerged Artificial Reef Training Structure (SMART) proposal in Dade County, Florida. The proposed structure would be located approximately 150 feet from the toe of fill for the Test Beach Renourishment in the vicinity of 63rd Street, in Miami Beach, Florida. The SMART design consists of 200-foot by 40-foot reef module segments, attached to an articulated concrete mat and positioned parallel to the shoreline for a total length of 1,800 feet. The artificial reef modules would vary in size from 2,400 pounds (4.5 feet high) to 9,800 pounds (6 feet high) and would be covered by a minimum of one foot of water at mean low water. The reef modules would be anchored to the mats to prevent rolling and the mat ends would be free of any reef structure to help prevent scouring. According to the information provided the SMART design breakwater is designed protect the renourished beach and provide environmental benefits. The primary benefit of the SMART is sand retention; however, according to information provided, the Army Corps of Engineers (COE) expects the artificial reef will provide increased habitat for juvenile marine organisms.

By letter dated April 28, 2003, the COE requested that NOAA Fisheries define issues and concerns that would be addressed during development of the "100 percent plans and specifications" for the Section 227 National Shoreline Erosion Control Demonstration Project at 63rd Street in Dade County, Florida. The URS Group, on behalf of the COE, is developing the 100 percent submittal for the SMART proposal. By letter dated May 27, 2003, NOAA Fisheries acknowledged the COE's effort to provide additional marine habitat and recreational benefits and we requested additional information.

By letter dated July 17, 2004, NOAA Fisheries responded to your letter of June 26, 2003, which initiated essential fish habitat (EFH) consultation for development of the Section 227 National

Shoreline Erosion Control Demonstration Project at 63rd Street for the nearshore SMART proposal. In that letter, we provided the following EFH conservation recommendations. The COE's April 20, 2004 response to our EFH conservation recommendations is also provided:

1. It should be demonstrated that the project will provide enhanced marine fisheries habitat. In connection with this, the following information should be provided:
   A. Identification of the specific fisheries and life history stages that would be enhanced by the proposed activity.
   B. Information demonstrating that the structural design of the reef will provide suitable cover for juvenile fish and that populations of these fish will not be susceptible to unacceptable levels of predation.

COE response: The Jacksonville District COE rejects this conservation recommendation since the proposed SMART structure is designed to be a submerged breakwater to abate wave energy, not an artificial reef. Subsequently, recommendation #1 is not within the authority of the Section 227 program and the COE cannot fulfill this recommendation.

2. The COE should prepare a benthic survey of the overall project area to ensure the proposed artificial reef structures will not threaten the integrity of natural habitats in the area, including live/hard bottoms, corals, seagrasses, and macroalgae. NOAA Fisheries recommends a 30-foot-wide or greater buffer between the proposed structures and natural habitats that occur within the project area.

COE response: The SMART structure is a submerged breakwater and will be located well shoreward of hardbottoms and corals. No seagrasses are within the project area.

3. The COE should demonstrate full consistency with the *National Artificial Reef Plan* (1985) and the draft plan revision (2001), including, but not limited to, the following provisions:
   A. Demonstrated consistency with the State of Florida's Artificial Reef Plan. Through this, the COE should:
      1. have a specific objective for fisheries management or other purpose stated in the goal of the statewide, or site-specific plan;
      2. have biological justification relating to present and future fishery management needs;
      3. have minimal negative effects on existing fisheries, and/or conflicts with other uses;
      4. have minimal negative effects on other natural resources and their future use;
      5. use materials that have long-term compatibility with the aquatic environment; and
      6. conduct monitoring during and after construction to determine whether reefs meet permit terms and conditions and are functioning as anticipated (note that this monitoring plan shall be provided for NOAA Fisheries review).

COE response: The COE had read the above referenced artificial reef plans and consulted with federal and state points on contacts concerning artificial reef guidelines. The SMART structure would comply with the intent of the artificial reef plans. The SMART structure would be approximately 2,272-feet-long, 6-feet-wide and located 400-feet from the mean shoreline. The SMART structure would be perpendicular to the shoreline and form a crescent-shaped submerged breakwater, covering approximately 2.1 acres of sandy benthic habitat. The appropriate marine specific connections as per the American Society of Testing Materials would be used. It is designed to control shoreline erosion. The SMART structure would have minimal negative effects to fisheries, natural resources, and their future use. Monitoring is proposed to inspect physical and biological aspects within the project area.

4. The COE should demonstrate the capability of assuming long-term financial liability for the deployment, monitoring, and maintenance of the project; and

COE response: Under the Section 227 Program the COE would cost-share the proposed SMART project with the local sponsor, Miami-Dade County Department of Environmental Resources Management (DERM). After the SMART structure has been constructed DERM would be responsible for the monitoring and maintenance.

5. Please provide geotechnical information that documents the sand depth below the reef and supports the determination that the SMART will not subside.

COE response: Geotechnical information available from the Sunny Isles submerged breakwater project found sand, carbonate, fine to coarse sand, sand size shell and limestone fragments, trace shell (gravel size fragments) and trace silt deposits to depths of 6-feet. Average silt content of Sunny Isles core borings is 6.1 percent. Visual shell content ranged from one to 76 percent. The composite mean grain size of the sediment is approximately 0.44 mm. Tested samples showed 96 percent carbonate material. Rock fragments are estimated to range between one inch and three feet could comprise up to 10 percent of the project area. Core borings taken in location of the Sunny Isles submerged breakwater revealed generally 6-feet of medium dense, gray, fine to medium grained shelly sand, overlying a hard gravelly clayey sand. It was summarized that the above conditions should provide a stable foundation for the proposed breakwater. These conditions are thought to be similar to the 63rd Street "Hotspot" project area. The SMART structure engineering consultant, URS Corporation, feels confident that the proposed submerged breakwater will not subside more than three inches.

Although NOAA Fisheries remains concerned in regard to the design of the structure and associated lack of demonstration that the project will provide enhanced marine fisheries habitat (EFH conservation recommendation #1), we belived that the COE has sufficiently addressed our recommendations, given that the overall purpose of the work is to abate shoreline erosion. We request that copies of biological and physical monitoring reports be provided to NOAA Fisheries for review and that any significant modification of the SMART structure be coordinated with us.

We have no additional comments to regarding the DEA or EFH consultation. The goals and requirements of the Magnuson-Stevens Fishery Conservation and Management Act and the regulations for implementing the EFH requirements of the Act have largely been met.

We appreciate the opportunity to provide these comments. Related correspondence should be addressed to Ms. Jocelyn Karazsia at our Charleston, South Carolina, Office. She may be reached at 219 Fort Johnson Road, Charleston, South Carolina, 29412, or by telephone at (843) 762-8559.

Sincerely,

David H. Rackley

for Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc:
EPA, WPB
FWS, Vero
DEP, Tallahassee
FFWCC, Tallahassee
F/SER45-Karazsia

Consultation with USFWS Under Section 7 of the Endangered Species Act

From:	Trish_Adams@fws.gov
To:	Stevenson, Paul C SAJ
Cc:	Spencer_Simon@fws.gov
Subject:	SMART Reef Section 227
Date:	Tuesday, April 19, 2005 5:04:28 PM

Dear Paul,

In the U.S. Army Corps of Engineers' (Corps) Biological Assessment dated April 9, 2004, regarding the Section 277 SMART Reef project located in Miami Beach, Florida, the Corps determined the project "may affect, but is not likely to adversely affect" the federally threatened loggerhead sea turtle (Caretta caretta), endangered green sea turtle (Chelonia mydas), endangered leatherback sea turtle (Dermochelys coriacea), endangered hawksbill sea turtle (Eretmochelys imbricata), endangered Kemp's ridley sea turtle (Lepidochelys kempii), and endangered West Indian manatee (Trichechus manatus).

The Corps anticipates that sea turtle nesting beach habitat may be temporarily affected as the beach equilibrates after the breakwater structure is construction. Since equilibrium is expected to be reached in two years or less, the Service concurs with the Corps' "may affect, but is not likely to adversely affect" determination regarding nesting sea turtles. The Corps has agreed to implement the Standard Manatee Construction Conditions into the project design, the Service concurs with the Corps' "may affect, but is not likely to adversely affect" determination for the manatee.

If you have any questions, please feel free to contact me at the number below.

Thank you,
Trish

Trish Adams
US Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
Phone: (772) 562-3909, extension 232
Fax: (772) 562-4288

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

APR 0 9 2004

Mr. James J. Slack
US Fish and Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

Dear Mr. Slack:

Enclosed is a Biological Assessment prepared by the U.S. Army Corps of Engineers (Corps), Jacksonville District, under Section 7 of the Endangered Species Act of 1973 (ESA) as amended. The proposed project is the Section 227, National Shoreline Erosion Control Developmental and Demonstration Program, 63rd Street "Hotspot", SubMerged Artificial Reef Training (SMART) structure, at Miami Beach, Miami-Dade County, Florida.

The U.S. Fish and Wildlife Service (FWS) in coordination with the Corps identified the manatee as potentially occurring in the project area. Nesting sea turtles were also identified as a FWS concern.

Based on the enclosed Biological Assessment, the Corps has determined that the proposed action may affect, but is not likely to adversely affect the manatee or nesting sea turtles. The Corps requests your written concurrence on this determination.

We are incorporating by reference, the FWS, October 24, 1995 Biological Opinion for the Region III of the Coast of Florida Erosion and Storm Effects Study, "Reasonable and Prudent Measures" and "Terms and Conditions" (as updated by the March 1, 2001 FWS, Fish and Wildlife Coordination Act Report for the Corps' "Alternative Test Beach Renourishment Study, Miami-Dade County"). The Corps would also like to incorporate by reference the Miami Harbor Biological Assessment dated July 21, 2002 and the FWS June 17, 2003 Biological Opinion (#4-1-03-I-786).

The point of contact in is Mr. Paul Stevenson at 904-232-3747 or electronic mail at paul.c.stevenson@saj02.usace/army.mil.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

BIOLOGICAL ASSESSMENT

Section 227, National Shoreline Erosion Control Developmental and Demonstration Program
63rd Street "Hotspot"
SubMerged Artificial Reef Training (SMART) Structure
Miami Beach, Miami-Dade County, Florida

1. Location. The site of the proposed action is State of Florida monuments R-44 to R-46A, in the vicinity of 63rd Street, Miami Beach, Miami-Dade County, Florida (Figure 1).

2. Identification of Listed Species and Critical Habitat in the Vicinity of the Proposed Action. The US Fish and Wildlife Service (USFWS) in coordination with the Corps identified the West Indian manatee (*Trichecus manatus*) and nesting sea turtles [loggerhead sea turtle, *(Caretta caretta)*, green turtles *(Chelonia mydas)*, leatherback turtles *(Dermochelys coriacea)*, hawksbill turtles *(Eretmochelys imbricate)*, Kemp's ridleys (*Lepidochelys kempii)* and olive Ridley (*Lepidochelys oliveaca*)] as potentially occurring within the project area of Miami Beach between State monuments R-44 and R-46A. No designated critical habitat is located in the project area.

3. Description of the Proposed Activity.
The objective of the National Shoreline Erosion Control Development and Demonstration Program, 63rd Street "Hotspot", Miami Beach, Dade County, Florida, proposed project, is to abate shoreline erosion and retain placed fill material along shorelines in the most cost-effective and environmentally friendly manner possible. The program strives to utilize research to develop innovative methods to meet objectives. Under the Water Resources Development Act (WRDA) of 1996, Section 227, the project can be altered or removed if it does not meet the stated objectives.

The Corps, in partnership with the Dade County Department of Environmental Resources Management (DERM), proposes to construct the SubMerged Artificial Reef Training (SMART) structure 400-foot from the mean shoreline in 7-foot of water. The SMART structure would be comprised of 6-foot tall hollow goliath reef balls and 4-foot tall solid bay balls, attached to an articulated concrete mat. Four goliath reef balls and one bay ball would comprise one 'segment', 42.8-foot long by 6-foot wide (Figure 2). The segments would be placed on the Atlantic Ocean floor by crane from a barge, perpendicular to the shoreline. The 30-ton segments would be placed next to each other for a total SMART structure length of 2,272-foot. The ends would be tapered to form an overall crescent shaped submerged breakwater (Figure 3). The SMART structure installation would be diver assisted for quality assurance. The SMART structure footprint would be approximately 2.1 acres.

4. Assessment of Potential Impacts on Listed Species. Based on the precautions listed in paragraph (5) below, the Corps has determined that the proposed action may affect, but is not likely to adversely affect listed species or critical habitat.

5. Efforts to Eliminate Potential Impacts to Listed Species or Critical Habitat.

a. Standard manatee protection measures (such as observers and no wake speeds for work vessels) would be implemented. A species observer would be present during the SMART structure construction. All SMART structure construction would be diver assisted to ensure construction quality and endangered species protection.

b. No SMART structure construction would be undertaken from the beach. All SMART structure construction would be conducted from the Atlantic Ocean via barge and crane.

c. If the SMART structure is constructed during the sea turtle nesting window, work lighting would be shielded and or focused only on work areas only to avoid disorienting nesting sea turtles or sea turtle hatchlings.

1. Any marine mammal(s) in the SMART structure construction zone would not be forced to move out of the zone by human intervention. Work would stop until the animal(s) move(s) out of the project construction zone on its own volition.

2. In the event a marine mammal or marine turtle is injured or killed during SMART structure construction, the Contractor would immediately notify the Contracting Officer as well as the following agencies:

Florida Marine Patrol "Manatee Hotline" 1-800-342-5367.

U.S. Fish and Wildlife Service, Vero Beach Field Office at 561-562-3909 for South Florida.

National Marine Fisheries SERO 727-570-5312.

6. Species Included in this Assessment

Of the listed species under USFWS jurisdiction occurring in the action area, the Corps believes that the nesting green turtle (*Chelonia mydas*) and loggerhead turtle (*Caretta caretta*), may be affected by the SMART structure. Additionally the hawksbill, kemps ridley, olive ridley and leatherback may also be found in the vicinity of the project. Daily sea turtle nesting surveys are conducted by Dade County Park and Recreation Department with a historically very successful relocation and hatch rate (pers. Comm., B. Flynn, Dade Co. DERM). Hardbottom resources outside of the proposed project area are not likely to be adversely affected.

The endangered West Indian manatee (*Trichecus manatus*) may also occur within the action area. Standard Manatee Construction Protection Measures will be implemented as done in the past with Corps projects where manatee are known to frequent the project area. The Corps has undertaken consultation with the National Marine Fisheries Service concerning the effects of the proposed action on jurisdictional species in January 2004. Their concurrence is anticipated and would be included in the EA package.

Sea Turtles

Dade County is within the normal nesting range of three species of sea turtles: the loggerhead (*Caretta caretta*), green turtle (*Chelonia mydas*) and leatherback turtle (*Dermochelys mydas*). The green sea turtle is listed under the U. S. Endangered Species Act, 1973 and Chapter 370, F.S. The loggerhead turtle is listed as a threatened species. The majority of sea turtle nesting activity occurred during the summer months of June, July and August, with nesting activity occurring as early as March and as late as September.

The waters offshore of Dade County are also habitat used for foraging and shelter for the three species listed above and the hawksbill turtle (*Eretmochelys imbricata*), and possibly the Kemp's Ridley turtle (*Lepidochelys kempii*)

(USACE, 2000) and olive Ridley (*Lepidochelys oliveaca*). Daily sea turtle nesting surveys are conducted by Dade County Park and Recreation Department with a historically very successful relocation and hatch rate (pers. Comm., B. Flynn, Dade Co. DERM). These turtles do occur in Atlantic Ocean and could nest on Dade County beaches, possibly within the proposed project area. Observers would be posted during construction operations to look for sea turtles and manatees that may wander into the proposed project area.

Hardbottom Resources

Hardbottom resources can be found offshore of the proposed SMART structure but not within the project area (Figure 4).

Other Threatened or Endangered Species

Other threatened or endangered species that may be found in the in the coastal waters off of Miami-Dade County during certain times of the year are the finback whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), right whale (*Eubalaena glacialis*), sei whale, (*Balaenoptera borealis*) and the sperm whale (*Physeter macrocephalus catodon*). These are infrequent visitors to the area and are not likely to be impacted by project activities.

7. Effects of the Action on Protected Species.
As previously stated, the Corps believes that the loggerhead turtle and leatherback turtle, have the potential to be indirectly effected by the proposed National Shoreline Erosion Control Development and Demonstration Program, 63rd Street "Hotspot", Miami Beach, Dade County, Florida project.

The Corps acknowledges that the SMART structure may temporarily increase turbidity levels within the construction area, however, given the turbidity level fluctuation of the nearshore area, the Corps does not believe that there would be any additional adverse impacts to sea turtles. Modeling with Storm induced Beach Change (SBEACH) and General Neural Simulation System (GENESIS) has predicted some littoral sediment transport changes to the project area that would seek equilibrium before returning to historic conditions. The SMART structure may also provide an increase of forage habitat for sea turtles.

8. Effect Determination

The Corps has determined that the proposed construction of the SMART structure may affect, but would not adversely affect listed species within the action area and requests USFWS concur with this finding.

9. References

The Corps is incorporating by reference, the USFWS, October 24, 1995 Biological Opinion for the Region III of the Coast of Florida Erosion and Storm Effects Study, "Reasonable and Prudent Measures" and "Terms and Conditions" (as updated by the March 1, 2001 USFWS, Fish and Wildlife Coordination Act Report (CAR) for the Corps' "Alternative Test Beach Renourishment Study, Miami-Dade County"). The Corps would also like to incorporate by reference the Miami Harbor Biological Assessment dated July 21, 2002 and the USFWS June 17, 2003 Biological Opinion (#4-1-03-I-786).

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Consultation with NMFS Under Section 7 of the Endangered Species Act

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5505
727.824.5312, FAX 824.5309
http://sero.nmfs.noaa.gov

SEP 16 2010 F/SER31:MCB

Mr. Eric P. Summa
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232

Dear Mr. Summa:

This responds to your letter dated July 17, 2010, requesting National Marine Fisheries Service (NMFS) concurrence with your determinations pursuant to section 7 of the Endangered Species Act (ESA) for the Army Corps of Engineers (COE) Jacksonville District's proposed Submerged Artificial Reef Training (SMART) Structure. Consultation was originally initated in July 2004, whereupon we concluded that green, loggerhead, Kemp's ridley, leatherback, and hawksbill sea turtles, as well as smalltooth sawfish, are not likely to be adversely affected by the project. The project was subsequently put on hold due to lack of funding, but was recently reauthorized, albeit at a smaller scale than initially proposed. Due to the listing of new species since the January 31, 2005, concurrence letter, you provided additional information and determined the project may affect, but is not likely to adversely affect, smalltooth sawfish, elkhorn coral, and staghorn coral, and will not adversely modify designated (*Acropora*) critical habitat. NMFS' determinations regarding the effects of the proposed action are based on the description of the action in this informal consultation. You are reminded that if the proposed action changes, or if any new species are listed or critical habitat designated before all work is completed, the findings of the present consultation may be negated and reinitiation of consultation with NMFS may be required.

The purpose of the project is to place reef balls to serve as an artificial reef to attenuate wave energy to abate shoreline erosion. The site is proposed offshore of Miami Beach in the vicinity of 63rd Street, between the State of Florida Department of Natural Resources Monuments R-46, northward to R-45, the midpoint of which is located at approximate latitude 25.84556°N, longitude 80.11704°W (NAD83). The COE proposes to construct the SMART Structure 500 ft from the mean shoreline, at a depth of 8.2 ft, mean lower low water. Construction of the artificial reef is expected to occur over a 2-3 month period sometime between October and early April. The reef will be comprised of 6-ft-diameter hollow goliath reef balls and 3-ft-diameter bay balls. Each segment of the 1,250-ft-long structure would be 41 ft long by 6.5 ft wide, with each segment having a mass of approximately 30 tons. Each segment will be placed perpendicular to the beach with a barge crane assisted by divers in the water in three structural areas, such that the total SMART Structure will be approximately 1,250 ft long and 42 ft wide. To allow sea turtles access to and from the beach, a 6-ft-wide "turtle lane" will be constructed every tenth segment, in addition to two 250-ft wide gaps between the three structural areas. The total footprint of the structure will be approximately 0.7 acre.

Both elkorn and staghorn corals, as well as smalltooth sawfish, protected by the ESA can be found in or near the action area and may be affected by the project. Additionally, the action area is found within designated critical habitat for both elkhorn and staghorn corals.

NMFS concludes that smalltooth sawfish and elkhorn and staghorn corals are not likely to be adversely affected by the proposed action. Effects on smalltooth sawfish and corals include the risk of injury from placement of the SMART Structure components. However, due to the mobility of smalltooth sawfish and the fact the components will be aided into position by divers in the water, the risk of injury will be discountable. Also, the implementation of NMFS' March 23, 2006, *Sea Turtle and Smalltooth Sawfish Construction Conditions* will further reduce the chance of an interaction. As the placement of the SMART Structure will occur in nearshore waters on unconsolidated sand, no impact to elkhorn and staghorn corals are expected. Based on the above, NMFS concludes that smalltooth sawfish and elkhorn and staghorn corals are not likely to be adversely affected by the proposed action.

Additionally, NMFS concludes the proposed action will not adversely affect designated critical habitat for elkhorn and staghorn corals. Since the proposed project will occur on unconsolidated sand, the action area lacks the essential feature necessary for coral settlement and growth (i.e., natural consolidated hard substrate).

This concludes your consultation responsibilities under the ESA for species under NMFS' purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

We have enclosed additional information on other statutory requirements that may apply to this action, and on NMFS' Public Consultation Tracking System, which will allow you to track the status of ESA consultations. If you have any questions, please contact Michael Barnette at (727) 551-5794 or by e-mail at Michael.Barnette@noaa.gov.

Sincerely,

James E. Weaver

for Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

File: 1514-22 F.4
Ref: I/SER/2010/03870

PCTS Access and Additional Considerations for ESA Section 7 Consultations
(Revised 5-13-2008)

Public Consultation Tracking System (PCTS) Guidance: PCTS is an online query system at https://pcts.nmfs.noaa.gov/ that allows federal agencies and U.S. Army Corps of Engineers' (COE) permit applicants and their consultants to ascertain the status of NMFS' Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations, conducted pursuant to ESA section 7, and Magnuson-Stevens Fishery Conservation and Management Act's (MSA) sections 305(b)2 and 305(b)(4), respectively. Federal agencies are required to enter an agency-specific username and password to query the Federal Agency Site. The COE "Permit Site" (no password needed) allows COE permit applicants and consultants to check on the current status of Clean Water Act section 404 permit actions for which NMFS has conducted, or is in the process of conducting, an ESA or EFH consultation with the COE.

For COE-permitted projects, click on "Enter Corps Permit Site." From the "Choose Agency Subdivision (Required)" list, pick the appropriate COE district. At "Enter Agency Permit Number" type in the COE district identifier, hyphen, year, hyphen, number. The COE is in the processing of converting its permit application database to PCTS-compatible "ORM." An example permit number is: SAJ-2005-000001234-IPS-1. For the Jacksonville District, which has already converted to ORM, permit application numbers should be entered as SAJ (hyphen), followed by 4-digit year (hyphen), followed by permit application numeric identifier with no preceding zeros. For example: SAJ-2005-123; SAJ-2005-1234; SAJ-2005-12345.

For inquiries regarding applications processed by COE districts that have not yet made the conversion to ORM (e.g., Mobile District), enter the 9-digit numeric identifier, or convert the existing COE-assigned application number to 9 numeric digits by deleting all letters, hyphens, and commas; converting the year to 4-digit format (e.g., -04 to 2004); and adding additional zeros in front of the numeric identifier to make a total of 9 numeric digits. For example: AL05-982-F converts to 200500982; MS05-04401-A converts to 200504401. PCTS questions should be directed to Eric Hawk at Eric.Hawk@noaa.gov. Requests for username and password should be directed to PCTS.Usersupport@noaa.gov.

EFH Recommendations: In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NMFS' Habitat Conservation Division (HCD) pursuant to the MSA requirements for EFH consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NMFS letterhead from HCD regarding their concerns and/or finalizing EFH consultation.

Marine Mammal Protection Act (MMPA) Recommendations: The ESA section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If such takes may occur an incidental take authorization under MMPA section 101 (a)(5) is necessary. Contact Ken Hollingshead of our NMFS Headquarters' Protected Resources staff at (301) 713-2323 for more information on MMPA permitting procedures.

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

JUL 1 7 2010

Planning Division
Environmental Branch

Mr. David Bernhart
National Marine Fisheries Service
Southeast Regional Office
Protected Species Resources Division
263 13th Avenue South
St. Petersburg, Florida 33701

Dear Mr. Bernhart:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, has prepared a draft Environmental Assessment (EA) for the construction of the Submerged Artificial Reef Training (SMART) Structure under Sections 227 and 2038 of the Water Resources Development Acts (WRDA) of 1996 and 2007, respectively, in Miami-Dade County, Florida. The preferred alternative of the EA is to construct the SMART Structure parallel to Miami Beach in the vicinity of NE 63rd Street in a north/south orientation at approximately the -8.2 feet below the Mean Lower Low Water (MLLW) depth contour.

Enclosed please find the Corps' Biological Assessment of the effects of the project as currently proposed on listed species in the action area not previously consulted on for the project in 2004 under the Corps' original EA for the proposed project. The original consultation and NMFS' January 31, 2005 concurrence should be considered part of the consultation package. After preparing this Biological Assessment of the impacts of the proposed project, the Corps has determined that the proposed project may affect, but is not likely to adversely affect the smalltooth sawfish (*Pristis pectinata*), elkhorn coral (*Acropora palmata*) and staghorn coral (*Acropora cervicornis*) and will not adversely modify designated critical habitat. We request that you concur with this finding.

If you have any questions, please contact Mrs. Terri Jordan-Sellers at 904-232-1817 or email Terri.Jordan-Sellers@usace.army.mil.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Enclosure

BIOLOGICAL ASSESSMENT TO
THE NATIONAL MARINE FISHERIES SERVICE FOR
PROPOSED SUBMERGED ARTIFICIAL REEF TRAINING (SMART) STRUCTURE
SECTION 227/2038 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT PROGRAM
FOR THE 63RD STREET "HOTSPOT" MIAMI BEACH
MIAMI-DADE COUNTY, FLORIDA

The Corps has completed a draft Environmental Assessment (EA) for the construction of the Submerged Artificial Reef Training (SMART) Structure under Sections 227 and 2038 of the Water Resources Development Acts (WRDA) of 1996 and 2007, respectively in Miami-Dade County, Florida. The preferred alternative in the EA is to place the SMART Structure offshore of the 63rd erosional hotspot in -8.2 ft (MLLW) of water.

Project Location

Miami-Dade County is located along the southeast coast of Florida. Broward County (Fort Lauderdale) lies to the north, and Monroe County (Florida Keys) lies to the south of Miami-Dade County. The Miami-Dade County shoreline extends along two long peninsular barrier island segments and three smaller islands, each of which is separated from the mainland by Biscayne Bay. The city of Miami is located on the mainland, and a number of coastal communities are located along the barrier islands. These barrier islands vary in width from about 0.2 to 1.5 miles, with an average width of about 0.5 miles. Elevations along the entire coastal region (and much of the mainland) are low, generally less than 10 feet. Along the coastal region elevations are generally the highest along the coastline, sloping gradually downward toward the bay.

The Section 227/2038 proposed SMART structure project is proposed to be placed within Miami-Dade County in the vicinity of NE 63rd Street, near State of Florida DNR Monument R-46, northward to the proximity of DNR Monument R-45, in Miami Beach, FL (Figure 1).

Figure 1: Location Map

Background

The proposed SubMerged Artificial Reef Training (SMART) structure project was first authorized under Section 227 of the WRDA of 1996, and more recently authorized under Section 2038 of the WRDA 2007, H.R. 1495 of the 110th Congress, the National Shoreline Erosion Control Development Program of the U.S. Army Corps of Engineers (Corps).

The proposed SMART structure project was initially authorized under Section 227 of WRDA 1996 between 1998 and 2004, and due to the loss of funding was dropped in 2004. Section 227 authorities were extended for a 12 year period, and more recently the project was given authority under Section 227/2038. The 1996 authority specified that the Secretary of the Army shall establish and conduct a national shoreline erosion control development and demonstration program for a period of six years beginning on the date that funds are made available to carry out this section; the 2007 authority was similar, but does not expire.

In July 2004, the Corps released a Draft EA for the SMART structure entitled "Final Environmental Assessment, Section 227 National Shoreline Erosion Control Development and Demonstration Program – 63rd Street "Hotspot" Submerged Artificial Reef Training (SMART) Structure Miami-Dade County, Florida". Comments were received on that EA. The project then was placed on hold due to lack of funding and the Draft EA from July 2004 was not finalized with a FONSI determination. WRDA 2007 reauthorized the 227 program under Section 2038 of the Act, funding for the existing program was put in place and for the newly authorized project. Since the original EA had not been finalized, the Corps and local sponsor determined that it should be updated and re-released for review and comment before being finalized.

EA Preferred alternative – Construction of the SMART Structure.

The proposed Section 227/2038 SMART project would be located parallel to Miami Beach in the vicinity of NE 63rd Street (Figure 1) in a north/south orientation at approximately the -8.2 feet below the Mean Lower Low Water (MLLW) depth contour. The exact dimensions of the structure will be no greater than 1,250 feet in length, and 42 feet in width and the location of the structure is based on extensive modeling efforts. The SMART structure crest would be covered by approximately 1.5 feet of water at MLLW. The SMART structure would be placed at a the -8.2 ft MLLW contour, which as of March 2010 is located approximately 500 feet offshore of the mean shoreline. The specific location will be determined at the time of construction based on the -8.2 ft depth contour, which could change from the March 2010 location due to erosion from storms, etc prior to deployment of the modules. Final placement location will be determined based on the -8.2 ft MLLW contour.

The SMART structure would be constructed of numerous 41-foot long segments which will be approximately 6.5 feet wide. The SMART structure will be placed parallel to the shoreline, with individual units having a 25 degree offset from shore perpendicular, to form an overall crescent-shaped, continuous structure with the northern and southern structure terminus angled and narrowed.

The SMART structure segments would be composed of Goliath Reef Balls; standard size 6 by 5 feet (1.82 by 1.52 m), and Bay Balls; standard size 2 by 3 feet (0.61 by 0.91m) (Figure 2). Each reef ball will be molded to a square concrete slab attached to ARMORTEC Armorflex Concrete Block Mats (ABM) connected with cables in PVC pipe to form a continuous, articulated structure. The SMART structure units will be placed next to each other to efficiently absorb and diffuse wave energy in addition to mimicking a variable benthic landscape. Every 10th SMART segment would be comprised of an ABM without the Goliath Reef Balls and having only Bay Balls at the ends for weight to provide adequate sea turtle access lanes with a width of six feet and a depth of water above the Bay Ball of 4.5 feet at MLW per a request from US Fish and Wildlife Service (USFWS) on June 16, 2004, yielding adequate depth of water for adult sea turtle passage. In addition to having 6-foot wide turtle lanes every tenth segment, the final design of the SMART structure includes two 250-feet wide gaps between the three structural segments which will also facilitate passage of marine life (Figure 3).

The Goliath Reef Balls are bell-shaped, constructed of concrete, and weigh approximately 9,800 pounds. Both the Goliath and Bay Balls are hollow with randomly perforated complex (piling and ventilation) holes (Figure 2). A solid Bay Ball would be attached to the concrete mat to anchor the oceanside segment of the mat and prevent scouring. The SMART design provides a significant mass with a low center of gravity that is cost-effective to install from the sea via barge and crane. No upland construction lands would be needed except at a local port for the loading of materials.

Figure 2**: Reef Balls molded to concrete blocks and connected into an articulated unit.**

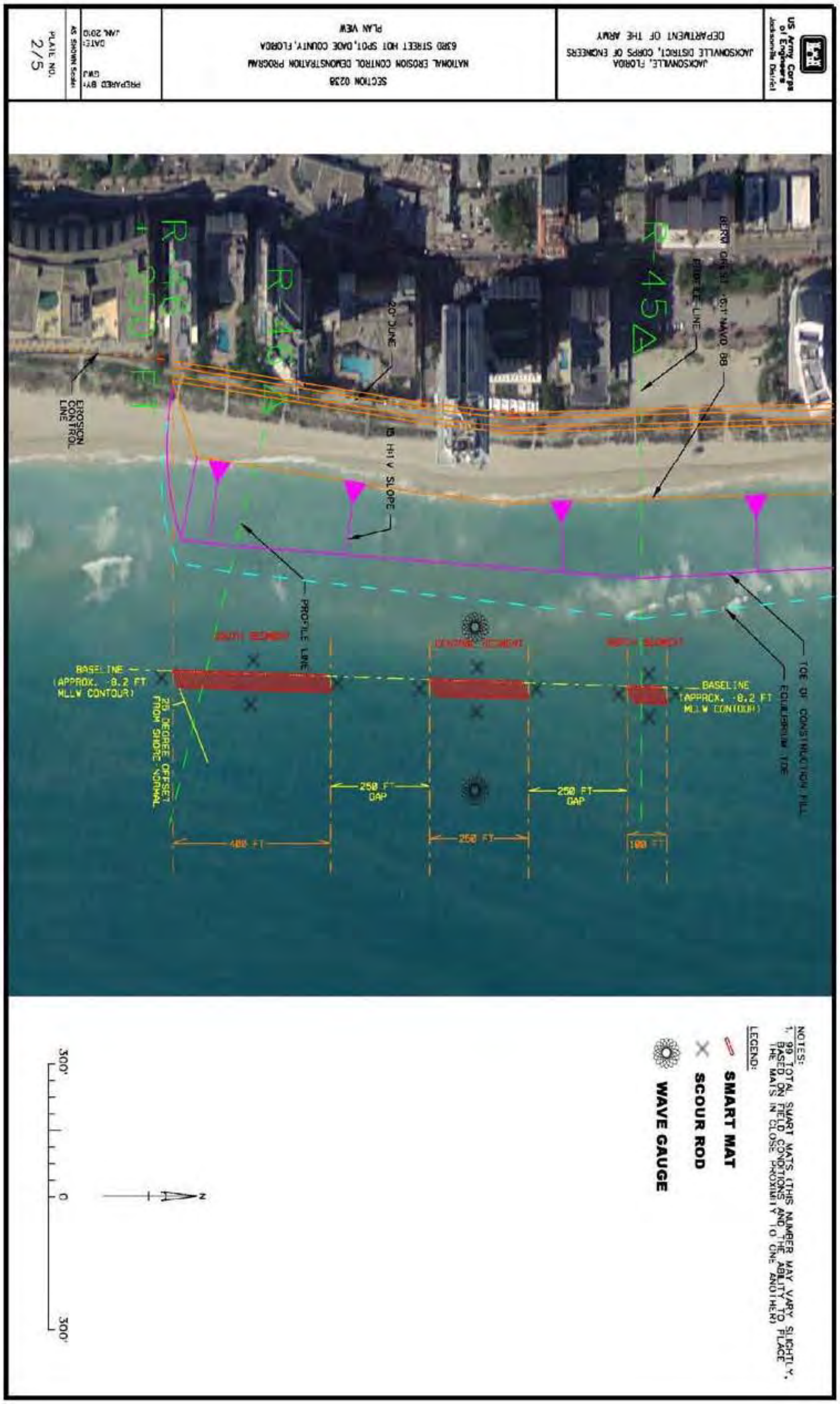

Figure 3 - Location of the SMART Structure

Protected Species Under NMFS Jurisdiction Included in this Assessment
On July 7, 2004, the Corps initiated consultation under Section 7 of the Endangered Species Act (ESA) with NMFS through the submittal of a Biological Assessment (BA) on the proposed SMART Structure project with a determination that the project "may affect, but is not likely to adversely affect listed species under NMFS' jurisdiction". On October 7, 2004, NMFS responded to the submittal of the BA with a request for additional information, and the Corps provided answers to NMFS' questions through email and phone conversations concluding with a summary letter on November 30, 2004. On January 31, 2005, NMFS concluded consultation under Section 7 of the ESA with a concurrence with the Corps' determination, this consultation and NMFS' "may affect, not likely to adversely affect "determination are hereby incorporated into this BA. Since that determination, NMFS has listed three additional species and designated critical habitat for two of the species in the project area. This BA serves to reinitiate consultation on smalltooth sawfish (*Pristis pectinata*), elkhorn coral (*Acropora palmata*) and staghorn coral (*Acropora cervicornis*) and designated critical habitat for the corals.

The Corps has reviewed the biological, status, threats and distribution information available through recovery plans, status reviews, previous biological assessments and biological opinions and believes that the following species will be in or near the action area and thus may be affected by the proposed project: smalltooth sawfish and the Acroporid corals. Details of the life history and status of these species will not be repeated here. A list of references reviewed is in the literature cited.

While Johnson's seagrass (*Halophila johnsonii*) and designated critical habitat for Johnson's seagrass is found in Miami-Dade County, it has only been found growing in lagoons along approximately 200 km of coastline in southeastern Florida (NMFS, 2002) and has never been recorded in an open ocean environment or beach environment like at the 63rd street project area and as such, the Corps believes that this project will have no effect on threatened Johnson's seagrass and no adverse modification of designated critical habitat. Based on this determination, there will be no further consideration of Johnson's seagrass in this assessment.

Elkhorn and staghorn coral (Acroporid corals)
On May 9, 2006, staghorn (*Acropora cervicornis*) and elkhorn (*Acropora palmata*) corals were listed as "threatened" under the ESA. On November 26, 2008, NMFS published a final rule in the Federal Register to designate critical habitat for elkhorn and staghorn corals. Designated critical habitat includes one specific area of the Atlantic-Ocean offshore of Palm Beach, Broward, Miami-Dade, and Monroe counties, Florida with defined parameters (Primary Constituent Elements or PCE) that must be present for the designated footprint to be considered critical habitat for the species. Elkhorn and staghorn corals are two of the major reef-building corals in the wider Caribbean. Staghorn coral is characterized by

staghorn-antler-like colonies, with cylindrical, straight, or slightly curved branches. Elkhorn colonies are flattened to near-round, with frond-like branches that typically radiate outward from a central trunk that is firmly attached to the sea floor. Historically, both acroporid species formed dense thickets at shallow (<5 m) and intermediate (10 to 15 m) depths in many reef systems, including some locations in the Florida Keys, western Caribbean (e.g., Jamaica, Cayman Islands, Caribbean Mexico, Belize), and eastern Caribbean. Early descriptions of Florida Keys reefs referred to reef zones, of which the staghorn zone was described for many shallow-water reefs (Jaap 1984, Dustan 1985, Dustan and Halas 1987). As summarized in Bruckner (2002), however, the structural and ecological roles of Atlantic *Acropora spp*. in the wider Caribbean are unique and cannot be filled by other reef-building corals in terms of accretion rates and the formation of structurally complex reefs.

The Corps requested that DERM conduct a diver verified nearshore hardbottom and *Acropora* survey for all of Miami-Dade County nearshore between R-37 and R-61 in conjunction with the Contract E and Contract G renourishment events. The surveys were conducted in March and April 2010 and in the SMART Structure project area (between R-45 and R-46), the substrates were found to be sand with no exposed hardbottom. This confirms the mapping provided by Walker (2009) for the Southeast Florida Coral Reef Initiative’s Habitat Mapping program.

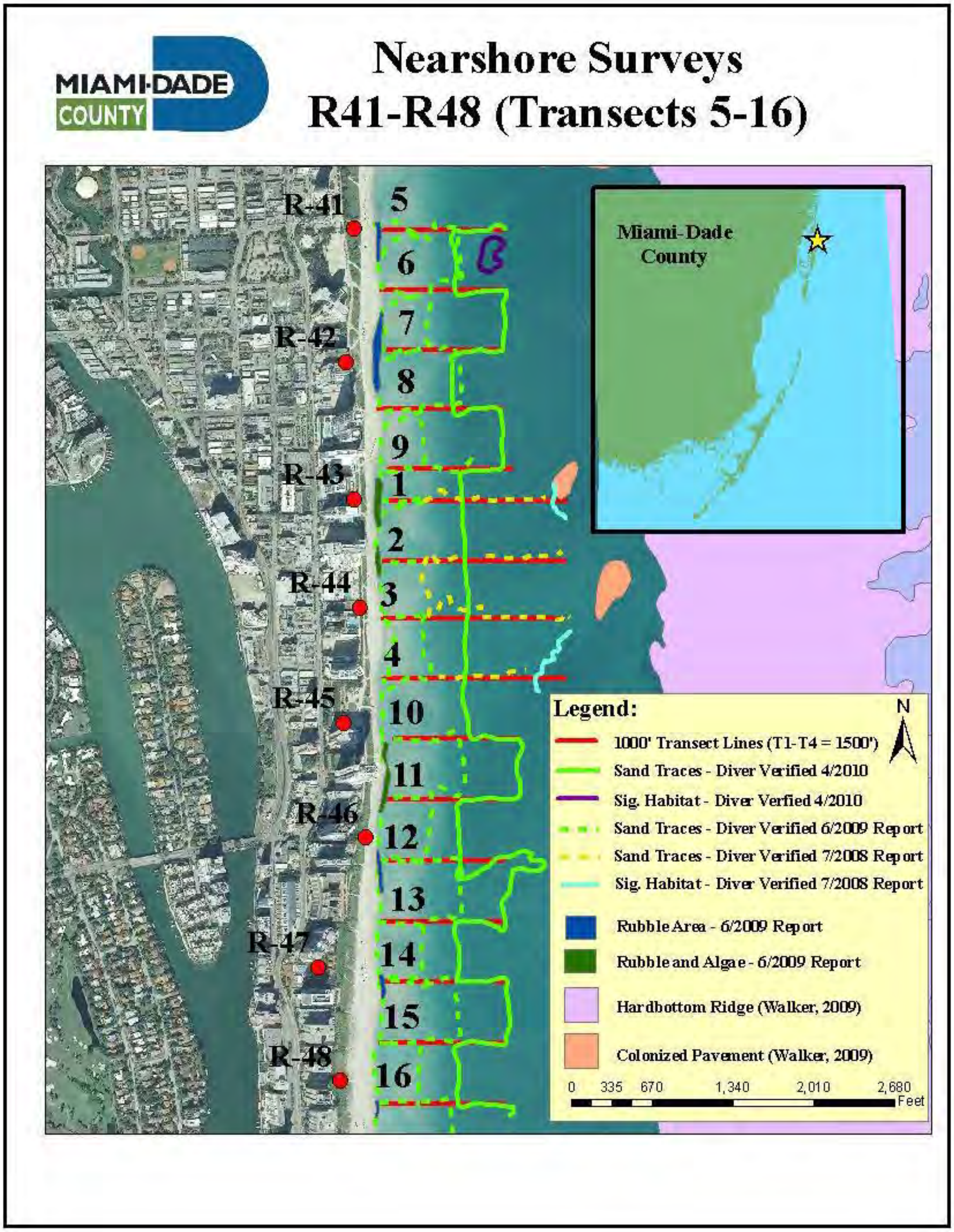

Figure 4 - Nearshore Diver Survey for Hardbottom Conducted by DERM

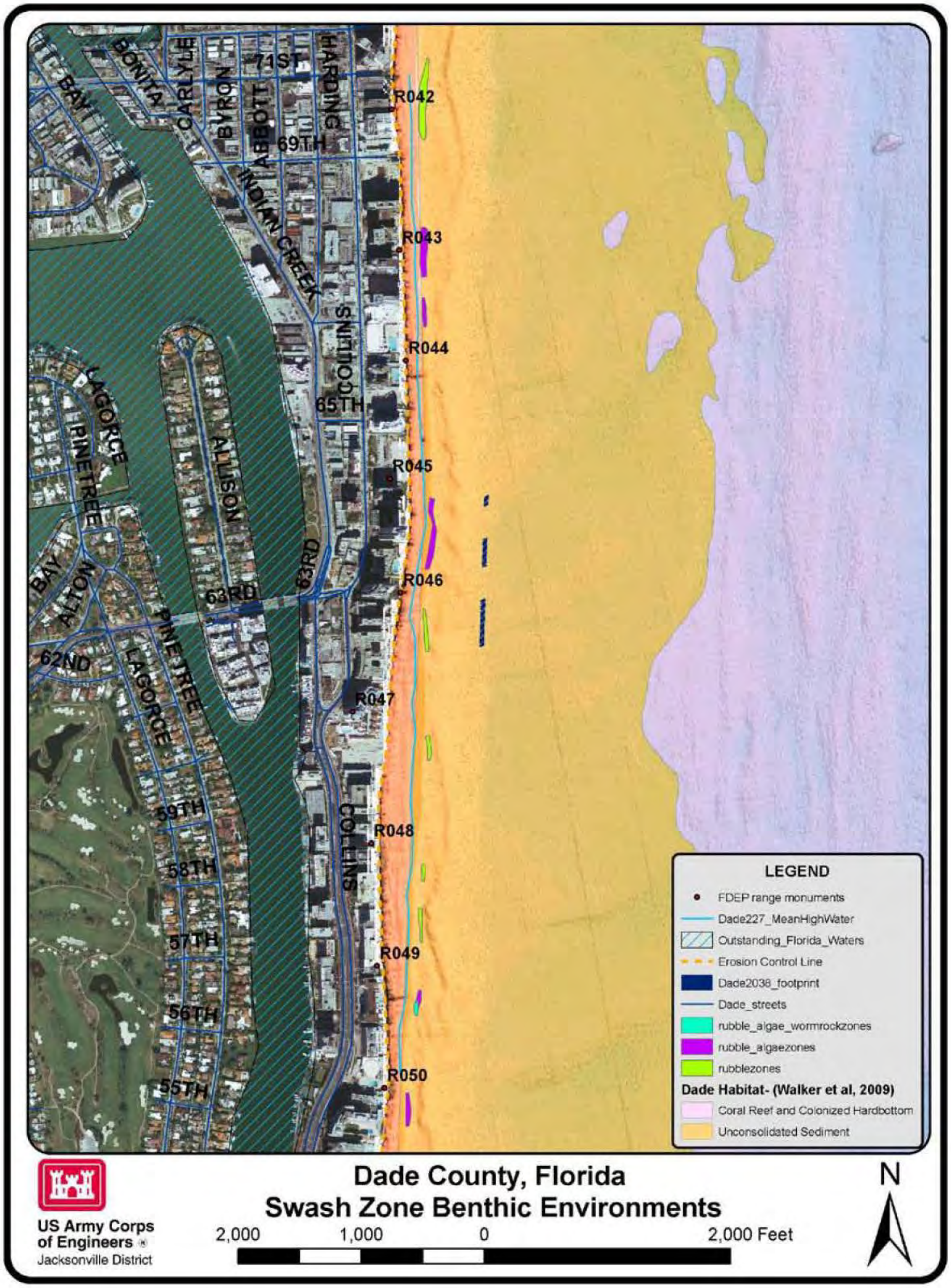

Figure 5**: Location of hardbottom resources in relation to SMART Structure location (Based on combined data from DERM survey and Walker, 2009)**

Although the goal of the SMART Structure is not to create an artificial reef for habitat, placement of the SMART Structure will provide clean hard substrate for colonizing hardcorals; including Acroporid corals; soft corals, fleshy macroalgae and other hardbottom and coral reef species as has been commonly observed by artificial reef structures throughout southeast Florida.

The final rule designating Critical Habitat for *Acropora sp*. states "Substrate of suitable quality and availability" is defined as natural consolidated hardbottom or dead coral skeleton that is free from fleshy turf macroalgae cover and sediment cover". Since the substrate in the project area is only sand, it does not meet the requirement to be classified as "substrate of suitable quality and availability" and therefore lacks the PCE to be classified as critical habitat for *Acropora sp*. under the ESA.

Since the species are not present, nor is designated critical habitat, the proposed construction of the SMART Structure may affect, but it not likely to adversely affect Acroporid corals listed as threatened under the ESA nor adversely modify designated critical habitat.

Smalltooth Sawfish

On April 1, 2003, NMFS published a final rule (68 FR 15674) listing this the Distinct Population Segment (DPS) of smalltooth sawfish found in the US as an endangered species under the ESA. Smalltooth sawfish, *Pristis pectinata* were once common in Florida as detailed by the Smallthooth sawfish recovery plan (NMFS, 2009) and are very rarely reported in southeast Florida. NMFS designated critical habitat in September 2009 (74 FR 45353) and published a final recovery plan in January 2009. The Corps requested sighting information from the Florida Fish and Wildlife Conservation Commission's (FWC) smalltooth sawfish sighting database on October 18, 2006 for the "area of North Dade County, near Baker's Haulover Inlet". In an email response dated October 31, 2006 FWC sawfish Biologist, Jason Seitz states, "Miami-Dade County encounters are especially rare, and our combined database of several thousand United States encounters only lists eight records from this county, spread over more than a century (between 1895 and 2005). This certainly doesn't mean that *Pristis pectinata* does not utilize the inlet, as encounters with sawfish depend heavily on human usage of a given location. If low numbers of angling and diving are done in the area, it can be expected that little or no encounters will take place, even if sawfish frequent that area." While the smalltooth sawfish has designated critical habitat under the Act, none is present in the project area. The logic set forth about mechanical dredges in the 1991, 1995 and 1997 South Atlantic Regional Biological Opinions (SARBO) by NMFS for sea turtles holds true for sawfish and crane placement of the SMART structure as well. The impacts of dredging operations on sea turtles have been previously assessed by NMFS (NMFS, 1991; NMFS 1995; NMFS 1997; NMFS 2003) in the various versions of the SARBO and the 2003 (revised in 2005 and 2007) Gulf Regional

Biological Opinion. Construction of the SMART Structure will be done by crane on a barge that is very similar to a clamshell dredge in configuration and operation.   The 1991 SARBO states that "clamshell dredges are the lease likely to adversely affect sea turtles because they are stationary and impact very small areas at a given time. Any sea turtle injured or killed by a clamshell dredge would have to be directly beneath the bucket. The chances of such an occurrence are extremely low…" (NMFS, 1991). NMFS also determined that "Of the three major dredge types, only the hopper dredge has been implicated in the mortality of endangered and threatened sea turtles." This determination was repeated in the 1995 and 1997 SARBOs (NMFS, 1995 and 1997).

The Corps believes that if this statement holds true for a species that is relatively abundant in south Florida like sea turtles, it should also hold true for a very rare species like sawfish. The probability of a sawfish being taken during placement of the SMART Structure is so unlikely as to be discountable. The Corps will incorporate the standard NMFS sawfish protection construction protocols into the project plans and specifications. Based on the information included in the draft recovery plan, the census information from FWC and the proposed construction techniques, the Corps believes that the construction of the SMART structure may affect, but is not likely to adversely affect the endangered smalltooth sawfish as defined by the ESA.

Effects Determination

Based on the information presented here, the Corps determines that the construction of the SMART Structure at the 63rd street erosional hotspot may affect but is not likely to adversely affect the smalltooth sawfish and *Acropora palmata* and *A.cervicornis* and will not adversely modify designated critical habitat for *Acropora sp*. and request that NMFS concur with this determination.

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Benthic Nearshore Survey Report

Identification of Benthic Resources in the Nearshore Zone
Miami Beach, FL
DNR Monuments: R-37 to R-62
March-April 2010

The second "Request for Additional Information (RAI #2), associated with the Joint Coastal Permit application JCP File # 0295427-001-JC, question #25, requested expansion of the nearshore survey information provided to the Department. The geographic scope of this survey effort was designed to cover the nearshore areas within 1000 feet of shore, from "DNR" Monument R-37 south to R-62 in Miami-Dade County (Figure 1). The nearshore areas between R-37 and R-62 have been identified through three different survey efforts and their associated reports as summarized in Table 1. This report includes surveys of R37-R41 (Transects 45-54) from shore out to 1000 ft. and R42-R62 (Transects 5-44) from 600-1000 ft. from shore. Identification of benthic resources from R41-R62 from shore out to 600 ft. was completed and the report submitted in June 2009 (attached as Appendix 5). Note that R43-R44 + 500 ft. (Transects 1-4) were surveyed in July 2008 and results are included in the June 2009 report as Appendix 9. While the descriptions and graphical representations in the body of this report pertain explicitly to the surveys conducted during the March-April 2010 surveys, Appendices 1-4 are composite maps including all habitat information from the current 2010, July 2008 and June 2009 surveys, as well as layers from the Miami-Dade County benthic habitat map (Walker, 2009).

Table 1. Survey Summary for R-37 through R-62

	Report Name	Date	R-Mon.	Area Surveyed	Comments
1	Field verification of benthic communities in the nearshore region for segments of Miami Beach, Bal Harbor, and Sunny Isle, Miami-Dade county	July 2008	43-44+500	300' to 1500' from shore	Included as Appendix 9 in Report #2: JCP File # 023382-004-JM, RAI #2, Item 23
2	Identification of Benthic Resources in the Nearshore Zone NE 74th St to 24th Street, Miami Beach, Miami-Dade County, Fl (DNR Monuments: R-41 to R-62)	June 2009	41-62	Shore east 600' except for areas covered in Report #1	Included as Appendix 5 of this report
3	Identification of Benthic Resources in the Nearshore Zone Miami Beach, FL DNR Monuments: R-37 to R-62	March-April 2010	37-41 41-62	Shore east 1000' 600' to 1000' from shore except for areas covered in Report #1	Present Report

Methods:

Shore-perpendicular transects were established at approximately 500' intervals between the monuments noted above resulting in establishment of 50 transects. For the segments between monuments R37-R41 (Transects 45-54), each transect extended east from the estimated high water line to approximately 1000' offshore. For R41-R62 segment (Transects 5-44), each transect initiated approximately 600' from shore east, extending transects conducted for July 2008 report to 1000' from shore except. The areas between R43 and R44+500 not included in this effort as they were surveyed to a distance of at least 1,000 ft in 2008 (Table 1).

Due to the presence of a "Vessel Exclusion Zone" (e.g., a swim zone) the western 300ft portion of each transect was surveyed by biologists while snorkeling. The snorkelers utilized underwater scooters to assist in the surveys where appropriate. The portion of each transect seaward of the vessel exclusion zone out to 1000' was surveyed by snorkelers towed by a small boat. The survey path along each transect was traced by a Garmin GPS unit secured to a surface float (foam board), that was towed by the on of the individuals (divers) conducting the survey. When resources were found, the western edge (e.g., most proximal to shore) was traced by biologists on SCUBA using a Garmin GPS unit secured to a surface float. Divers also noted and recorded benthic species observed during the habitat trace.

Figure 1: Nearshore survey area from DNR Monument R-37 south to R-62.

Results:

Appendices 1-4 show the survey paths along each transect surveyed from March 9 – April 29, 2010. Table 2 lists the DNR monuments and corresponding appendix map and transects of the survey area. Transects 6-31 (Appendices 2, 3), 33-40 (Appendix 4), and 42-54 (Appendix 4,1) consisted of open sand (labeled in green) without benthic growth although occasional sand dollars and drift algae were observed. Continuous hard bottom was not observed although areas of emergent biota on sand (labeled in purple) as well as an area of derelict concrete material (labeled in pink) with benthic growth were observed.

Table 2. DNR monuments (from North to South) with corresponding transect and appendix map numbers.

DNR Monument	Transect	Appendix
R37-R41	45-54	1
R41-R48	1-16	2
R49-R55	17-31	3
R56-R62	32-44	4

An area of emergent biota on sand (labeled in purple) was observed just south of R 41 (Transect 5, Appendix 2). This area is approximately 3,579m^2 and 262m (860 ft) from shore. Benthic species observed here included *Pseudopterogorgia* sps., unidentified hydroids, various macroalgae species including and *Halimeda* sps. and drift red algae. An Atlantic Guitarfish (*Rhinobatos lentiginosus*) was also observed here. Figure 2 shows an image of this area.

Figure 2. Emergent biota on sand south of R41 (Transect 5).

An area of derelict concrete material consisting of cinder blocks and other material was observed just north of R56 (Transect 32, Appendix 4) approximately160m (525 ft) from shore. The western edge of this habitat was verified and traced by DERM divers (labeled in purple). The material here is sparsely scattered (approximately 1-2 pieces every 15ft.), but supports benthic growth including *Pseudopterogorgia* species, hydroid species, encrusting bryozoans, *Cliona varians*, SPO SPEC, and various macroalgae species (*Caulerpa* sps, *Halimeda* sps, *Dictyota* sps, drift red algae species). Fish species observed here included Slippery Dick (*Halichoeres bivittatus*), juvenile Grunts species (*Haemulon* sps), and a Lined Seahorse (*Hippocampus erectus*). Figure 3 shows images of this area.

Figure 3. Benthic growth on derelict concrete material north of R56 (Transect 32).

Transect 41 (labeled in orange), south of R60, consisted of very sparse emergent biota on sand (Appendix 4). Approximately four (4) *Pseudopterogorgia* species were observed throughout this transect along with approximately two (2) *Cliona varians* sponges. Figure 4 shows images of biota along this transect. A tire with benthic growth (*Pseudopterogorgia* sps, and marcoalgae) was also found on this transect (Figure 5).

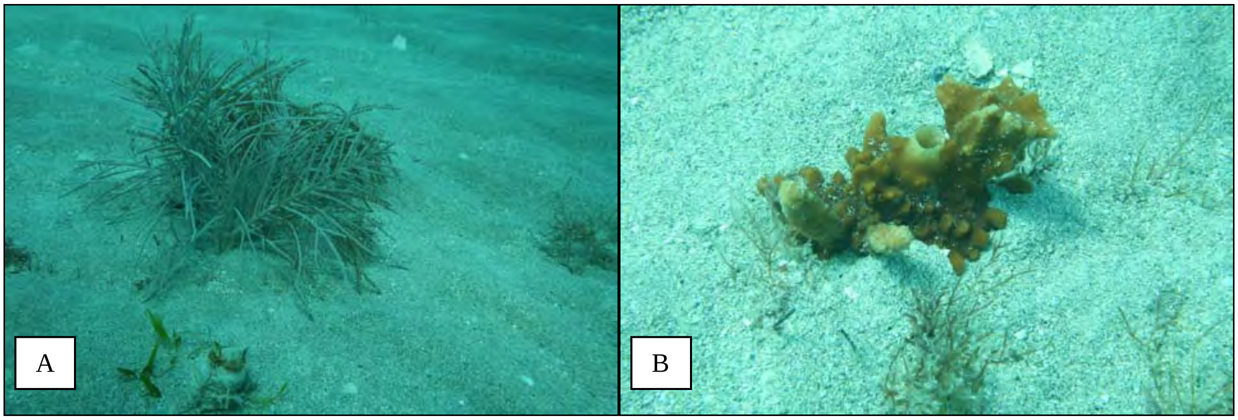


Figure 4. A) *Pseudopterogorgia* species and B) *Cliona varians* along Transect 41.

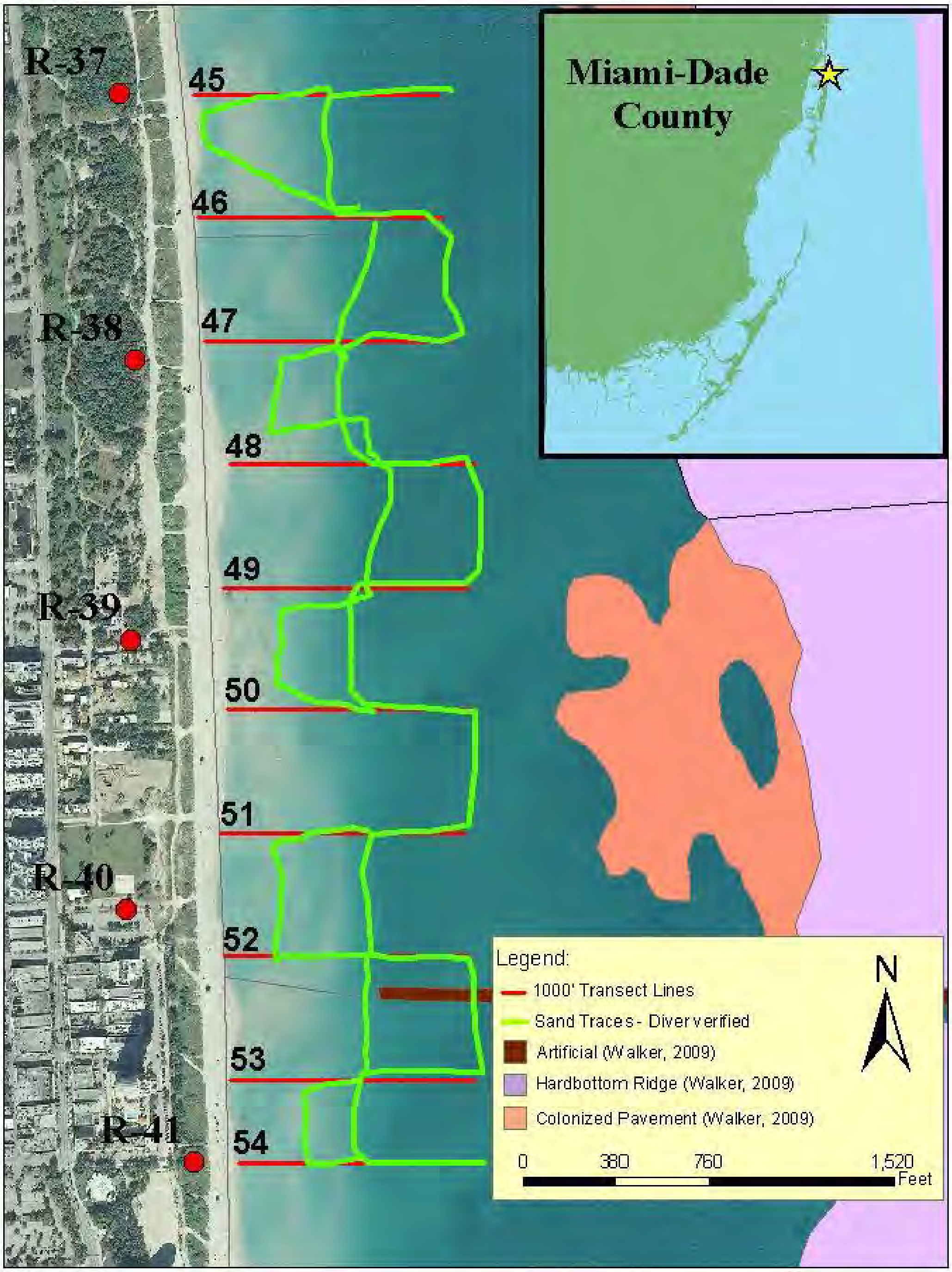
Figure 5. Tire with benthic growth along Transect 41.

Reference:

Walker, B.K. 2009. Benthic Habitat Mapping of Miami-Dade County: Visual Interpretation of LADS Bathymetry and Aerial Photography. Florida DEP Report #RM069.

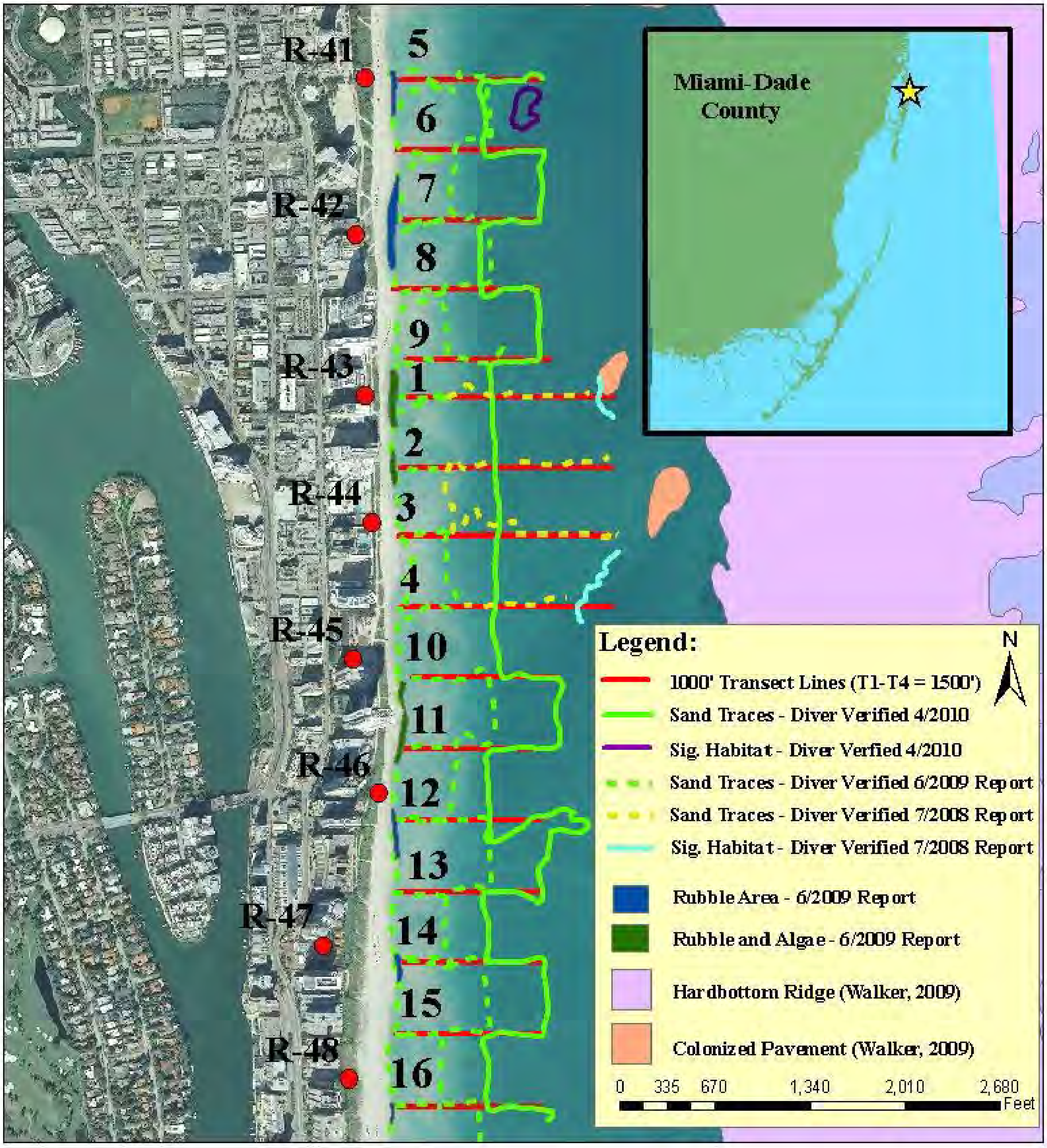
Appendix 1

Nearshore Surveys
R37-41 (Transects 45-54)

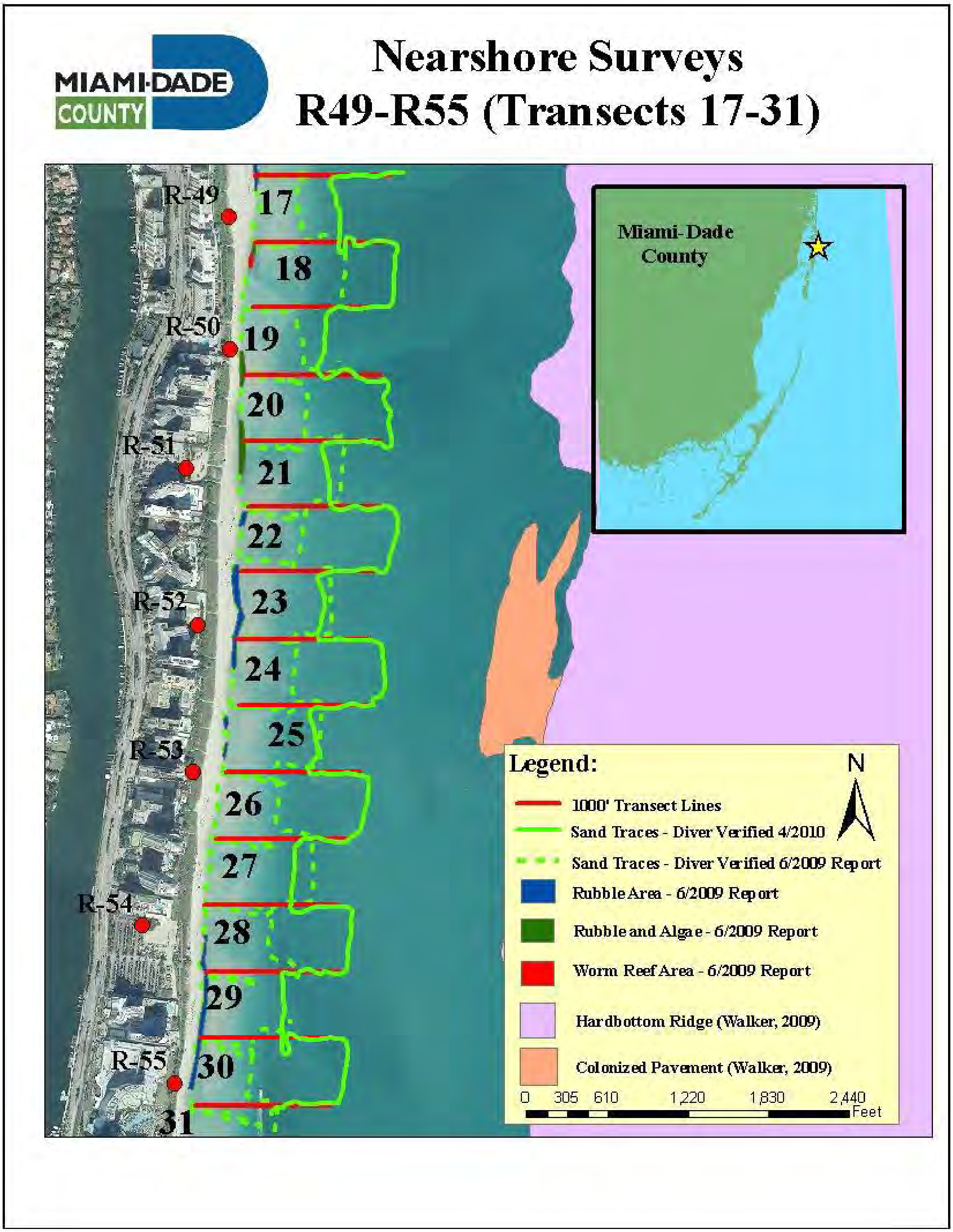


Appendix 2

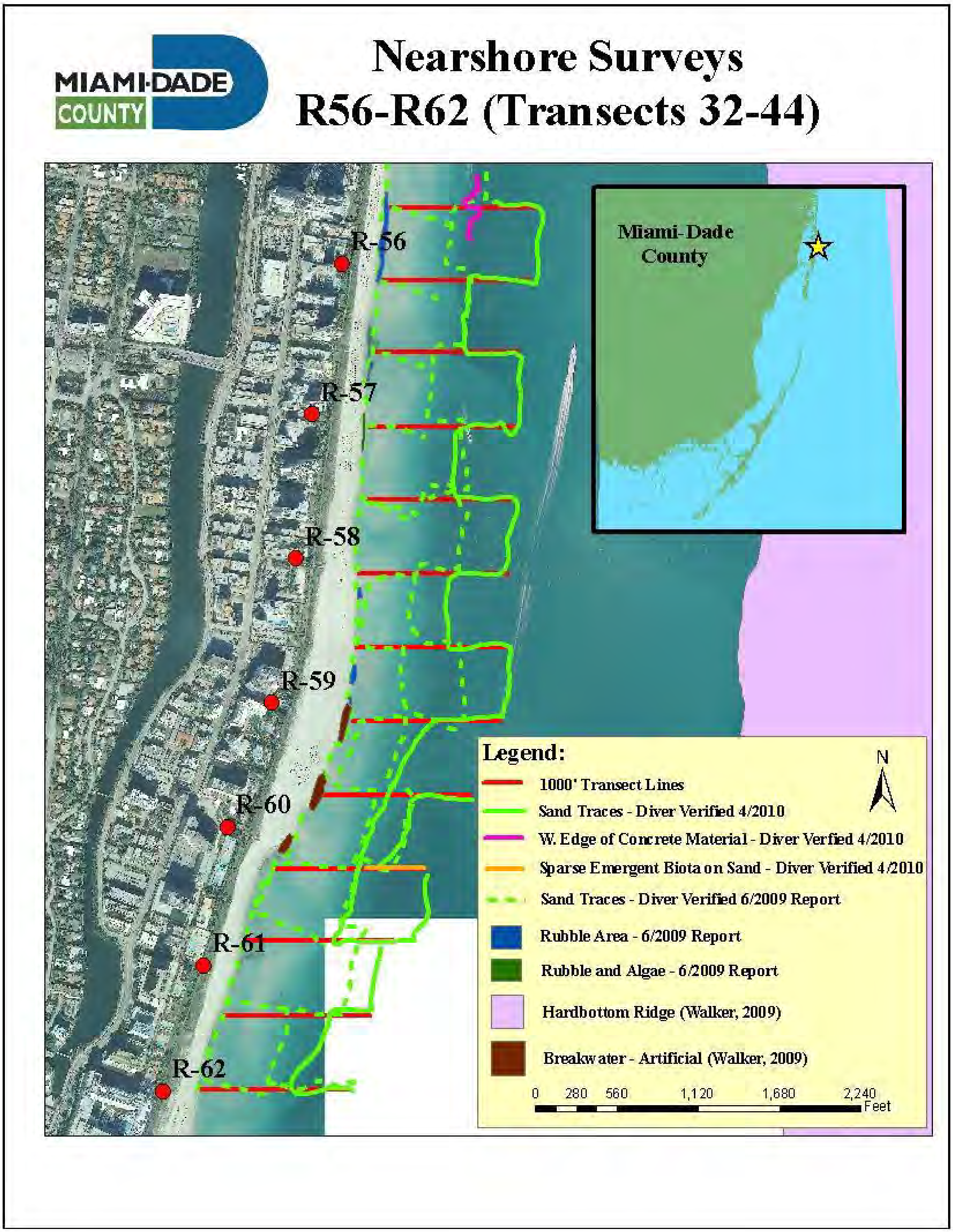
Nearshore Surveys R41-R48 (Transects 5-16)



Appendix 3


MIAMI-DADE COUNTY
Nearshore Surveys
R49-R55 (Transects 17-31)
R-49
R-50
R-51
R-52
R-53
R-54
R-55
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
Miami-Dade County
Legend:
1000' Transect Lines
Sand Traces - Diver Verified 4/2010
Sand Traces - Diver Verified 6/2009 Report
Rubble Area - 6/2009 Report
Rubble and Algae - 6/2009 Report
Worm Reef Area - 6/2009 Report
Hardbottom Ridge (Walker, 2009)
Colonized Pavement (Walker, 2009)
N
0 305 610 1,220 1,830 2,440
Feet

Appendix 4


Nearshore Surveys
R56-R62 (Transects 32-44)
MIAMI-DADE
COUNTY
R-56
R-57
R-58
R-59
R-60
R-61
R-62
Miami-Dade
County
Legend:
1000' Transect Lines
Sand Traces - Diver Verified 4/2010
W. Edge of Concrete Material - Diver Verfied 4/2010
Sparse Emergent Biota on Sand - Diver Verified 4/2010
Sand Traces - Diver Verified 6/2009 Report
Rubble Area - 6/2009 Report
Rubble and Algae - 6/2009 Report
Hardbottom Ridge (Walker, 2009)
Breakwater - Artificial (Walker, 2009)
N
0
280
560
1,120
1,680
2,240
Feet

Identification of Benthic Resources in the Nearshore Zone
NE 74th St to 24th Street, Miami Beach, Miami-Dade County, Fl
(DNR Monuments: R-41 to R-62)
June 2009

Methods:
The geographic scope of this survey effort was designed to cover the nearshore areas (within 600 feet of shore) adjacent to Miami Beach from DNR Monument R-41 south to R-62 (Figure 1). Shore-perpendicular transects were established at approximately 500' intervals between the monuments noted above resulting in establishment of 44 transects. Each transect extended east from the estimated high water line to approximately 600' offshore. The nearshore swash zone region (from 1-2' east of the low water mark to approximately 50' offshore) was also surveyed along the length of the area investigated.

The western portion of each transect was surveyed by biologists out to 300' or the eastern end of the vessel exclusion zone (which ever was furthest). The surveys were conducted while snorkeling. During longer transects, the snorkelers utilized underwater scooters to assist in the surveys. The survey path along each transect and in the swash zone was traced by the snorkelers towing a Garmin GPS unit secured to a surface float (foam board). During these surveys, specific GPS coordinates were also recorded documenting the northern and southern extent of any benthic resources or substrates observed, including areas of rubble and worm reef (live *Phragmatopoma caudata* reef). The portion of each transect seaward of the vessel exclusion zone out to 600' was surveyed by snorkelers towed by a small boat. The survey path was traced using a Garmin GPS unit aboard the small vessel.

For Transects 1 through 4 covering R-43 to R-44 + 500, the swash zone and the portion of each transect from shore out to 300' were evaluated during the present surveys. The area from 300' to 1500' from shore was surveyed in July of 2008 in response to a Request for Additional Information for an application to the Florida Department of Environmental Protection (FDEP; File Number 023382-00-JM). A copy of this response is included as Appendix 9.

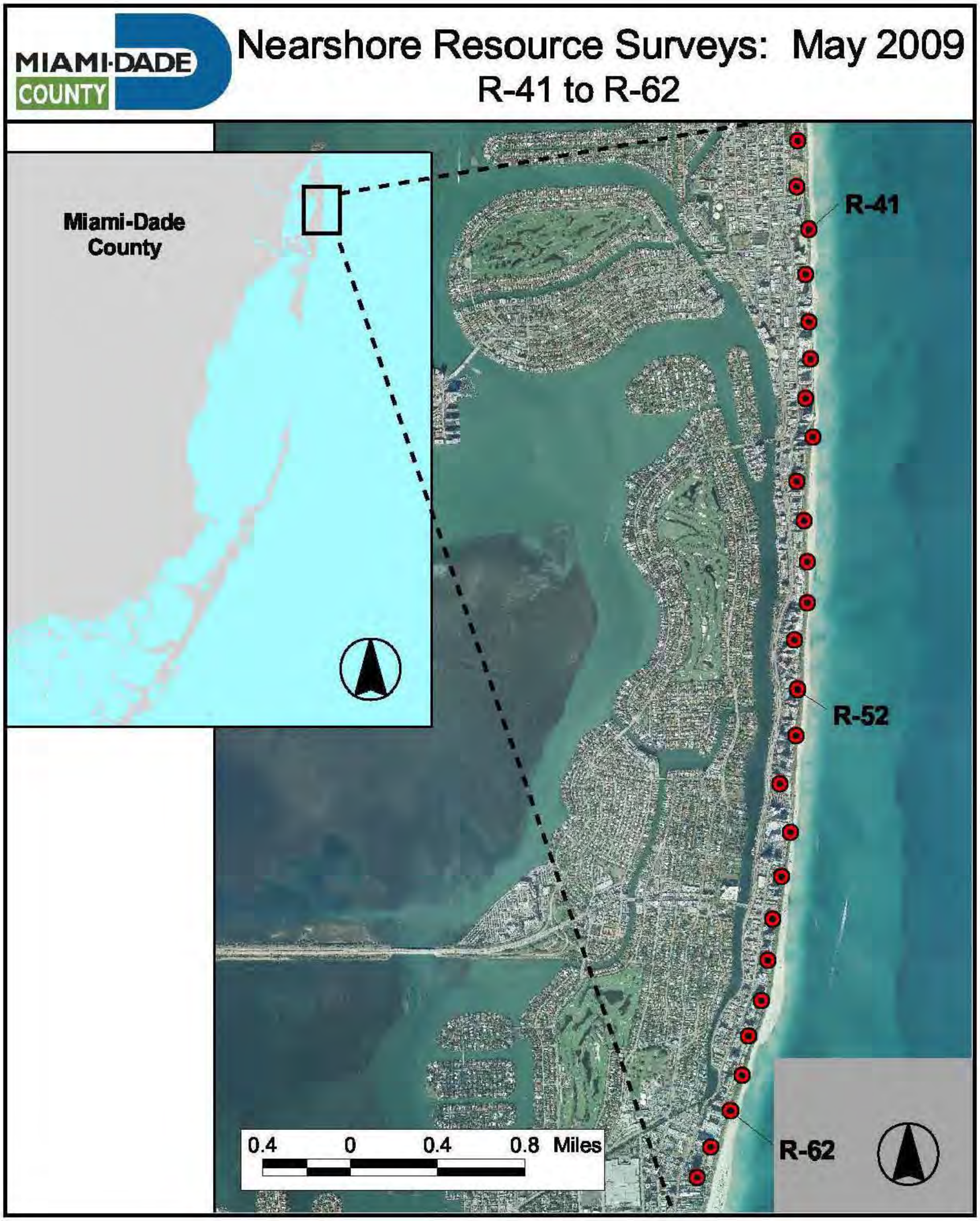


Figure 1: Nearshore survey area from DNR Monument R-41 south to R-62.

Results:
Appendices 1 through 8 show the survey paths along each transect as well as in the swash zone surveyed from May 7th - June 9th, 2009. All transects beyond the swash zone area out to 600' consisted of open sand, without benthic growth although sand dollars were occasionally observed in the eastern portion of the survey area and drift algae (*Sargassum* sp.) was observed throughout the region. Continuous hard bottom was not observed in any of the areas surveyed. However, multiple areas of loose unconsolidated rubble were noted at the base of the swash zone (just below mean low water).

The rubble areas are identified as Areas A – W in Appendices 1 through 8. In general, the rubble areas began within 5' of the mean low water line and extended to the east 20' to 50'. The rubble consisted of loose coral rock fragments ranging in size from a few inches up to 12" – 18" in diameter. The rubble is most likely remnants from storm deposition and winnowing of rubble from sands placed during early (pre-1980's) beach renourishment projects. The rubble was most often bare with no algal growth and appeared to be normal accumulations of course material and rock at the base of the swash zone (Figure 2). Some of the rubble areas did support benthic growth. Rubble with algae was noted at seven locations (Appendices 1-4 and 7) and live wormrock (*Phragmatopoma. caudata*) was noted at one location (Appendix 4). The approximate area of each type of rubble area is included in Table 1.

Figure 2. Bare rubble in Area S (Transect 34).

Table 1. Approximate area of bare rubble, rubble with algae, and live worm reef. For the rubble areas, the area was calculated using specific GPS coordinates for the northern and southern extent of the rubble and field estimates of width of the rubble zones. For the worm reef, the entire area was traced. These data and GIS software (ArcView®) were utilized to create defining polygons to allow calculation of areal extent of the areas.

	AREA	
SUSTRATE TYPE	(m^2)	(acres)
Bare Rubble	16,270	4.02
Rubble with Algae	8,344	2.06
Worm Reef	319	0.08

In the areas that supported benthic growth, several algae species were present, most notably crustose coralline algae, *Dictyota* species, and *Padina* species (Table 2, Figure 3). The algal cover was sparse over each rubble area, but occasional locally dense on individual pieces of rubble. Several fish species were also observed in these extensive rubble/algae areas including both juvenile and adults as indicated in Table 2. One unidentified anemone was also observed on a piece of rubble in Area K (Figure 12).

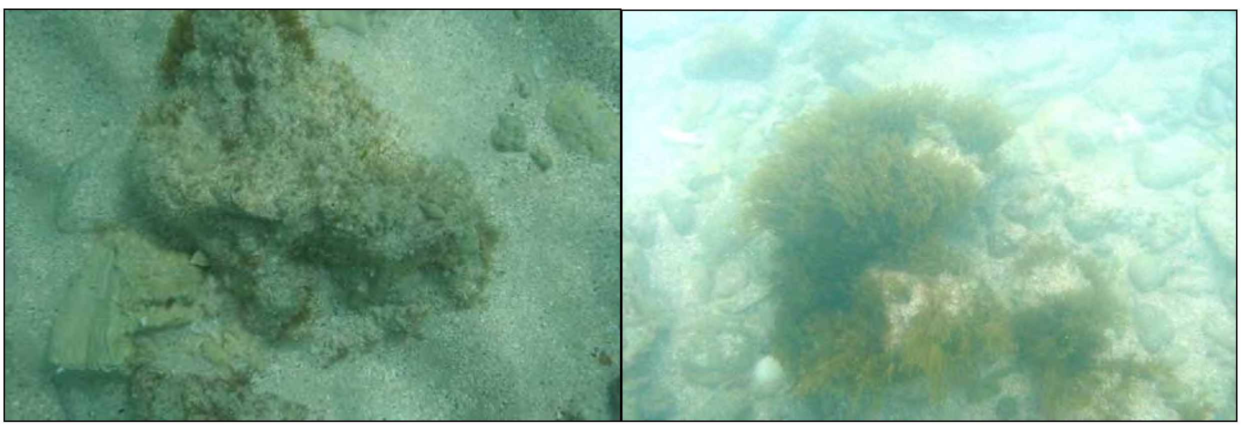


Figure 3. Rubble with algal growth. A.) Turf algae and Dictyota sp. in Area K (Transect 20). B.) *Dictyota* sp. and *Padina* sp. in Area L (Transect 21).

Figure 12. Unidentified anemone on rubble in Area K.

One notable area south of R-49 and Transect 18 (Area J) was observed with extensive rubble, algae, and live wormrock, *P. caudata* (Figure 5 and 12). This area began approximately 5' from the mean low water line and extended out approximately 50' to the east. Area J was approximately 300' long north to south with the wormrock (*P. caudata*) observed in the southern half and dense rubble observed in the northern portion with sparse algal cover. Unidentified species of encrusting tunicates were observed growing on the worm reef (Figure 14). Several fish species were also observed in area (Table 2). The most common species observed included juvenile Sergeant majors (*Abudefduf saxatilis*), juvenile grunts (Haemulon sp.), and Molly Millers (*Scartella cristata*) (Figures 13 and 15). In addition to fish, numerous hermit crabs and mollusks were observed.

Figure 13. Live wormrock (*Phragmatopoma caudata*) south of R49 (Transect 18) south with juvenile grunts (*Haemulon* species) and sergeant majors (*Abudefduf saxatilis*).

Figure 14. Unidentified species of encrusting tunicates growing over the worm reef (*P. caudata*).

Figure 15. Molly Miller (*S. cristata*) on worm reef (*P. caudata*).

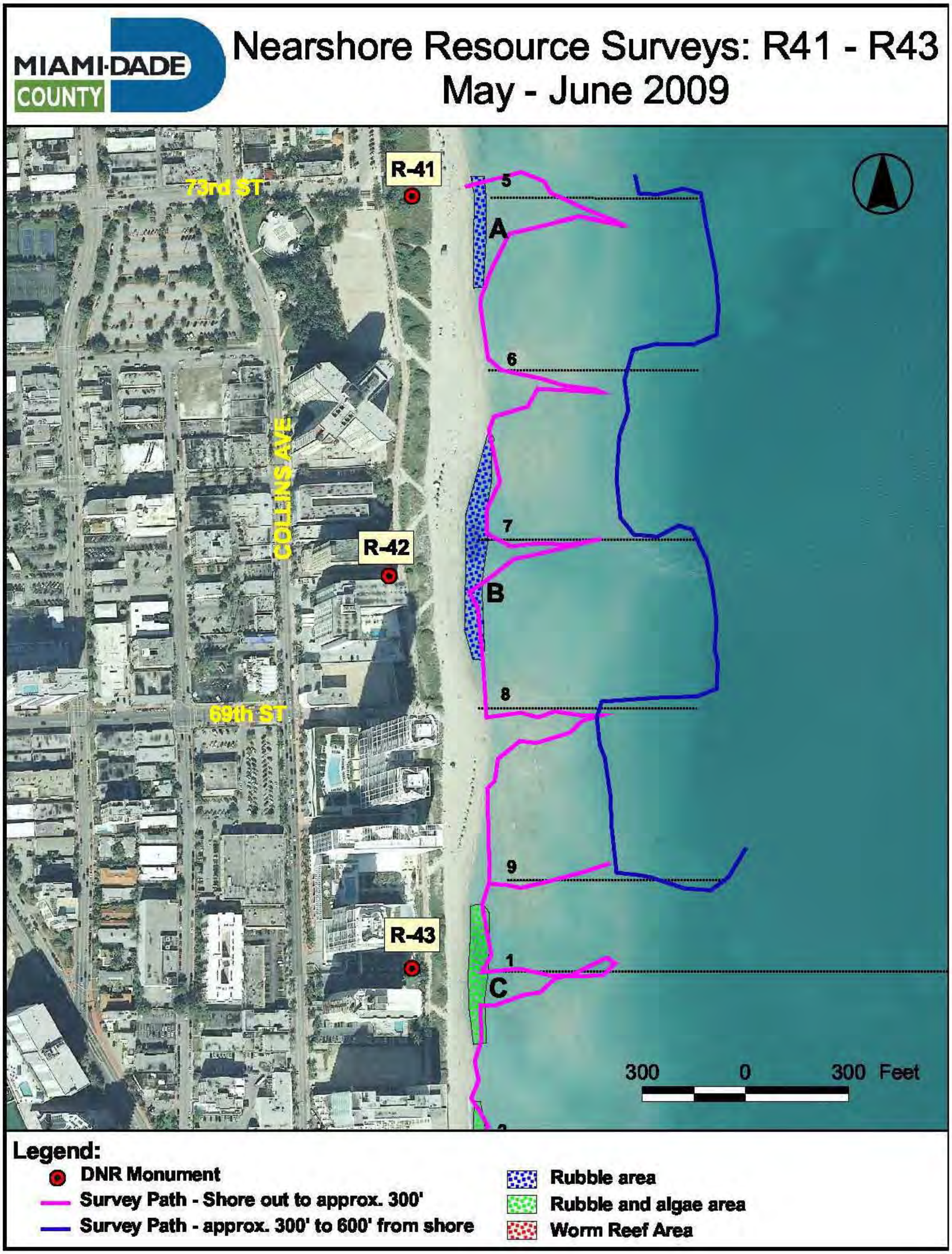
In Figure 8, at the western end of Transect 34 between R-56 and R-57, a dark area is shown on the underlying aerials. Only sand was observed in this area during the survey effort. Rubble and other benthic resources were not observed. The 'dark' area observed in the aerial in Figure 8 is most likely drift detritus material as seen Figure 16.

Figure 16. Detritus accumulation near Transect 34.

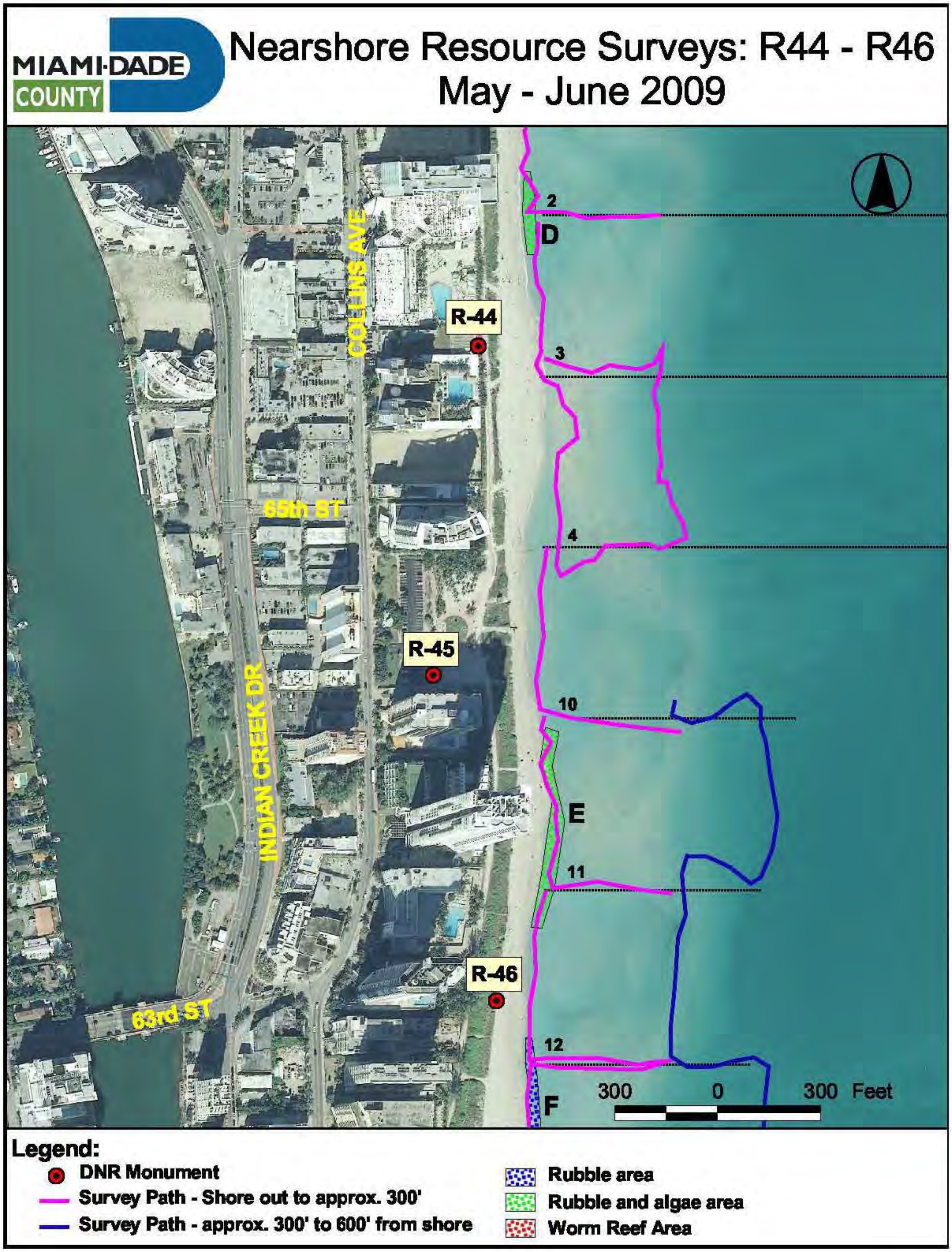
Table 2. Species observed in the nearshore region during transect and 'swash zone' surveys.

Common Name	Scientific Name	Substrate Type: Sand	Bare Rubble	Rubble & Algae	Worm Reef
Sargussum seaweed	*Sargassum* sp.	X	X	X	X
Brown algae	*Dictyota* spp.			X	X
Brown algae	*Padina* spp.			X	X
Crustose coralline algae	Unidentified species			X	X
Green filamentous algae	Unidentified species				
Encrusting tunicate	Unidentified species				
Hermit crabs	Unidentified species				
Mollusks- gastropoda	Unidentified species				
Turf algae	Unidentified species			X	X
Sand dollars	Unidentified species	X			
Worm reef	*Phragmatopoma caudata*				X
Barracuda	*Sphyraena barracuda*	X	X	X	X
Cocoa damselfish	*Stegastes variabili*			X	X
Grunts (unid. juvenile)	Haemulon species			X	X
Hairy blenny	*Labrisomus nuchipinnis*				X
Highhat (juvenile)	*Pareques acuminatus*		X	X	X
Lane snapper	*Lutjanus synagris*			X	X
Leatherjacket	*Oligoplites saurus*				
Lookdown	*Selene vomer*			X	X
Molly miller	*Scartella cristata*				X
Scrawled cowfish	*Acanthostracion quadricornis*			X	
Sergeant major	*Abudefduf saxatilis*		X	X	X
Slippery dick	*Halichoeres bivittatus*				X
Southern stingray	*Dasyatis americana*	X		X	X
Tomtate	*Haemulon aurolineatum*			X	X
Yellow stingray	*Urolophus jamaicensis*				X
Yellowfin mojarra	*Gerres cinereus*		X	X	X

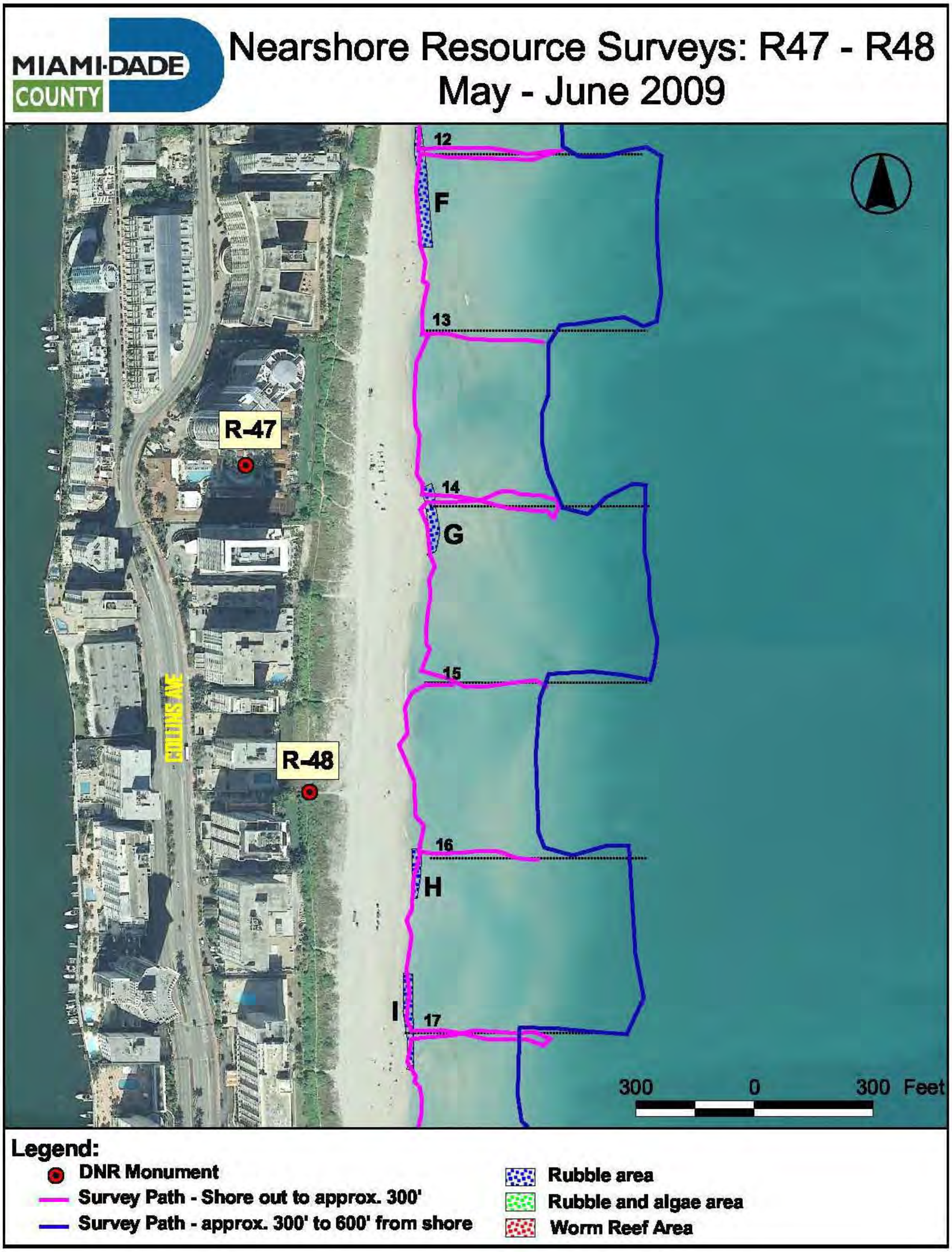
Appendix 1.


MIAMI-DADE
COUNTY
Nearshore Resource Surveys: R41 - R43
May - June 2009
R-41
73rd ST
5
A
6
COLLINS AVE
7
R-42
B
8
69th ST
9
R-43
1
C
300
0
300 Feet
Legend:
DNR Monument
Survey Path - Shore out to approx. 300'
Survey Path - approx. 300' to 600' from shore
Rubble area
Rubble and algae area
Worm Reef Area

Appendix 2.

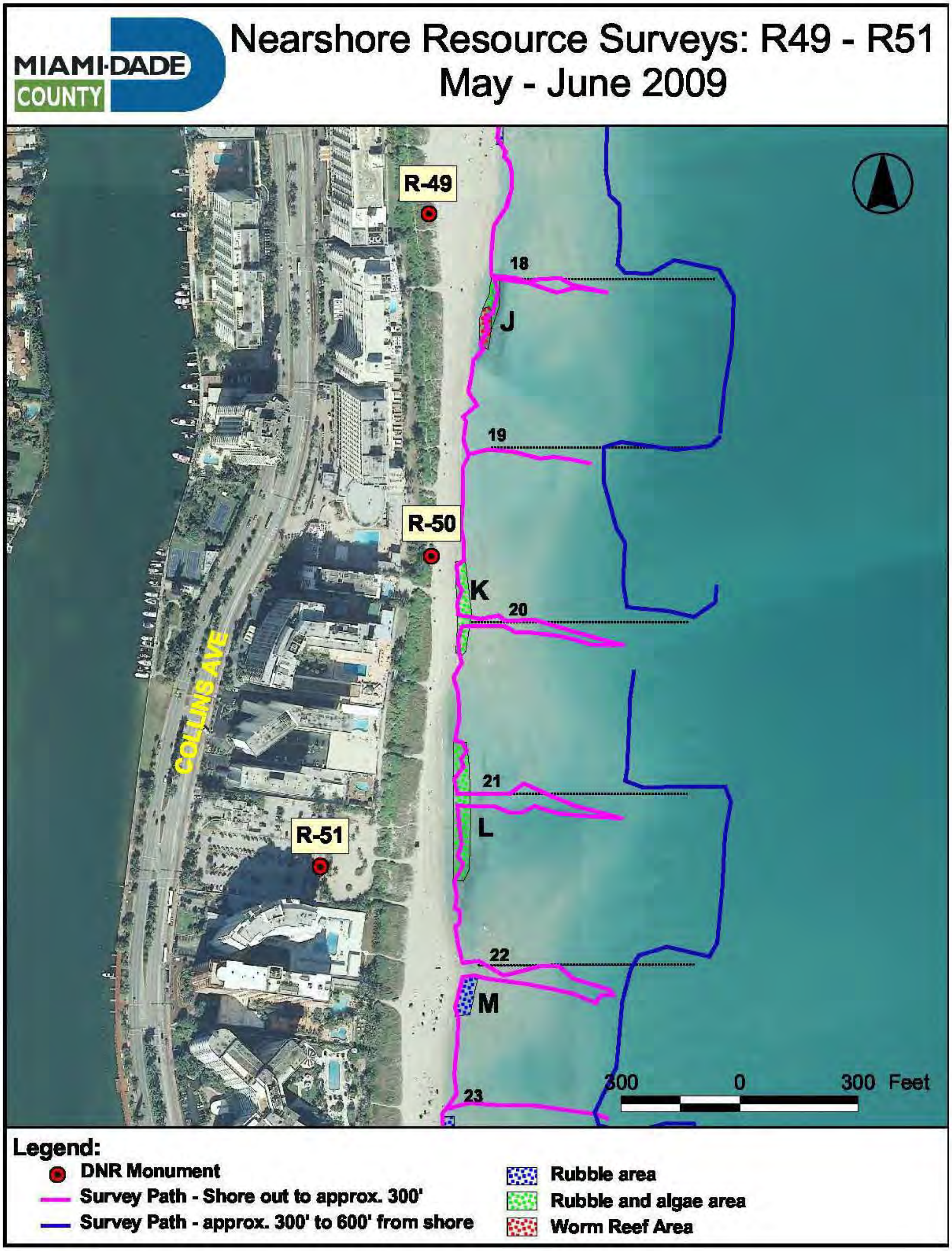

MIAMI-DADE COUNTY
Nearshore Resource Surveys: R44 - R46
May - June 2009
COLLINS AVE
65th ST
INDIAN CREEK DR
63rd ST
R-44
R-45
R-46
2
3
4
10
11
12
D
E
F
300
0
300 Feet
Legend:
DNR Monument
Survey Path - Shore out to approx. 300'
Survey Path - approx. 300' to 600' from shore
Rubble area
Rubble and algae area
Worm Reef Area

Appendix 3.

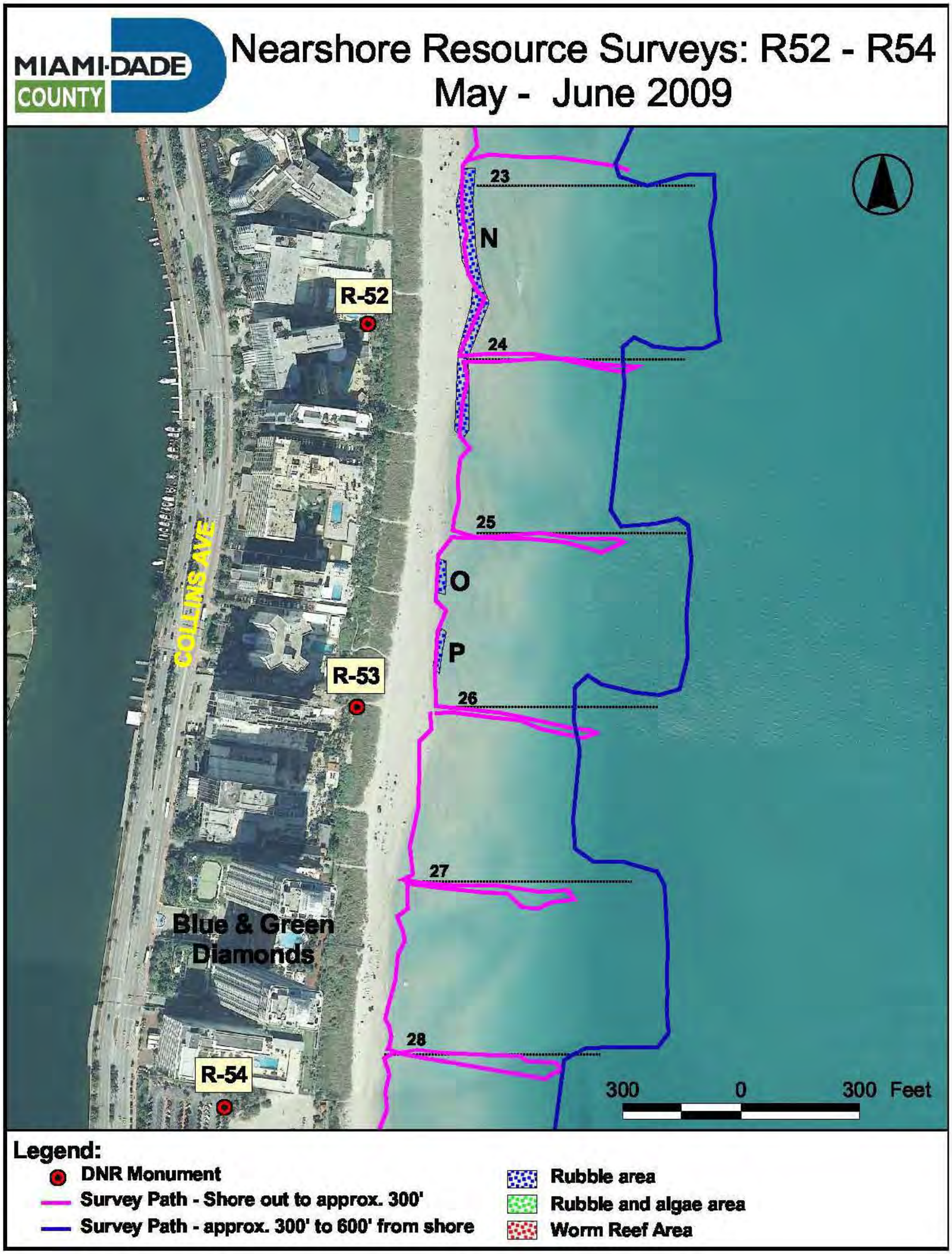


MIAMI-DADE COUNTY
Nearshore Resource Surveys: R47 - R48
May - June 2009
12
F
13
R-47
14
G
15
COLLINS AVE
R-48
16
H
I
17
300 0 300 Feet
Legend:
DNR Monument
Survey Path - Shore out to approx. 300'
Survey Path - approx. 300' to 600' from shore
Rubble area
Rubble and algae area
Worm Reef Area

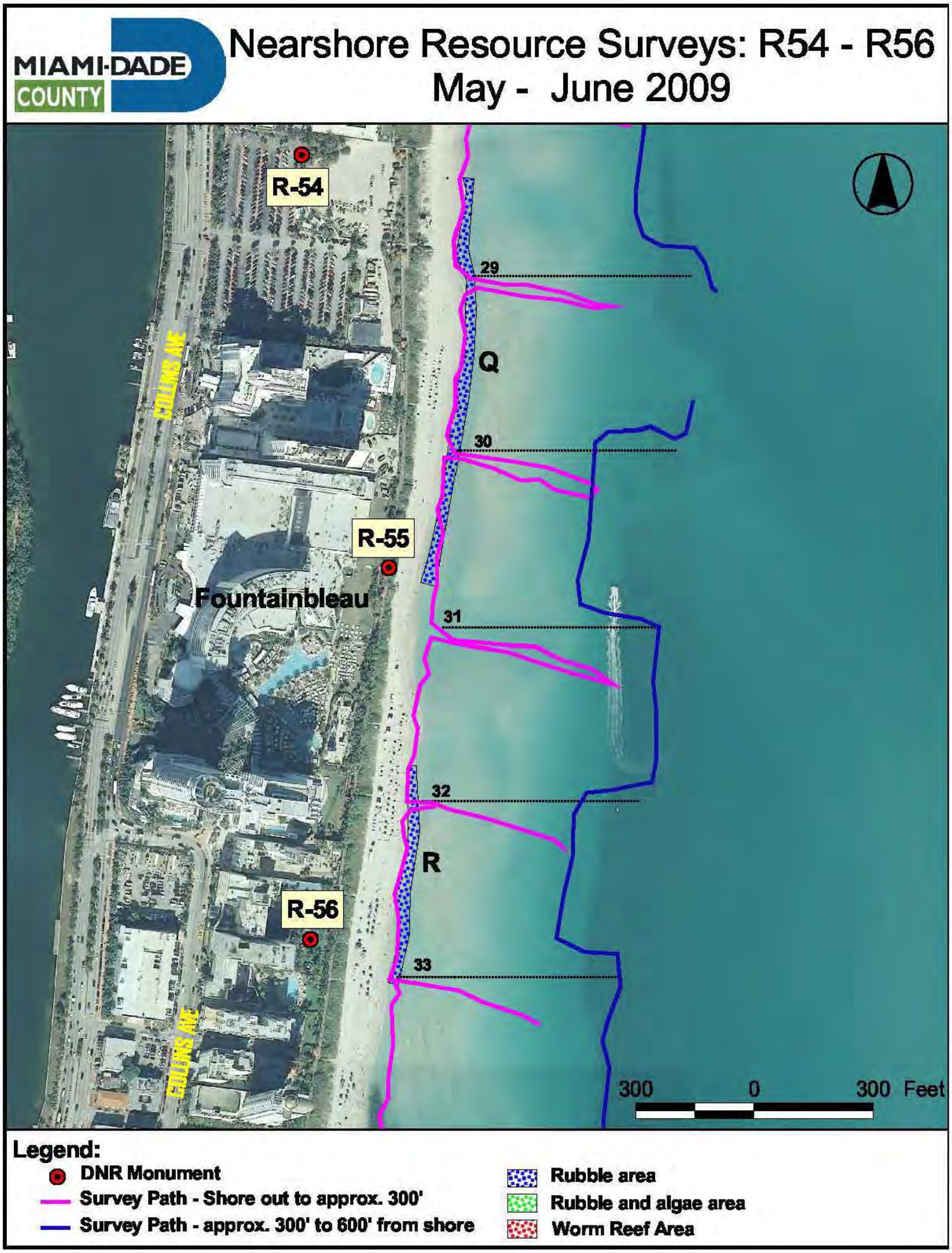
Appendix 4.


MIAMI-DADE COUNTY
Nearshore Resource Surveys: R49 - R51
May - June 2009
R-49
R-50
R-51
COLLINS AVE
18
19
20
21
22
23
J
K
L
M
300 0 300 Feet
Legend:
DNR Monument
Survey Path - Shore out to approx. 300'
Survey Path - approx. 300' to 600' from shore
Rubble area
Rubble and algae area
Worm Reef Area

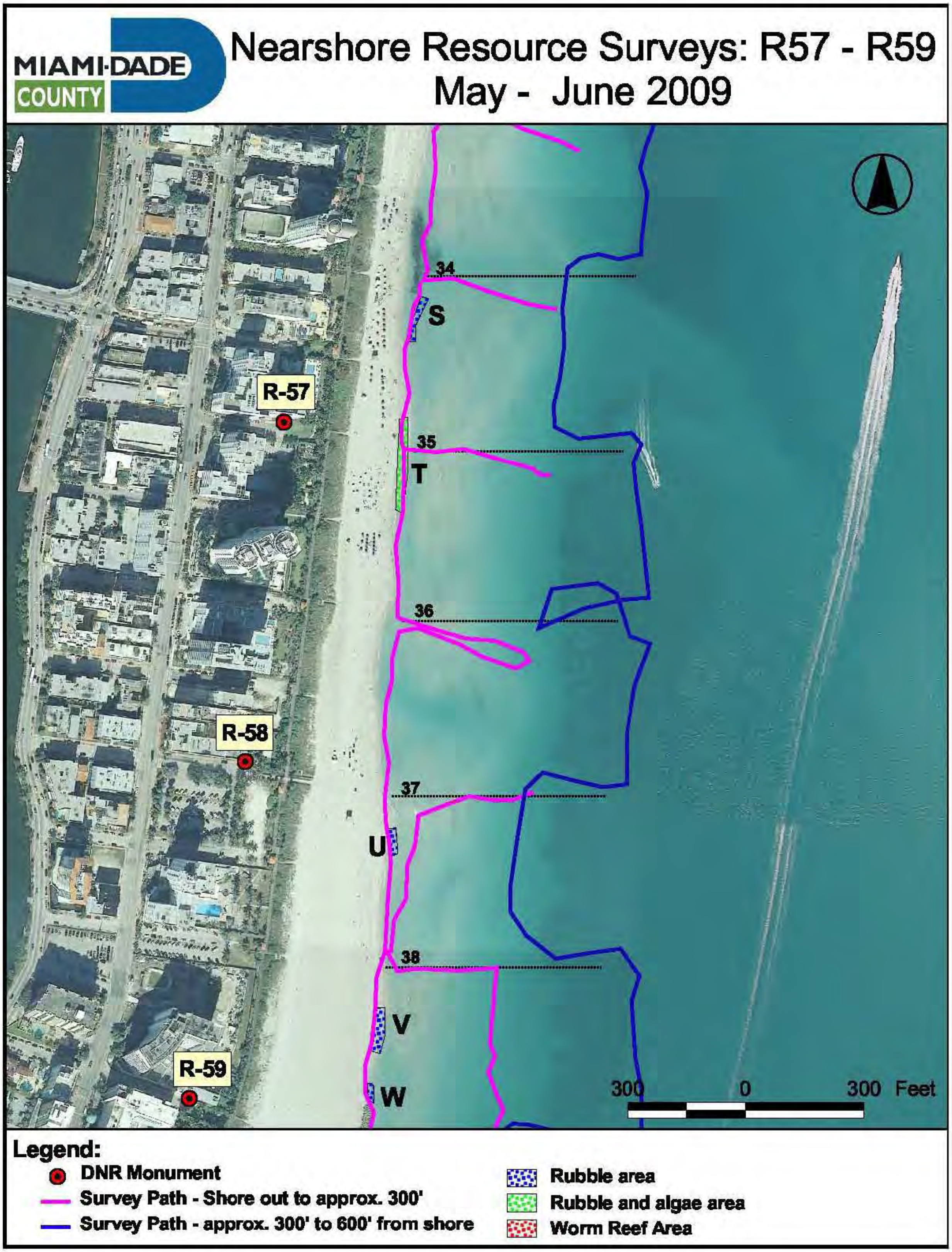
Appendix 5.


MIAMI-DADE COUNTY
Nearshore Resource Surveys: R52 - R54
May - June 2009
23
N
R-52
24
25
O
P
R-53
26
COLLINS AVE
27
Blue & Green Diamonds
28
R-54
300 0 300 Feet
Legend:
DNR Monument
Survey Path - Shore out to approx. 300'
Survey Path - approx. 300' to 600' from shore
Rubble area
Rubble and algae area
Worm Reef Area

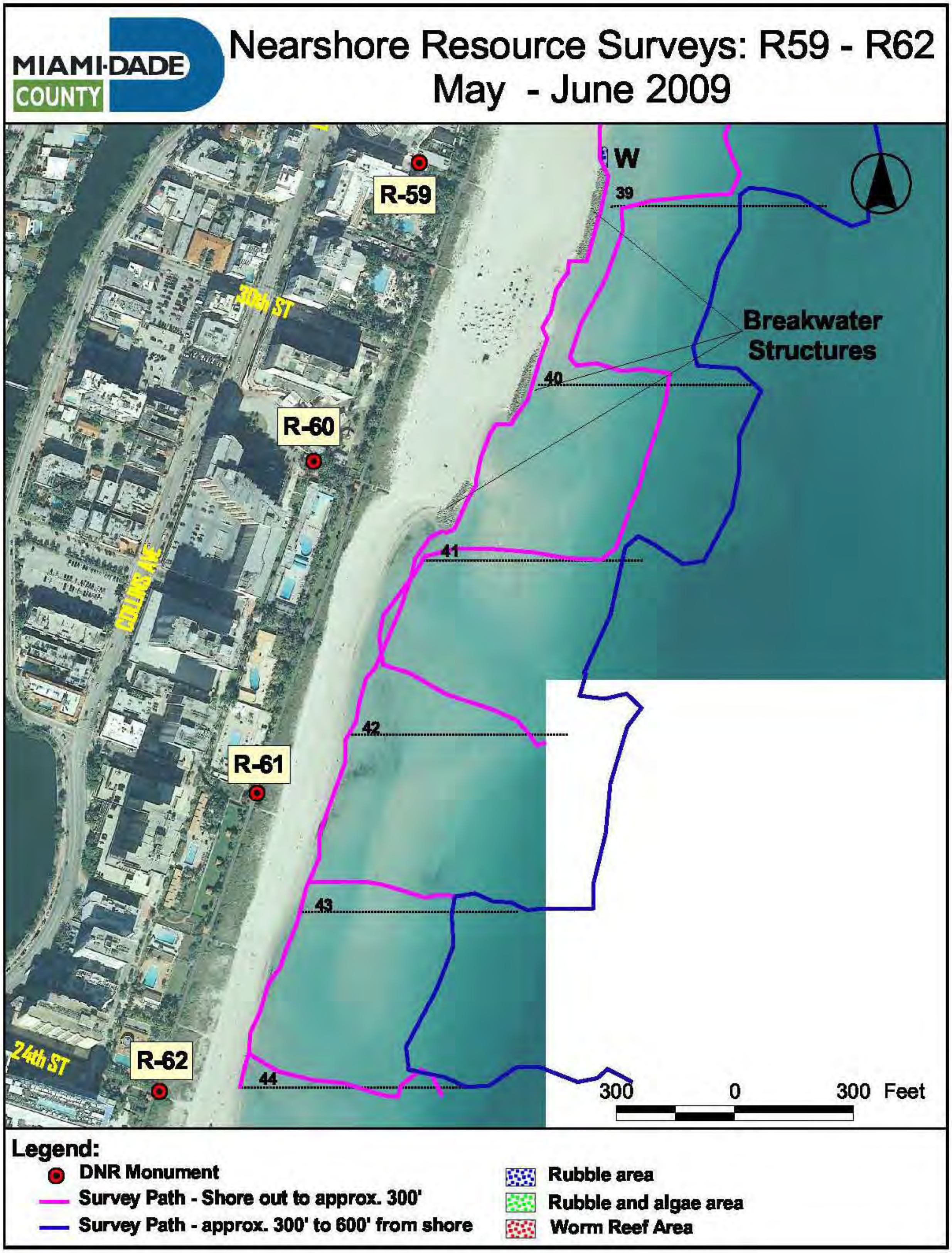
Appendix 6.


MIAMI-DADE
COUNTY
Nearshore Resource Surveys: R54 - R56
May - June 2009
R-54
R-55
R-56
Fountainbleau
COLLINS AVE
COLLINS AVE
Q
R
29
30
31
32
33
300
0
300 Feet
Legend:
DNR Monument
Survey Path - Shore out to approx. 300'
Survey Path - approx. 300' to 600' from shore
Rubble area
Rubble and algae area
Worm Reef Area

Appendix 7.


MIAMI-DADE
COUNTY
Nearshore Resource Surveys: R57 - R59
May - June 2009
34
S
R-57
35
T
36
R-58
37
U
38
V
R-59
W
300
0
300 Feet
Legend:
DNR Monument
Survey Path - Shore out to approx. 300'
Survey Path - approx. 300' to 600' from shore
Rubble area
Rubble and algae area
Worm Reef Area

Appendix 8.



MIAMI-DADE COUNTY
Nearshore Resource Surveys: R59 - R62
May - June 2009
W
R-59
39
30th ST
Breakwater Structures
40
R-60
41
COLLINS AVE
42
R-61
43
24th ST
R-62
44
300 0 300 Feet
Legend:
DNR Monument
Survey Path - Shore out to approx. 300'
Survey Path - approx. 300' to 600' from shore
Rubble area
Rubble and algae area
Worm Reef Area

Appendix 9:

RE: JCP FILE NUMBER: 023382-004-JM, MIAMI DADE COUNTY
RAI #2: Item 23: Field verification of benthic communities in the nearshore region for segments of Miami Beach, Bal Harbor, and Sunny Isle, Miami-Dade county

BACKGROUND

Miami-Dade County manages the approximate fifteen miles of coastal beach resources within the County. This includes periodic nourishment of eroded segments of the beach. Miami-Dade County conducts annual surveys of the beach to determine their status relative to providing appropriate storm protection for upland resources, as well as appropriate recreational and environmental benefits. At this time, three segments of the coastal Miami-Dade beaches are in need of nourishment in order to maintain the storm protection functions of the beach. Miami-Dade submitted a permit application to the Florida Department of Environmental Protection (FDEP; File Number 023382-00-JM), for authorization to nourish these segments. The FDEP has requested additional information regarding the location and type of nearshore communities offshore of those beach segments needing nourishment.

Miami-Dade County conducted in-water field investigations of the ocean floor off each of the three segments referenced in the application, to identify location and community composition of any nearshore resources of the beach segments. The inspections were conducted out to 1500' from the shoreline. Specifics of the methodology and the results of these investigations are presented below.

METHODS

Survey Transect Distribution and Orientation within the Project Area

The geographic scope of this survey effort was designed to cover the nearshore area (within 1500 feet of shore), adjacent to three segments of beach identified in the application: Miami Beach (DNR Monuments R-43 to R-44+500), Bal Harbor (R-27 to R29), and Sunny Isle Beach (R-7 to R-12). Shore-perpendicular transects were established with approximately 500' intervals at and between the monuments noted above. Each survey transect started approximately 300' off the beach, at the outer limit of the 300' vessel exclusion zone extending to a point roughly 1500' off the beach. No emergent or attached biota has been documented within the "Swim-zone" region off Miami-Dade, with the exception of relic shore-perpendicular groins within the Bal Harbor region of the study. These groins have historically supported Sabellariid (*Phragmatopoma*) aggregations on the pilings, when erosion has exposed the remnant pilings.

Tracing Significant Habitat[1] Communities

The ocean bottom along each transect was visually inspected and characterized by biologists using mask & snorkel and/or scuba. The surveys and inspections were conducted in two phases. The first phase involved visualization of the bottom to determine the general presence and location of benthic resources. For this task, biologists were towed by a small boat, starting at "Swim-Zone" line, and progressing offshore. Along each transect, if and when "significant habitat" or hard bottom resources were observed, the location (using GPS with <= 3m accuracy)

[1] For the purposes of this report "Significant Habitat" is defined as any aggregation of stabilized emergent epibenthic biota. This is to include regions of algae, sponge, soft corals, and or hard corals that may be attached to sand inundated (covered) hard bottom or stabilized rubble areas.

was documented. The second phase of the survey involved the divers swimming the western most edge of each of the habitat areas noted, while towing a surface GPS unit. For this, a Garmin GPS unit (*GPSMap 76* model) was secured onto a foam board and the floating board was towed by the diver (with as short a "scope" on the tow line as conditions would allow). Each "tracing" of the habitat/reef areas were downloaded from the GPS and subsequently imported as a layer into a GIS program (ESRI ArcView). The traces were then 'over-laid' on Miami-Dade County geo-rectified aerial photographs or laser airborne depth sounder surveys to produce the maps contained herein.

RESULTS

All surveys started at 300ft from shore, on the seaward side of the 'swim-zone' and continued to a point 1500ft offshore. Sand-bottom was found along two of the 4 Miami-Beach, and one of the five Bal Harbor transects (e.g., all sand-bottom out to at least 1500 ft from shore. On those transects where 'significant habitat was found, it was minimally 1200 ft from the shoreline. The Sunny Isles segment was the 'exception', with epibenthic communities (algae, sponge and soft coral) being found 650 ft to 1200 ft offshore. Along the transects surveyed, open sand with no epibenthic resources was found along 65% to 96% of the overall transect length for each segment.

As described below, most areas of significant habitat had dense seasonally-abundant macro algae, providing a 'lush' appearance to the communities. It should be noted that the surveys were conducted during the middle of the summer when macroalgal biomass is at its highest. Permanent (e.g., non-seasonal) components were abundant in places, but much less so that the seasonal macro algae.

Miami Beach Segment (R-43 to R-44+500):
Significant habitat was observed on two of the four transects off this segment: approximately 1400' from shore on the eastern end of the northern-most transect, MB-1, and approximately 1250' from shore on the eastern end of the southern-most transect, MB-4 (Figure 1). The 'significant habitats' were drift algae/sponge/soft coral dominated communities. Thus, approximately 94% of the total transect distance was of open sand with no epibenthic resources seen.

The areas of significant habitat accounted for less than 6% (5.8%) of the overall distance of the transects surveyed. In both of the significant habitat areas, the western most edge were mainly rubble and hardbottom covered with a sand veneer (< 0.5m deep). Exposed hardbottom was observed occasionally within this area. Drift red algae (*Chondria* sp., *Acanthophora*. *spicifera*, *Spyridia filamentosa*) were the most abundant component in both areas (Figure 2). Other macroalgae species (e.g., *Halimeda* spp., *Caulerpa* sp., *Dictyota* sp., *Dasya bailouviana*) were also common to abundant components of the community. Sponges, soft coral and hard corals were present throughout the area with varying abundance. More species and higher abundances were observed on the northern significant habitat area at the eastern end of transect MB-1. Figures 3 through 5 provide representative illustrations of the significant habitat of this area. Table 1 provides a species list and relative abundance for the components of the benthic community and fish identified during the surveys for the Miami Beach Segment.

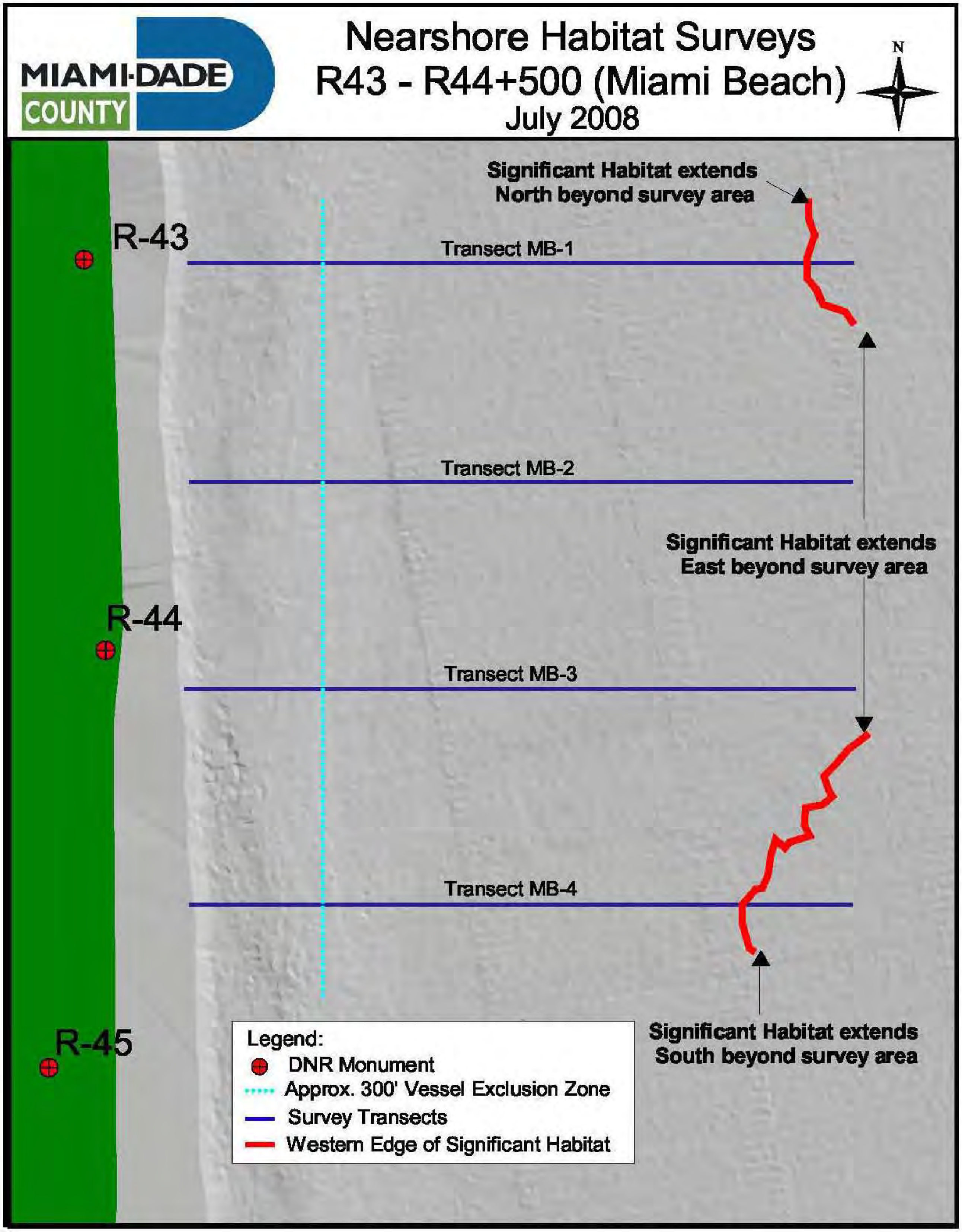


Figure 1. Location of significant habitat within the Miami Beach Segment—R43 to R44+500.

Figure 2. Significant habitat and drift red algae community on sand veneer at eastern end of the northern transect (MB-1) of Miami Beach segment

Figure 3. Sponges and juvenile soft coral (*Pseudopterogorgia* sp.) in the northern significant habitat area (off transect MB-1) of Miami Beach segment.

Figure 4. *Pseudopterogorgia* spp. among a drift red algae community in northern significant habitat area within the Miami Beach segment.

Figure 5. *Pseudopterogorgia* spp. among a drift red algae in southern significant habitat area within the Miami Beach Segment.

Table 1. Benthic and fish species observed while tracing western edge of significant habitat for Miami Beach Segment. Approximate abundance scale given: Single (1 individual); few (2-10 individuals); many (10-50 individuals); abundant (> 50 individuals).

	Species	**Northern Abundance**	**Southern Abundance**
Algae	*Acanthophora spicifera*	Abundant	Abundant
	Lyngbya sp	Abundant	Abundant
	Caulerpa mexicana	Abundant	Abundant
	Chondria sp.	Abundant	Abundant
	Dasya baillouviana	Abundant	Abundant
	Dictyota sp.	Many	Many
	Halimeda discoidea	Abundant	Abundant
	Halimeda incrassata	Abundant	Abundant
	Hypnea sp.	Abundant	Abundant
	Laurencia sp.	Abundant	Abundant
	Spyridia filamentosa	Abundant	Abundant
Sponges	*Anthosigmella varians*	Many	Many
	Cliona sp.	Few	
	Dysidea sp.	Few	
	Iotrochorta birotulata	Few	
	Spheciospongia vesparium	Many	
	Unidentified sponge	Few	
Hard Coral	*Siderastrea radians*		Few
Soft Coral	*Pseudopterogorgia acerosa*	Many	Few
	Pseudopterogorgia americana	Many	Few
Other benthic	Unidentified hydroids	Abundant	Abundant
Fish	*Balistes capriscus*	Many	Many
	Halichoeres bivittatus	Many	Many
	Scarus iserti		Few

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Bal Harbor Segment (R-27 to R-29):

Significant habitat was observed on one of the 5 transects off the Bal Harbor Beach Segment; approximately 1200' from shore (off R-29) on the southern-most transect, BH-5 (Figure 6). Thus, 96% of the transect length surveyed was of open sand, with no epibenthic resources.

Significant habitat was found along approximately 4 % of the overall transect length within this area, and was restricted to the eastern most portion of the transect on which it was seen. The western-most edge of the 'significant habitat' was mainly rubble and hardbottom covered with a sand veneer to the north transitioning to more exposed hardbottom in the south. Seasonal drift red algae communities (*Chondria* sp., *Acanthophora*. *spicifera*, *Spyridia filamentosa*) were abundant in this area particularly the northern portion. Macroalgae (e.g., *Halimeda* spp., *Caulerpa* spp., *Dictyota* sp., *Dasya bailouviana*) were also common throughout. In addition to the algae, occasional soft corals, sponges, and hard corals were observed in the northern area with increasing abundance toward the south. Figures 9 through 12 provide representative illustrations of the significant habitat in this area. Benthic and fish species identified during the surveys for the Bal Harbor Segment and their relative abundance are listed in Tables 2 and 3 respectively.

At this location, seasonal and seasonally abundant macroalgae give a very dense appearance to the communities, however, the persistent components of the community, while at times "abundant" are not as common or high in cover as the seasonally abundant macroalgae.

The Bal Harbor Beach segment has two exposed shore-perpendicular groins extending offshore from the beach between R27 and R29 (Figure 6). Three more groins are farther to the south. These groins have been buried and unburied through nourishment/erosion process. Portions of the groins are tidally exposed. At this time, the groins support benthic species including sponges (*Cliona* spp.), bryozoans, hydroids, tunicates, and algae. Numerous fish species and other motile invertebrates were also found along the groin structures. Figures 7 and 8 illustrate the resources found on the groins while Tables 2 and 3 list the species of benthic and motile species respectively.

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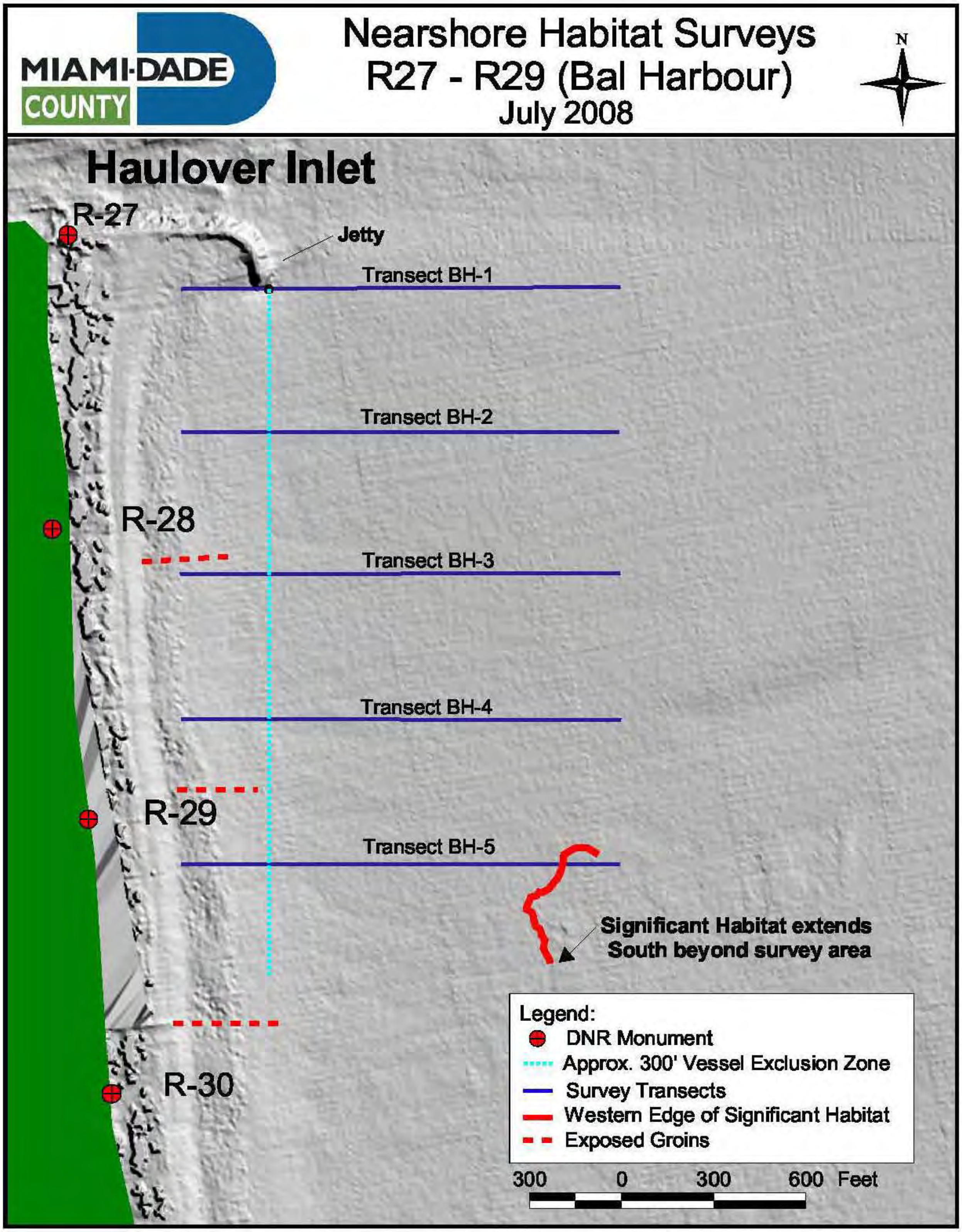

Figure 6. Location of groin structures and significant habitat within the Miami Beach Segment—R43 to R44+500.

Figure 7. Juvenile *Equetus punctatus* and *Lutjanus synagris* among algae (*Padina* spp.) and hydroids on the exposed portions of the shore beach groin structures off the Bal Harbour Beach Segment.

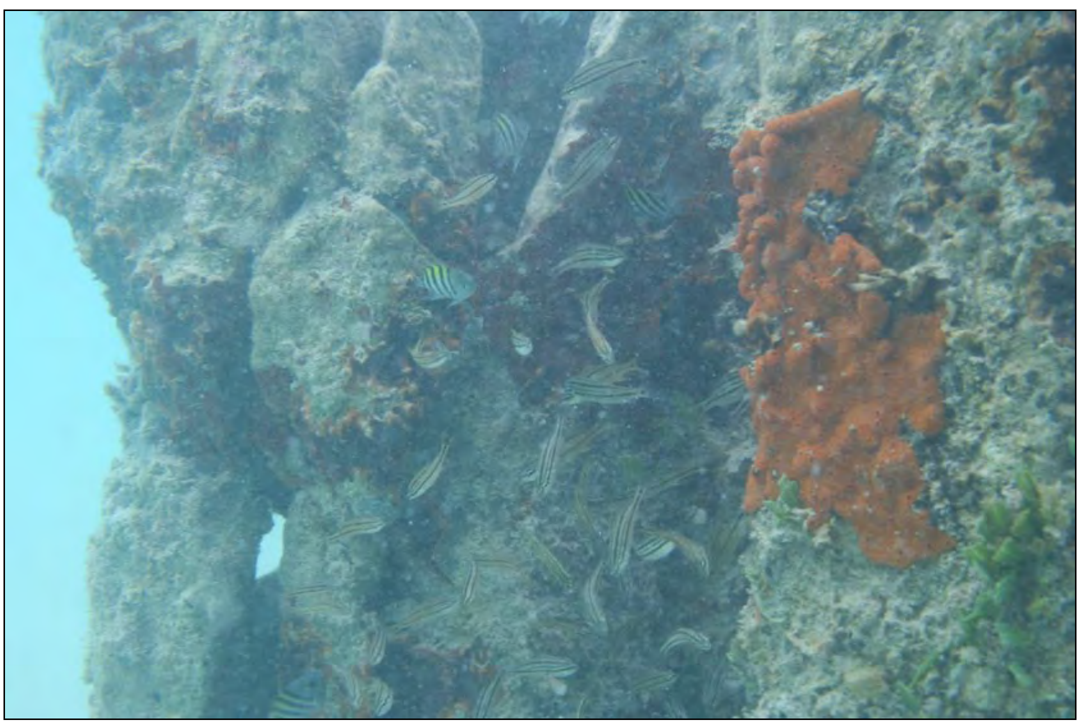

Figure 8. Juvenile grunts (*Haemulon* spp.) and *Abudefduf saxatilis* along with encrusting tunicates, sponges, and algae (*Caulerpa sertulariodes*) on the groin structures off the Bal Harbour Beach Segment.

Figure 9. Attached and drift macroalgae and *Pseudopterogorgia* spp. on rubble and sand veneer in northern portion of significant habitat area within the Bal Harbour Beach segment.

Figure 10. *Solenastrea bournoni* and *Pseudopterogorgia* spp. in significant habitat area within the Bal Harbour Beach segment.

Figure 11. Exposed hardbottom with *Pseudopterogorgia* spp. in significant habitat area within the Bal Harbour Beach segment.

Figure 12. Hardbottom with soft corals and large barrel sponge, *Spheciospongia vesparium*, in significant habitat area within the Bal Harbour Beach segment.

Table 2. Benthic species observed while surveying the exposed groins and tracing western edge of significant habitat for the Bal Harbour Beach Segment. Approximate abundance scale given: Single (1 individual); few (2-10 individuals); many (10-50 individuals); abundant (> 50 individuals).

	Species	Groin Abundance	Sig. Habitat Abundance
Algae	*Acanthophora spicifera*		Abundant
	Blue-Green Algae		Abundant
	Unidentified Brown Algae	Many	
	Caulerpa racemosa		Few
	Caulerpa sertioldes	Abundant	
	Chondria sp.		Abundant
	Dasya baillouviana		Abundant
	Dictyota sp.		Abundant
	Halimeda discoidea		Many
	Halimeda incrassata		Many
	Hypnea spp.		Abundant
	Laurencia sp.		Abundant
	Padina spp.	Abundant	
	Spyridia filamentosa		Abundant
	Udotea sp.		Many
Sponges	*Anthosigmella varians*		Many
	Cliona sp.	Abundant	Few
	Spheciospongia vesparium		Many
Hard Coral	*Siderastrea radians*		Many
	Siderastrea siderea		Many
	Solenastrea bournoni		Many
	Stephanocoenia intersepta		Many
Soft Coral	*Plexaurella* spp.ecies		Many
	Pseudoplexaura sp.		Many
	Pseudopterogorgia americana		Abundant
	Pseudopterogorgia acerosa		Abundant
	Pterogorgia anceps		Many
Other benthic	Unidentified barnacles	Abundant	
	Unidentified bryozoans (encrust)	Many	
	Unidentified hydroids	Abundant	Abundant
	Unidentified tunicates	Abundant	
	Phragmatopoma caudata	Many	

Table 3. Fish and motile invertebrate species observed while surveying the exposed groins and tracing western edge of significant habitat for the Bal Harbour Beach Segment. Approximate abundance scale given: Single (1 individual); few (2-10 individuals); many (10-50 individuals); abundant (> 50 individuals).

	Species	**Groin Abundance**	**Sig. Habitat Abundance**
Fish	*Abudefduf saxatilis*	Abundant	
	Balistes capriscus		Many
	Caranx ruber (juv.)	Many	Few
	Caranx spp. (juv.)	Abundant	
	Diodon holocanthus		Single
	Equetus punctatus	Few	
	Gerres cinereus	Many	
	Haemulon aurolineatum	Single	Few
	Haemulon sciurus		Few
	Haemulon spp. (juv.)	Abundant	
	Halichoeres bivittatus		Many
	Lutjanus synagris (juv.)	Many	Single
	Parablennius marmoreus	Few	
	Seriola dumerili (juv.)		Few
	Sparisoma chrysopterum		Few
	Urolophus jamaicensis		Single
Other Motile	*Sepioteuthis sepiodea*	Few	
	Unidentified crabs	Few	
	Unidentified Cerith snails	Many	

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<u>Sunny Isles (R-7 to R-12)</u>:

Significant habitat was found within the survey on each of the transects surveyed off the Sunny Isles Beach segment; with the closest habitat occurring approximately 650' on transect SI-4, and as far off as approximately 1500' offshore on transect SI-12 (Figure 13), with an average distance from shore of 930 ft. Approximately 62 % of the region was of open sand with no epibenthic resources. The western most edge of the significant habitat was mainly rubble and hardbottom covered with a sand veneer with occasional exposed hardbottom. Seasonal drift red algae communities were dominant throughout this area (*Chondria* sp., *Acanthophora spicifera*, *Laurencia* spp., *Spyridia filamentosa*) and the most apparent component of the benthic community (Figure 14). Attached macroalgae (e.g., *Halimeda* spp., *Caulerpa* spp., *Dictyota* sp., *Dasya bailouviana*) were also an abundant community component throughout the area.

The abundance of sponges, soft coral and hard corals ranged greatly from a solitary soft coral (*Pseudopterogorgia* sp.) surrounded by sand to a few soft corals surrounded by the drift red algae community to denser areas with several soft corals, sponges, and hard corals. Figures 15 through 17 illustrate some of the variation in the components of the significant habitat in this area. Worm rock (*Phragmatopoma caudata*) was also occasionally observed in this area (Figure 19 and 20). Benthic and fish species identified during the surveys for the Sunny Isles Segment and their relative abundance are listed in Tables 4 and 5 respectively. More extensive exposed hardbottom (with 1-2' relief) and dense benthic assemblages were observed farther to the east approximately 1500' offshore at the eastern transect edges.

In addition to the natural habitat described above, two submerged breakwater structures are located approximately 400' from shore between R-7 and R-8 (transects SI-1 to SI-3) as shown in Figure 13. The breakwater structures off the Sunny Isles Segment were constructed from limerock boulders during the summer and fall of 2001 and now support benthic invertebrate, algal, and fish assemblages (Figures 21 and 22). Benthic and fish species observed on the boulders are included in Tables 4 and 5 respectively.

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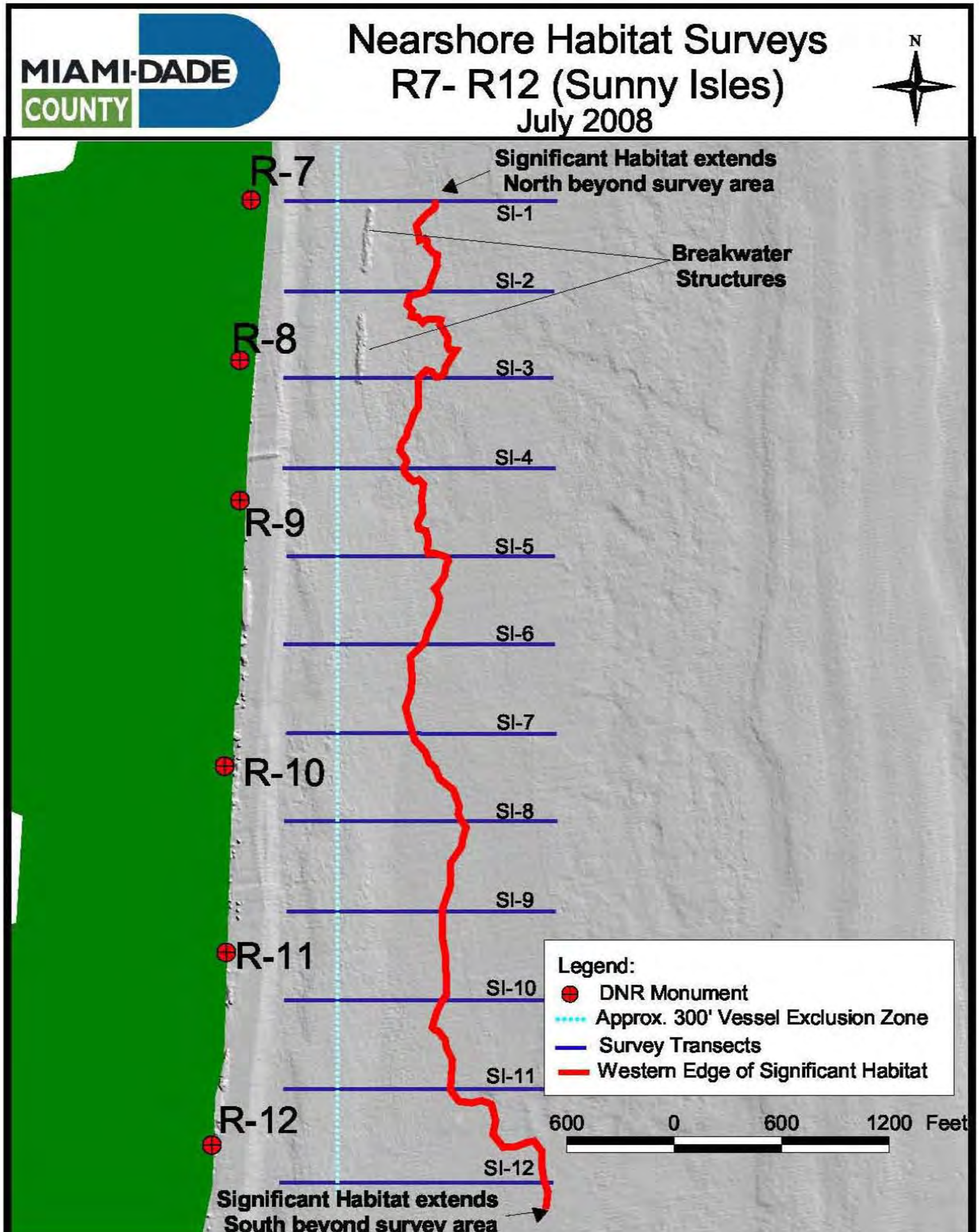

Figure 13. Location of significant habitat within the Miami Beach Segment—R43 to R44+500.

Figure 14. Abundant drift red algae dominated area of the Sunny Isles Beach Segment.

Figure 15. *Pseudopterogorgia* sp. surrounded by sand within the Sunny Isles Beach segment.

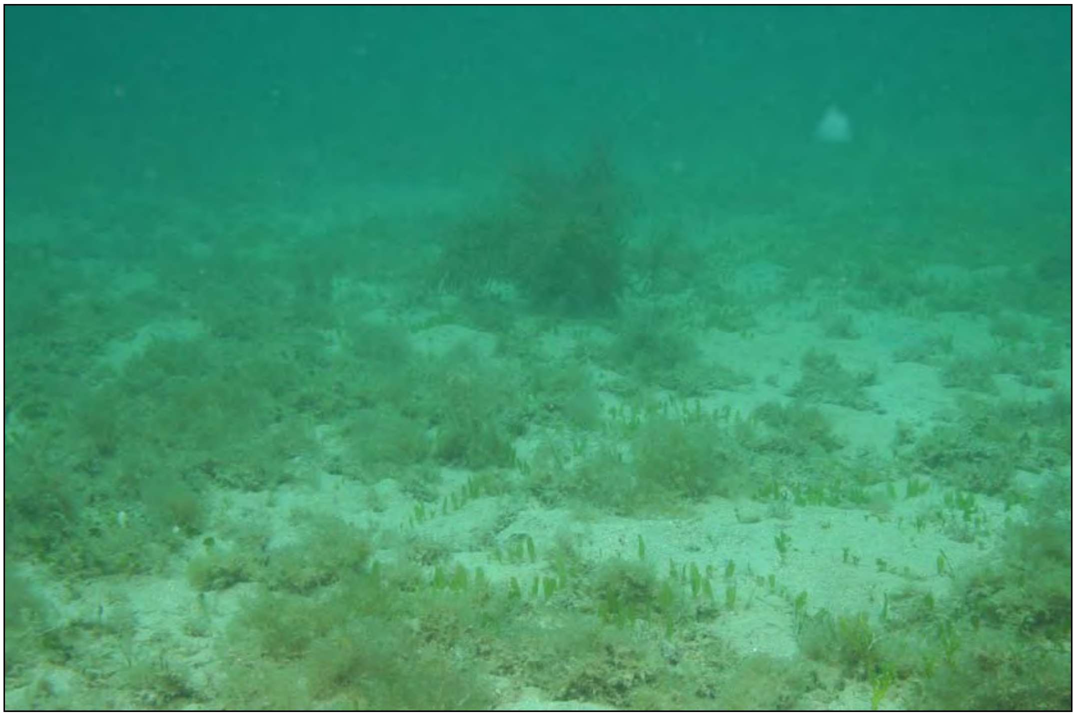

Figure 16. *Pseudopterogorgia* sp. surrounded by algae within the Sunny Isles Beach Segment.

Figure 17. Soft coral (*Pseudopterogorgia* spp. and *Plexaurella* spp.), sponges (*Anthosigmella varians* and *Spheciospongia vesparium*), and algae within the Sunny Isles Beach Segment.

Figure 18. Hard coral, *Solenastrea bournoni*, and sponge, *Anthosigmella varians,* within the Sunny Isles Beach Segment.

Figure 19. Significant habitat area with soft corals (*Pseudopterogorgia* sp.) and worm rock (*Phragmatopoma caudata*) within the Sunny Isles Segment.

Figure 20. Worm rock (*Phragmatopoma caudata*) and algae within the Sunny Isles Segment.

Figure 21. Northern breakwater structure with sponge growth (*Cliona* sp.) and juvenile grunts (*Haemulon* spp.) sheltered by boulders.

Figure 22. Southern breakwater structure with sponge growth (*Cliona* sp.) and Sergeant Majors (*Abudefduf saxatilis*).

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Table 4. Benthic species observed on western edge of significant habitat and breakwater structures for the Sunny Isles Beach Segment. Approximate abundance scale given: Single (1 individual); few (2-10 individuals); many (10-50 individuals); abundant (> 50 individuals).

	Species	Sig. Habitat Abundance	Breakwater Abundance
Algae	*Acanthophora spicifera*	Abundant	
	Blue-Green Algae	Abundant	Abundant
	Caulerpa mexicana	Abundant	
	Chondria sp.	Abundant	
	Dasya baillouviana	Abundant	
	Dictyota sp.	Abundant	
	Halimeda discoidea	Abundant	
	Halimeda incrassata	Abundant	Many
	Halimeda monile	Many	
	Halymenia floresia	Few	
	Hypnea spp.	Abundant	
	Laurencia sp.	Abundant	
	Spyridia filamentosa	Abundant	
	Udotea sp.	Many	
Sponges	*Anthosigmella varians*	Many	
	Cliona delitrix	Few	
	Cliona sp.	Few	Abundant
	Dysidea sp.	Few	
	Iotrochorta birotulata	Few	
	Holopsamma helwigi		Few
	Monanchora barbadensis		Many
	Niphates erecta	Many	
	Spheciospongia vesparium	Many	
	Unidentified sponge	Few	
Hard Coral	*Dichocoenia stoksi*	Few	
	Diploria strigosa	Few	
	Montastrea cavernosa	Few	
	Siderastrea radians	Many	
	Siderastrea siderea	Many	
	Solenastrea hyades	Single	
	Solenastrea bournoni	Many	
Soft Coral	*Pseudopterogorgia acerosa*	Abundant	
	Pseudopterogorgia americana	Abundant	
	Plexaurella spp.	Many	
Other benthic	*Millepora alcicornis*	Many	
	Palythoa caribaeorum		Few
	Phragmatopoma caudata	Many	Many
	Unidentified hydroid	Abundant	
	Unidentified tunicate	Few	

Table 5. Fish and motile vertebrate species observed while tracing western edge of significant habitat for the Sunny Isles Beach Segment. Approximate abundance scale given: Single (1 individual); few (2-10 individuals); many (10-50 individuals); abundant (> 50 individuals).

Species	**Sig. Habitat Abundance**	**Breakwater Abundance**
Acanthurs bahianus	Many	
Abudefduf saxatilis		Abundant
Acanthurus chirurgus	Many	
Anisotremus virginicus		Few
Balistes capriscus	Many	
Coryphopterus glaucofraenum	Few	
Cryptotomus roseus	Few	
Dasyatis sabina		Single
Diplodus holbrookii		Abundant
Gerres cinereus		Many
Gymnura micrura	Single	
Haemulon aurolineatum		Few
Haemulon plumeri	Few	
Haemulon sciurus	Few	
Haemulon spp. (juv.)	Many	Few
Halichoeres bivittatus	Many	Few
Lutjanus synagris (juv.)	Single	
Megalops atlanticus	Single	
Ocyurus chrysurus	Single (juv.)	Few
Pareques acuminatus		Single
Pomacanthus paru	Single	
Sphyraena barracuda	Single	
Stegastes leucostictus	Single	
Synodus intermedius	Few	
Thalossoma bifasciatum	Many	Few
Urolophus jamaicensis	Single	
Xyrichtys splendens	Few	
Chelonia mydas	Single	

SUMMARY

The reef and habitat areas off Miami-Dade County are normally found 500 to +1500 ft offshore. Low relief, exposed bedrock reefs are most commonly found at least 1000 feet offshore. Benthic assemblages often establish on non-consolidated rubble, which can support persistent benthic assemblages for a given period of time (until a storm disrupts the stability of the rubble). These areas are often inundated with sand, create conditions of high sedimentation due to the shifting sands which often disrupt and scour available substrate. Despite these conditions, these areas of often support algal, sponge, soft coral, and very limited hard coral; and are composed of species with high tolerance of sedimentation.

RECEIVED
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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Dr. N.
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JAN 31 2005 F/SER3:KPB

Mr. James C. Duck
Chief, Planning Division
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Duck:

We reviewed your letter dated July 7, 2004, and associated documents regarding the Section 227, National Shoreline Erosion Control and Development Program, 63rd Street Hotspot, Submerged Artificial Reef Training (SMART) Structure. We have also received the draft environmental assessment (EA) that we requested on August 19, 2004. You have requested that we analyze the possible effects on the species listed under the Endangered Species Act (ESA) under the purview of the National Marine Fisheries Service (NOAA Fisheries), pursuant to the interagency consultation requirements of section 7 of the ESA.

The purpose of the project is to place reef balls to serve as an artificial reef to attenuate wave energy to abate shoreline erosion. The site is proposed offshore of Miami Beach between 63rd and 83rd Streets (between the state of Florida monuments R-44 to R-46A). The Army Corps of Engineers (COE) proposes to construct the SMART structure 400 ft from the mean shoreline, in 7 ft of water. Construction of the artificial reef is expected to occur over a 2-3 month period between the months of January and May. The reef will be comprised of 6-ft diameter hollow goliath reef balls, 3-ft diameter hollow reef balls, and 3-ft diameter solid bay balls. Each segment of the 2,272-ft long structure would be 42.8 ft long by 6 ft wide, with each segment having a mass of approximately 30 tons. Each segment will be placed perpendicular to the beach with a barge crane, such that the total SMART structure will be approximately 2,272 ft long and 42.8 ft wide. To allow sea turtles access to and from the beach, a "turtle lane" will be constructed every tenth segment for a total of 33 lanes. The total footprint of the structure will be approximately 2.1 acres.

Listed species/designated critical habitat

ESA-listed species under the purview of NOAA Fisheries that potentially occur in the action area include the green (*Chelonia mydas*)[1], loggerhead (*Caretta caretta*)[2], Kemp's ridley (*Lepidochelys*

[1] NMFS (National Marine Fisheries Service) and FWS (US Fish and Wildlife Service). 1991. Recovery Plan for U.S. Population of Atlantic Green Turtle. NMFS, Washington D.C.

kempii),[3] leatherback (*Dermochelys coriacea*)[2], and hawksbill (*Eretmochelys imbricata*)[4] sea turtles. There is no designated critical habitat for listed species in the project area.

The U.S. population of smalltooth sawfish *(Pristis pectinata)* was listed as endangered under the ESA on April 1, 2003 (68 FR 15674); critical habitat has not yet been designated. Historically, smalltooth sawfish commonly occurred in the shallow waters of the Gulf of Mexico and the eastern seaboard up to North Carolina; current distribution is believed to be centered around the extreme southern portion of peninsular Florida (i.e., Everglades National Park including Florida Bay). Recent sawfish records are limited to Georgia, Florida, and most recently, Texas. There are no known sawfish breeding or juvenile habitats in the project area.[5] NOAA Fisheries believes any possible disturbances to smalltooth sawfish would be insignificant due to their low probability of occurrence at the project site.

Effects of the Action

Placement of the SMART structure is expected to occur over a 2-3 month period, outside of the nesting season for sea turtles in the southeast United States (May to October). Therefore, we do not believe any adverse effects will result from construction activities (e.g., noise or lighting). Although the project is not expected to overlap with the sea turtle nesting season, the COE has agreed to prohibit any nighttime activities to avoid any potential impacts to nesting sea turtles or hatchlings swimming offshore associated with the construction noise or lighting. Hard bottom resources can be found offshore of the proposed SMART structure, but none are found within the project area. In addition, placement of the SMART structure will be guided by in-water divers to avoid any animals or bottom obstructions that may be present. Once in place, the structure should attract biota; thus, creating foraging opportunities for various species, including sea turtles. No adverse effects are expected from placement of the artificial reef due to alteration of sea turtle behavior or foraging success.

The annual numbers of nesting sea turtles on Miami Beach are low due to the high level of anthropogenic effects in the vicinity of the city of Miami. An average of 15.33 nests (ranging from 7 to 23) annually have been observed on Miami Beach over the past several years. An

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[2] NMFS (National Marine Fisheries Service). 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. U.S. Department of Commerce NOAA Technical Memorandum NMFS-SEFSC-455.

[3] Turtle Expert Working Group. 2000. Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the Western North Atlantic. U.S. Department of Commerce, NOAA Technical Memorandum NMFS_SEFSC_444; 2000. 115 pp.

[4] NMFS (National Marine Fisheries Service) and FWS (U.S. Fish and Wildlife Service). 1993. Recovery Plan for Hawksbill Turtles in the U.S. Caribbean, Atlantic Ocean, and Gulf of Mexico. National Marine Fisheries Service, St. Petersburg, Fla.

[5] Identify Fishing Mortality of Smalltooth Sawfish and Monitor its Nursery Habitats. 3rd Quarterly Report to the National Marine Fisheries Service, St. Petersburg, Florida. Mote Marine Laboratory, Contract No. WC133F-SE-0594

offshore breakwater may improve nesting beach conditions by abating beach erosion, but may potentially inhibit a turtle's ability to access the beach to nest. To address these concerns, the COE has incorporated "turtle lanes" into the design of the SMART structure. Turtle lanes are proposed to be installed using 3-ft wide spherical reef balls placed every tenth segment (a total of 33 turtle lanes will be installed) that will provide a minimum of 3 ft of clearance over the reef balls for passage through the SMART structure. Each turtle lane will be 6–8 ft wide. Additionally, there is a minimum clearance of 1 ft over the entire reef at mean low tide; however, turtles will have greater than 1 ft of clearance the majority of the time that should allow turtles to swim over the reef most of the time. Both of these design considerations are expected to allow sea turtles access to the beach, such that no adverse affects are expected to sea turtles attempting to access the beach.

Because of the potentially adverse effects to nests and hatchlings from existing conditions on the beach, approximately 95 % of nests in Miami-Dade County are presently relocated to the Haulover Beach Park hatchery. However, 100% of nests have been relocated from Miami Beach, with some nests in remote areas left undisturbed, which account for the remaining 5% left *in situ*. Because all nests are relocated to a hatchery beach, the proposed SMART structure is not expected to increase the predation rates of hatchlings since they will not be passing over the SMART structure during the swimming frenzy to offshore waters. The draft EA indicates that predatory fish may concentrate along the artificial reef, and large predatory fish may inhabit the inside of the large reef balls. Some studies have shown that some types of artificial reefs may interrupt the offshore migration of hatchlings by slowing passage over the structure, and an increase in predatory fish along these structures may result in increased hatchling predation rates.[6] Although NOAA Fisheries is concerned with the potential for breakwaters to result in increased predation rates on hatchlings, no adverse effects are expected from this particular project due to the relocation of all nests in the project area.

Minimization Measures

The COE will implement the following measures to reduce any potential impacts to protected species:

A. No SMART structure construction will be undertaken from the beach. All SMART structure construction will be conducted via a barge.
B. Every effort will be made to conduct the SMART structure placement outside of the sea turtle nesting season (May to October). If unanticipated delays occur which result in placement activities during these months, no construction will occur at night, and no artificial lighting will be used.

---

[6] Wyneken, J., and M. Salmon. 1996. Aquatic predation, fish densities, and potential threats to sea turtle hatchlings from open-beach hatcheries: final report. Broward County Department of Natural Resource Protection. Technical Report 96-04, 47 pp.

C. Observers will be posted during construction operations to observe for sea turtles and manatees that may be found in the project area.
D. Any marine mammals or sea turtles in the SMART structure construction zone will not be forced to move out of the zone by human intervention. Work will stop until the animal exits the zone of its own volition.

After considering the possible sources of effects on the listed species that may occur in the action area, NOAA Fisheries concludes that listed species are not likely to be adversely affected by this project. This concludes your consultation responsibilities with NOAA Fisheries under section 7 of the ESA for the proposed SMART project. Be advised that a new consultation must be initiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. Potential project impacts utilizing methodology not considered in the consultation will require additional ESA section 7 consultation with NOAA Fisheries' Protected Resources Division.

We also strongly recommend that the COE carry out the proposed study of hatchling mortality rates following construction of the SMART structure that is mentioned in your BA. The effects of the increasing number of erosion control structures (e.g., SMART structures, T-groin structures, breakwalls, and beach armoring) in the southeast United States should continue to be studied. It is highly recommended that the COE use the data collected to programmatically analyze all the possible effects of all current and planned erosion control/beach renourishment structures in the southeast United States on sea turtles. Please provide a copy of the study currently proposed for our review.

You are also reminded, in addition to your protected species/critical habitat consultation requirements with NOAA Fisheries' Protected Resources Division pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NOAA Fisheries' Habitat Conservation Division (HCD) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act's requirements for essential fish habitat (EFH) consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-600.930, subpart K). Consultation is not complete until EFH and ESA concerns have been addressed. If you have any questions about EFH consultation for this project, please contact Ms. Kay Davy, HCD, at (786) 263-0028.

Thank you for your continued cooperation in the conservation of our protected resources. If you have any questions about this letter, please contact Kyle Baker, fishery biologist, at the number listed above or by e-mail at Kyle.Baker@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

cc: F/SER47 – Kay Davy
Paul Stevenson - COE JAX
Lauren Milligan – FWC Tallahassee
Sandy McPherson – FWS JAX
Trish Adams – FWS Vero Beach

File: 1514-22.f.1 FL
Ref. No. I/SER/2004/01930

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

NOV 30 2004

Planning Division
Environmental Branch

Mr. David Bernhart
Assistant Regional Administrator For Protected Resources
National Marine Fisheries Services
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Bernhart;

We have received your October 7, 2004 letter (enclosure 1) response to the July 2004 Section 227 National Shoreline Erosion Control Development and Demonstration Program, 63rd Street "Hotspot" SubMerged Artificial Reef Training (SMART) Structure, Miami-Dade County, Florida, Draft Environmental Assessment (DEA). Based on telephone conversations with National Marine Fisheries Service staff on November 9, 2004, we believe the July 2004 DEA may address many of your staff's concerns (see page 2, pg. 4, Section 3, pg. 14 & 15, Section 4, pg. 20, pg. 26, Appendix C - Pertinent Correspondence). A proposed 'Sea Turtle Access Lane' sketch (enclosure 2) has been provided for your information also.

Nesting sea turtle access over, through or around the SMART structure to the beach would be available as depicted in enclosure 2. The SMART structure would rarely have a minimum one-foot of freeboard at mean low water and would not deter sea turtle access to or from the shoreline. The tidal range of the project area is roughly 3.5-foot which could provide 4.5-foot of water depth over the SMART structure often. The SMART structure additionally proposes 'Sea Turtle Access Lanes' that would be 6 to 8-foot wide every tenth segment (60-foot) and provide 4 to 7.5 -foot of water depth. Historical nesting access of loggerhead females would not be deterred by the proposed SMART structure and may be improved by the SMART structure's nearshore wave energy abatement function.

Sea turtle hatchling predation would not be increased by the SMART structure. Sea turtle hatchling predation occurs naturally in great numbers although predatory fish numbers are in decline (www.nwfsc.noaa.gov). The SMART structure would

The U.S. Fish and Wildlife Service (FWS) in coordination with the Corps identified the manatee as potentially occurring in the project area. Nesting sea turtles were also identified as a FWS concern.

Based on the enclosed BA, the Corps has determined that the proposed action will not jeopardize listed species and may affect, but is not likely to adversely affect, the manatee or sea turtles. The Corps requests your written concurrence on this determination.

We are incorporating by reference, the FWS, October 24, 1995 Biological Opinion for the Region III of the Coast of Florida Erosion and Storm Effects Study, "Reasonable and Prudent Measures" and "Terms and Conditions" (as updated by the March 1, 2001 FWS, Fish and Wildlife Coordination Act Report for the Corps' "Alternative Test Beach Renourishment Study, Miami-Dade County"). The Corps would also like to incorporate by reference the Miami Harbor Biological Assessment dated July 21, 2002 and the FWS June 17, 2003 Biological Opinion (#4-1-03-I-786).

The point of contact is Mr. Paul Stevenson at telephone number 904-232-3747 or via electronic mail at paul.c.stevenson@saj02.usace/army.mil. If our response to your October 7, 2004 letter does not satisfy your questions about the proposed action, not likely to adversely affect, consider this initiation of formal consultation.

Sincerely,

James C. Duck

James C. Duck
Chief, Planning Division

Enclosures

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Dr. N.
St. Petersburg, FL 33702
(727) 570-5312, FAX 570-5517
http://sero.nmfs.noaa.gov

OCT -7 2004

F/SER3:KPB

Mr. James C. Duck
Chief, Planning Division
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Duck:

We reviewed your letter dated July 7, 2004, and associated documents regarding the Section 227, National Shoreline Erosion Control and Development Program, 63rd Street "Hotspot", Submerged Artificial Reef Training (SMART) Structure. We have also received the draft environmental assessment (EA) that we requested on August 19, 2004. You have requested that we analyze the possible effects on the species listed under the Endangered Species Act (ESA) under the purview of the National Marine Fisheries Service (NOAA Fisheries), pursuant to the interagency consultation requirements of section 7 of the ESA.

The purpose of the project is to place reef balls to serve as an artificial reef to attenuate wave energy to abate shoreline erosion. The site is proposed offshore of Miami Beach in the vicinity between 63rd and 83rd Streets (between the State of Florida monuments R-44 to R-46A). The COE proposes to construct the SMART structure 400 ft from the mean shoreline, in seven feet of water. The SMART structure will be a total length of approximately 2,272 feet comprised of six-foot tall hollow goliath reef balls, three-foot tall hollow reef balls, and three-foot tall solid bay balls. Each segment of the 2,272-ft long structure would be 42.8 ft long by six feet wide, with each segment having a mass of approximately 30 tons.

The purpose of the proposed project is to control beach erosion, and it may maintain or even improve beach quality for nesting sea turtles, and provide foraging habitat. However, we have the following concerns and questions that should be considered in the biological assessment and initiation of section 7 consultation under the ESA:

- the potential for the breakwater to deter nesting females,
- delayed offshore migration and increased predation on hatchlings by fish inhabiting the artificial reef,
- the possibility of entrapment of sea turtles in the reef balls,
- cumulative impacts, and
- alternatives and duration of the proposed action

Deterrence of nesting females

As indicated in your draft EA, nesting of sea turtles on this beach has already been drastically reduced by development and lighting on the beach. Because of the orientation of hatchlings to beach lighting and high human use of the beach that may result in other adverse effects such as compaction of nests, approximately 95% of nests are relocated to hatchery beaches. Because eggs are relocated to safer beach environments, the proposed SMART structure would have the potential to affect the approximately 5% of nests estimated to remain *in situ* on the beach. An offshore breakwater may improve nesting beach conditions, but may unfortunately further reduce the already low numbers of sea turtles nesting in this location due to anthropogenic activities. "Turtle lanes" are proposed to be installed using three-ft wide spherical reef balls placed every tenth segment (one segment equals 426 feet) that will provide a three-ft clearance over the reef balls for passage over the reef. Although "turtle lanes" are proposed to allow nesting turtles to pass over the structure, it is not clear how wide the lanes will be, nor how effective they will be. However, the documents submitted suggest that the design of the "turtle lanes" proposed may be too narrow and/or spaced too far apart for them to fulfill the purpose of allowing sea turtles to pass to the shoreline. Please provide additional information regarding the "turtle lanes" and information regarding previous use of these lanes in other erosion control projects.

Hatchling predation

In addition to the possibility of decreased numbers of nesting females on the beach, an increase in hatchling predation may result from the SMART structure. The draft EA indicates that predatory fish may concentrate along the artificial reef, and large predatory fish may inhabit the inside of the reef balls. Some studies have shown that artificial reefs may interrupt the offshore migration of hatchlings, and the concentration of predators along these structures may increase hatchling predation rates.[1]

Entrapment

There exists some evidence of sea turtles becoming entrapped within artificial reef structures.[2] Although this evidence is preliminary and the cause of death could not be not determined, it appears that turtles may enter certain artificial reef structures, and then become unable to exit. The potential for foraging turtles to become entrapped in these structures should be considered. The description of the reef balls does not include the size of the reef ball openings. Although the EA indicates that the reef ball openings allow for large predatory fish to inhabit them, we are unable to determine if these structures pose any risks to sea turtles. Please provide details on the sizes of the holes in the reef balls.

---

[1] Wyneken, J., and M. Salmon. 1996. Aquatic predation, fish densities, and potential threats to sea turtle hatchlings from open-beach hatcheries: final report. Broward County Department of Natural Resource Protection. Technical Report 96-04, 47 pp.

[2] Internet website: http://escambia.ifas.ufl.edu/marine/amie_coordinates.htm. October 5, 2004.

Cumulative impacts

The increasing number of erosion control structures (e.g., SMART structures, T-groin structures, breakwalls, and beach armoring) in the southeast U.S. may have a cumulative impact on sea turtle nesting behavior, hatching success, and hatchling survival that may have consequences at the population level. It is highly recommended that the COE programmatically analyze all the possible effects of all erosion control/beach renourishment structures in the southeast U.S. on sea turtle populations, including those that may result in both beneficial and adverse effects on individuals or populations. We also strongly recommend that the COE carry out the proposed study of hatchling mortality rates following construction of the SMART structure that is mentioned in your BA. Please provide a copy of the proposed study for our review.

Alternatives and duration

The alternatives section of the draft EA suggests only one alternative (no-action alternative) to the proposed alternative (preferred alternative). Viable alternatives such as groins should be considered as alternatives to reef balls for this project so that the proper consideration is given in regard to the effects on endangered and threatened species. Also, please provide additional information regarding the seasonality and duration of the construction proposed to occur for each of the alternatives. Construction is recommended to be limited to the months of October through April when sea turtle nesting and hatchling emergence would not be expected to occur.

Please provide the above information pursuant to interagency consultation requirements of the ESA. If you have any questions about this letter or section 7 consultation under the ESA, please contact Kyle Baker, Fishery Biologist, at the number listed above or by e-mail at Kyle.Baker@noaa.gov.

Sincerely,

David Bernhart
Assistant Regional Administrator
for Protected Resources

cc: Paul Stevenson - COE JAX
Lauren Milligan – FWC Talahassee
Sandy McPherson – FWS JAX
Trish Adams – FWS Vero Beach

File: 1514-22.f.1 FL
Ref. No. I/SER/2004/00873

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF
Planning Division
Environmental Branch

JUL 0 7 2004

Mr. David Bernhart
National Marine Fisheries Service
Southeast Regional Office
Protected Species Resources Division
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Bernhart:

Enclosed is a Biological Assessment (BA) prepared by the U.S. Army Corps of Engineers (Corps), Jacksonville District, under Section 7 of the Endangered Species Act of 1973 as amended. The proposed project is the Section 227, National Shoreline Erosion Control Development and Demonstration Program, 63rd Street "Hotspot", SubMerged Artificial Reef Training (SMART) Structure, Miami Beach, Dade County, Florida.

The Corps has identified six species of sea turtles [loggerhead sea turtle, *(Caretta caretta)*, green turtles *(Chelonia mydas)*, leatherback turtles *(Dermochelys coriacea)*, hawksbill turtles *(Eretmochelys imbricate)*, Kemp's ridley *(Lepidochelys kempii) and Kemp's olive (Lepidochelys olivacea)*] that may occur within the project area.

Enclosed please find the Corps' BA of the effects of the proposed project on listed species under the National Marine Fisheries Service's (NMFS) jurisdiction in the vicinity of the project area. A copy of the draft Environmental Assessment (EA) will be issued as soon as we receive the draft U.S. Fish and Wildlife Coordination Act Report. We request initiation of informal consultation under Section 7 of the Endangered Species Act of 1973 as amended, concerning the effects of the proposed activities listed species under NMFS' jurisdiction.

After reviewing the status of the species in the action area and the draft EA, we find that the proposed SMART structure may affect, but is not likely to adversely affect, listed species

BIOLOGICAL ASSESSMENT
63rd STREET "HOTSPOT" MIAMI BEACH
DADE COUNTY, FLORIDA

1. Location. The site of the proposed action is between State of Florida monuments R-44 to R-46A, in the vicinity of 63rd Street, Miami Beach, Miami-Dade County, Florida (Figure 1).

2. Identification of Listed Species and Critical Habitat in the Vicinity of the Proposed Action. The Corps has identified the sea turtles [loggerhead sea turtle, *(Caretta caretta)*, green turtles (*Chelonia mydas)*, leatherback turtles (*Dermochelys coriacea)*, hawksbill turtles (*Eretmochelys imbricate)*, Kemp's ridleys (*Lepidochelys kempii)* and olive Ridley (*Lepidochelys oliveaca*)] as potentially occurring within the project area of Miami Beach between State monuments R-44 and R-46A. No designated critical habitat is located in the project area.

3. Description of the Proposed Action. The objective of the National Shoreline Erosion Control Development and Demonstration Program, 63rd Street "Hotspot", Miami Beach, Dade County, Florida, proposed project, is to abate shoreline erosion by attenuating wave energy in the most cost-effective and environmentally friendly manner possible. The program strives to utilize research to develop innovative methods to meet objectives. Under the Water Resources Development Act (WRDA) of 1996, Section 227, the project can be altered or removed if it does not meet the stated objectives within Appendix F - Physical and Biological Monitoring Program of the Environmental Assessment.

The Corps, in partnership with the Miami-Dade County Department of Environmental Resources Management (DERM), proposes to construct the SubMerged Artificial Reef Training (SMART) structure 400-foot from the mean shoreline in 7-foot of water. The SMART structure would be comprised of 6-foot tall hollow goliath reef balls, 3-foot tall reef balls and 3-foot tall solid bay balls, attached to an articulated concrete mat (Figure 2). Four goliath reef balls and one bay ball would comprise one 'segment' 42.8-foot long by 6-foot wide (Figure 3). 'Sea turtle lanes', proposed to address USFWS sea turtle access concerns, would be constructed for each 10th segment utilizing 3-foot tall reef balls (Figure 3). The segments would be placed on the

F.S. The loggerhead turtle is listed as a threatened species. The majority of sea turtle nesting activity occurred during the summer months of June, July and August, with nesting activity occurring as early as March and as late as September.

The waters offshore of Dade County are also habitat used for foraging and shelter for the three species listed above and the hawksbill turtle (*Eretmochelys imbricata*), and possibly the Kemp's Ridley turtle (*Lepidochelys kempii*) (USACE, 2000) and olive Ridley (*Lepidochelys oliveaca*). Daily sea turtle nesting surveys are conducted by Dade County Parks and Recreation Department with a historically very successful relocation and hatch rate (pers. Comm., B. Flynn, Dade Co. DERM). These turtles do occur in the Atlantic Ocean and nest on Dade County beaches, possibly within the proposed project area. Observers would be posted during construction operations to look for sea turtles (and manatees) that may wander into the project area.

Hardbottom Resources

Hardbottom resources can be found offshore of the proposed SMART structure but not within the project area (Figure 4).

Other Threatened or Endangered Species

Other threatened or endangered species that may be found in the in the coastal waters off of Miami-Dade County during certain times of the year are the finback whale (*Balaenoptera physalus)*, humpback whale (*Megaptera novaeangliae)*, right whale (*Eubalaena glacialis)*, sei whale, (*Balaenoptera borealis)* and the sperm whale (*Physeter macrocephalus catodon)*. These are infrequent visitors to the area and are not likely to be impacted by project activities. Bottlenose Dolphins are protected under the Marine Mammal Protection Act of 1972, as amended, and may be found within the project activity area.

7. Effects of the Action on Protected Species.

As previously stated, the Corps believes that the loggerhead turtle and green turtle, have the potential to be indirectly effected by the proposed National Shoreline Erosion Control Development and Demonstration Program, 63rd Street "Hotspot", Miami Beach, Dade County, Florida SMART project.

Community Analysis. Coral Reef Associates, Inc./ Florida International University, Miami, Florida. 20 pp.

Goldberg, W.M., P.A. McLaughlin, and S. Mehadevan. 1985. Long Term Effects of Beach Restoration in Broward County, Florida, A Three Year Overview. Part II: Infaunal Community Analysis. Coral Reef Associates, Inc./ Florida International University, Miami, Florida./Mote Marine Laboratory, Sarasota, Florida. 31 pp.

Florida. M.S. Thesis, Florida Atlantic University. 257 pp.

Lighty, R. G., I. G. MacIntyre, and R. Stuckenrath. 1978. "Submerged Early Holocene Barrier Reef South-east Florida Shelf." Nature (London) 276 (5683):59-60.

Marszalek, D. S., and D. L. Taylor. 1977. Professional Engineering Services for Surveying and Monitoring of Marine Hardground Communities in Dade County, Florida. Initial report for the USACE, Jacksonville District. Contract No. DACW17-77-C-0036.

Nelson, D.A., Mauck, K., and Fletemeyer, J. 1987. Physical Effects of Beach Nourishment on Sea Turtle Nesting, Delray Beach, Florida, Technical Report EL-87-15, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

Raymond, B., and A. Antonius. 1977. Biological Monitoring Project of the John U. Lloyd Beach Restoration Project. Final report for Broward County Erosion Prevention District, Broward County, Florida.

U.S. Army Corps of Engineers. 1982. Survey Report and EIS Supplement, Beach Erosion Control and Hurricane Protection Study for Dade County, Florida, North of Haulover Park.

U.S. Army Corps of Engineers. 1995. Dade County, Florida Shore Protection Project, Design Memorandum, Addendum III, North of Haulover Park (Sunny Isles) Segment, Jacksonville District.

U.S. Army Corps of Engineers. 1995. Final Environmental Assessment, Second Periodic Nourishment, Sunny Isles and Miami Beach Segments, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida, Jacksonville District.

U.S. Army Corps of Engineers. 1996. Coast of Florida Erosion and Storm Effects Study, Region III, Feasibility Report with Final Environmental Impact Statement, Jacksonville District.

U.S. Army Corps of Engineers. 1997. Final Environmental Assessment, Second Periodic Nourishment, Surfside and South Miami Beach Segments, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida, Jacksonville District.

U.S. Army Corps of Engineers. 1997. Draft Environmental Impact Statement, Modifications at Sunny Isles, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida, Jacksonville District.

MIAMI-DADE

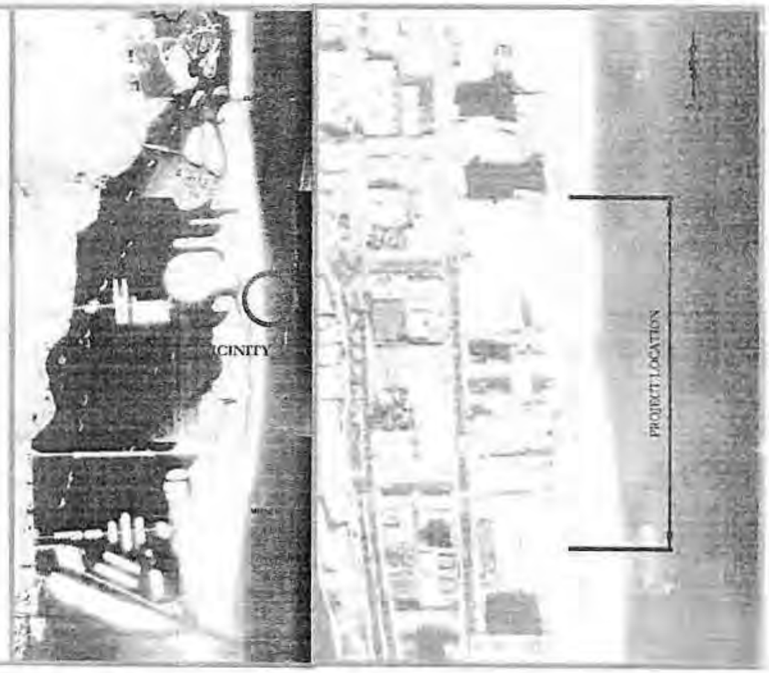
SECTION 227

NATIONAL SHORELINE EROSION
CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM

63rd STREET MIAMI BEACH, DADE COUNTY, FLORIDA

US Army Corps of Engineers

LOCATION MAP



DRAWING INDEX:

SHEET DRAWING TITLE

1. COVER SHEET
2.-5. SMART STRUCTURE LOCATION PLAN
6.-8. EXISTING PROFILES PLAN
9. REEFBALL AND BASE DETAILS
10. REEFBALL DETAILS
11. SMART TERMINUS CONFIGURATION STRUCTURE

SECTION 227

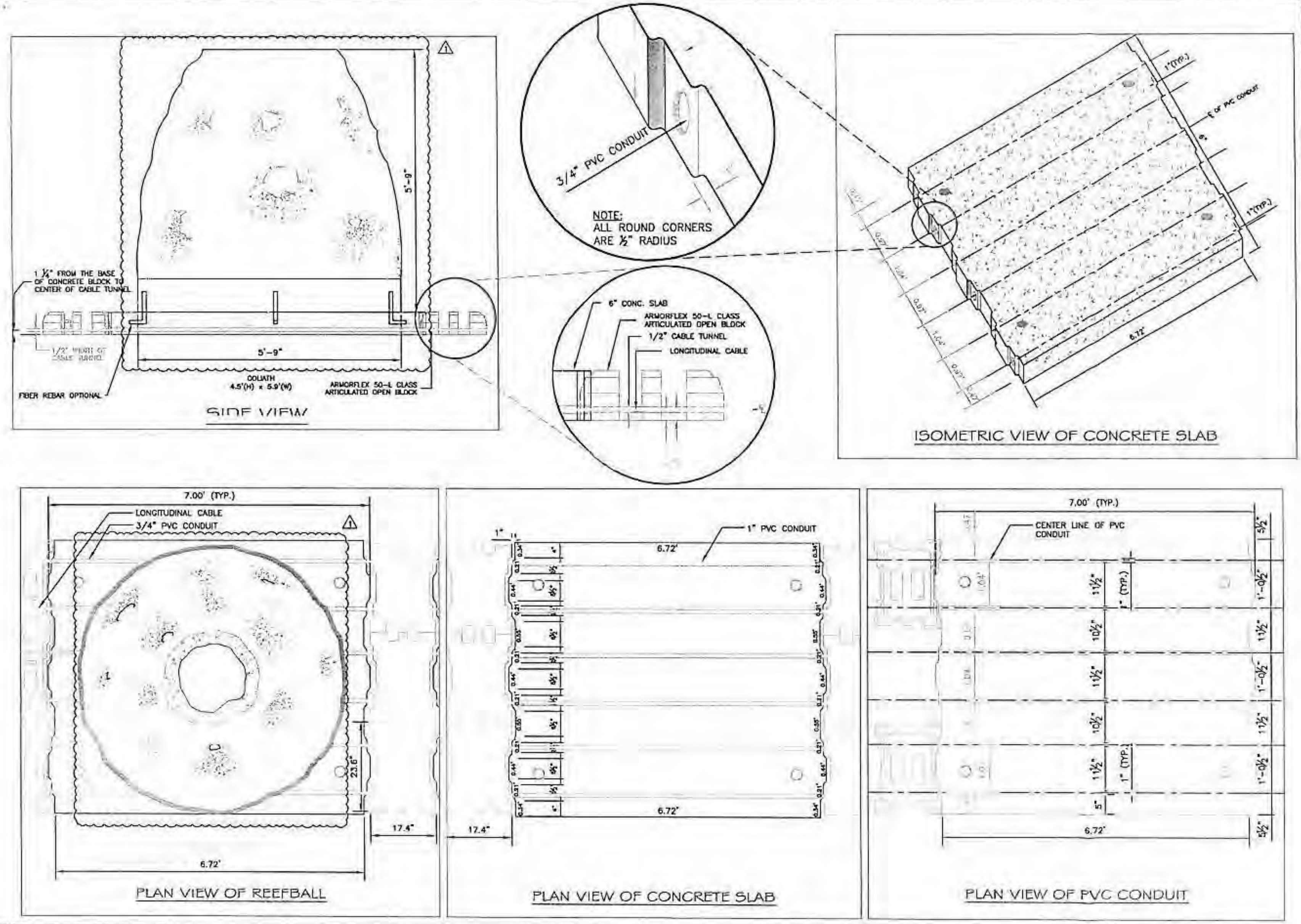
NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM

N.E. 63rd. STREET MIAMI, FLORIDA

URS

1 of 11

FIGURE 2



REEFBALL AND BASE DETAIL

CITY OF MIAMI BEACH
U.S. ARMY CORPS OF ENGINEERS
63rd STREET "HOTSPOT"

URS

DESIGN G.F.T. DRAWN JDH DATE 12/12/2003
CHECKED M.A.G. APPROVED G.F.T. JOB NO. 09052004

9 OF 11

FIGURE 2

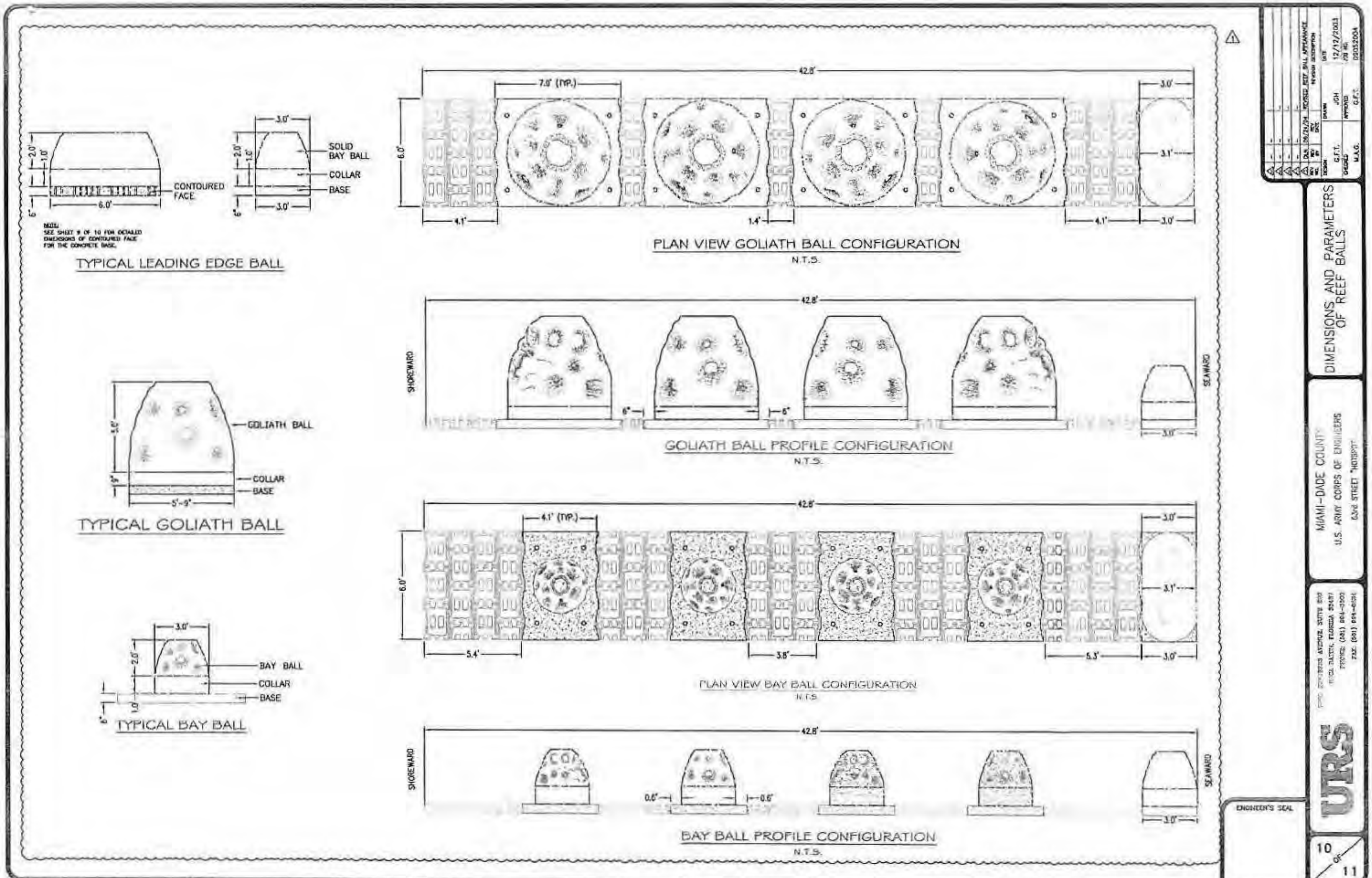
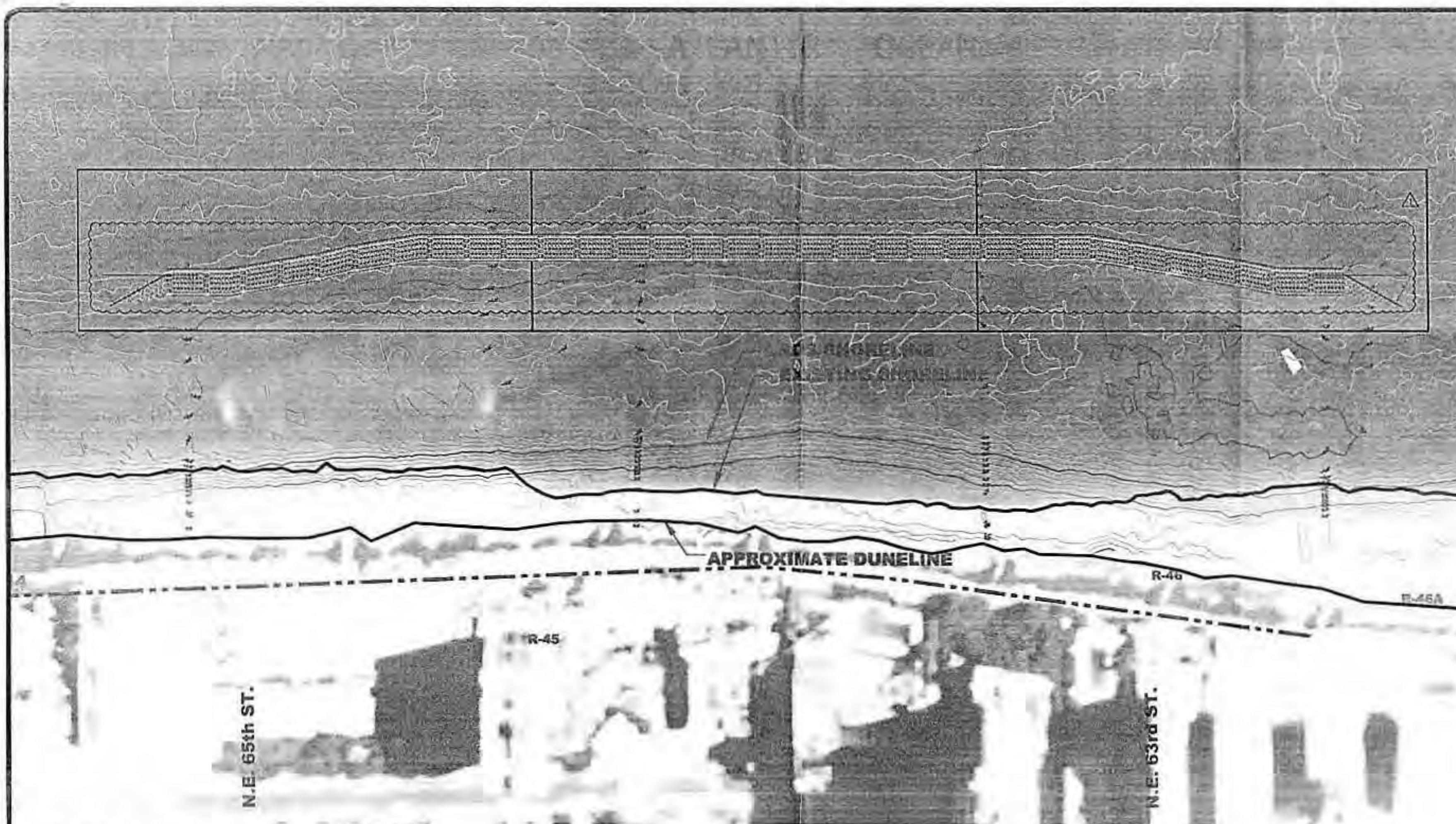

TYPICAL LEADING EDGE BALL
CONTOURED FACE
SOLID BAY BALL
COLLAR
BASE
NOTE: SEE SHEET 9 OF 10 FOR DETAILED DIMENSIONS OF CONTOURED FACE FOR THE CONCRETE BASE.
TYPICAL GOLIATH BALL
GOLIATH BALL
TYPICAL BAY BALL
BAY BALL
PLAN VIEW GOLIATH BALL CONFIGURATION
N.T.S.
GOLIATH BALL PROFILE CONFIGURATION
N.T.S.
PLAN VIEW BAY BALL CONFIGURATION
N.T.S.
BAY BALL PROFILE CONFIGURATION
N.T.S.
SHOREWARD
SEAWARD
42.8'
DIMENSIONS AND PARAMETERS OF REEF BALLS
MIAMI-DADE COUNTY
U.S. ARMY CORPS OF ENGINEERS
URS
ENGINEER'S SEAL
10 of 11

FIGURE 3



GENERAL NOTES:

1. BATHYMETRIC DATA REFERENCED FROM LADS SURVEY CONDUCTED IN NOVEMBER 2002.

2. HORIZONTAL DATUM REFERENCED TO FLORIDA STATE PLANE, ZONE EAST, NORTH AMERICAN DATUM OF 1927 (NAD27) IN FEET.

3. VERTICAL DATUM REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29) IN FEET.

4. THE AERIAL PHOTOGRAPH IS PRESENTED FOR GENERAL INFORMATION ONLY AND WAS FLOWN DURING 2003.

LEGEND:

ERROSION CONTROL LINE

R-45 SURVEY REFERENCE MONUMENT

VERTICAL DATUM DIAGRAM

N.G.V.D. 1929

1.30'

M.L.W.

0' 80' 160' 320'

SCALE: 1"=80'

ENGINEER'S SEAL

REV NO.	REV BY	DATE	REVISION DESCRIPTION
1	D.H.	08/24/04	REEF BALL LAYOUT

DESIGN C.F.T. DRAWN JCH DATE 12/12/2003
CHECKED M.A.G. APPROVED C.F.T. JOB NO. 09052004

SMART STRUCTURE LOCATION PLAN

MIAMI-DADE COUNTY
U.S. ARMY CORPS OF ENGINEERS
63rd STREET "HOTSPOT"

URS

2 OF 11

FIGURE 4

Of the areas evaluated, two segments (Miami Beach and Bal Harbor Segments) showed >= 94% open sand, with no epibenthic resources. Less than 6% of the area surveyed in off each of these segments contained significant habitat. The location of the habitat was on the far eastern portions of the transects, at a minimum of 1200 ft from the shoreline. One area, Sunny Isles segment had attached epibenthic resources along on each of the transects surveyed. These resources were found between 650ft and 1500 ft from the shoreline (average distance 930 ft), thus approximately 62% of the area was of open sand with no epibenthic resources.

As described herein, most areas of significant habitat had dense seasonally-abundant macro algae, providing a 'lush' appearance to the communities. It should be noted that the surveys were conducted during the middle of the summer when macroalgal biomass is at its highest. Permanent (e.g., non-seasonal) components were abundant in places, but much less so that the seasonal macro algae.

Due to the location of these communities (in regions unconsolidated sand sediments), they experience considerable levels of suspended sediments and associated sedimentation. Thus, these communities are tolerant of a high level of sand scour and sedimentation. Considering the fact that the anticipated nourishment activities will involve dry placement above the mean high water line (associated with trucked in sand), and the areas of significant habitat found were at distances equivalent to 1.6 to 3.0 times the maximum "buffer" distance required in beach renourishment permits involving hydraulic dredging and wet placement of dredged material. The distance from sand placement activities (e.g., project related turbidity or sedimentation) is sufficient to provide protection of habitat areas noted above.

APPENDIX C – FISH AND WILDLIFE COORDINATION ACT REPORT

September 22, 2005

Colonel Robert M. Carpenter
District Engineer
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Service Log No.: 4-1-03-I-2890
Project : Section 227 SMART Structure
Sponsor: Miami-Dade County Department of Environmental Resources Management
County: Miami-Dade

Dear Colonel Carpenter:

In accordance with the Fiscal Year 2005 Transfer Fund Agreement between the Fish and Wildlife Service (Service) and the U.S. Army Corps of Engineers (Corps), enclosed is the final Fish and Wildlife Coordination Act (FWCA) Report regarding the Section 227 National Shoreline Erosion Control Development and Demonstration Program, Submerged Artificial Reef Training Structure for the 63rd Street Hot Spot located in Miami Beach, Miami-Dade County, Florida. This final report, provided in accordance with the FWCA of 1958, as amended (48 Stat.401; 16 U.S.C. 661 *et seq*.) and under the provisions of section 7 of the Endangered Species Act of 1973, as amended (ESA) (87 Stat. 884; 16 U.S.C. 1531 *et seq*.), has been prepared to provide an evaluation of the environmental effects of the proposed experimental submerged breakwater structure.

The Corps determined in their Biological Assessment, dated April 9, 2004, that the proposed project "may affect, but is not likely to adversely affect" the federally endangered West Indian manatee (*Trichechus manatus*), and nesting sea turtles including the threatened loggerhead sea turtle (*Caretta caretta*), endangered green sea turtle (*Chelonia mydas*), endangered leatherback turtle (*Dermochelys coriacea*), and endangered hawksbill sea turtle (*Eretmochelys imbricata*).

The project is not expected to have any direct effects on nesting sea turtles because construction is not occurring on the nesting beach and is not expected to occur at night when lighting can cause orientation problems for adult and hatchling sea turtles. Modeling with Storm induced Beach Change and General Neural Simulation System suggests the indirect effects of the proposed project on sea turtle nesting beaches will be minor. The shoreline in the project area should equilibrate as sand builds at the breakwater then bypasses the structure to the adjacent shoreline. Consequently, these effects are expected to be insignificant and the Service concurs with the Corps' determination for the above listed sea turtles.

The Corps has agreed to incorporate the *Standard Manatee Protection Construction Conditions*, therefore, the Service concurs with the Corps' determination for the West Indian Manatee. This letter fulfills the requirements of section 7 of the ESA and no further action is required.

If modifications are made to the project, if additional information involving potential effects to listed species becomes available, or if a new species is listed, reinitiation of consultation may be necessary. The Corps has initiated consultation with the National Marine Fisheries Service concerning federally listed, free-swimming sea turtle species found in the project area including those listed above, the endangered Kemp's ridley sea turtle (*Lepidochelys kempii*), and the threatened olive ridley sea turtle (*Lepidochelys olivacea*).

This report is submitted in accordance with the FWCA and constitutes the final report of the Secretary of the Interior as required by Section 2(b) of the FWCA. Should you have any questions regarding the findings and recommendations contained in this report, please contact Connie Cassler at 772-562-3909, extension 243.

Sincerely yours,

James J. Slack
Field Supervisor
South Florida Ecological Services Office

Enclosure

cc: w/enclosure
FWC, Bureau of Protected Species Management, Tallahassee, Florida (Robbin Trindell)
FWC, Vero Beach, Florida
FWC, West Palm Beach, Florida (Ricardo Zambrano)
NOAA Fisheries, Habitat Conservation Division, Miami, Florida
NOAA Fisheries, Protected Species Division, St. Petersburg, Florida (Eric Hawk)

FINAL
FISH AND WILDLIFE COORDINATION ACT REPORT

SECTION 227 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM, SUBMERGED ARTIFICIAL REEF TRAINING STRUCTURE FOR THE 63RD STREET "HOT SPOT," MIAMI BEACH, MIAMI-DADE COUNTY, FLORIDA

Prepared for:
U.S. Army Corps of Engineers
Jacksonville District
701 San Marco Boulevard
Jacksonville, Florida 32207-8175

By the:
Fish and Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

August 22, 2005

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (Corps), with Miami-Dade County Department of Environmental Resources Management (Miami-Dade DERM) as the local sponsor, proposes to construct an experimental 2,272-foot long submerged breakwater reef structure offshore of an erosional "hot spot" in the vicinity of 63rd Street, Miami Beach, Miami-Dade County, Florida (Figure 1). This Fish and Wildlife Coordination Act (FWCA) report evaluates the likely effects of the proposed breakwater structure on fish and wildlife resources and is submitted in accordance with the FWCA of 1958, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq.*) and the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq*.).

The purpose of the Submerged Artificial Reef Training (SMART) structure is to attenuate wave energy and minimize the potential of accelerated beach erosion within the hot spot, thereby extending the renourishment interval of the associated federally authorized Miami-Dade County Beach Erosion Control and Hurricane Protection (BEC&HP) beach renourishment project. Implementation of the BEC&HP project over the last 26 years has nearly depleted offshore sources of beach compatible sand along the Miami-Dade County shoreline. As a result, the Corps has begun to investigate alternative solutions, such as the proposed project, to address localized beach erosion and conserve beach-quality material.

The 63rd Street Hot Spot at Miami Beach is one of seven initial demonstration sites selected from around the nation for inclusion in the Corps' National Shoreline Erosion Control Development and Demonstration Program, which was authorized under Section 227 of the Water Resources Development Act (WRDA) of 1996. The goal of the Section 227 Program is to evaluate the function and structural performance of innovative or non-traditional methods of abating coastal erosion. The Corps states that the program is intended to advance the state-of-the-art shoreline erosion control technology, encourage the development of innovative solutions, and provide technical and public information designed to further the use of well-engineered alternative approaches.

The proposed project will permanently convert 2.1 acres of sandy ocean bottom habitat to artificial high-relief hardbottom reef habitat. Since the project is designed to disrupt the natural littoral movement of sand along the beach, the shoreline adjacent and downdrift may be impacted. However, the Corps does not anticipate a net loss of shoreline as a result of the proposed project. Though adjacent natural hardbottom communities may experience periods of elevated turbidity and sedimentation during deployment of the structure, the Corps anticipates that impacts to reef organisms will be temporary, largely due to the distance of the nearest hardbottom (600 feet). Should the structure fail, nearby beaches and hardbottom habitat may be impacted. A concern of the Fish and Wildlife Service (Service) is that a plan for long-term monitoring and maintenance of the structure, which is expected to have a 50-year project life, has not been identified. The Service believes that the proposed 3 years of post-project monitoring is not sufficient to evaluate the affects of the structure. This report constitutes the final report of the Secretary of the Interior as required by Section 2(b) of the FWCA.

TABLE OF CONTENTS

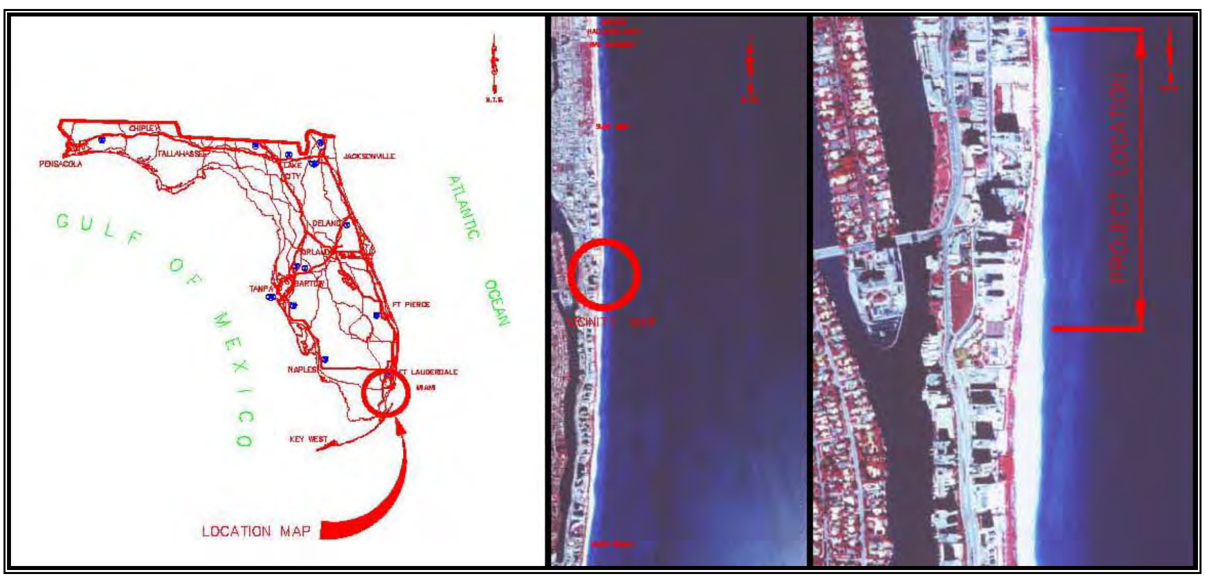
LIST OF ACRONYMS

ABM - Articulated Concrete Block Mat
BEC&HP - (Miami-Dade County) Beach Erosion Control and Hurricane Protection
Corps - U.S. Army Corps of Engineers
DEP - Florida Department of Environmental Protection
DERM - Miami-Dade County Department of Environmental Resources Management
EFH - Essential Fish Habitat
ESA - Endangered Species Act
FMP - Fishery Management Plan
FWCA - Fish and Wildlife Coordination Act
FWC - Florida Fish and Wildlife Conservation Commission
GENESIS - Generalized Model for Stimulating Shoreline Change
MMPA - Marine Mammal Protection Act
NOAA - National Marine Fisheries Service
SAFMC - South Atlantic Fishery Management Council
SMART - Submerged Artificial Reef Training structure
Service - Fish and Wildlife Service
WRDA - Water Resources Development Act

1.0 IDENTIFICATION OF PURPOSE, SCOPE, AND AUTHORITY

The U.S. Army Corps of Engineers (Corps), with Miami-Dade County Department of Environmental Resources Management (Miami-Dade County DERM) as the local sponsor, proposes to construct an experimental submerged breakwater reef structure offshore of a nodal point of erosion or "hot spot" in the vicinity of 63rd Street, Miami Beach, Miami-Dade County, Florida (Figure 1). The purpose of the Submerged Artificial Reef Training (SMART) structure is to absorb wave energy and minimize the potential of accelerated beach erosion within the hot spot, thereby, extending the renourishment interval of the associated federally authorized Miami-Dade County Beach Erosion Control and Hurricane Protection (BEC&HP) beach renourishment project. Implementation of the BEC&HP project over the last 26 years has nearly depleted offshore sources of beach compatible sand along the Miami-Dade County shoreline. As a result, the Corps has begun to investigate alternative solutions, such as the proposed project, to address beach erosion and conserve beach-quality material.

Figure 1. Project location (URS 2003)



The 63rd Street Hot Spot at Miami Beach is one of seven initial demonstration sites selected from around the nation for inclusion in the Corps' National Shoreline Erosion Control Development and Demonstration Program, which was authorized under Section 227 of the Water Resources Development Act (WRDA) of 1996. The goal of the Section 227 Program is to evaluate the function and structural performance of innovative or non-traditional methods of abating coastal erosion. The Corps states that the program is intended to advance the state-of-the-art shoreline erosion control technology, encourage the development of innovative solutions, and provide technical and public information designed to further the use of well-engineered alternative approaches.

This Fish and Wildlife Coordination Act (FWCA) Report evaluates the likely effects of the proposed erosion control demonstration project on fish and wildlife resources and is submitted in accordance with provisions of the FWCA of 1958, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq*.) and the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*).

2.0 PROJECT HISTORY AND SERVICE INVLOVEMENT

The creation and subsequent stabilization of the Bakers Haulover Inlet in northern Miami-Dade County disrupted the natural littoral movement of sediment to the south. As a result, erosion occurred along the beaches south of the inlet and was exacerbated by storm activity. During this period, heavy development of the barrier island by commercial and private interests occurred. In efforts to protect property, shoreline stabilization structures were constructed, but were ineffective, except to further exacerbate the effects erosion. To address the erosion along the barrier island and the loss of recreational beach between Bakers Haulover Inlet and Government Cut, the Corps initiated a study to evaluate the feasibility of a large-scale beach nourishment project.

The nourishment of the Atlantic shoreline of Miami-Dade County was authorized by the Flood Control Act of 1968, and referred to as the BEC&HP. In addition, Section 69 of the 1974 Water Resources Act (PL 93-251) included the initial construction by non-Federal interests of the 0.85-mile segment along Bal Harbour Village, immediately south of Bakers Haulover Inlet. The authorized project, as described in House Document 335/90/2, provided for the construction of a protective and recreational beach, as well as, a protective dune for 9.3 miles of shoreline between Government Cut and Bakers Haulover Inlet, which encompasses Miami Beach, Surfside, and Bal Harbour. It also included the construction of a protective beach along the 1.2 miles of shoreline within Haulover Beach Park, which is directly north of the Haulover Inlet.

The original BEC&HP encompassed approximately 10.5 miles of shoreline extending from Government Cut north to the northern boundary of Haulover Beach Park. The Supplemental Appropriations Act of 1985, and the WRDA of 1986 (PL 99-662), provided authority for extending the northern limit of the authorized BEC&HP to include the construction of a protective beach along an additional 2.5 miles of shoreline north of Haulover Beach (Sunny Isles) and for periodic renourishment of all the BEC&HP beaches. This authority also provided for the extension of the period of Federal participation in the cost of nourishing the modified BEC&HP from 10 years to 50 years, which is the life of the BEC&HP.

The beaches in the City of Miami Beach were initially nourished in 1978, renourished in 1980, 1987, 1994, and 1997 with beach compatible material obtained from offshore borrow sites, which are now nearly depleted. To address this issue, in 1997 the Corps investigated the use of oolitic aragonite obtained from the Bahamas as a potential source of renourishment material. In 1999, Congress rejected this proposal and the Corps began to investigate upland sand sources and other options.

As a result of storm activity in 2001, the beach at 63rd Street had experienced an accelerated rate of erosion in 2001. The Corps determined that the existing beach affected by the hot spot of erosion would not likely provide adequate hurricane and flood protection of public and private property until the next renourishment event. As an interim measure, the Corps renourished approximately 2,000 feet of shoreline at 63rd street in the spring of 2002. To address possible solutions to the long-term hot spot erosion potential in the vicinity of 63rd Street, the Corps submitted the site for inclusion in the Section 227 program.

3.0 DESCRIPTION OF THE PROJECT AREA

The project is located on Florida's southeast coast within the Atlantic Ocean immediately offshore of the City of Miami Beach in the vicinity of 63rd Street, Miami-Dade County, Florida. The 9.3-mile barrier island segment between the Bakers Haulover Inlet and Government Cut ranges in width between 0.5 and 1.5 miles and has an average elevation of approximately 10 feet. The photo below taken in 1997 shows 63rd Street in the lower right corner and the adjacent beaches to the south or left portion of the photograph (Coastal Systems International 1997) (ARS Marine Consulting and Research 2003). Miami Beach is heavily developed by private and commercial interests, and receives a tremendous volume of tourists each year, particularly during the winter months.

Offshore of Miami Beach, three shore-parallel reef tracts occur that support a highly diverse assemblage of vertebrate and invertebrate organisms. The continental shelf offshore of Miami-Dade County is much narrower than other areas along Florida's east coast with significant depths located within 2 miles of shore. These features provide opportunities for SCUBA diving and offshore fishing enthusiasts.

The Miami Beach shoreline between Florida Department of Environmental Protection (DEP) monuments R-44 to R-46.5 (63rd Street vicinity) has been determined by the Corps to be an "erosional hotspot" within the federally authorized BEC&HP project. Since its authorization, the project area has been the subject of multiple renourishment events with material obtained from offshore borrow sites, which are located between the reef tracts. Despite these efforts, the shoreline in the vicinity of 63rd Street has experienced erosion rates of 14 to 25 feet per year since the early 1980s, as shown in the photo below provided by Miami-Dade County DERM.

4.0 DESCRIPTION OF THE RECOMMENDED PLAN AND ALTERNATIVES

The Corps indicated that a number of design and material alternatives were originally considered, but were excluded primarily because they would not adequately attenuate wave energy or abate shoreline erosion within the hot spot. Two alternatives were analyzed in the Corps' Environmental Assessment, the "no action" alternative and the recommended plan as described below.

4.1 "No Action" Alternative

Under the Corps' "no action" alternative, the submerged breakwater would not be constructed. The Corps states that offshore or upland sand sources would be utilized for renourishment and accelerated erosion within the hot spot would continue, which would result in a more frequent renourishment interval and the National Economic Development objective may not be met.

4.2 Recommended Plan

The Corps proposes to construct a contiguous crescent-shaped submerged breakwater structure approximately 2,272 feet long and 42.8 feet wide oriented parallel to the shoreline in the vicinity of 63rd Street, Miami Beach, between DEP monuments R-46A and R-44. The SMART structure would be placed approximately 400 feet offshore of the mean shoreline within 7 feet of water. At mean low water, the structure is expected to remain submerged by minus 1-foot (Appendix A). The total footprint of the structure would cover 2.1 acres of sandy subtidal habitat. The proposed structure will be comprised of approximately 1,260, 140, and 350 pre-fabricated concrete Goliath, Bay, and Leading Edge reef balls, respectively, which will be anchored to an articulated concrete block mat (ABM). The structure would be constructed and deployed from a barge in 6 foot by 6 foot segments. A majority of segments will include four Goliath reef ball and one Leading Edge reef ball anchored to the ABM. Each segment will weigh approximately 30 tons. The Goliath reef ball unit is a hollow, porous, dome-shaped structure that measures 5.9 feet in height by 5.9 feet in width and weighs 9,800 pounds. The smaller Leading Edge reef ball measures 3 feet in height by 3 feet in width by 6 feet in length. Every tenth segment consists of 4 Bay reef balls and one Leading Edge reef ball. The Bay reef ball is a hollow, porous dome-shaped structure that measures 3 feet in height by 3 feet in width. Figures related to the reef ball and ABM dimensions are found in Appendix A. To achieve the crescent shape, the plans indicate that approximately 32 Goliath reef balls will be placed at the northern and southern terminus directly upon the seafloor at a 30 degree angle from the main structure (Appendix A, URS 2003). The structure will be placed approximately 600 feet west of the nearest natural hardbottom reef.

In total, the Corps anticipates that the structure would require 6 months of offsite segment fabrication and 8 weeks for deployment. The construction time-frame, location of the barge loading site, and the tug and barge travel route have yet to be determined.

In total, the Corps anticipates that 2.1 acres of unconsolidated benthic subtidal habitat would be directly impacted and converted to consolidated hardbottom reef habitat as a result of structure deployment. The species most likely to be directly affected by this activity include non-motile benthic organisms. During deployment of the reef segments, periods of elevated levels of turbidity may occur which may temporarily impact natural reefs in the vicinity of the project. Since the Corps has determined that direct impacts to native hardbottom reef habitat will be avoided, mitigation has not been proposed. However, if post-project biological monitoring indicates that unanticipated hardbottom reef impacts did occur, the Corps intends to mitigate for those impacts.

4.3 Proposed Protection Measures

To minimize the potential adverse impacts of the action on fish and wildlife resources, including hardbottom reef communities and listed species, the Corps has indicated that the following measures will be included in the contract specification:

1. Contractors and their personnel would be educated regarding potential presence of listed species in the project area, their protection status, and project implications.
2. The *Standard Manatee Construction Conditions* will be implemented upon all construction vessels, including support and crew transport vessels.
3. During sea turtle nesting season (March 1 through November 30) all work will cease if an adult or hatchling sea turtle occurs within 100 yards of the construction equipment or crew transport vessels.
4. If construction occurs at night within the sea turtle nesting season, appropriate light-shielding measures will be implemented upon work vessels to avoid sea turtle disorientation on the beach.
5. Turbidity monitoring will be implemented during construction to ensure DEP water quality standards are not exceeded, if so, construction activities will be suspended until background levels are achieved.
6. Vessel transport corridors will be established within deep water to avoid potential impacts to hardbottom reef communities between the Haulover Inlet or Government Cut and the project site.
7. During deployment of the SMART structure segments, scuba divers will “micro-site” the installation of the segments to avoid potential impacts to hardbottom resources.
8. Storage of equipment, materials, or other construction activities related to the proposed project will not occur on the adjacent beach.
9. A biological and physical monitoring program will be implemented to assess the effects of the SMART structure on adjacent habitats and assess the performance of the structure.

5.0 FISH AND WILDLIFE RESOURCES

5.1 Biotic Communities

The primary habitats that occur in the project vicinity that may be affected by the proposed project include: the dry beach above mean-high-water (supralittoral zone); the beach between mean-high-water and mean-low-water (intertidal zone); the shallow sandy ocean bottom (subtidal zone); and hardbottom reefs. It is anticipated that direct impacts will be limited to the non-motile benthic organisms within the sandy subtidal habitat as a result of the installation of the proposed project. Indirect impacts may occur to natural hardbottom reef habitat and to beaches adjacent to the project site. However, the Corps believes that the results of the proposed biological and physical monitoring plans will demonstrate that the direct and indirect impacts are temporary in nature, or will not result in a net loss of the beach.

5.1.1 Supralittoral Zone

The supralittoral zone supports an abundant benthic infaunal assemblage of burrowing invertebrates that are well adapted to the relatively harsh conditions of the dry beach. The beaches of Miami-Dade County are typical of other Atlantic Coast beaches in Florida that are subject to the full force of ocean wave energy. Biological diversity is generally lower in this zone when compared to the intertidal and subtidal zones. It is populated with small, short-lived infauna with low species diversity but high species density and substantial reproductive potential and recruitment. Common species include talitrid and haustoriid amphipod species and decapod crustaceans. These beaches usually have low species diversity, but populations of individual species are often very large. Species such as ghost crabs (*Ocypode quadrata*) are highly specialized to survive in this environment.

Florida has approximately 744 miles of beaches, mainly along the shorelines of barrier islands. Wind and waves are constantly changing the shape of barrier islands and their beaches. On the east coast of Florida, general patterns of sand transport or littoral drift have been well documented. During winter, net littoral drift is to the south; whereas, during summer, the net transport of sand may retreat slightly to the north if southeasterly winds prevail. Stabilized inlets and erosion control structures such as groins and jetties disrupt the southern littoral movements of sediments along the shoreline. As a result, beaches on the up-drift or north side of these inlets tend to accumulate sand, while those on the down-drift or southern side is deprived of this sand (Corps 1996).

Florida beaches vary in material composition and compaction depending on the physical characteristics of the beach material. In northern Florida, the beaches are primarily silica-based (quartz sand), with a lower percentage of carbonate material, and are a finer grain size than southern beaches. From Cape Canaveral south, the profile grades into a greater percentage of carbonates, which are primarily composed of shell and shell fragments. The shell and shell fragments are generally a mixture of clam species dominated by the coquina clam, *Donax* spp. This shell and shell hash sediment produces a less compacted, coarser grained beach. This gradation profile continues south into Miami-Dade County, where the beach profile is primarily carbonate and composed almost entirely of calcareous algae fragments, coral fragments, and sponge spicules. The Miami-Dade County beach profile can routinely produce turbid conditions from the reworking and resuspension of the calcareous algae and coral fragments from seasonal storm events and is generally a more compact beach. A survey of the beach profiles of Miami-Dade County (Service 2002a) noted a beach composition change at Haulover Inlet, which is in north Miami-Dade County. Beach profiles north of the inlet were composed of a carbonate component that was primarily shell and shell hash, where as, beach profiles south of the inlet were composed primarily of calcareous algae fragments, coral fragments, and sponge spicules. Historical records suggest that the shell and shell hash beach profile extended further south to include central and southern portions of Miami-Dade County and that the existing profile is the result of renourishment actions (Service 2002a).

Florida’s beaches function as nesting habitat for four species of federally listed sea turtles: the threatened loggerhead turtle (*Caretta caretta*), the endangered green turtle (*Chelonia mydas*), the endangered leatherback turtle (*Dermochelys coriacea*), and the endangered hawksbill turtle (*Eretmochelys imbricata*). Approximately 40 percent of all loggerhead nesting occurs in the southeastern United States, primarily in Florida. Nesting beaches in Miami-Dade County experience considerable anthropogenic disturbance that stems from extensive commercial and recreational development, as well as public use of the beaches. As a result, nesting densities and hatchling success are adversely affected. In 1987, Miami-Dade County initiated a sea turtle hatchery program that relocates nests to more isolated beaches to minimize some of these adverse affects.

The supralittoral zone also serves as important nesting habitat for state listed shorebird species. Ground-nesting shorebirds are particularly vulnerable to nest predation and disturbance associated with increased coastal development. As a result, the nests of both shorebirds and turtles may be inadvertently disturbed and/or destroyed by beachgoers or their pets. Historically, the available supralittoral habitat on Miami-Dade County beaches has undergone considerable variation, due to the natural and man-made alterations of the shoreline.

5.1.2 Intertidal Beach Zone

The intertidal beach zone is an important area for shorebird foraging and provides habitat for many invertebrates, including bivalves, decapod crustaceans, amphipods, and polycheates. Also, the intertidal zone must be traversed by nesting and hatchling sea turtles. Structures or persistent escarpments that restrict this movement have decreased the amount of shoreline available for nesting activities.

The species diversity in the zone between mean-high water and mean-low water is greater than the supralittoral zone. Typical macrofauna found within this zone include haustoriid amphipods, polychaetes, isopods, mollusks, and some larger crustaceans, such as mole crabs (*Emerita spp.*) and burrowing shrimp (*Callianassa spp.*). This zone is an important forage area for multiple shorebird species.

5.1.3 Subtidal Zone

The nearshore subtidal zone east of this section of Miami Beach is comprised of softbottom habitats of sand, shell, and silt substrate with little or no rock, limestone, or hard coral structure. The biota that comprises the subtidal zone include benthic invertebrate assemblages, epifaunal invertebrates, and macrophyte assemblages that form reef communities if hard substrate is present. The organisms associated with the nearshore surf zone and deeper subtidal sand bottom habitats are generally dominated by polychaetes, amphipods, isopods, decapods, mollusks, echinoderms, and a variety of other taxa. Though many of the dominant infaunal species are found both in the surf and offshore subtidal zones, the diversity and abundance is greater in the subtidal zone. Other frequent occupants of these habitats include benthic fishes (e.g., flounders), bivalves, decapod crustaceans, and certain shrimp species.

5.1.4 Hardbottom Reefs

The waters offshore of Florida support several reef types: subtropical coral reefs, hardbottom reefs, nearshore sabellariid worm (*Phragmatopoma lapidosa*) reefs, vermetid reefs, and deep-water *Oculina varicosa* reefs. Coral reefs are best developed in the United States in south

Florida, particularly in the Florida Keys. Farther north, through Miami-Dade and Broward Counties on the east coast and Collier County on the west coast, as water clarity and temperature declines, the frequency of occurrence of reef-building corals. Continuing north, hard corals are fewer, and octocorals (soft corals) dominate.

Sabellariid worms can dominate the reef community and form a unique live rock reef type known as "worm rock." These are most often formed in high-energy surf zones particularly between Martin and Brevard Counties on the east coast. Such reefs are composed of sand particles loosely cemented together by mucus secreted by the worms when building their casing. *Oculina* reefs occur in depths greater than 100 feet and are found from St. Lucie County to Jacksonville. Intertidal vermetid reefs off the Ten Thousand Islands are a remnant of structures formed by the reef-building gastropod, *Petaloconchus* spp.

The reefs within the project area can be classified as "live bottom" or hardbottom reef communities with scattered hard coral. These reef areas are populated by sponges, small (ahermatypic) hard corals, tunicates, bryozoans, algae, and sabellariid worms. Nearshore hardbottom communities typically, are also more common in or near the high energy surf zone. The South Atlantic Fishery Management Council (SAFMC) has developed a Fishery Management Plan (FMP) for Coral, Coral Reef, and Live/Hardbottom Habitats of the South Atlantic Region. Furthermore, damaging, harming, and/or killing live rock is prohibited by the current FMP and all harvesting of live rock has been prohibited since January 1, 1996.

The extent of reefs is well known in Miami-Dade, Broward, and Palm Beach Counties because the sea floor out to the 60-foot depth contour has been mapped with side-scan sonar by the Corps (Continental Shelf Associates 1993). Other mapped areas include Venice Beach in Sarasota County, Hutchinson Island in Martin County, and Vero Beach in Indian River County. With deeper reef areas taken into account, the Service estimates that less than one percent of areas statewide, which may contain live rock communities, have been mapped. Reefs in Miami-Dade County are typical of the classical reef profile described for southeast Florida. For instance, the nearshore high energy, inner reef is in approximately 15 to 25 feet of water, the middle patch reef is in about 30 to 50 feet of water and the outer reef is in approximately 60 to 100 feet of water. The composition of the hardbottom biological assemblages along Florida's east coast has been detailed by many authors (Goldberg 1970, 1973; Marszalek and Taylor 1977; Continental Shelf Associates 1984, 1985, 1987, 1993).

Although the reefs in the project area and the reefs north of Government Cut support a large variety of hard coral species, these corals are no longer actively producing the reef features seen there. The reef features seen north of Government Cut have been termed "gorgoniod reefs" (Goldberg, 1970; Raymond and Antonius 1977). Blair and Flynn (1989) described the reefs and hardbottom communities off Miami-Dade County and compared them to the offshore reef communities from Broward and Palm Beach Counties. They documented a decrease in the hard coral species density moving northward from Miami-Dade County to Palm Beach County.

Many fish and motile invertebrates are attracted to hardbottom habitat by its structure. The numerous crevices, holes, and epibiotic structures provide these organisms with a refuge from larger predatory fish. Structures can also provide barriers to currents and substrate for attaching demersal eggs. In addition to these features, the sessile organisms of the reef provide a diverse food base on which some fish species feed directly. Others benefit from this indirectly by feeding on invertebrates and other smaller fish that are nurtured by sessile plant material.

Reef fauna may be divided into sessile and motile components. The sessile component contains the primary producers, some grazers or first order consumers, planktivores, and filter feeders. Soft and hard corals occupy niches as both producers and consumers. Zooxanthellic algae within coral polyps photosynthesize while the polyps themselves capture planktonic organisms for consumption. As with the hard corals, carbon fixed far offsite is also concentrated on the reefs by tunicates, sabellariid worms, and sponges. These attached filter-feeding organisms contribute to the organic base by trapping nutrient-rich plankton as it is swept past the reef by wave and wind generated currents. Tunicates, sponges, and sabellariid worms add structure to the reef, providing shelter from predation for the numerous fishes of the reef.

Important recreational fish species observed on Miami-Dade County reefs include hogfish *(Lachnolaimus maximus*), porkfish (*Anisotremus virginicus*), gray snapper (*Lutjanus griseus*), spadefish (*Chaetodipterus faber*), gag grouper (*Mycteroperca microlepis*), and gray triggerfish (*Balistes carpiscus*). Species such as the gray snapper use shallow nearshore reefs as a staging area before recruitment into the offshore commercial and recreational fishery (Stark and Schroeder 1970). All reef fish species are ecologically or scientifically important and are of value to divers and commercial and recreational fishermen. Many species are collected for aquariums, such as angelfish (Pomacanthidae), butterflyfish (Chaetodontidae), wrasses (Labridae), damselfish (Pomacentridae), and doctorfish (Acanthuridae).

Nearshore and offshore low-relief hardbottoms are characterized by limestone, rock, or worn coral substrates that contain crevasses, holes, and low-lying ledges that create microhabitat diversity, and thereby can support higher species diversity than unvegetated, softbottom habitats. Low-relief hardbottom habitats are important for organisms such as crustaceans, notably, crabs, spiny lobster (*Panulirus argus*), and penaeid shrimp (*Penaeus* spp.), also numerous fishes, including species of the snapper-grouper complex. Several species utilize hardbottom as refugia during juvenile life-history stages, whereas adults of various predatory species use these areas as foraging grounds. Hardbottom fauna may be divided into sessile and motile components. The sessile component contains the primary producers, such as macroalgae; some grazers or first order consumers, planktivores, and filter feeders. Hard corals occupy niches as both producer and consumer. Tunicates, sponges, and hydroids add structure to the bottom, providing shelter from predation for many crustaceans and smaller fishes.

The spiny lobster is the most popular fishery of the nearshore reefs. After spending its early post-larval life stages in estuarine habitats, young lobsters move to the nearshore reefs, where they may spend a good part of their adult lives. Many of these adults move further offshore seasonally (Lyons et al. 1981). Other motile invertebrates include sea urchins, conch, octopus, polychaetes, and decapod crustaceans, which include penaeid shrimp, portunid crab (*Portunus* spp.), stone crab (*Menippe mercenaria*), and spiny lobster. Crustaceans consume sessile and epiphytic algae and are, in turn, consumed by higher predators such as grunts (Pomadasydae) and snappers (Lutjanidae) (Odum 1969). Gastropods graze on algae, thereby passing nutrients and energy produced on the reef up the food chain. Predators of gastropods include other invertebrates, such as the spiny lobster.

5.2 ESSENTIAL FISH HABITAT

The community types listed above, except the supralittoral and intertidal zones, are considered Essential Fish Habitat (EFH) as described in the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (PL 104-267). EFH provisions support the management goals of sustainable fisheries. EFH that may be directly and indirectly impacted by the proposed project are likely to include the water column, littoral zone, sublittoral zone, hardbottom, and seagrass habitats. Specific aspects of EFH that may be adversely affected include spawning, foraging, predator/prey relationship, and refuge habitats for managed species such as the snapper/grouper complex, penaeid shrimp, and spiny lobster. The National Marine Fisheries Service (NOAA Fisheries) is the lead agency responsible for the complete assessment of the possible adverse impacts of the proposed project to EFH.

The SAFMC (1998b) has designated mangrove, seagrass, nearshore hardbottom, and offshore reef areas within the study area as EFH. The nearshore bottom and offshore reef habitats of southeastern Florida have also been designated as Habitat Areas of Particular Concern (SAFMC 1998b). Managed species that commonly inhabit the study area include pink shrimp (*Farfantepenaeus duorarum*), and spiny lobster. These shellfish utilize both the inshore and offshore habitats within the study area, including macroalgae beds (*e.g.*, *Laurencia* spp.). Members of the 73-species snapper-grouper complex that commonly use the inshore habitats for part of their life cycle include blue stripe grunts (*Haemulon sciurus*), French grunts (*Haemulon flavolineatum*), mahogany snapper (*Lutjanus mahogoni*), yellowtail snapper (*Ocyurus chysurus*), and red grouper (*Epinephelus morio*). These species utilize the inshore habitats as juveniles and sub-adults and as adults utilize the hardbottom and reef communities offshore. In the offshore habitats, the number of species within the snapper-grouper complex that may be encountered increases. Other species of the snapper-grouper complex commonly seen offshore in the study area include gray triggerfish (*Balistes capriscus*), and hogfish (*Lachnolaimus maximus*). Coastal migratory pelagic species also commonly utilize the offshore area adjacent to the study area. In particular, king mackerel (*Scomberomorus cavalla*) and Spanish mackerel (*Scomberomorus maculatus*) are the most common. As many as 60 corals can occur off the coast of Florida (SAFMC 1998a and b), all of which fall under the protection of the management plan.

The focus of NOAA Fisheries' mitigation policy is to conserve and enhance EFH and to avoid, minimize, and thereafter compensate for impacts to EFH due to development activities. Like other Federal agencies with regulatory responsibilities, the first priority of NOAA Fisheries is to advocate avoidance of impacts to natural resources when presented with any development plan. However, when unavoidable impacts to EFH are proposed, NOAA Fisheries may recommend mitigation measures to compensate for any loss of resource value. Recommendations may include restoration of riparian and shallow coastal areas (*i.e.*, reestablishment of vegetation, restoration of hardbottom characteristics, removal of unsuitable material, and replacement of suitable substrate), upland habitat restoration**,** water quality improvement or protection, watershed planning, and habitat creation. The preferred type of mitigation is enhancement of existing habitat, followed by restoration, and finally creation of new habitat.

5.3 THREATENED AND ENDANGERED SPECIES

5.3.1 Sea Turtles

Miami-Dade County is within the nesting range of the federally threatened loggerhead sea turtle, endangered green sea turtle, and endangered leatherback sea turtle. On the 37.8 miles of beach surveyed within the Miami-Dade County, a total of 489 nests were found in 2003 (Florida Marine Research Institute 2003a, b, and c). Though some green and leatherback sea turtles nest along Miami-Dade County beaches, the loggerhead sea turtle is the dominant species. The majority of sea turtle nesting activity occurs during the summer months of June, July, and August, with some nesting activity occurring as early as March and as late as September (Florida Fish and Wildlife Conservation Commission [FWC] 2003). As a result of anthropogenic disturbance, such as beach front lighting, approximately 95 percent of all sea turtle nests are relocated to a hatchery located on dark beaches in the northern portion of Miami-Dade County (FWC 2002).

The waters offshore of Miami-Dade County are also used for foraging and shelter for the three species listed above as well as the endangered hawksbill sea turtle, and possibly the endangered Kemp’s ridley sea turtle (*Lepidochelys kempii*).

5.3.2 West Indian Manatee

The West Indian manatee (*Trichechus manatus*) is known from coastal areas of Beaufort, North Carolina through Florida and the Gulf of Mexico. Manatees frequently inhabit shallow areas where seagrasses are present and are commonly found in protected lagoons and freshwater systems. In winter they frequently move into areas where cool water temperatures are mitigated by spring-fed streams or power generation plan effluent. In general, very few manatees are present in the offshore waters from November through April. During the remainder of the year, manatees occasionally use open ocean passages to travel between favored habitats (Hartman 1979).

The manatee has been listed as a protected mammal in Florida since 1893, and is also protected under the Marine Mammal Protection Act (MMPA) of 1972 and the ESA of 1973. Florida provided further protection in 1978 by passing the Florida Marine Sanctuary Act designating the state as a manatee sanctuary, and providing signage and speed zones in Florida’s waterways. All of Biscayne Bay has been designated as Critical Habitat under the ESA. In addition, a *No Entry* zone within the Bill Sadowski Critical Wildlife Area has been established for manatee conservation purposes.

Within Miami-Dade County there exist both permanent and transient populations of manatees. Surveys show that during the winter months, when temperatures drop, manatees from north Florida and also Miami-Dade County will migrate to the Florida Power and Light's power plants at Port Everglades and Fort Lauderdale (U.S. Geological Survey 2000). During the summer months when the water warms, manatees return to the counties to the north and south to forage and reproduce. Telemetry and aerial surveys confirm manatees are present within Miami-Dade County all year (Miami-Dade County 1999, and U.S. Geological Survey 2000). Historical records regarding manatees in South Florida are sparse.

Manatees are mentioned in documents that are dated as early as the mid 1800s and early 1900s (O'Shea 1988). Moore (1951) indicated that manatees commonly used the New River and the Miami River. He also noted a 1943 anecdotal observation of more than 100 manatees killed during the deepening of the Miami River Channel and a reference to 195 manatees aggregating at the Miami power plant discharge in 1956. In general, the rivers, creeks, and canals that open into Northern Biscayne Bay were locations noted for their manatee abundance. These remain important habitats, particularly on a seasonal basis.

In freshwater environments in Miami-Dade County, within the upper reaches of canals, manatees feed primarily on the exotic hydrilla (*Hydrilla verticillata*). During cooler weather, manatees feed on extensive meadows of seagrasses in many parts of Biscayne Bay. The causes for manatee deaths in Miami-Dade County are varied. The highest number of manatee deaths in Miami-Dade County result from water control structures. Freshwater is often available at floodgates, and is typically slightly warmer than the ambient water. An example of this situation is the floodgate on the Little River in Miami-Dade County. This site is known to attract manatees in winter during mild weather. This location has a 1-degree Celsius higher water temperature than surrounding areas and freshwater is available (Deutsch 2000). Also, freshwater vegetation is often washed down from upriver and made available when the gates are opened. The second most frequent cause of manatee deaths in Miami-Dade County is boat-related injuries.

5.3.3 Smalltooth Sawfish

During 2002, the smalltooth sawfish (*Pristis pectinata*) was federally listed as an endangered species. This species inhabits softbottom estuarine habitats in depths generally less than 30 feet. Its former range in United States waters extended from Texas through Maryland. Currently, few are observed outside peninsular Florida. At least one recorded observation occurred in Biscayne Bay (NOAA Fisheries 2000). Populations likely decreased due to a low intrinsic rate of natural increase; the long interval to time of reproduction; and human impacts, most notably overfishing, incidental take in nets due in part to its body size and unusual morphology, and habitat loss related to the development of the shoreline and nearshore habitats (NOAA Fisheries 2000).

5.3.4 Whales and Dolphins

The Northern right whale (*Eubalaena glacialis*) is a federally listed endangered species and is protected under the MMPA. The current migratory population within the Atlantic Region is less than 350 animals. Right whales are highly migratory and summer in the vicinity of the Canadian Maritime Provinces. They migrate southward in winter to the eastern coast of Florida. The breeding and calving grounds for the right whale occur off of the coast of southern Georgia and north Florida. During these winter months right whales are routinely seen close to shore and have been sighted as far south as south Florida, with isolated sightings in the Gulf of Mexico.

Dolphins common to inshore waters of southeast Florida include the Atlantic spotted dolphin (*Stenella frontalis*), the spinner dolphin (*Stenella longirostris*), the spotted dolphin (*Stenella attenuata*), and the bottlenose dolphin (*Tursiops truncatus*), which is listed as *depleted* under MMPA. A resident population of bottlenose dolphins can be found in Biscayne Bay (Service 2003).

6.0 PROJECTED FISH AND WILDLIFE RESOURCES WITHOUT PROJECT

If the project is not constructed, the nodal point of erosion in the 63rd Street vicinity will likely continue to reduce the available habitat on the beach and threaten dune vegetation at its current rate. Frequent beach renourishment activities associated with the BEC&HP project will likely continue, which may adversely affect nesting sea turtles, hardbottom reef habitat, and infaunal benthic communities. These fish and wildlife resources may be impacted as a result of: (1) increased frequency of periods where sea turtle nesting habitat is subject to changes in the physical environment of the beach, which may affect nesting success; (2) increased frequency of events where hardbottom reef organisms are subject to prolonged periods of turbidity and sedimentation, which may lead to increased stress or mortality; (3) directs impacts to hardbottom reefs organisms as a result of the installation of the dredge pipeline, regardless if offshore borrow material or upland sand sources are utilized; and (4) direct loss of benthic habitat within offshore borrow sites, as a result of excavation.

After 26 years of dredging, beach compatible material located within nearshore borrow sites in Miami-Dade County are nearly exhausted. These geologic resources are finite and non-renewable. As a result, the search for beach compatible material has extended to deep water areas offshore, foreign sand sources, such as aragonite from The Bahamas, and upland sand sources. High quality upland sand material in Florida is often mined from areas that were once ancient beaches or sand dunes, which exist today as scrub or similar habitat. These habitats support relic ecosystems rich in species diversity, including several threatened and endangered plant and animal species. As the demand for suitable material for beach renourishment increases, the pressure to mine finite resources within these important habitats will likely also increase.

7.0 EVALUATION OF THE RECOMMENDED PLAN

The evaluation of the Recommended Plan examines the potential adverse effects of project activities to fish and wildlife resources, listed species, and their associated habitats. Direct and indirect effects of the action on habitats within the project footprint and areas adjacent to the project are considered.

Direct impacts may occur to adjacent hardbottom reef habitat as a result of deployment of the proposed breakwater structure. Indirect effects such as turbidity associated with installation of the breakwater structure may temporarily impact hardbottom reef habitat. In addition, sea turtle hatchlings may be affected as a result of increased predation by adult fish which are likely to inhabit the structure after construction.

The impacts to habitats within the project area are evaluated in the following section, while the potential effects of the action on important fish and wildlife taxa, such as listed and managed species, are discussed in subsequent sections.

7.1 Biotic Communities

7.1.1 Supralittoral and Intertidal Zones

Since the proposed breakwater structure will be constructed from a barge and placed approximately 400 feet from the mean shoreline, direct impacts to the beach as a result of project construction are not anticipated. After construction, the adjacent and downdrift shorelines may experience secondary impacts, such as erosion. However, the shoreline in the project area should equilibrate as sand builds at the breakwater then bypasses the structure to the adjacent shoreline. If the structure fails or breaks apart, the beach and associated dune vegetation may be impacted as a result of debris dispersal and subsequent removal efforts.

Breakwaters are designed to attenuate wave energy which reduces the primary cause of erosion. Additionally, breakwaters modify wave patterns through diffraction. The combination of these factors on wave energy modifies the local littoral transport rates and may result in the accumulation of sand and minimization of erosion along the shoreline behind the breakwater. When properly designed, the shoreline forms a salient which ultimately achieves a state of equilibrium. A salient can form as sand accumulates prominently behind, but does not connect to the breakwater. Once equilibrium is achieved, sand transport past the structure resumes; thereby, minimizing the potential of adverse downdrift affects (Humiston and Moore 2001). The Corps anticipates that the effects to the adjacent shoreline as a result of the proposed project will be temporary and the equilibrium is expected to be achieved within one year. Though the downdrift shoreline may be altered, the Corps' Generalized Model for Stimulating Shoreline Change (GENESIS) results indicate that a net loss of beach habitat is not anticipated (URS 2003).

Breakwaters may adversely affect the adjacent shoreline if they are not properly designed. They may form a tombolo, a term used to describe prominent sand accumulation behind and connected to the breakwater structure. This creates a situation where the breakwater acts as a headland (a prominent land feature) rather than an offshore feature. In this case, the breakwater functions as a barrier to the longshore transport of material in a manner similar to a conventional terminal groin, resulting in offshore sand movement and downdrift erosion.

The Corps states that the primary objective of the proposed project is to retain sand in the southern portion of the authorized beach project without significant impact to the adjacent or downdrift shoreline. The second objective is to design the structure to remain stable and intact when exposed to wave energy generated by tropical and winter storm events.

Since a breakwater constructed with reefballs is a relatively new technology, a limited amount of data is available regarding their hydraulic stability (URS 2003). Hydraulic wave tests and wind tunnel tests were conducted by Florida Institute of Technology, Melbourne, Florida, to determine stability of the reef ball units. The results of these tests were combined with an analytical Morison Equation approach to determine the forces and movements on the submerged structure (URS 2003).

Submerged structures have the potential to shift, roll, or otherwise move when subject to wave energy or as a result of scour, which may create voids beneath the ABM. Based on the stability analyses of the reef balls, it was concluded that the resisting forces of the structure will prevent movement due to wave induced forces. Since the reef balls will be anchored either to the ABM or directly into the substrate, the 14-ton submerged weight of the total structure is anticipated to adequately resist sliding as a result of the estimated 6,000 pounds of frontal wave energy to which the structure will likely be subjected. The Corps has concluded that the structure will remain stable during the most severe wave conditions generated during a 20-year storm level (*e.g.*; 14.6 feet).

Though it appears that the structure will initially remain stable during storm events, we question whether the integrity of the structure will decrease over time as the materials that connect the ABM together and connect the reef balls to the ABM corrode. The Corps Draft Environmental Assessment includes a 3-year post-project monitoring plan to evaluate the performance of the proposed demonstration project. After storm events, the performance of the structure and the effects to the shoreline will be evaluated by the project sponsor, Miami-Dade County. However, the plan does not indicate that regular physical inspection of the structure will be conducted over the 50-year life of the project, nor does the plan include provisions in the event that maintenance to the structure is required.

7.1.2 Subtidal Zone

The proposed 2,272-foot long breakwater structure will permanently convert approximately 2 acres of sandy bottom habitat to hardbottom habitat that is occupied by benthic infaunal communities. The organisms that are most likely to be impacted as a result of the conversion include non-motile invertebrate infaunal species within the footprint of the breakwater such as by polychaetes, amphipods, isopods, decapods, mollusks, echinoderms, and a variety of other taxa.

7.1.3 Hardbottom Reef

To avoid direct impacts to adjacent hardbottom reef habitat, the proposed breakwater structure will be constructed approximately 600 feet east of the edge of the nearest hardbottom reef. Construction and support vessels transit routes will likely pass over reef habitat during construction. The Corps has indicated that travel corridors with adequate depth will be selected and discussed with the contractor to avoid potential impacts to hardbottom reefs by vessels. During construction and breakwater deployment, multiple anchors will be required to stabilize vessels, which may impact hardbottom habitat.

Turbidity and sedimentation may be generated during the deployment and installation of the breakwater structure that may cause short-term and temporary impacts to adjacent hardbottom reef organisms. The Corps has proposed to implement turbidity curtains or similar measures to minimize the effects of turbidity and sedimentation to hardbottom habitat.

In the event the breakwater structure fails or becomes destabilized, debris from the structure may impact reef organisms or portions of the structure may collide with the reef.

7.2 ESSENTIAL FISH HABITAT

The EFH that may be directly and indirectly impacted by the proposed project are likely to include the water column, subtidal zone, and hardbottom habitat. Specific aspects of EFH that may be adversely affected include spawning, foraging, and refuge habitats for managed species such as the snapper/grouper complex, penaeid shrimp, and spiny lobster. The NOAA Fisheries is the lead agency responsible for the assessment of the possible adverse impacts of the proposed project to EFH.

7.3 THREATENED AND ENDANGERED SPECIES

7.3.1 Sea Turtles

According to data provided by the FWC, Miami-Dade County accounts for approximately 0.6 percent of Florida’s total sea turtle nesting population (Meylan et al. 1995). The loggerhead sea turtle constitutes by far the larger percentage of Miami-Dade County’s total nesting activity with an average of 400 loggerhead nests constructed per year. Small numbers of green and leatherback sea turtle nests are also present. On the Miami Beaches, a total of 385 sea turtle emergences (194 nests and 191 false crawls) were documented during the 2003 nesting season (FWC 2003).

Within the 1.8-mile zone (Zone I) surveyed by Miami-Dade Park staff, which includes the project area, sea turtle nesting is considered sparse (B. Ahern, personal communication). This is largely attributed to the affects of development and beach front lighting. As shown in the table below, between 2001 and 2003, a total 36 loggerhead nests were found within zones H through J on Miami Beach and relocated to Haulover Beach Park (Miami-Dade County 2004). Nesting by green and leatherback sea turtles was not documented during this period. However, the overall sea turtle nesting trend in Miami-Dade County since the 1980s appears to be on the increase (B. Ahern, Miami-Dade Parks, personal communication).

As a result of anthropogenic disturbance along Miami Beach related to beach front lighting and heavy recreational use, Miami-Dade County initiated a sea turtle hatchery program that relocates approximately 95 percent of all sea turtle nests to a less disturbed segment within Haulover Beach Park. Sea turtle survey information along Miami-Beach between Government Cut and Haulover Inlet indicate the greatest proportion of sea turtle nesting occurs on South Beach (approximately 42 percent) and North Miami Beach. Nesting density is lowest within the mid-portion of Miami Beach (B. Ahern, Miami-Dade Parks, personal communication). In 2003, the FWC recommended that relocation of green and leatherback sea turtle nests should not continue since nest success of relocated nests are greatly reduced when compared to nests that remain *in situ* (R. Trindell, FWC, personal communication).

Year	Loggerhead Nests	Loggerhead False crawls	Green Nests	Green False crawls	Leatherback Nests	Leatherback False crawls
2001	16	16	0	0	0	0
2002	7	12	0	0	0	0
2003	23	22	0	0	0	0

If construction activities occur at night during the sea turtle nesting season (March 1 through November 30), the presence of light and/or noise from construction vessels anchored offshore may adversely affect sea turtles. These factors may interrupt the movement of adult, nesting, female turtles swimming toward or away from nesting beaches, and may cause disorientation of hatchlings following emergence. However, all construction vessels will be required to adhere to best management practices, such as preventing lights from exposure to shore through use of shields. In view of this, the proposed project should not appreciably change the ambient conditions of nesting areas in the vicinity of the action.

As discussed in Section 5.1.1, the breakwater structure will likely interrupt the natural littoral movement of sand in the vicinity of the structure which may cause a temporary deficit of sand to beaches downdrift of the structure. The potential loss nesting beach for sea turtles is expected to be insignificant and discountable as the shoreline in the project area should equilibrate as sand builds at the breakwater then bypasses the structure to the adjacent shoreline. During equilibration, no net loss of shoreline is expected. If the breakwater is successful, the hot spot of erosion is expected to be ameliorated; thereby reducing the potential adverse affects of frequent beach renourishment to nesting sea turtles. It has been suggested that erosion control structures constructed in appropriate high erosion areas may benefit sea turtles by reestablishing nesting habitat where none currently exists or where nesting habitat is diminished.

Caution should be exercised not to automatically assume that reestablishing nesting habitat will wholly benefit sea turtle populations without determining the extent that the erosion control structures may affect adult sea turtle and hatchling behavior, as well as risk of hatchling predation. Under natural conditions, it is known that hatchling predation in nearshore waters is high (Stancyk 1995, Wyneken and Salmon 1996, Gyuris 1994). There are many documented occurrences of nearshore predators captured with hatchlings found in their digestive tracts. Reef balls were originally designed for deployment as artificial reefs to attract adult fish for recreational purposes in generally deeper waters. Natural nearshore hardbottom habitat in the vicinity of the structure has an average relief of approximately 1 to 4 feet in height with features (*e.g.*, small holes and crevices) that serve to attract juvenile fish. The proposed structure will provide features that will likely attract and concentrate larger predatory fish typically found in deeper water further from shore. As a result of the conversion of unconsolidated sandy bottom habitat to an artificial hardbottom habitat conducive to adult fish populations, sea turtle hatching mortality may increase in the vicinity of the project due to fish predation. In addition, colonization of the structures by epibenthic macroalgae, invertebrates, and other organisms will change over time and will likely result in changes of fish assemblages as the structures mature and continue to concentrate predators in the future.

During email and phone conversations with the Corps, the Service suggested an alteration of reef ball design that included smaller holes to reduce the potential colonization by large predatory fish. In response, the Corps indicated the design could not be modified since the porosity of the unit provides optimal interaction with fluid flow, thereby, substantial absorption of wave energy can occur due to friction and turbulent eddy formation.

Though sea turtle nesting is generally low in the project area, the Service expressed concern to the Corps during earlier coordination that adult gravid sea turtles may be obstructed by the structure as they attempt to reach the shoreline to nest. Sea turtle access lanes were subsequently added to the project to address these concerns (Appendix A, URS 2003). These lanes are perpendicular to the length of the structure and occur every 60 feet. These lanes are 6 feet wide and, due to the shorter height of the Bay reef balls, provide an extra 3 feet of clearance over the structure. Another concern is that sea turtle hatchlings of nests that remained *in situ*, or were missed during the daily nest surveys, may experience an increase in predation as the hatchlings attempt to cross the proposed structure in their attempt to swim to offshore nursery grounds as has been shown for other artificial reefs (Wyneken and Salmon 1996). This is especially true if hatchlings hesitate before crossing the structure. Hatchling hesitation (that is, stopped swimming) was observed for some hatchlings before crossing the PEP reef in Vero Beach at low tide (Brian Barnett, FWC, letter to Lauren Milligan, Florida State Clearing House, September 15, 2004 (APPENDIX D)). The Service recommends the inclusion of an additional component to the proposed monitoring plan to determine whether hatchling mortality is increased as a result of the breakwater structure. To aid the Corps, the Service has included as Appendix C, the monitoring plan developed by Mote Marine Laboratory that will be initiated by Lee County in 2004 for the Gasparilla Island erosion control structure project.

7.3.2 West Indian Manatee

The West Indian manatee is present in the project area, particularly in the inshore estuarine waters in the vicinity of Government Cut and the Haulover Inlet. Since it is likely that the barge and support vessels will be loaded from an inshore location, the vessels will likely traverse habitats occupied by the manatee. To avoid and minimize potential adverse affects to the manatee during the proposed breakwater construction, the Corps has agreed to implement the *Standard Manatee Protection Conditions* for all construction and support vessels associated with the project (Service 2002b).

7.3.3 Smalltooth Sawfish

Though vessels associated with the proposed breakwater construction will operate within waters that may be occupied by the smalltooth sawfish, these activities are not expected to adversely affect inshore habitat, especially because the population density of this species in Miami-Dade County is low (NOAA Fisheries 2000).

7.3.4 Whales and Dolphins

Since the project will occur in nearshore waters less than 20-feet deep, it is unlikely that endangered whale species, such as the fin whale (*Balaenoptera physalus)*, humpback whale (*Megaptera novaeangliae*), and sperm whale (*Physeter macrocephalus*) would be observed within the project boundaries. Dolphins are common to the nearshore waters of Miami-Dade County. Vessel traffic and noise generated during construction periods may alter the dolphin's natural travel patterns and feeding behavior in the project area. However, these potential adverse affects are expected to be temporary and limited to the periods of active construction.

8.0 RECOMMENDATIONS

In the Draft FWCA report, the Service provided recommendations to the Corps to further avoid and minimize impacts to fish and wildlife resources. The Corps provided the following responses to our recommendations (Appendix D):

1. Within 3 months of deployment of the proposed breakwater structure, underwater surveys to determine the presence or absence of hardbottom within the project footprint should be conducted. If hardbottom is found, mitigation for those impacts should be provided in-kind at a 1:1 ratio.

Corps Response: Concur.

2. To provide better access to sea turtles across the structure, consider a modification to the proposed design to replace a series of diagonal rows of Goliath reef balls with smaller reef balls or bay balls to allow gaps approximately every 60 feet along the length of the structure.

   Corps Response: Every 10th SMART segment, perpendicular to the shore, will utilize approximately 3-foot tall reef balls to provide sea turtle access lanes (approx. 4-foot deep by 6-foot wide at MLW), in addition to the one-foot of freeboard SMART will provide at mean low water over the entire submerged structure.

   The FWC has provided comments to the Florida State Clearing House regarding the width of the proposed sea turtle access lanes (Appendix D). The FWC is concerned that the 6 to 8-foot width of the access lanes may not be adequate to allow female sea turtles to pass over the structure to reach the nesting beach. FWC indicates that previous projects have required gaps up to 25-feet wide (e.g. the PEP reef in Vero Beach) between structures. The FWC recommends modifying the SMART Reef structure minimize impacts to sea turtles attempting to pass over the structure

   The Service supports the FWC's recommendation.

3. Develop and include a vessel anchoring plan, in addition to the vessel transit plan, to avoid potential impacts to hardbottom.

   Corps Response: Concur. SMART installation contractor will be informed of their responsibility to avoid all adverse affects to hardbottoms within project area. GPS and electronic depth finder equipment will be used to guide vessel transits to navigate deeper waters and avoid hardbottoms within project area.

4. Increase the duration of the SMART reef Physical and Biological Monitoring Program from 3 years to 5 years to better evaluate the affects of the structure over-time.

   Corps Response: Do not concur. Unfortunately the Corps cannot commit to extending the monitoring as our project authority will not allow us to do that. DERM will provide annual monitoring info.

   The Service acknowledges that the Corps' authority is limited; however, the sponsor could assume the responsibility. The Service maintains that 3 years is insufficient time to determine if swimming and nesting sea turtles are adversely affected by the project.

5. Provide a comprehensive and detailed annual report of the results of the SMART reef Physical and Biological Monitoring Program to State and Federal agencies for review and

comment.

Corps Response: A DERM courtesy copy of the annual monitoring report will be provided.

6. If the post-project Physical Monitoring Plan indicates that the adverse affects to the downdrift or adjacent shoreline exceeds the level anticipated, reinitiation of consultation under section 7 of the ESA is recommended.

   Corps Response: An ‘after-the-fact’ consultation would be initiated.

   If post-project monitoring indicates that project affects exceed anticipated levels, immediate reinition of consultation under section 7 of the ESA is recommended.

7. The post project biological monitoring plan should include an evaluation of the structure’s affect on adult sea turtle nesting success in the project area.

   Corps Response: Concur.

8. Consultation under section 7 of the ESA should be initiated with NOAA Fisheries, Protected Species, to evaluate the potential adverse affects of the breakwater on swimming turtles.

   Corps Response: Concur. Will be done.

9. Include an evaluation of the possible adverse cumulative affects of the proposed breakwater structure on swimming sea turtles, particularly the potential increase hatchling mortality related to predatory fish.

   Corps Response: Concur. Will be included.

10. Develop a long-term maintenance plan to include provisions and annual inspections of the structural integrity of the breakwater, in addition to inspection of the structure after storm events. The plan should also identify the entity responsible, fiscally and otherwise, for the long-term repair and maintenance of the structure.

    Corps Response: Concur. Will be included.

11. The Final EA should evaluate and discuss how the breakwater is expected to affect the BEC&HP with respect to the renourishment interval, potential downdrift affects, and the equilibrium toe of fill.

    Corps Response: Concur. Will be included.

12. After construction, if it is determined that the structure has caused significant erosion of adjacent beaches, section 7 consultation should be reinitiated with the Service to determine if the structure should be modified or removed.

    Corps Response: Concur. Will be included.

9.0 SUMMARY

The Service appreciates the opportunity to review and provide comments on this important project. The Service supports the Corps' efforts to investigate innovative and alternative methods to address shoreline erosion across the United States.

The primary concern of the Service relates to the proposed 3-year duration of the physical and biological monitoring. We believe this plan may be insufficient to determine the affects of the structure on fish and wildlife resources. Since this is a long-term project, the Service recommends that a long-term monitoring and maintenance plan be developed to minimize the potential of structural failure and subsequent potential impacts to fish and wildlife resources.

10.0 LITERATURE CITED

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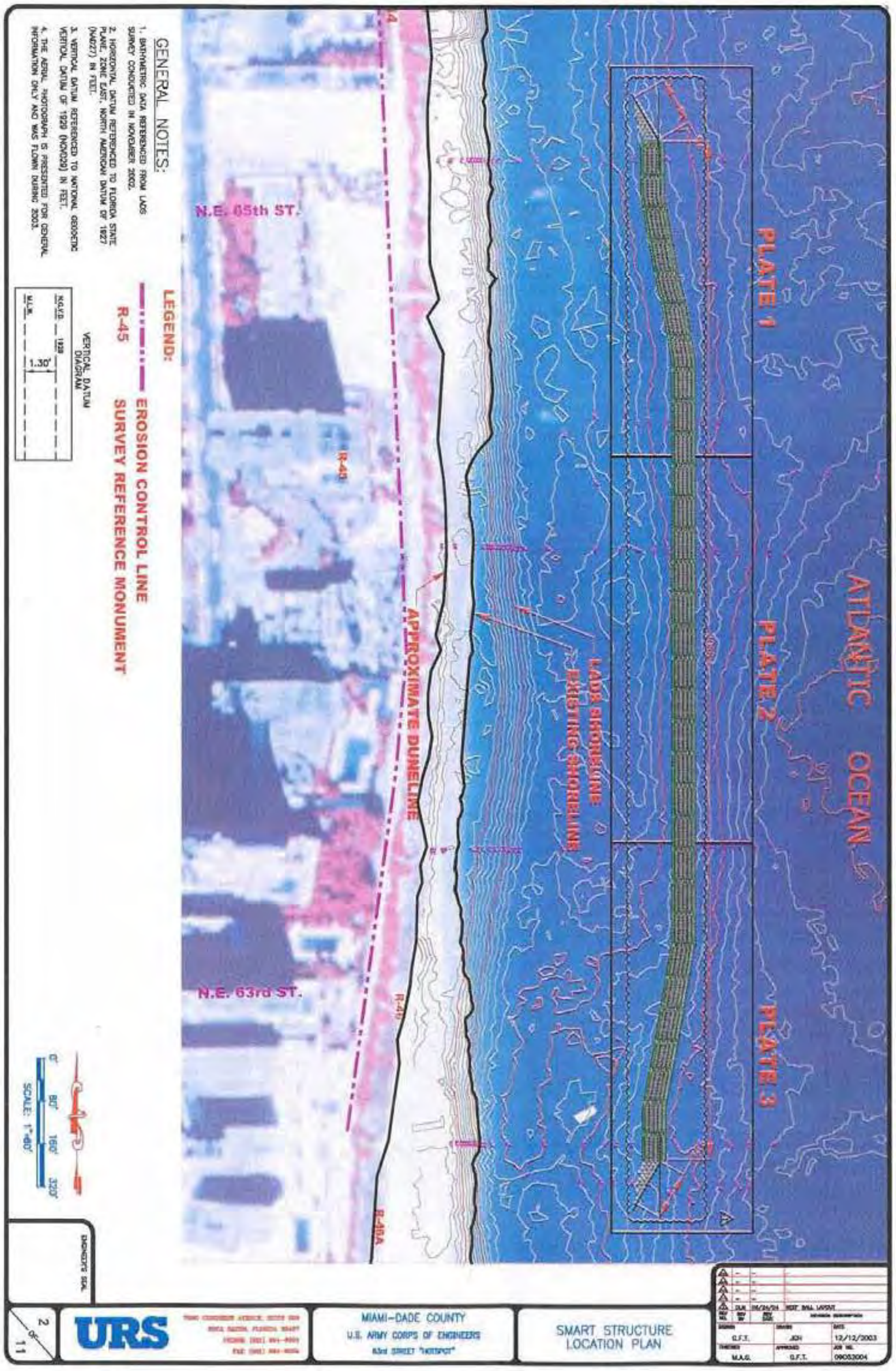
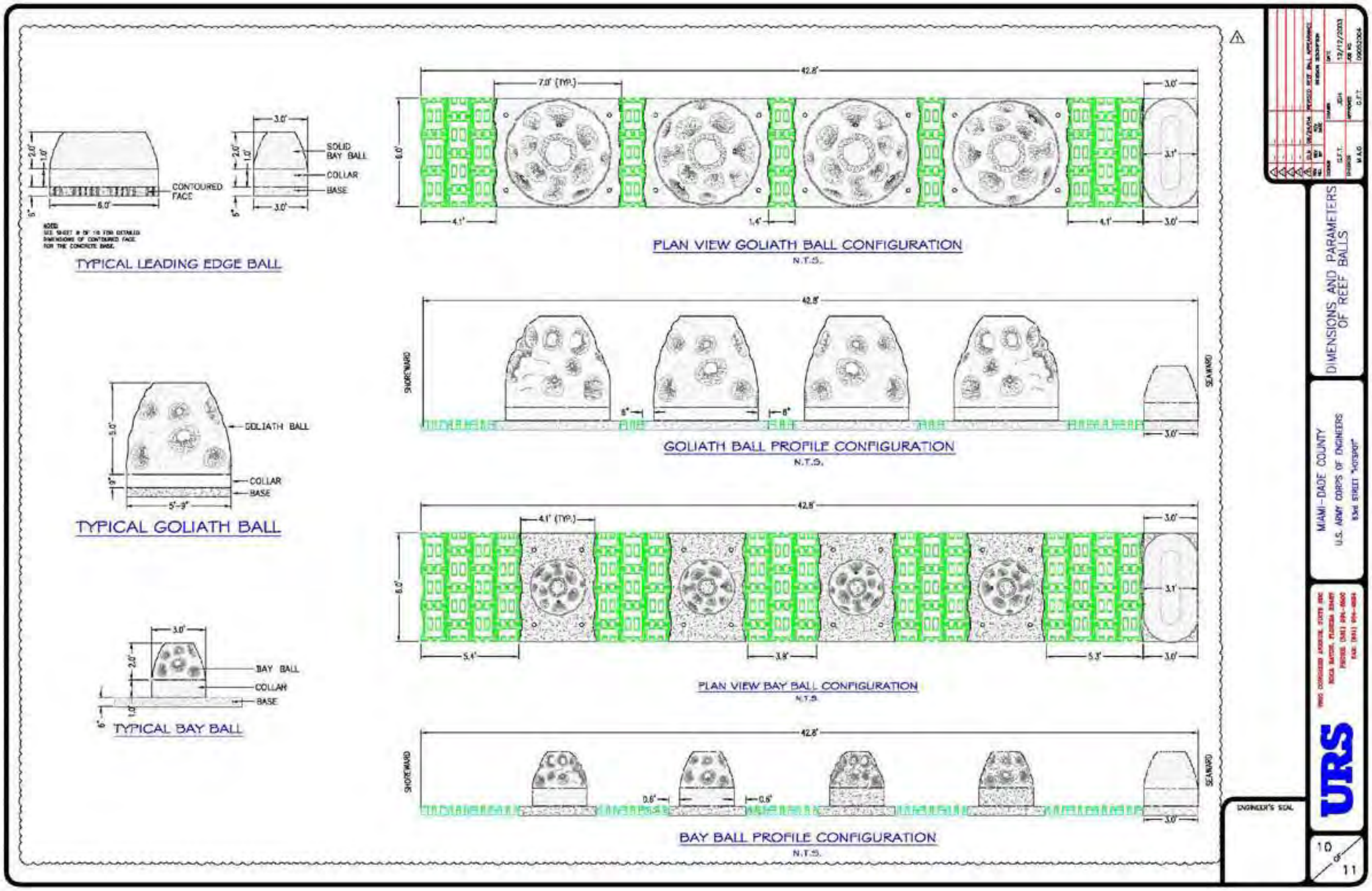
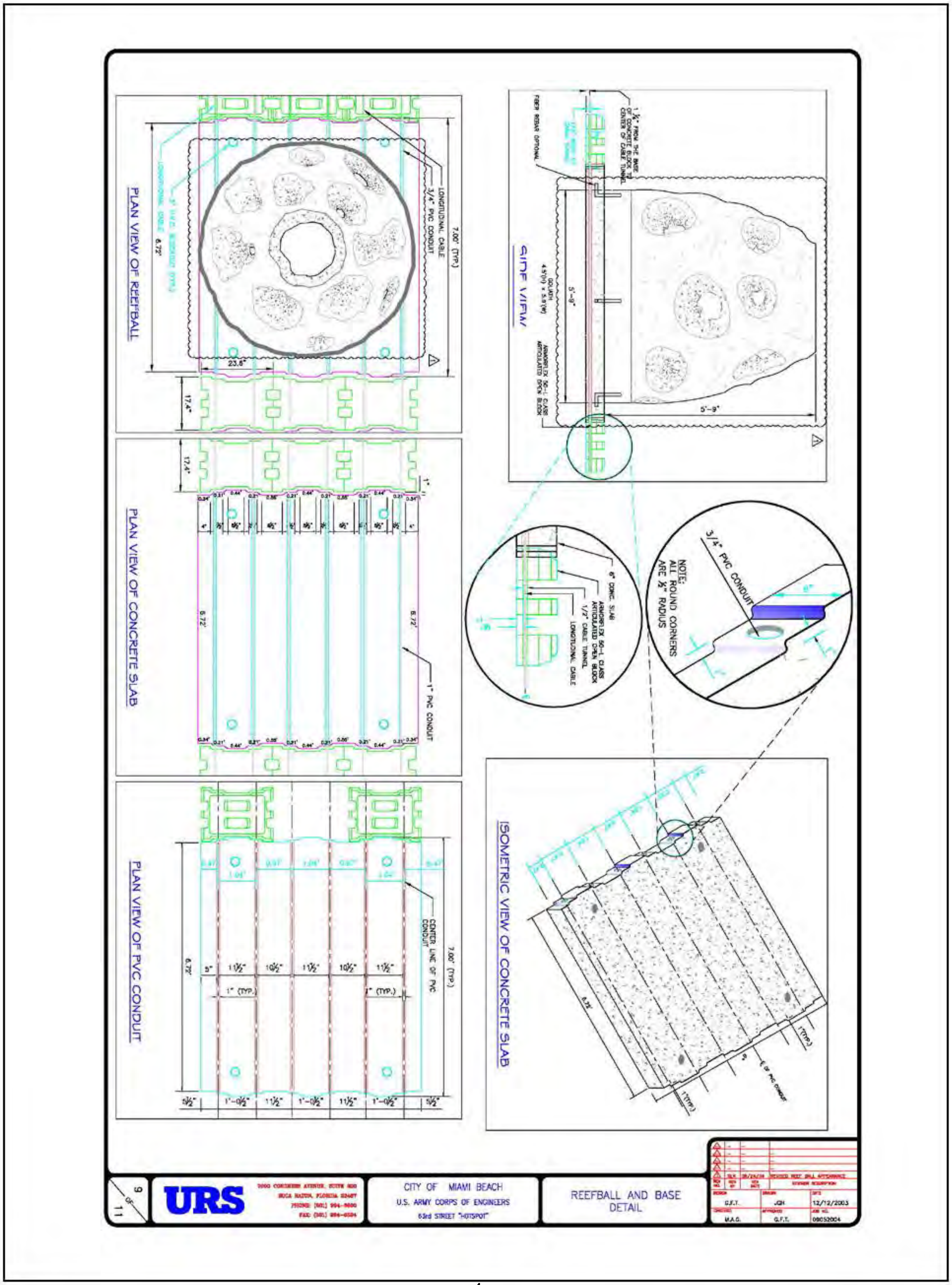
APPENDIX A

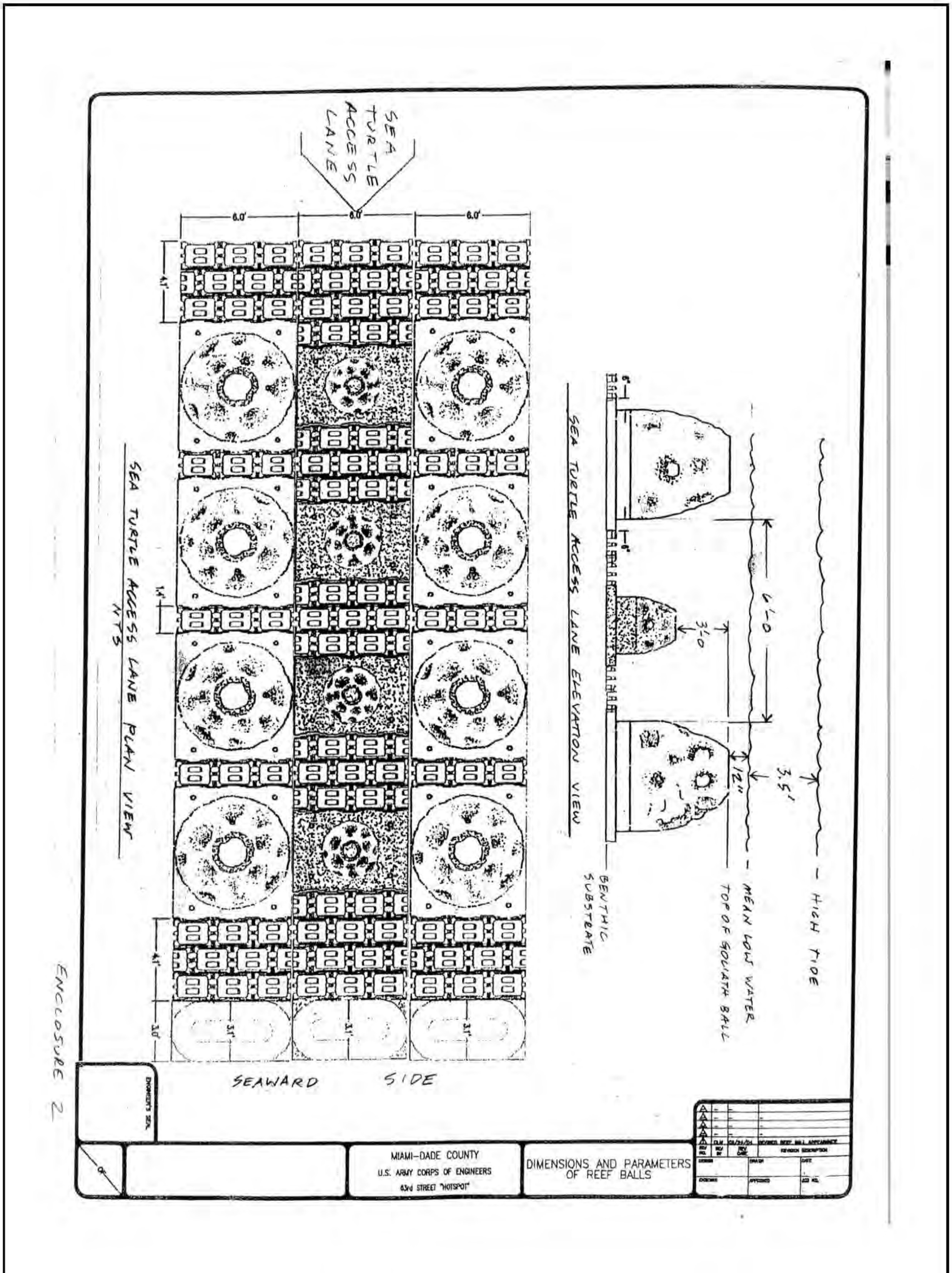
Project Plan Views (URS 2003)


GENERAL NOTES:
LEGEND:
EROSION CONTROL LINE
R-45
SURVEY REFERENCE MONUMENT
VERTICAL DATUM DIAGRAM
N.E. 65th ST.
N.E. 63rd ST.
APPROXIMATE DUNELINE
LADS SHORELINE
EXISTING SHORELINE
PLATE 1
PLATE 2
PLATE 3
ATLANTIC OCEAN
SCALE: 1"=80'
URS
MIAMI-DADE COUNTY
U.S. ARMY CORPS OF ENGINEERS
63rd STREET "HOTSPOT"
SMART STRUCTURE
LOCATION PLAN
12/12/2003


TYPICAL LEADING EDGE BALL
CONTOURED FACE
SOLID BAY BALL
COLLAR
BASE
TYPICAL GOLIATH BALL
GOLIATH BALL
TYPICAL BAY BALL
BAY BALL
PLAN VIEW GOLIATH BALL CONFIGURATION
N.T.S.
GOLIATH BALL PROFILE CONFIGURATION
N.T.S.
PLAN VIEW BAY BALL CONFIGURATION
N.T.S.
BAY BALL PROFILE CONFIGURATION
N.T.S.
SHOREWARD
SEAWARD
42.8'
7.0' (TYP.)
4.1' (TYP.)
3.0'
6.0'
ENGINEER'S SEAL
DIMENSIONS AND PARAMETERS OF REEF BALLS
MIAMI-DADE COUNTY
U.S. ARMY CORPS OF ENGINEERS
83rd STREET "HOTSPOT"
URS
12/12/2003
10 of 11

3


PLAN VIEW OF REEFBALL
PLAN VIEW OF CONCRETE SLAB
PLAN VIEW OF PVC CONDUIT
SIDE VIEW
ISOMETRIC VIEW OF CONCRETE SLAB
NOTE: ALL ROUND CORNERS ARE ½" RADIUS
3/4" PVC CONDUIT
1" PVC CONDUIT
LONGITUDINAL CABLE
3/4" PVC CONDUIT
CENTER LINE OF PVC CONDUIT
6" CONC. SLAB
1/2" CABLE TUNNEL
LONGITUDINAL CABLE
7.00' (TYP.)
6.72'
23.6"
17.4"
5'-9"
URS
CITY OF MIAMI BEACH
U.S. ARMY CORPS OF ENGINEERS
63rd STREET "HOTSPOT"
REEFBALL AND BASE DETAIL
12/12/2003
9 of 11


SEA TURTLE ACCESS LANE
6.0'
4.1'
1.4'
3.0'
3.1'
SEA TURTLE ACCESS LANE PLAN VIEW
NTS
SEA TURTLE ACCESS LANE ELEVATION VIEW
6"
6'-0
3'-0
12"
3.5'
HIGH TIDE
MEAN LOW WATER
TOP OF GOLIATH BALL
BENTHIC SUBSTRATE
SEAWARD SIDE
ENCLOSURE 2
MIAMI-DADE COUNTY
U.S. ARMY CORPS OF ENGINEERS
63rd STREET "HOTSPOT"
DIMENSIONS AND PARAMETERS OF REEF BALLS

APPENDIX B

Corps' Proposed Post-Project Physical and Biological Monitoring Plan

SECTION 227 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM
63RD STREET "HOTSPOT"
MIAMI BEACH, FLORIDA
MONITORING PROGRAM OUTLINE

1. INTRODUCTION and BACKGROUND

2. MEASURES OF SMART STRUCTURE PHYSICAL PERFORMANCE
   - 2.1 General
   - 2.2 Functional Performance of SMART structure
     - 2.2.1. Functional Parameters
       - 2.2.1.1. Volume Change
       - 2.2.1.2. Change in Beach Width
     - 2.2.2. Performance Metrics
   - 2.3 Structural Performance
     - 2.3.1. Parameters
       - 2.3.1.1 SMART Elevation Change
       - 2.3.1.2 Alongshore Integrity Change
       - 2.3.1.3 Scour
     - 2.3.2 Structural Performance Metrics

3. BIOLOGICAL MONITORING
   - **3.1 Topography and Bathymetric Surveys**
     - **3.1.1. Monitoring Area**
     - **3.1.2. Survey Methodology**
     - **3.1.3. Profile Lines**
     - **3.1.4. Monuments**
     - **3.1.5. Pre & Post Installation Surveys**
     - **3.1.6. Beach Fill Surveys**
     - **3.1.7. Baseline Surveys**
     - **3.1.8. Storm Contingency Surveys**
     - **3.1.9. Structure elevation Surveys**
   - 3.2 Aerial Photography
   - 3.3 Scour Measurement
   - 3.4 Environmental Monitoring
     - 3.4.1 Sea Turtles
     - 3.4.2 Biological Communities
   - 3.5 Storm Contingency Plan
   - 3.6 Methods
     - 3.6.1. Underwater Surveys
     - 3.6.2. Fish surveys
     - 3.6.3. Data Analysis

Section 1 – INTRODUCTION and BACKGROUND

The Miami-Dade County Department of Environmental Resources Management (DERM) and the US Army Corps of Engineers (CORPS), plan to install a 2,272-foot long SubMerged Artificial Reef Training (SMART) structure approximately 400-foot offshore of the mean low water (MLW), adjacent to the 63rd Street erosional "Hotspot" of Miami Beach, Florida. The SMART structure would be installed as an erosion control and wave attenuation measure and would be placed in approximately 7-foot of water (see Cross Section Figure 2). The U.S. Army Engineer Research and Development Center (ERDC) would also be involved with the proposed SMART structure monitoring effort.

The proposed project is authorized by the Water Resources Development Act (WRDA) of 1996, Section 227, National Shoreline Erosion Control Development and Demonstration Program. Under Section 227, innovative technologies are developed to demonstrate shoreline erosion abatement in a cost-effective and environmentally friendly manner. Performance metrics are developed to measure the successfulness of the demonstration project. The proposed structures can be modified or removed within the lifespan of authority.

A demonstration project has to demonstrate something. The monitoring program is the mechanism to "demonstrate" whether the SMART structure can provide a benefit (or are detrimental). This test plan establishes the criteria against which the performance of the SMART structure would be measured and evaluated. This could have implications on how the Miami-Dade County beaches are managed in the future (i.e., renourishment interval and treatment of "hot spots"). This in turn could have environmental impacts or benefits. The coastal engineering and environmental aspects of shore protection are inter-related.

The development and implementation of a monitoring plan is conducted to gather data and analyze it to provide a comprehensive and unbiased documentation of the performance of the proposed SMART structure. The application of this 3-year experimental test plan as prepared by the ERDC and reviewed by DERM would provide an unbiased evaluation of the performance of the SMART structure. ERDC develops innovative science and technology solutions to support warfighting, infrastructure, environmental, water resources and disaster operations. The local sponsor, DERM, would implement the following monitoring plan, which has been appropriately scaled to the proposed project and based on other coastal monitoring plans, research and conversations with scientists, biologists and engineers.

The monitoring program contains several elements designed to test the effectiveness of the SMART structure on the local coastal environment, including determinations of:
a). the functional ability of the SMART structure to retain sand and stabilize the shoreline as measured through shoreline change;
b). the structural stability of the SMART structure to include structural integrity, settlement and scour resistance;
c). the environmental effects of the SMART structure on sea turtle beach access for nesting, fish and fouling communities, interaction of juvenile sea turtles

d). storm event contingency monitoring plan to include nearshore and offshore surveys, structure elevation surveys and scour measurements.

Long-term research to address USFWS concerns of cumulative secondary affects would include site visits and visual inspections. Coordination of this information would be made available to interested resource agencies. Consideration of USFWS, NMFS and FDEP recommendations included in prior coastal reports (Coast of Florida, Region III, 1996, Sunny Isles Submerged Breakwater, 1997, Proposed Test Fill At Miami Beach, 2002).

2. MEASURES OF SMART PHYSICAL PERFORMANCE

2.1 General. The SMART offshore, segmented breakwater attenuates wave energy through processes of wave shoaling and breaking, increasing bottom friction and inducing turbulence, refraction, reflection and diffraction. Measures of performance are proposed to evaluate whether the project meets the intended objectives generally defined by the Section 227 Demonstration Program. These proposed measures focus on quantifying two categories of performance criteria:
• Functional - sand retention and stabilization of shoreline.
• Structural - stability of the reef, structural integrity, settlement and scour-resistance. For each performance category, measurement parameters are defined, and performance criteria are suggested.

2.2 Functional Performance – Sand Retention and Shoreline Stabilization. Assessment of the functional performance of the SMART structure will be based on protecting the 63rd Street shoreline erosional “Hotspot” area. In the event the beach fill project is not completed, the SMART Reef will be assessed on how effective the site-specific shoreline is stabilized. However, it is assumed that the beach fill will take place. No net loss of beach shoreline is expected. Some shift of shoreline width may result in some net gain of beach.

Functional performance focuses on the degree to which the SMART structure retains sand and reduces sand loss from the shoreline. Sand loss may occur, to a lesser degree, to cross-shore processes (post-construction equilibration, seasonal beach profile change, and storm-induced beach erosion) and, to a greater degree, to longshore processes (natural gradients in longshore sand transport, and interruption of sand transport by structures). In order to predict performance, it has been assumed that cross-shore losses are negligible.

It is difficult, even in ideal conditions, to predict the long-term fate of the beach fill, either with or without the SMART structure. To this end, GENESIS numerical modeling was utilized to predict shoreline evolution for both cases: beach fill stabilization with and without the structure.

Inputs for the model include local shoreline positions obtained from LADS surveys (~2000), shoreline erosion rates from USACE reports (Martin 2001) and WIS hindcast data (Station 470, 1990-2000, including storms). Several assumptions concerning the beach fill must be made as the project has not yet been awarded and the sand source is unknown at the time of this writing. The median grain size, construction or design template, and the volume of fill/LF are all unknown. Some data has been provided, such as a probable design template; this data has been used, with the assumption that the as-built construction profile may vary significantly from the proposed fill profile. Analysis addressing the potential error generated from the differences in planned vs. constructed templates is offered.

Comparisons of numerical results of the GENESIS shoreline model will be made with data collected during post-construction monitoring (beach profile surveys, aerial photography, Argus data, etc.). Functional performance can then be evaluated following each beach profile survey, starting from initial construction and continuing throughout the monitoring program. Performance should be evaluated over both incremental (survey to survey) and cumulative time scales.

2.2.1. Functional Parameters:

2.2.1.1. Volume Change: Loss or gain of volume measured over time between the landward point of profile closure and to a distance offshore defined by the depth of closure (in absence of an offshore structure). The volumes will be determined from beach profile surveys.

2.2.1.2. Change in Dry Beach Width: Change in distance measured from the "R" markers to the berm crest. This will be determined from beach profile surveys and Argus video data. A standard mean "shoreline" would be determined for this study, either a datum-based line (i.e. MHW) to be measured off the profiles or a visual line (e.g. the wet/dry line) to be measured off the aerial photography. The lines are not the same, so some provision would need to be undertaken to determine a relationship between these lines.

2.2.2. Performance Metrics:

2.2.2.1 Difference in net volume change behind structure and north control site. *Evaluation Criterion: Structure is successful in retaining sand if volume loss is 30% or less than control site.*

2.2.2.2. Difference in net volume change between in-situ measurements and GENESIS and SBEACH output. *Evaluation Criterion: Actual structure sand retention is within +/-20% of model results.*

2.2.2.3. Difference in dry beach width change behind structure and north control site. *Evaluation Criterion: Structure is successful in retaining dry beach width if beach width loss is 30% or less than north control site.*

2.2.2.4. Difference in dry beach width change between in-situ measurements and GENESIS output. *Evaluation Criterion: If relative reduction in beach width loss is +/- 20% of model results.*

2.3. Structural Performance – Structure Stability

Structural performance measures focus on stability of the offshore structures. Objectives are that the structures maintain functionality over a design life consistent with that of a beachfill project (i.e., 50 years) while requiring minimal operation and maintenance. Structural performance should be evaluated throughout the duration of the monitoring program.

2.3.1. Parameters:

2.3.1.1. Change in Elevation of Mean Structure Crest: Decrease in elevation of mean structure crest due to settlement or translation. Determined from baseline elevation surveys along the crest of the structure immediately following construction.

2.3.1.2. Change in alongshore Structure Integrity: formation of gaps in structure due to separation of interlocking units or other structure failure resulting in loss of structural integrity and excessive water transmission. Determined from elevation surveys along structure.

2.3.1.3. Scour: Elevation of seabed adjacent to structure (seaward and landward sides) in comparison to initial elevation at time of structure placement. Excessive scour may result in failure of structure.

2.3.2. Structural Performance Metrics:

2.3.2.1. Evaluation of above parameters for SMART structure.

2.3.2.2. Evaluation Criteria:

- Successful if average lowering of crest elevation is < 1-foot and maximum lowering is < 2-foot.
- Successful if no gaps form that result in structural instability.
- Successful if no permanent voids have formed beneath the mats.

SECTION 3 – MEASURES OF SMART BIOLOGICAL PERFOMANCE

Field data collection would begin during the period immediately prior to installation and for three years following installation. Each of the elements and their role in accomplishing the objectives outlined in Chapter III of the test plan are described below.

3.0 Monitoring Plan - Field Data Collection Program

3.1. Activity 1 - Topographic and Bathymetric Surveys. Beach and nearshore surveys would be conducted to document the topographic and bathymetric changes that occur throughout the project test area during the three-year monitoring period. These surveys would be conducted immediately prior to the installation of the SMART structure, periodically as described below, throughout the three year monitoring, after a significant storm event, and after placement of any fill within the monitoring area.

3.1.1. The survey monitoring area would extend approximately 5,000-foot north and south of the SMART structure terminus. Thirty profile lines would be surveyed. Ten profile lines would be surveyed within the SMART structure limits at a spacing of approximately 200-foot and twenty profile lines (ten to the north and ten to the south) would be surveyed outside of the SMART structure limits with a spacing of approximately 500-foot. Tolerance of all surveys would meet the specifications summarized in this chapter.

3.1.2. Surveys would be accomplished through a combination of "wading depth" surveys to extend from landward terminus locations to seaward of the SMART structure and hydrographic surveys seaward of the SMART structure. Included in the "wading depth" surveys would be a SMART structure condition survey to document the settling of individual units. SHOALS surveys may also be used extending from inside of the SMART structure seaward, but are not required.

3.1.3. Location of profile lines for the beach and nearshore surveys would be with total station and rod off of Florida DNR Monuments R-46A through R-44 previously established in the area and would have an azimuth of N70E. Profile lines commencing at Florida DNR

3.1.4. Monuments would extend to 3,000-foot offshore or –30-foot depth (whichever is less). Intermediate profile lines not commencing at Florida DNR Monuments would be surveyed to 1,200-foot offshore on a quarterly basis, 3,000-foot on an annual basis and would have an azimuth of N70E. The profile lines would be displayed in an appropriate figure.

3.1.5 Pre- and Post-Installation Surveys. Pre- and post-installation beach and nearshore surveys would be conducted immediately prior to and within three weeks following the SMART structure installation. A comparison of these surveys would be used to document the changes resulting from SMART structure installation. The post-installation survey would be used as the baseline survey to compare with subsequent surveys. In addition, in the event that a significant change in the bathymetry occurs between the pre-installation and the post installation period, an additional post-installation survey would be undertaken. The pre- and post-installation surveys would survey all profile lines to the distance specified for an annual survey, as described above.

3.1.6. Beach Fill Surveys. A beach fill survey would be required in the event that DERM, City of Miami Beach, or private property owners place fill within the project area. The DERM would survey the fill area within one week prior to and following placement of the fill or the quantity and location of the material would be reviewed by a professional engineer or surveyor.

3.1.7. Baseline Surveys. Beach and nearshore surveys would be conducted just prior to and within three weeks of SMART structure and every three months for the first year, and then every 4 months for the remaining two years of the monitoring period. As stated above, all profile lines would extend to 3,500-foot for the annual surveys and the intermediate lines would extend to 1,200-foot for the quarterly surveys.

3.1.8. Storm Contingency Surveys. A storm contingency survey would also be performed as deemed necessary by ERDC and DERM. A courtesy copy would also be provided the FDEP. This survey would be performed immediately following a significant storm event, when wave conditions permit and a notice to proceed provided by the FDEP. The storm contingency survey would include 12 survey profile lines to the distance specified for an annual survey.

3.1.9 Structure Elevation Surveys. Structure elevation surveys would be conducted on a quarterly basis for the first year. The structure elevation would be measured by sighting the elevations of each end of each unit with a rod from a total station situated on land. The elevation surveys would include scraping the biological growth off the top of the structure so that a true reading of structure settlement can be ascertained. The scraping can be performed with a metal spatula, hammer, and wire brush.

3.2. Activity 2 - Aerial Photography.

Controlled aerial photography at a scale of approximately 1" = 600-foot would be obtained annually as part of an ongoing program with the State of Florida.

3.3. Activity 3 - Scour Measurements.

Scour measurements would be performed following SMART structure installation for a period of 2-years during the project life. Measurements would be performed following significant storm events to measure expected maximum scour. The post-installation scour survey would act as the baseline survey. Scour would be visually assessed on a quarterly basis. Any areas of significant scour would be quantified during bathymetric surveys.

3.4. Activity 4 - Environmental Monitoring.

3.4.1. Impacts to Marine Turtles. The objective of this investigation would be to determine if the SMART structure exerts an impact on the seaward orientation behavior of hatchling turtles emerging from nests located on the beach adjacent to the reef. Methods: input would be solicited from various experts before deciding upon a final experimental design. Following the deployment of the SMART structure, the structure would be monitored to determine its influence on the coastal system. Of crucial importance would be a determination of how long the SMART structure would be exposed above the ocean surface. This determination would have an important bearing regarding the eventual research design of this investigation.

Beginning in Mid-August following installation, a sample of Atlantic loggerhead, *Caretta caretta*, hatchlings (not to exceed 150 animals) would be released from the beach at various sites located in the vicinity of the SMART structure and from a nearby control area. A special attempt would be made to use turtles still manifesting their "frenzy" behavior. Upon release the hatchlings would be followed at a non-impact distance either by swimming with snorkeling gear and/or via a paddleboard or sea kayak. All turtles would be tracked at least 300 feet east of the SMART structure. During this investigation, both early morning and nocturnal releases would be conducted.

To facilitate night tracking, individual hatchlings would be tethered to a one to two gram pencil diameter float. The tether line would be approximately two meters in length and would consist of a 10-pound test monofilament line. The float would be wrapped in either reflective tape to permit observation using a night vision scope or alternatively would consist of a chemical light source with a foil-screening device to prevent being seen by the hatchling attached to the tether line. Tether attachment would be accomplished using a self-corroding, 'barbless' fish hook (#20) implanted into the hatchling's marginal, distal scute. Every attempt would be made to retrieve the turtle in order to remove the hook upon termination of the tracking episodes.
'
To provide documentation of the orientation behavior during the early morning releases, a number of subject animals would be photographed using an underwater video camera. This would be especially important during tracking episodes involving animals being released when the SMART structure is exposed above or closest to the surface.
If conditions permit, a statistical valid sample of animals would be released from a control site as well as from at least two SMART structure site. These subjects would be timed via stopwatch from the beach to a point approximately 100 feet seaward of the reef. An anchored buoy would be used to mark the precise distance. Every attempt would be made during these releases to control ocean related variables that might affect swimming speed and behavior (i.e. tidal state, long shore currents, sea state).

Once this timed experiment is completed, the three data sets would be statistically compared to determine if there is a significant difference in swimming speed between turtles released from the control and from the two SMART structure release sites. Although it would not be possible to systematically investigate hatchling predation rates, anecdotal observations would be made regarding the species of the predator as well as any other pertinent information deemed to be of significance.

Following the conclusion of the first season's tracking investigation, the results would be summarized in an interim report and then submitted to experts for their review and evaluation. From their comments and critiques, a more comprehensive tracking experimental design would be developed. During this time, it is anticipated that a larger sample of hatchlings would be involved so that a wider range of environmental and experimental conditions can be considered.

3.4.2. Impacts to Biological Communities. The proposed biological monitoring program provides a scientifically credible analysis of biological issues resulting from the installation of a SMART structure in the near shore of Miami Beach, Florida, while keeping monitoring costs to a minimum. The proposed monitoring program focuses on fish and fouling (hard substrate dwelling) communities associated with the reef modules. The monitoring would utilize quantitative scientific data to analyze the responses of fish and fouling organism communities that are attracted to the SMART structure modules. Collection of quantitative data would also be available to respond to the public in the event of any changes to near shore-fishing resources, which might be attributed to the presence of the reefs.

After installation, the SMART structure modules would presumably function as typical hard substrata and would develop a fouling community that would progressively increase in its abundance and diversity over time. Similarly, the physical structure provided by the reefs should provide an attractant for fishes. Studies on the development of the fouling and fish communities have not been done within the shallow, near shore region in the Miami Beach area. The precise nature of the development of these communities is important in several regards.

3.4.2.1. First, installation of the reef modules would involve the placement of reef modules on top of existing sand bottom areas with the consequent destruction of the natural communities at these locations. It is important to quantitatively document that the SMART structure modules themselves actually are providing habitat.

3.4.2.2. Secondly, the natural world is extremely variable. Changes in fish populations occur for natural reasons, and may occur during or after the project. It is always tempting to attribute change to an obvious factor such as the SMART structure, even if there is no functional relationship. Quantitative studies of fish populations would provide data to evaluate the potential role of the SMART structure versus natural factors should any major changes take place.

3.4.2.3. Third, fouling community development may be significant in terms of the long-term integrity of the SMART modules, which may be influenced by whether boring sponges, and urchins become established. Evaluation of bioerosion rates would assist in projections of project lifetime. A common near shore sponge species (*Cliona lampa*) can bioerode 3 kg per square meter per year on carbonate substrata in Bermuda (Rutzler, 1975).

3.4.2.4. Fourth, the interaction of sea turtles with the SMART structure is potentially important. Juvenile turtles are known to utilize near shore natural reefs as a food resource (Ehrhart, pers. comm.}, and local availability of benthic invertebrates for food may influence selection of nesting beaches for loggerheads (D. Nelson, 1988). Sharks, barracuda, snook, jacks, snapper, and other larger predatory species may potentially consume hatchling turtles (D. Nelson, 1988). While small artificial reefs located farther offshore in deeper water in the Miami Beach area did not develop large populations of predators over a two year period (Vose, 1990), the situation for large reef modules inshore may be quite different. Direct observation of predation events on sea turtles is extremely difficult, and therefore the best approach is to attempt to estimate the potential increase in predation pressure via estimation of changes in fish populations associated with reef installation.

3.5. Activity 5 - Storm Contingency Plan

Three monitoring elements would be performed in the event of a significant storm as deemed appropriate by DERM and FDEP. These three monitoring elements are: 1) nearshore/offshore surveys to 3,500 feet; 2) structure elevation surveys; and 3) scour measurements.

3.6. METHODS

3.6.1. Quarterly underwater surveys of reef modules would also be conducted to estimate coverage of encrusting and boring organisms. Benthic growth would be assessed using digital video transects using the protocols outlined in the Florida Marine Research Institutes "Standard Operating Procedures Field and Laboratory Operations: Florida Keys National marine Sanctuary Coral Reef/Hardbottom Monitoring Project" (http://www.cofc.edu/~coral/epacrmp/crmp.htm). Sponge coverage would be estimated as percent coverage. The quarterly sampling would evaluate changes in species, composition and numerical abundance, which occur in this community over time.

3.6.2. Fish Surveys

Quarterly daytime underwater fish surveys would be undertaken by SCUBA divers utilizing two census techniques. Transect surveys would be carried out along sections of the SMART structure and would provide primarily qualitative data on overall fish community composition. Stationary census data would be collected from fixed positions on the SMART structure to provide quantitative estimates of fish abundance.

3.6.3. Transect studies would consist of swimming the length of the SMART structure proceeding either along the inshore side and returning on the offshore side of the structure or vice versa. Three SMART nearshore and three SMART offshore survey points would be recorded for further data collection and comparison. During these surveys, additional effort would be made to survey crevices for cryptic species or for newly settled larval or juvenile fishes. Comparison would be made to three transects surveyed on randomly selected natural rock reefs offshore of the project area.

Data would be analyzed with two-way ANOVA (ANalysis Of VAriance between groups) to determine whether significant differences in the main factors of time and substrate type (natural versus SMART structure segments) occur.

3.6.4. Responsible Field Data Collection Tasks

As part of the monitoring plan, several parties would participate in various monitoring activities or be responsible for contracting of work associated with field data collection, data analyses and products including reports and presentations. Parties include DERM and FDEP.

3.6.5. Data Analysis

All data collected in accordance with this test plan would be completed in a form suitable for analysis, would be reduced by the data collector and provided to DERM within thirty days after each data collection effort. ASCII versions of the data are required in accordance with this test plan and would conform to DEP format. Periodic meetings would be held with all interested parties to discuss data and the interpretation of findings to date. Adjustments or refinements to the monitoring techniques may be proposed periodically. Any change to the monitoring plan would be approved by the FDEP.

3.6.6. Results would be documented in interim, annual and final reports. Interim reports would be submitted within thirty days following receipt of the field data by the parties listed above. Annual and Final reports would be submitted within forty-five (45) days upon receipt of the field data by the parties listed above. The analyses would focus on quantifying: 1) the effect of the SMART structure on waves and currents and its interaction with these hydrodynamic elements; 2) the effect of the SMART structure on sediment transport with special emphasis on the seasonal and annual cumulative volumetric changes and patterns of sediment trapped behind the SMART structure, and the seasonal and annual patterns of shoreline and volumetric changes adjacent to the SMART structure; 3) the character of any sediment which has accumulated shoreward of the SMART structure; 4) the effect of waves and currents on the structure with special reference to settlement or movement; 5) the effect of the SMART structure on storm wave activity; 6) the results of the colonization studies and fish censusing; and 7) the results of the marine turtle monitoring. In addition to the above, the annual reports would include a summary of wave, tide and current data (correlated to the above measurements).

3.6.7. DERM would oversee the collection of nearshore surveys (including structure elevation surveys) and make data available to CERC and FDEP in both ASCII and ISRP (Interactive Survey Reduction Program) format. DERM would also process data by producing line drawings of profile cross sections. Processing and reporting of data in reports would be performed by DERM. Information to be contained in these reports includes shoreline change maps associated with the nearshore surveys and structure change maps/diagrams associated with the structure elevation surveys, also to be provided by DERM.

Environmental monitoring data would be collected, processed and analyzed by Florida Institute of Technology and provided in quarterly and annual reports.

The collection of aerial photography data would be overseen by DERM. DERM would provide both hard copies and films of aerial images. ERDC would process and analyze the data sets and would generate aerial photograph and mapping/shoreline change maps for the annual and final reports. DERM would be responsible for the collection of data associated with the storm contingency plan (including nearshore surveys/structure elevation surveys; aerial photography; and scour measurements).

ERDC would generate a historical coastal trends/shoreline change report including information on littoral processes information, shoreline change maps/rates, wave information and sediment budget information. A literature review would be included in this effort. This information would be included in the first annual report.

APPENDIX C

Gasparilla Island Beach Nourishment Project: Sea Turtle Hatchling Interaction with Erosion Control Structures Study

Gasparilla Island Beach Nourishment Project: Hatchling Marine Turtle Interaction with Erosion Control Structure Study.

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Introduction

The beaches along the central Gulf coast of Florida provide vital nesting habitat for loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) sea turtles. In addition, these beaches have supported incidental nesting of the Kemp's ridley (*Lepidochelys kempi*) and the leatherback (*Dermochelys coriacea*) sea turtle. All four are listed as threatened or endangered, and are provided protection under the Federal Endangered Species Act of 1973, as well as the Marine Turtle Protection Act Chapter 370.12 (Florida Administrative Code).

Hatchling marine turtles emerge from eggs deposited in nests following an incubation period of 43 to 75 days (Mote Marine Laboratory, Sea Turtle Conservation & Research Program data). Typically, emergence from the nest occurs at night (Witherington 1990) when lower sand temperatures elicit an increase in hatchling activity. Emergence occurs *en masse*, usually involving between 20 and 120 hatchlings (Lohmann et al. 1997). After emerging from the sand hatchlings crawl immediately to the surf using predominately visual cues to orient themselves (Witherington and Salmon 1992, Lohmann et al. 1997). Upon reaching the water loggerhead and green sea turtle hatchlings orient themselves into waves (Witherington 1991; Wyneken et al. 1990) and begin a period of hyperactive swimming activity, or swim frenzy, which lasts for approximately 24 hours (Salmon and Wyneken 1987). The swim frenzy effectively moves the hatchling quickly away from shallow water, rich in predatory fish, and out to the relative safety of deeper water (Wyneken 2000; Gyuris 1994).

The first hour of a hatchling's life is precarious and predation is high but decreases as hatchlings distance themselves from the natal beach (Stancyk 1982, Pilcher et al. 1999). Delays in hatchling migration (both on the beach and in the water) can cause added expenditures of energy and an increase of time spent in predator rich shallow water. Thus a delay in the offshore migration can cause increased predation of the hatchlings (Glenn 1998; Gyuris 1994; Witherington and Salmon 1992) .

Objectives

The southern shoreline of Gasparilla Island in Lee County has been designated as critically eroded by the Florida Department of Environmental Protection (FDEP). The Lee County Board of County Commissioners petitioned the FDEP (File No. 0174403-001-JC) to conduct beach restoration/renourishment during the year 2002. The restoration project shoreline is located at the southern end of Gasparilla Island adjacent to Gasparilla Island Pass. Sand placement is to occur between FDEP reference monuments R-10 and R-26 (Figure 1 and 2 taken from above referenced file#).

Figure 1

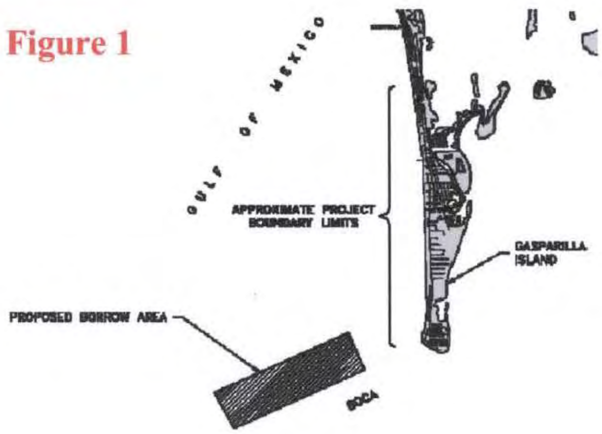
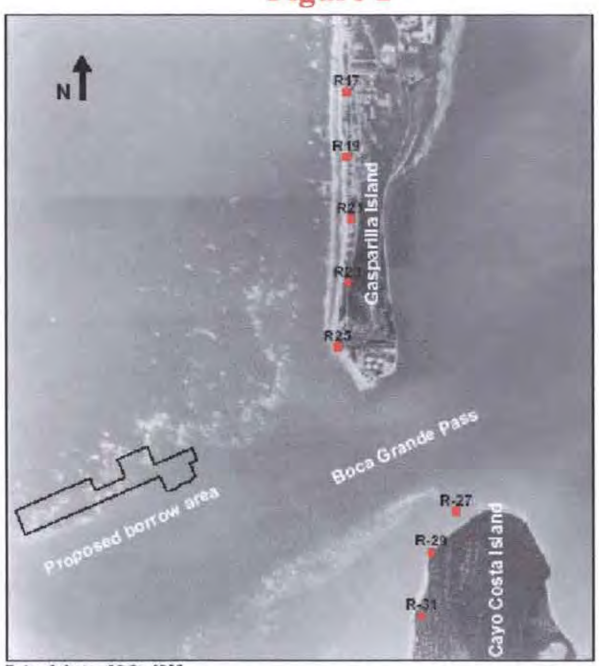


Figure 2



Date of photo 02-25-1986

In addition to the beach fill, a segmented emergent breakwater is to be constructed approximately 325 feet offshore from FDEP reference monument R-25 and two T-groins are to be constructed between R-25 and R-26.

Sea turtle nest monitoring, marking, protection and evaluation for the project shoreline is to be coordinated through a cooperative effort between the Florida Fish and Wildlife Conservation Commission (FWC), Lee County Natural Resources Department, Florida Park System and the Gasparilla Island Turtle Watch. Because sea turtles utilize the sandy beaches of Gasparilla Island for nesting and because no definitive studies have documented the effects that these structures have on sea turtle hatchlings, this scope of work is designed to 1) identify the behavior of sea turtle hatchlings upon encountering the structures, and 2) document incidents, if any, of predation from nearshore fish populations.

Erosion Control Structures

The offshore-segmented breakwater (emergent) to be constructed 325 feet offshore from FDEP reference monument R-25 consists of two segments with a small gap between. The breakwater is a rubble mound type structure with a total combined length of 550 feet and a crest elevation of +3 feet (NGVD). Two T-groins scheduled for the shoreline south of the breakwater are to be constructed of sheet piles with a rock apron in the seaward side of the T-groin segments. The length of the head of each T is to be 200 feet with a crest elevation of +2 feet (NGVD). The "T head" is shore parallel and the "body of the T" is shore perpendicular for a distance of 235 feet. Rocks averaging five tons each will form the breakwater armor and rocks averaging two tons each will form the T-groin aprons.

Problem Statement

Gasparilla Island provides vital nesting habitat for loggerhead (*Caretta caretta)* and green (*Chelonia mydas*) sea turtles both of which are protected under the U.S. Endangered Species Act of 1973 and the Marine Turtle Protection Act Chapter 370.12 (Florida Administrative Code). Florida Administrative Code includes in its definition of "take" significant habitat modification or degradation that kills or injures marine turtles by significantly impairing essential behavioral patterns. Under these regulations it is illegal for an unauthorized take of a sea turtle or any parts of a sea turtle, sea turtle eggs or hatchlings.

Historic data demonstrate a range of 76 to 289 loggerhead nests and 4 green turtle nests for the years 1997 through 2000 (FWC data for Lee County, Gasparilla Island; maps provided by Humiston & Moore Engineers). Although nest numbers within the erosion control project area (~R-23-R-6A) are few, 16 nests and 17 non-nesting emergences, or false crawls, were documented in 1999, and 19 nests and 12 non-nesting emergences were documented in 2000.

The erosion control structures are proposed to absorb wave energy and minimize sand scouring thus providing a sandy beach for humans, for property protection and for sea turtle nesting habitat. If the structures perform successfully and adequate sand remains within the project area it is probable that sea turtles will nest near the erosion control structures. To date there are few data available regarding sea turtle hatchling reactions/interactions with the offshore emergent breakwaters or shoreline T-groins. There are currently few similar structures along the West Florida shoreline. These Gulf coast structures can be found at 1) at Marco Island in Collier County, 2) in Naples, north of Gordon Pass, Collier County, and 3) at North Captiva Island, at the north side of Redfish Pass in Lee County. Monitoring has shown that the existing structures on the west coast have improved beach stability leading to additional nesting habitat (Ken Humiston, Humiston & Moore Engineers, personal communication). No adverse impacts have been documented although only limited nesting has occurred near the existing structures, additionally; there has been minimal monitoring effort to evaluate the failure or success of the hatchling migration from the shoreline to and/or beyond these structures. One T-groin of dissimilar design on the east Florida coast in Palm Beach County was found to cause a delay in the offshore migration of 13% of the hatchlings emerging from nests near the structures (Davis et al., 2000). It is currently unknown whether the emergent breakwater and/or the T-groins have potential for 1) obstructing the movement of sea turtles and/or hatchlings, or 2) causing increased predation of hatchlings as they swim near the structures.

Questions

1. How do hatchling sea turtles, after emerging from the nest, interact with T-groins and breakwater structures?
2. Can hatchlings get around/through the T-groins to achieve open Gulf waters?
3. Can hatchlings get past emergent, shore parallel breakwater structures?
4. Are hatchlings delayed in offshore migration by the structures, and if so, does the delay cause increased predation?
5. If there is a take, what are the possible predators?
6. If there is a take, what percentage is being taken? *(Or If there is a take is it significant?)*
7. Over time, the structures will be colonized by benthic, algal and fish species. Is there a possibility of increased predation near the structures in future years?
8. *If impacts from the structures are identified, do the benefits of restoring and stabilizing critically eroded shoreline outweigh the structure's impacts.*

Nearshore predation

Strong tidal currents along the south Gasparilla Island shoreline create hazardous conditions for navigation under present conditions. Although the shore protection design is intended to reduce currents in the vicinity of the structures, will this have an effect on the offshore navigation of the hatchlings? Predation on hatchlings in nearshore waters is high (Stancyk, 1982; Wyneken et al., 1996, Gyuris, 1994) There are many documented occurrences of nearshore predators captured with hatchlings found in their digestive tracts. Any impediment to sea turtle hatchlings rapid offshore migration could cause increased predation on the hatchlings and/or create a situation in which the swim frenzy is "used up" prior to the hatchlings getting away from the nearshore area.

During hatchling predation studies on the East Coast of Florida Jeanette Wyneken of Florida Atlantic University documented species of predatory fish targeting sea turtle hatchlings in nearshore habitat (Wyneken 1996; Wyneken et al. 2000). The fish were captured and found to have hatchlings in their gastro-intestinal tract or they were observed eating hatchlings. The fish documented during these studies include: Tarpon (*Megalops atlanticus*), Mangrove Snapper (*Lutjanus griseus*), Great Barracuda (*Sphyraena barracuda*), Hardhead Catfish (*Arius felis*), Red Grouper (*Epinephelus morio*), Crevalle Jack (*Caranx hippos*), Blue Runners (*Caranx crysos*) and Reef Squid (*Sepiateuthis sepiodea*). Small sharks were also observed feeding on hatchlings (Gyuris, 1994). Tarpon and Crevalle Jack are abundant in Charlotte Harbor (Williams et al., 1990) as well as bull (*Carcharhinus leucas*), great hammerhead (*Sphyrna mokarran*), nurse (*Ginglymostoma cirratum*), tiger (*Galeocerdo cuvier*), lemon (*Negaprion brevirostris*), blacktip (*Carcharhinus limbatus*), blacknose (*Carcharhinus acronotus*) and bonnethead (*Sphyrna tiburo*) sharks (Mote Marine Laboratory, Center for Shark Research data).

Exposed rock along beaches of Lee County provide substrate for the attachment of epibenthic macroalgae. The algae provide food for herbivorous fish, marine turtles, and invertebrates. In addition to the algal food, which grows on the reefs, fish and invertebrates are attracted to the basic structure of the reef and rapid rates of colonization occur. Because of the obvious potential for similar colonization of the submerged rocks on the breakwater and T-groin structures there is the potential for increased numbers of fish near the structures. Will hatchlings leaving the shoreline near the structures be slowed in their movement past or around the structures and thus be at increased risk of predation? Will the predation risk become higher as the colonization of the structures increases over time?

For comparative purposes, there are no naturally occurring habitats similar to these erosion control structures. Water at the breakwaters is projected to be approximately -14 feet for the entire 550 feet of breakwater structure and the base is wider than it is high. If predation does occur and there is evidence of increased predation at the structure as it is colonized, at what point does the loss of these animals create an overall disadvantage for the species? For example, the beach restoration and structures are engineered to build up sand where there currently is none. If the structures are successful and sand accumulates, there is a strong probability that turtles will begin nesting here thus increasing the number of hatchlings successfully entering the water. If hatchlings leaving the beach in the immediate vicinity of the structures are slowed by the structures in their offshore migration, there is a possibility that hatchling predation will increase over time. If this occurs, at what point might hatchling loss negate the positive aspects of the added shoreline habitat? When, instead of nesting habitat, the beach has receded to the point that the habitat is unsuitable for nesting, turtles would be unable to place nests and would nest elsewhere where there was adequate sandy habitat and no offshore structure. The actual hatchling survival rate could have the potential of being greater.

Materials and methods:

To assess the effects of the structures on hatchling orientation and behavior a series of trials is necessary for the project shoreline. The T-groins will be examined separately from the Breakwater with a control area for each. The approximate locations of the structures are observed in the figure below (Figure 6 from DEP, File No. 0174403-001-JC).

Consolidated Notice of Intent to Issue
Lee County Natural Resources Division
File No. 0174403-001-JC
Page 8 of 27

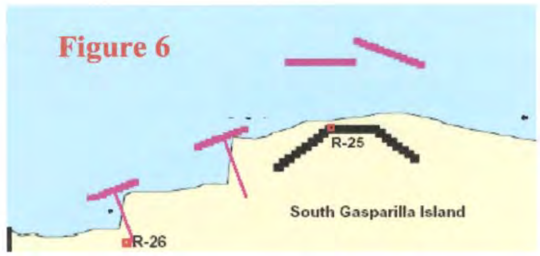


Figure 6

It is proposed that there be an advisory committee for the project composed of representatives from the Fish and Wildlife Service (Service), the Florida Fish and Wildlife Conservation Commission (FWC), Mote Marine Laboratory (MML), Lee County Natural Resources Department, Humiston & Moore Engineers and the Gasparilla Island Sea Turtle Patrol. The advisory committee will decide the exact project parameters at the beginning of each season.

Background conditions at the proposed control and experimental sites are to be checked during field visits to ensure that there are no significant differences in the ambient lighting, current conditions, topography, human activity, and beach sediments at the selected locations prior to implementing the trials. A set of pre-project hatchling trials will be conducted at the project location during the 2002 marine turtle hatch season to obtain baseline data. The purpose of these trials will be to document marine turtle hatchling activity during offshore migrations prior to installation of the erosional control structures and sand placement. These trials will allow the Committee to determine the feasibility of this study in Boca Grand Pass, an area of strong tidal currents, and to clarify protocol based on the outcome of the pre-project trials. A minimum of 4 trials, utilizing 3 hatchlings each, will be completed during the summer of 2002.

Three trial areas (one control and two experimental sites) are identified for the T-groins and are listed below. These trial locations could be modified and/or located more precisely following the pre-trial field meeting by the project Advisory Committee. To insure that hatchlings will have a high probability of contact with the structures, hatchlings used in experimental trials will be released on the beach within close proximity to the structures. If a nest occurs naturally in the project area, it will be left in situ. Upon hatch the hatchlings will be monitored in their migration from the nest.

A. T-groin (1) - located at the northern T-groin, at approximately R-25.5.
B. T-groin (2) - located at the southern T-groin, at approximately R-26.
C. Control - the control area will be selected following inspection of the shoreline and upland development, a possibility for the control is between R-26.5 and R-26A. This location is adjacent to the south and east of the southern most T-groin and is located at the mouth of Gasparilla Island Pass.

Three trial areas (one control and two experimental sites) are identified for the segmented breakwater located at R-25. Here also the exact hatchling release location at each segment of the breakwater will be determined by the Advisory Committee following site inspection.

A. North segment of breakwater.
B. South segment of breakwater.
C. Control - a site between R-23 and R-24.5 which is approximately 1,000 to 1,500 feet north of the T-groins and is located on the west facing beach south of Gasparilla Island Pass

Trials for the T-groins are to be conducted concurrently at the three locations: T-groin (1), T-groin (2) and control, followed by concurrent trials at the emergent offshore breakwaters: N breakwater, S breakwater and control if/when hatchlings are available. In the event that 18 hatchlings are not available in a single night, trials for the two experimental locations will be held on different nights.

A maximum of 260 loggerhead hatchlings will be used for trials, three at each of the three trial areas for the two treatments (T-groin and breakwater), or a maximum of 18 hatchlings per night. This number of hatchlings represents approximately162 hatchlings to be used in trials at the two treatment locations during 8 nights at each treatment location. From 18 to 36 hatchlings will be used during daytime trials (just before sunset or immediately following sunrise) in order video document the hatchlings and to check trial methodology. The extra hatchlings represent those obtained for the trials to be used in the event any of the original 18 were not active when released. The remaining hatchlings will be released immediately following completion of the trial experiments. Only loggerhead hatchlings will be utilized.

Statistical analysis for hatchling speed, direction and distance traveled will be calculated using methodology chosen by Blair Witherington during his studies of hatchling orientation (Witherington 1991). A straightness index (Batschelet 1981) will be calculated for hatchling paths and defined as the ratio of (1) the straight distance between the release point and the end point (the point where the hatchling is captured and the trial terminated), and (2) the actual distance traveled. The average swimming velocity for each hatchling will be calculated as the distance traveled between release and end points, divided by time. Average directions of swimming hatchlings will be compared using statistics for circular distributions (Batschelet 1981). If applicable, the Kruskal-Wallis test and associated nonparametric multiple comparison test (Gibbins 1985) will be used to compare straightness indices, average velocities and average directions among groups.

The percentage of hatchlings taken by predators will be calculated from the total number of hatchlings utilized for the trials at both treatment locations. The location of the take will be documented utilizing GPS along with visual descriptions of the location where the hatchling was taken. Because the trials will be conducted primarily at night when it will be difficult if not impossible to identify the predatory species, species of predatory fish will only be documented when known.

Trials will be completed consistently at low tide, or at various tidal conditions, during the months of July through October. The decision to conduct the trials at low tide or various tidal conditions will be decided upon by the Advisory Committee prior to commencement of the project. Environmental factors that could influence hatchling behavior will be documented, and if possible, controlled. Such factors include beach topography, ambient lighting conditions, background activity, and nearshore hydrographic conditions. At each trial location, both immediately before and after the trials are completed, surface current speed and bearing will be measured by tracking a lighted drogue at points perpendicular to the shore landward of the breakwater, beyond the groin and at the control area. At these same locations, the wave height / direction and wind speed /direction are to be recorded. A release location at each of the trial sites can be determined dependent upon outcome of the above to ensure that the hatchlings will not be swept out of the breakwater or T-groin locations.

Hatchling Collection

Members of the Advisory Committee will coordinate with the Florida Parks System and the Gasparilla Island Turtle Patrol to insure that a maximum of 40 nests are verified and marked along the Charlotte and Lee County, Gasparilla Island shoreline. Nest verification and marking will be conducted according to Florida FWC, Nest Productivity Protocol as follows. On the morning following egg deposition, the clutch site will be verified by carefully digging into the sand by hand. Following location of the uppermost eggs a temporary mark is to be placed at the sand surface to indicate the clutch location. Following the placement of several handfuls of moist sub-surface sand, the area is to be packed by applying steady pressure with the fist. The excavated sand is to be replaced to the original height. The nest will be marked with redundant location indicators so that monitoring personnel can locate the clutch in approximately two months. A sample method for marking the nests is to place one nest marking stake two feet landward, and one stake two feet seaward of the clutch location. An optional method is to bury a crushed aluminum can two feet north of the clutch and one foot deep into the sand.

The selected nests will be monitored throughout incubation. The incubation data for the Gasparilla Island shoreline will be utilized to determine the approximate date of hatch. Nests due to hatch will be checked at sunrise for evidence of eminent hatchling emergence. A depression or cone in the sand over the nest cavity indicates that the hatchlings have pipped out of their egg shells and may be near the surface. A temporary restraining cage, monitored during the evening that hatchlings are expected, may be placed over the nest to collect hatchlings when they emerge, or, by carefully probing with fingers, hatchlings that are within 10 cm of the surface may be removed from the sand on the same evening that the tracking trials are to be completed. Depending upon the availability of hatchlings, from 18 to 27 (the 9 extra hatchlings are being collected as a precautionary measure to ensure that at least 18 are vigorous) will be removed from either the nest or restraining cage and will be placed immediately in a darkened container until released on the project or control beach. Any hatchlings not used during the evening trials will be released that same night. All efforts will be made to release hatchlings within one to three hours following emergence or removal from the nest. All information, including the number of hatchlings removed, location of the nest(s), and date and time of removal will be forwarded the following morning to the appropriate Principal Permit Holder.

Trials are to be carried out at dark (2100-0500h) and a target number of 18 hatchlings will be tracked at each of the trial locations for both treatments (T-groins and breakwater) per night. In order to record hatching actions on video and to check trial methodology, at least one hatchling release at each treatment location (n=18 hatchlings) will occur prior to sunset or just after sunrise. In the event that storm or tidal activity destroy the marked nests, hatchlings can be obtained from nests located on the northern, Charlotte County shoreline of Gasparilla Island, or the Sarasota and/or Charlotte County shoreline of Manasota Key.

Hatchling Tracking Methodology

The tracking method to be utilized was developed by Blair Witherington of the Florida Marine Research Institute (Witherington 1991). A 0.5 cm square, 10 cm long balsa wood float (no greater than 2 g) with a lead keel is to be fitted with a small chemical light stick (Cyalume) or light reflective vinyl. This balsa float will be towed by tethering it to the hatchling. The total mass of the float rig should be no greater than 1.9 g, <10% of the weight of a loggerhead hatchling. The average swimming velocity of hatchlings towing these floats was found to be comparable with or slightly lower than velocities recorded for a sample set of loggerhead hatchlings swimming without floats (Witherington 1991). The hatchlings will be observed using night-vision goggles and an infrared light source if the vinyl is used. Infrared light has been documented to have no visible effect on hatchlings, even at close range (1 m). The Wyneken method of tethering hatchlings is to be utilized. Two other methods of tethering hatchlings have also been utilized successfully in the past and are discussed below as alternative methods in the event that problems arise with the Wyneken method.

The <u>Wyneken method</u> of tethering utilizes a 1.5 to 2.0 m long light cotton thread which is also attached to the balsa wood float (Wyneken and Salmon 1996). A slip knot is made in the opposite end which is then placed just behind the front flippers, between the flippers and the carapace.

The <u>Witherington method</u> of tethering the float to the hatchling (Witherington 1991) utilizes a 2.0 m long piece of monofilament line (1- 5 kg test strength) attached to the float at an eyelet on one end. The opposite end attaches to a small (#20) wire hook. The hook is inserted into the soft pygal scutes at the posterior edge of the carapace of each loggerhead hatchling. The barb on the hook is flattened to allow the hook to be removed following the end of the trials and the hook is to be notched with a metal file to ensure that it corrodes rapidly if retrieval is not possible.

The Pilcher method of tethering (Pilcher et al. 1999) utilizes a Lycra harness with a velcro attachment placed around the hatchling. The monofilament line is sewn into the Lycra harness and attaches at the opposite end to the float.

At the trial location the hatchling which is going to be used is to be removed from the darkened container, measured, and fitted with a balsa wood float (see options for attachment above). If hatchlings are released for T-groin trials and the distance from the sandy beach to the “head” of the T is less than 3 m the line attaching the float to the hatchling will be shortened accordingly. The hatchling will be placed on the sand by monitoring personnel dressed in dark clothing. The monitoring personnel will hold the float in hand and remain behind the hatchling while it crawls down the beach. The hatchling crawl orientation is to be documented using a hand held GPS. When the hatchling enters the water, it is to be allowed to begin swimming at which time the monitoring personnel will release the balsa float into the water behind the hatchling and alert the in-water observer. The observer will follow the float and hatchling in a kayak, or if the distance is less than 3 m, the hatchling will be followed by one observer on shore and one observer on the structure (T-groin) or in a kayak. Observers will use night-vision goggles and an infrared light source to watch the swimming hatchling while a driver maintains and records the boat position. Hatchling positions are to be recorded as GPS waypoints at two to five minute intervals or when the hatchling makes an abrupt change in direction or is taken by a predator. A constant offset of the observer from the hatchling will allow a calculation of turtle position from the observer position. The boat is to remain approximately 5-30 m from the hatchling and lateral to its direction of movement. In a previous hatchling tracking study, the presence of a similar, human propelled boat did not cause swimming hatchlings to alter their path (Witherington 1991.) Hatchlings are to be followed for 30 minutes or until beyond the structures, whichever is shorter. Any hatchling that encounters either the T-groin or breakwater will be followed to determine the complete effects of the structure on the hatchling migration or until the hatchling is taken by a predator. Following completion of the trial at the control, T-groin or breakwater locations, the hatchlings will be retrieved, the tethering and float will be removed, and the hatchling will be released. Retrieval will not be possible if the hatchling has been taken by a predator, but the location and time of predation will be documented. The average swimming velocity for each hatchling can be calculated as the distance traveled between release and end points, divided by time.

Anticipated Results:

When documenting the effects, if any, of erosion control structures on hatching activity, it is necessary to project a multi-year study due to the seasonal changes in the shoreline over time. A 3 to 5 year study will allow the documentation of colonization of the erosion control structures and will provide information on whether hatchlings are taken near the structures or whether the structures have an impact on hatchling migration. Following completion of the study, data will be published and made available to aid regulators and engineers in the accurate determination of the effects of these erosion control structures (offshore emergent breakwater and T- groins) on sea turtle hatchling survival and migratory activity.

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APPENDIX D

SMART Reef Correspondence

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

JUL 23 2004

REPLY TO ATTENTION OF

Planning Division
Plan Formulation Branch

Adams
RECEIVED
JUL 26 2004
BY:

Mr. James J. Slack, Field Supervisor
South Florida Ecological Services Office
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960

Dear Mr. Slack:

The Jacksonville District, U.S. Army Corps of Engineers (Corps) is providing responses to the ***Section 227 National Shoreline Erosion Control Development and Demonstration Program, 63rd Street "Hotspot", Miami Beach, Florida*** draft U.S. Fish and Wildlife Coordination Act Report (CAR) 'Conservation Recommendations' dated July 7,2004. The Corps accepts conservation recommendation numbers 1-3, and 5-12. The Corps cannot accept recommendation number 4 as it is beyond our project authority. Find our responses below after numbered recommendations.

1. Within three months of deployment of the proposed breakwater structure, underwater surveys to determine the presence or absence of hardbottom within the project footprint should be conducted. If hardbottom is found, mitigation for those impacts should be provided in-kind at a 1:1 ratio;

Response: Concur.

2. To provide better access to sea turtles across the structure, consider a modification to the proposed design to replace a series of diagonal rows of Goliath reef balls with smaller reef balls or bay balls to allow gaps approximately every 60 feet along the length of the structure;

Response: Concur. Every 10th SMART segment, perpendicular to the shore, will utilize approximately 3-foot tall reef balls to provide sea turtle access lanes (approx. 4-foot deep by 6-foot wide at MLW), in addition to the one-foot of freeboard SMART will provide at mean low water over the entire submerged structure.

3. Develop and include a vessel anchoring plan, in addition to the vessel transit plan, to avoid potential impacts to hardbottom;

Response: Concur. SMART installation contractor will be informed of their responsibility to avoid all adverse affects to hardbottoms within project area. GPS and electronic depth finder equipment will be used to guide vessel transits to navigate deeper waters and avoid hardbottoms within project area.

4. Increase the duration of the SMART reef Physical and Biological Monitoring Program from 3 years to 5 years to better evaluate the affects of the structure over time;

Response: Do not concur. Unfortunately the Corps cannot commit to extending the monitoring as our project authority will not allow us to do that. DERM will provide annual monitoring info.

5. Provide a comprehensive and detailed annual report of the results of the SMART reef Physical and Biological Monitoring Program to State and Federal Agencies for review and comment;

Response: Concur. A DERM courtesy copy of the annual monitoring report will be provided.

6. If the post-project Physical Monitoring Plan indicates that the adverse affects to the downdrift or adjacent shoreline exceeds the level anticipated, reinitiation of consultation under section 7 of the ESA is recommended;

Response: Concur. An 'after-the-fact' consultation would be initiated.

7. The post project biological monitoring plan should include an evaluation of the structure's affect on adult sea turtle nesting success in the project area;

Response: Concur.

8. Consultation under Section 7 of the ESA should be initiated with NOAA, Protected Species, to evaluate the potential adverse affects of the breakwater on swimming turtles;

Response: Concur. Will be done.

9. Include an evaluation of the possible adverse cumulative affects of the proposed breakwater structure on swimming sea

turtles, particularly the potential increase hatchling mortality related to predatory fish;

Response: Concur. Will be included.

10. Develop a long-term maintenance plan to include provisions and annual inspections of the structural integrity of the breakwater, in addition to inspection of the structure after storm events. The plan should also identify the entity responsible, fiscally and otherwise, for the long-term repair and maintenance of the structure;

Response: Concur. Will be included.

11. The Final EA should evaluate and discuss how the breakwater is expected to affect the BEC&HP with respect to the renourishment interval, potential downdrift affects, and the equilibrium toe of fill;

Response: Concur. Will be included.

12. After construction, if it is determined that the structure has caused significant erosion of adjacent beaches, section 7 consultation should be reinitiated with the Service to determine if the structure should be modified or removed.

Response: Concur. 'After-the-fact' coordination with the USFWS will be done if shoreline affects exceed Appendix F guidelines.

If you have any questions or need further information, please contact Mr. Paul Stevenson at 904-232-3747, fax at 904-232-3442 or e-mail paul.c.stevenson@saj02.usace.army.mil.

Sincerely,

James C. Duck

James C. Duck
Chief, Planning Division

Enclosure

Copies Furnished (wo/encl):

Ms. Trish Adams, U.S. Fish and Wildlife Service, 1339 20th Street, Vero Beach, Florida 32960-3559
Mr. Spencer Simon, U.S. Fish and Wildlife Service, 1339 20th Street, Vero Beach, Florida 32960-3559

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Dr. N.
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(727) 570-5312, FAX 570-5517
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RECEIVED adams FEB 09 2005 BY:

JAN 31 2005

F/SER3:KPB

Mr. James C. Duck
Chief, Planning Division
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Duck:

We reviewed your letter dated July 7, 2004, and associated documents regarding the Section 227, National Shoreline Erosion Control and Development Program, 63rd Street Hotspot, Submerged Artificial Reef Training (SMART) Structure. We have also received the draft environmental assessment (EA) that we requested on August 19, 2004. You have requested that we analyze the possible effects on the species listed under the Endangered Species Act (ESA) under the purview of the National Marine Fisheries Service (NOAA Fisheries), pursuant to the interagency consultation requirements of section 7 of the ESA.

The purpose of the project is to place reef balls to serve as an artificial reef to attenuate wave energy to abate shoreline erosion. The site is proposed offshore of Miami Beach between 63rd and 83rd Streets (between the state of Florida monuments R-44 to R-46A). The Army Corps of Engineers (COE) proposes to construct the SMART structure 400 ft from the mean shoreline, in 7 ft of water. Construction of the artificial reef is expected to occur over a 2-3 month period between the months of January and May. The reef will be comprised of 6-ft diameter hollow goliath reef balls, 3-ft diameter hollow reef balls, and 3-ft diameter solid bay balls. Each segment of the 2,272-ft long structure would be 42.8 ft long by 6 ft wide, with each segment having a mass of approximately 30 tons. Each segment will be placed perpendicular to the beach with a barge crane, such that the total SMART structure will be approximately 2,272 ft long and 42.8 ft wide. To allow sea turtles access to and from the beach, a "turtle lane" will be constructed every tenth segment for a total of 33 lanes. The total footprint of the structure will be approximately 2.1 acres.

Listed species/designated critical habitat

ESA-listed species under the purview of NOAA Fisheries that potentially occur in the action area include the green (*Chelonia mydas*)[1], loggerhead (*Caretta caretta*)[2], Kemp's ridley (*Lepidochelys*

[1] NMFS (National Marine Fisheries Service) and FWS (US Fish and Wildlife Service). 1991. Recovery Plan for U.S. Population of Atlantic Green Turtle. NMFS, Washington D.C.

kempii),[3] leatherback (*Dermochelys coriacea*)[2], and hawksbill (*Eretmochelys imbricata*)[4] sea turtles. There is no designated critical habitat for listed species in the project area.

The U.S. population of smalltooth sawfish *(Pristis pectinata)* was listed as endangered under the ESA on April 1, 2003 (68 FR 15674); critical habitat has not yet been designated. Historically, smalltooth sawfish commonly occurred in the shallow waters of the Gulf of Mexico and the eastern seaboard up to North Carolina; current distribution is believed to be centered around the extreme southern portion of peninsular Florida (i.e., Everglades National Park including Florida Bay). Recent sawfish records are limited to Georgia, Florida, and most recently, Texas. There are no known sawfish breeding or juvenile habitats in the project area.[5] NOAA Fisheries believes any possible disturbances to smalltooth sawfish would be insignificant due to their low probability of occurrence at the project site.

Effects of the Action

Placement of the SMART structure is expected to occur over a 2-3 month period, outside of the nesting season for sea turtles in the southeast United States (May to October). Therefore, we do not believe any adverse effects will result from construction activities (e.g., noise or lighting). Although the project is not expected to overlap with the sea turtle nesting season, the COE has agreed to prohibit any nighttime activities to avoid any potential impacts to nesting sea turtles or hatchlings swimming offshore associated with the construction noise or lighting. Hard bottom resources can be found offshore of the proposed SMART structure, but none are found within the project area. In addition, placement of the SMART structure will be guided by in-water divers to avoid any animals or bottom obstructions that may be present. Once in place, the structure should attract biota; thus, creating foraging opportunities for various species, including sea turtles. No adverse effects are expected from placement of the artificial reef due to alteration of sea turtle behavior or foraging success.

The annual numbers of nesting sea turtles on Miami Beach are low due to the high level of anthropogenic effects in the vicinity of the city of Miami. An average of 15.33 nests (ranging from 7 to 23) annually have been observed on Miami Beach over the past several years. An

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[2] NMFS (National Marine Fisheries Service). 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. U.S. Department of Commerce NOAA Technical Memorandum NMFS-SEFSC-455.

[3] Turtle Expert Working Group. 2000. Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the Western North Atlantic. U.S. Department of Commerce, NOAA Technical Memorandum NMFS_SEFSC_444; 2000. 115 pp.

[4] NMFS (National Marine Fisheries Service) and FWS (U.S. Fish and Wildlife Service). 1993. Recovery Plan for Hawksbill Turtles in the U.S. Caribbean, Atlantic Ocean, and Gulf of Mexico. National Marine Fisheries Service, St. Petersburg, Fla.

[5] Identify Fishing Mortality of Smalltooth Sawfish and Monitor its Nursery Habitats. 3rd Quarterly Report to the National Marine Fisheries Service, St. Petersburg, Florida. Mote Marine Laboratory, Contract No. WC133F-SE-0594

offshore breakwater may improve nesting beach conditions by abating beach erosion, but may potentially inhibit a turtle's ability to access the beach to nest. To address these concerns, the COE has incorporated "turtle lanes" into the design of the SMART structure. Turtle lanes are proposed to be installed using 3-ft wide spherical reef balls placed every tenth segment (a total of 33 turtle lanes will be installed) that will provide a minimum of 3 ft of clearance over the reef balls for passage through the SMART structure. Each turtle lane will be 6–8 ft wide. Additionally, there is a minimum clearance of 1 ft over the entire reef at mean low tide; however, turtles will have greater than 1 ft of clearance the majority of the time that should allow turtles to swim over the reef most of the time. Both of these design considerations are expected to allow sea turtles access to the beach, such that no adverse affects are expected to sea turtles attempting to access the beach.

Because of the potentially adverse effects to nests and hatchlings from existing conditions on the beach, approximately 95 % of nests in Miami-Dade County are presently relocated to the Haulover Beach Park hatchery. However, 100% of nests have been relocated from Miami Beach, with some nests in remote areas left undisturbed, which account for the remaining 5% left *in situ*. Because all nests are relocated to a hatchery beach, the proposed SMART structure is not expected to increase the predation rates of hatchlings since they will not be passing over the SMART structure during the swimming frenzy to offshore waters. The draft EA indicates that predatory fish may concentrate along the artificial reef, and large predatory fish may inhabit the inside of the large reef balls. Some studies have shown that some types of artificial reefs may interrupt the offshore migration of hatchlings by slowing passage over the structure, and an increase in predatory fish along these structures may result in increased hatchling predation rates.[6] Although NOAA Fisheries is concerned with the potential for breakwaters to result in increased predation rates on hatchlings, no adverse effects are expected from this particular project due to the relocation of all nests in the project area.

Minimization Measures

The COE will implement the following measures to reduce any potential impacts to protected species:

A. No SMART structure construction will be undertaken from the beach. All SMART structure construction will be conducted via a barge.
B. Every effort will be made to conduct the SMART structure placement outside of the sea turtle nesting season (May to October). If unanticipated delays occur which result in placement activities during these months, no construction will occur at night, and no artificial lighting will be used.

[6] Wyneken, J., and M. Salmon. 1996. Aquatic predation, fish densities, and potential threats to sea turtle hatchlings from open-beach hatcheries: final report. Broward County Department of Natural Resource Protection. Technical Report 96-04, 47 pp.

C. Observers will be posted during construction operations to observe for sea turtles and manatees that may be found in the project area.
D. Any marine mammals or sea turtles in the SMART structure construction zone will not be forced to move out of the zone by human intervention. Work will stop until the animal exits the zone of its own volition.

After considering the possible sources of effects on the listed species that may occur in the action area, NOAA Fisheries concludes that listed species are not likely to be adversely affected by this project. This concludes your consultation responsibilities with NOAA Fisheries under section 7 of the ESA for the proposed SMART project. Be advised that a new consultation must be initiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. Potential project impacts utilizing methodology not considered in the consultation will require additional ESA section 7 consultation with NOAA Fisheries' Protected Resources Division.

We also strongly recommend that the COE carry out the proposed study of hatchling mortality rates following construction of the SMART structure that is mentioned in your BA. The effects of the increasing number of erosion control structures (e.g., SMART structures, T-groin structures, breakwalls, and beach armoring) in the southeast United States should continue to be studied. It is highly recommended that the COE use the data collected to programmatically analyze all the possible effects of all current and planned erosion control/beach renourishment structures in the southeast United States on sea turtles. Please provide a copy of the study currently proposed for our review.

You are also reminded, in addition to your protected species/critical habitat consultation requirements with NOAA Fisheries' Protected Resources Division pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NOAA Fisheries' Habitat Conservation Division (HCD) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act's requirements for essential fish habitat (EFH) consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-600.930, subpart K). Consultation is not complete until EFH and ESA concerns have been addressed. If you have any questions about EFH consultation for this project, please contact Ms. Kay Davy, HCD, at (786) 263-0028.

Thank you for your continued cooperation in the conservation of our protected resources. If you have any questions about this letter, please contact Kyle Baker, fishery biologist, at the number listed above or by e-mail at Kyle.Baker@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

cc: F/SER47 – Kay Davy
Paul Stevenson - COE JAX
Lauren Milligan – FWC Tallahassee
Sandy McPherson – FWS JAX
Trish Adams – FWS Vero Beach

File: 1514-22.f.1 FL
Ref. No. I/SER/2004/01930

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

BRIAN S. BARNETT, DIRECTOR
OFFICE OF POLICY AND STAKEHOLDER COORDINATION
(850)488-6661 TDD (850)488-9542
FAX (850)922-5679

September 15, 2004

RECEIVED
SEP 2 2 2004
BY:

Ms. Lauren Milligan
Environmental Consultant
Florida State Clearinghouse
Department of Environmental Protection
3900 Commonwealth Blvd., Mail Station 47
Tallahassee, FL 32399-3000

Re: SAI #FL200408038541C (formerly #FL200305021926C), Department of the Army, Jacksonville District Corps of Engineers, Section 227 National Shoreline Erosion Control Development and Demonstration Program, NE 63rd Street "Hotspot" Submerged Artificial Reef Training (SMART) Structure, Miami Beach, Miami-Dade County

Dear Ms. Milligan:

Staff in the Florida Fish and Wildlife Conservation Commission (FWC) has reviewed this proposal to place reef balls, 5.9 feet in height and diameter, along approximately 2,272 feet of marine turtle nesting beach (R-46A and R-44). These structures will be placed in approximately 7 feet of water at 400 feet from the Mean High Water Line, with approximately 1 foot of freeboard at Mean Low Water (MLW). Reef balls would be attached to ~43-foot-long, 6-foot-wide concrete mats. Every 10th segment, shorter reef balls, only 3-feet high, would be placed to create a potential "corridor" for marine turtle movement to the beach.

This project is currently being reviewed by the Florida Department of Environmental Protection under the Joint Coastal Permit program. FWC staff will provide a final agency position as part of that process. The Corps of Engineers should be notified at this time that this project will require updated incidental take authorization from the U.S. Fish & Wildlife Service and the National Marine Fisheries Service, Protected Species Section, for impacts to marine turtles. To facilitate the state's approval process, the Corps should reinitiate consultation with both agencies as soon as possible. The information currently included in the referenced documents will not be sufficient for the FWC to finalize recommendations on the issuance of a state permit (e.g., water quality certificate).

620 South Meridian Street • Tallahassee • FL • 32399-1600
Visit MyFWC.com

In addition, we recommend that the project design be modified to minimize impacts to nesting sea turtles and hatchlings. The long, shallow reef ball structure has the potential to interfere with female turtles attempting to access the beach to nest. While the exact width of the corridors proposed is not clear, previous projects have required gaps up to 25 feet wide (e.g., the PEP reef in Vero Beach) between structures. The very narrow corridors proposed do not appear to be justified for this pilot project and could preclude female turtles from reaching the beach to nest under certain conditions.

In the event nests did occur landward of the proposed structures, the reef balls would also create a barrier to hatchling turtles attempting to migrate offshore. Hatchlings released landward of the PEP reef in Vero Beach "hesitated" (that is, stopped swimming) before crossing the structure during low tide. Such hesitations could increase the potential for predation by carnivorous fishes that will ultimately colonize the reef ball structures.

Finally, the structures should be engineered to minimize entrapment of juvenile or adult turtles in the interior of the reef balls. Unfortunately, there is evidence of marine turtle mortality in other structures similar to the reef balls. While the exact mortality source could not be determined, skeletal remains of more than one turtle from such structures suggests that individuals may enter such structures and then be unable to exit.

Thank you for the opportunity to comment on this project. If you have any questions regarding these comments, please contact me or Dr. Robbin Trindell at (850) 922-4330.

Sincerely,

Brian Barnett

Brian S. Barnett, Director
Office of Policy and Stakeholder Coord.

BSB/rnt
ENV 7-3
A:\sai 854 lc.doc
cc: Ms. Trish Adams, FWS-Vero
Ms. Sandy McPherson, FWS-Jax
Mr. Erik Hawk, NMFS- St. Pete
Mr. Stephen Blair, DERM
Mr. Matt Miller, ACOE-Jax

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

JUL 23 2004

REPLY TO
ATTENTION OF

Planning Division
Plan Formulation Branch

Mr. James J. Slack, Field Supervisor
South Florida Ecological Services Office
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960

Dear Mr. Slack:

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1. Within three months of deployment of the proposed breakwater structure, underwater surveys to determine the presence or absence of hardbottom within the project footprint should be conducted. If hardbottom is found, mitigation for those impacts should be provided in-kind at a 1:1 ratio;

Response: Concur.

2. To provide better access to sea turtles across the structure, consider a modification to the proposed design to replace a series of diagonal rows of Goliath reef balls with smaller reef balls or bay balls to allow gaps approximately every 60 feet along the length of the structure;

Response: Concur. Every 10th SMART segment, perpendicular to the shore, will utilize approximately 3-foot tall reef balls to provide sea turtle access lanes (approx. 4-foot deep by 6-foot wide at MLW), in addition to the one-foot of freeboard SMART will provide at mean low water over the entire submerged structure.

3. Develop and include a vessel anchoring plan, in addition to the vessel transit plan, to avoid potential impacts to hardbottom;

Response: Concur. SMART installation contractor will be informed of their responsibility to avoid all adverse affects to hardbottoms within project area. GPS and electronic depth finder equipment will be used to guide vessel transits to navigate deeper waters and avoid hardbottoms within project area.

4. Increase the duration of the SMART reef Physical and Biological Monitoring Program from 3 years to 5 years to better evaluate the affects of the structure over time;

Response: Do not concur. Unfortunately the Corps cannot commit to extending the monitoring as our project authority will not allow us to do that. DERM will provide annual monitoring info.

5. Provide a comprehensive and detailed annual report of the results of the SMART reef Physical and Biological Monitoring Program to State and Federal Agencies for review and comment;

Response: Concur. A DERM courtesy copy of the annual monitoring report will be provided.

6. If the post-project Physical Monitoring Plan indicates that the adverse affects to the downdrift or adjacent shoreline exceeds the level anticipated, reinitiation of consultation under section 7 of the ESA is recommended;

Response: Concur. An 'after-the-fact' consultation would be initiated.

7. The post project biological monitoring plan should include an evaluation of the structure's affect on adult sea turtle nesting success in the project area;

Response: Concur.

8. Consultation under Section 7 of the ESA should be initiated with NOAA, Protected Species, to evaluate the potential adverse affects of the breakwater on swimming turtles;

Response: Concur. Will be done.

9. Include an evaluation of the possible adverse cumulative affects of the proposed breakwater structure on swimming sea

turtles, particularly the potential increase hatchling mortality related to predatory fish;

Response: Concur. Will be included.

10. Develop a long-term maintenance plan to include provisions and annual inspections of the structural integrity of the breakwater, in addition to inspection of the structure after storm events. The plan should also identify the entity responsible, fiscally and otherwise, for the long-term repair and maintenance of the structure;

Response: Concur. Will be included.

11. The Final EA should evaluate and discuss how the breakwater is expected to affect the BEC&HP with respect to the renourishment interval, potential downdrift affects, and the equilibrium toe of fill;

Response: Concur. Will be included.

12. After construction, if it is determined that the structure has caused significant erosion of adjacent beaches, section 7 consultation should be reinitiated with the Service to determine if the structure should be modified or removed.

Response: Concur. 'After-the-fact' coordination with the USFWS will be done if shoreline affects exceed Appendix F guidelines.

If you have any questions or need further information, please contact Mr. Paul Stevenson at 904-232-3747, fax at 904-232-3442 or e-mail paul.c.stevenson@saj02.usace.army.mil.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

Copies Furnished (wo/encl):

Ms. Trish Adams, U.S. Fish and Wildlife Service, 1339 20th Street, Vero Beach, Florida 32960-3559
Mr. Spencer Simon, U.S. Fish and Wildlife Service, 1339 20th Street, Vero Beach, Florida 32960-3559

7.3.2 West Indian Manatee

The West Indian manatee is present in the project area, particularly in the inshore estuarine waters in the vicinity of Government Cut and the Haulover Inlet. Since it is likely that the barge and support vessels will be loaded from an inshore location, the vessels will likely traverse habitats occupied by the manatee. To avoid and minimize potential adverse affects to the manatee during the proposed breakwater construction activities, the Corps has agreed to implement the *Standard Manatee Protection Conditions* for all construction and support vessels associated with the project (Service 2002b).

7.3.3 Smalltooth Sawfish

Though vessels associated with the proposed breakwater construction will operate within the habitat that may be occupied by the smalltooth sawfish, these activities are not expected to adversely affect inshore habitat, especially because population density of individuals in Miami-Dade County are low (NOAA Fisheries 2000).

7.3.4 Whales and Dolphins

Since the project will occur in the nearshore waters less than 20-feet deep, it is unlikely that endangered whale species, such as the fin whale (*Balaenoptera physalus)*, humpback whale (*Megaptera novaeangliae*), and sperm whale (*Physeter macrocephalus*) would be observed within the project boundaries. Dolphins are common to the nearshore waters of Miami-Dade County. Vessel traffic and noise generated during construction periods may alter the dolphin's natural travel patterns and feeding behavior in the project area. However, these potential adverse affects are expected to be temporary and limited to the periods of active construction.

8.0 RECOMMENDATIONS

In addition to the Corps' environmental commitments, the Service provides the following recommendations to further avoid and minimize impacts to fish and wildlife resources:

1. Within 3 months of deployment of the proposed breakwater structure, underwater surveys to determine the presence or absence of hardbottom within the project footprint should be conducted. If hardbottom is found, mitigation for those impacts should be provided in-kind at a 1:1 ratio.
2. To provide better access to sea turtles across the structure, consider a modification to the proposed design to replace a series of diagonal rows of Goliath reef balls with smaller reef balls or bay balls to allow gaps approximately every 60 feet along the length of the structure.
3. Develop and include a vessel anchoring plan, in addition to the vessel transit plan, to avoid potential impacts to hardbottom.

4. Increase the duration of the SMART reef Physical and Biological Monitoring Program from 3 years to 5 years to better evaluate the affects of the structure over-time.
5. Provide a comprehensive and detailed annual report of the results of the SMART reef Physical and Biological Monitoring Program to State and Federal agencies for review and comment.
6. If the post-project Physical Monitoring Plan indicates that the adverse affects to the downdrift or adjacent shoreline exceeds the level anticipated, reinitiation of consultation under section 7 of the ESA is recommended.
7. The post project biological monitoring plan should include an evaluation of the structure's affect on adult sea turtle nesting success in the project area.
8. Consultation under section 7 of the ESA should be initiated with NOAA Fisheries, Protected Species, to evaluate the potential adverse affects of the breakwater on swimming turtles.
9. Include an evaluation of the possible adverse cumulative affects of the proposed breakwater structure on swimming sea turtles, particularly the potential increase hatchling mortality related to predatory fish.
10. Develop a long-term maintenance plan to include provisions and annual inspections of the structural integrity of the breakwater, in addition to inspection of the structure after storm events. The plan should also identify the entity responsible, fiscally and otherwise, for the long-term repair and maintenance of the structure.
11. The Final EA should evaluate and discuss how the breakwater is expected to affect the BEC&HP with respect to the renourishment interval, potential downdrift affects, and the equilibrium toe of fill.
12. After construction, if it is determined that the structure has caused significant erosion of adjacent beaches, section 7 consultation should be reinitiated with the Service to determine if the structure should be modified or removed.

9.0 SUMMARY

The Service acknowledges that a paradigm shift has occurred in the approach that coastal engineers and scientist approach shoreline protection. The Service supports the Corps' efforts to investigate innovative and alternative methods to address shoreline erosion across the United States.

In relation to the proposed project, the primary concerns of the Service relate to the potential that the breakwater structure: (1) may adversely affect nesting sea turtles as a result of a significant alteration of adjacent and downdrift beaches; (2) adult sea turtles may be obstructed by the structure; and (3) sea turtle hatchlings may experience an increase in predation as the breakwater may attract and concentrate predatory fish. In addition, the Service is concerned that the proposed 3-year duration of the physical and biological monitoring plan may be insufficient to determine the affects of the structure on fish and wildlife resources. Since this is a long-term project, the Service recommends that a long-term monitoring and maintenance plan be developed to minimize the potential of structural failure and subsequent potential impacts to fish and wildlife resources.

APPENDIX D – FINAL REPORT – GENESIS MODELING STUDY OF REEFBALL BREAKWATER - MIAMI, FLORIDA

Letter Report
GENESIS MODELING STUDY OF REEFBALL BREAKWATER MIAMI, FLORIDA 227 PROJECT

I. INTRODUCTION

The US Army Engineer Research and Development Center's (ERDC) Coastal and Hydraulics Laboratory (CHL) is working with the US Army Engineer District, Jacksonville, (SAJ) to implement the Miami Beach 63rd Street "Hotspot" 227 Project. The project involves the installation of a reefball breakwater to help control a local hotspot within the Dade County beachfill project. In addition to helping stabilize the beach, the project is intended to provide high quality nearshore hard bottom aquatic habitat and associated tourism benefits. For further details on the purpose of the 227 Program and of this project, see:
<http://chl.erdc.usace.army.mil/chl.aspx?p=s&a=ARTICLES;139> and
<http://chl.erdc.usace.army.mil/dirs/events/13/MiamiBeach_ASBPA-2005_Presentation_Ward.pdf>. This Letter Report discusses the technical details of the GENESIS modeling effort that was conducted to refine the breakwater location and layout.

II. STUDY AREA

Figure 1 shows the regional location of the south Florida project in North Miami Beach. Figure 2 shows some of the details of the study area.

Figure 1. North Miami Beach, Florida study area location map.

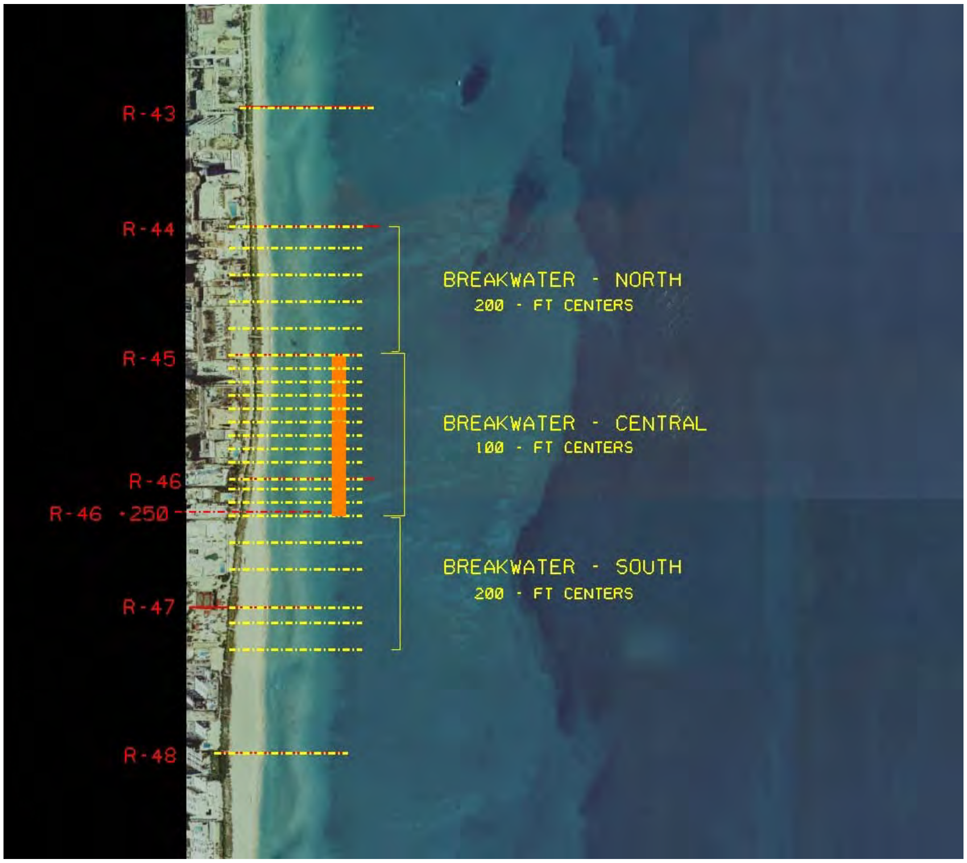


Figure 2. Location of breakwater (orange) and profile lines.

In Figure 2, R numbers refer to Florida DEQ Range lines. The 63rd St park (at 25.847573^{o} N, 80.118725^{o} W) is located just north of R-45. The breakwater, shown schematically in orange, is to be located between R-45 and R-46 +250.

III. MODELING OVERVIEW

The effect of the proposed breakwater on the shoreline was simulated using the numerical model GENESIS (GENEralized model for SImulating Shoreline change). GENESIS is a one-line shoreline change model that simulates longshore sand transport and the resulting change in shoreline position. The longshore sediment transport formula used in GENESIS requires wave height, period, and direction information at the seaward edge of the surf zone (the breaker line.) Wave data for this study were available in the form of offshore WIS hindcasts. The numerical model, STWAVE, (STeady-state spectral WAVE model) was applied to transform representative offshore waves to a near-breaking depth, where the shoaled wave data were handed off to GENESIS. The models (STWAVE and GENESIS) were executed on ERDC PC's within the CEDAS (V4.03) software package available at: <http://www.veritechinc.com>.

WIS wave data were obtained from the website: <http://frf.usace.army.mil/cgi-bin/wis/atl/atl_main.html>. Bathymetry data were needed to perform the wave transformations in STWAVE. These data were obtained from LADS LIDAR data provided by Tom Martin of (SAJ). Shorelines used in the GENESIS modeling were obtained from the Florida Department of Environmental Protection website: <http://www.dep.state.fl.us/beaches/data/his-shore.htm>. Other GENESIS modeling parameters (sediment grain size, berm elevation, depth of closure) were obtained from Tom Martin (SAJ).

The horizontal datum used in this study was State Plane (Florida East, 901), feet. When necessary, data were converted to and from this coordinate system using CORPSCON software (V 6.0.1), available at: <http://www.agc.army.mil/systems/products/corpscon2009/index.html>. The models themselves were run using metric units, but the output was converted to American Customary units. The vertical datum used was MSL. The relationship between this datum and other vertical datums was obtained from the NOAA tide gage station at Haulover Pier, N. Miami Beach (Station 8723080), available at: <http://www.ngs.noaa.gov/newsys-cgi-bin/ngs_opsd.prl?PID=AC4684&EPOCH=1983-2001>.

IV. STWAVE

A 20-year hindcast (1980-1999) of hourly interval wave height, period, and direction was obtained at WIS Atlantic Station 470 located at Latitude 25^{o} 83' N, Longitude 79^{o} 92' W in 317 meter water depth. This location is about 12 miles offshore and 1 mile south of the 63 St. park. Data from this site were compared with data from WIS Atlantic Station 469, located 5 miles north of Station 470, and found to be similar.

The 20-year wave climatology from WIS station 470 was characterized by binning the significant wave heights, peak spectral wave periods, and vector mean wave directions at the peak spectral frequencies, as shown in Figure 3. This figure is a histogram of wave heights, periods, and directions shown as percent occurrence. Bright yellow bins indicate those occurring most frequently and bright blue, least frequently. Wave direction data in this figure are referenced to the local shore normal which was determined to be due east. The zero degree direction of wave approach is 90.0^{o} clockwise from North. Positive wave angles are those approaching the coast from the northeast (from the left of shore normal for a person standing on the beach looking offshore). The 10 wave direction, 4 wave period, and 5 wave height bins shown in Figure 3 are the ones used in the STWAVE analysis. 149 of the possible 200 combined wave angle\period\height bins contained data.

Figure 3 shows that median wave heights are around 0.9 meter (3.0 ft), median wave periods are a little under five seconds and a significant percentage of the waves are highly oblique from the north. This is due to the sheltering effect of the Bahama Banks offshore of the region (Figure 1).

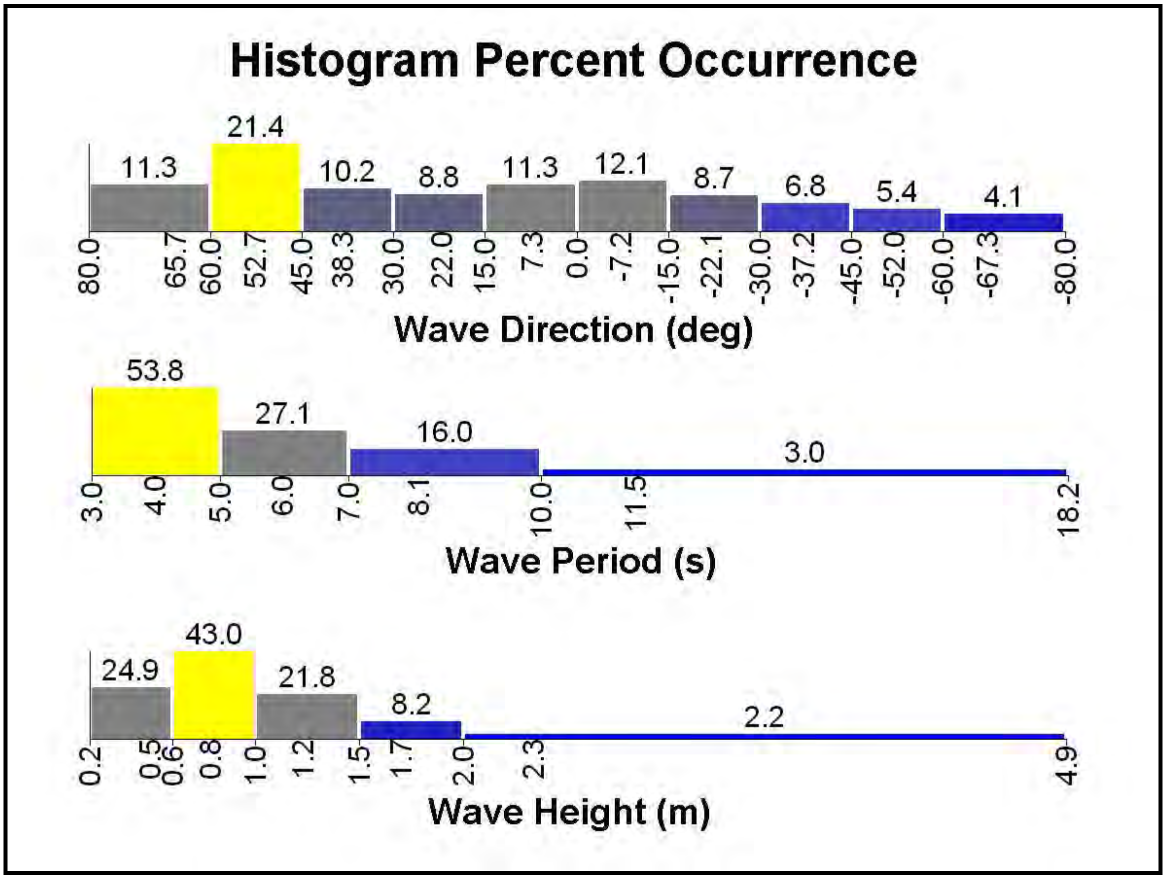


Figure 3. Wave histogram for WIS station 470.

The STWAVE bathymetry grid extended alongshore for 30,000 ft between Ranges lines R-030 and R-058, as shown in Figure 4. It extends 11,500 ft in the cross-shore direction, out to a seaward depth of approximately 65 ft. STWAVE grid cells were 100 ft (30.48m) on a side. The onshore grid direction was 270°. These and other STWAVE grid parameters are listed in Table 1.

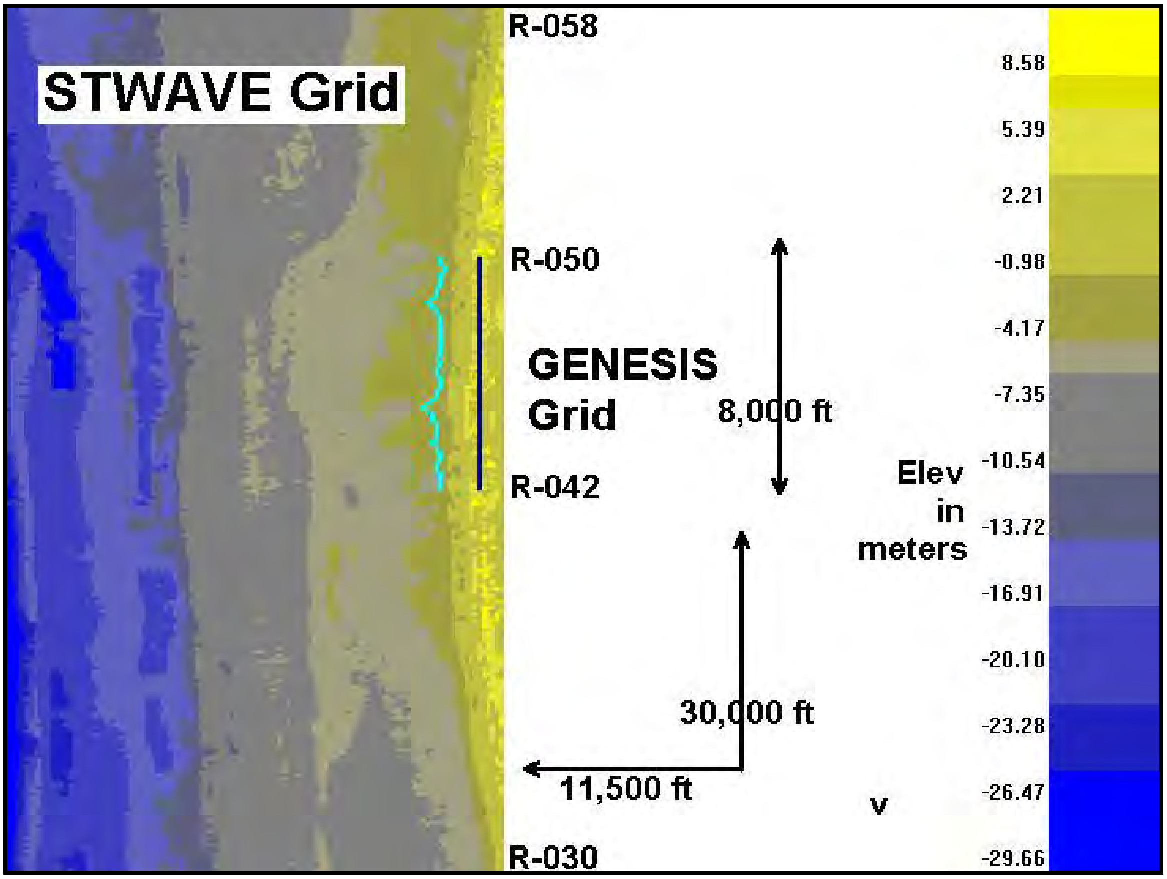


Figure 4. STWAVE bathymetry grid.

Table 1. STWAVE Grid Parameters

Grid Origin FL State Plane	X_o	Y_o	
	291511.3	172918.3	m
	956400	567316	ft
X_azimuth (onshore dir)	270°		
Cell Size	Δx	Δy	
	30.48	30.48	m
	100	100	ft
Grid Size	R_x	R_y	
	3505.2	9144.0	m
	11,500	30,000	ft
Approx depth	Offshore boundary	Save station	
	20	4.2	m
	65	13.8	ft

V. GENESIS SETUP AND CALIBRATION

The GENESIS grid extended 8000 ft alongshore between Range Lines R-042 and R-050 as shown in Figure 4. The grid contained 320 twenty five.ft cells. The GENESIS grid parameters are listed in Table 2.

Table 2. GENESIS Grid Parameters

Origin	Easting	Northing
	288219.46 m	168894.9 m
STWAVE Indices of GEN Origin	I	J
	109	133
X_azimuth (alongshore dir)	180°	
GENESIS Cell Size Δx	7.62 m	25 ft
Ratio GENESIS to STWAVE cells	4 : 1	
Grid Distance (alongshore)	2438.4 m	8000 ft
# GENESIS cells	320	

GENESIS calibration parameters that produced acceptable results are given in Table 3. The values for K_1, K_2, D_{50}, berm height, and depth of closure were identical to values used in a previous GENESIS modeling effort by SAJ at a location a few miles to the north. For calibration, the averaged 2002-2003 shoreline was used as the initial shoreline. Model results were compared with two 2005 shorelines. The shoreline comparison results are shown in Figure 5. Model average net longshore sediment transport rates, shown in Figure 6, are consistent with the value of 82,000 to 85,000 yd^3/yr published in USACE (2006).

Table 3. GENESIS Calibration Parameters

K_1	0.15
K_2	0.1
Median Grain Size D_{50}	0.36 mm
Berm Height	1.95 m
Depth of Closure	5.18 m
Left lateral BC	moving @ -0.00266 m/day
Right lateral BC	moving @ -0.0092 m/day
Regional Contour Trend	none

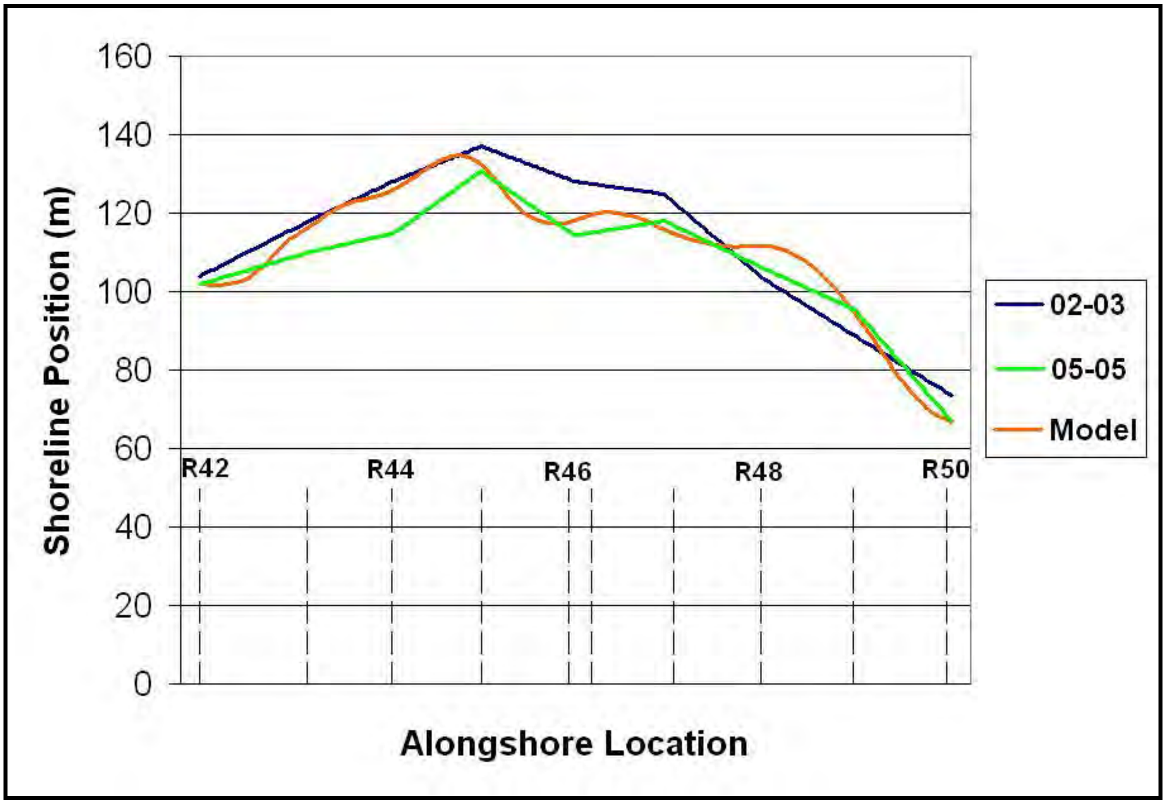


Figure 5. GENESIS calibration results for shoreline position.

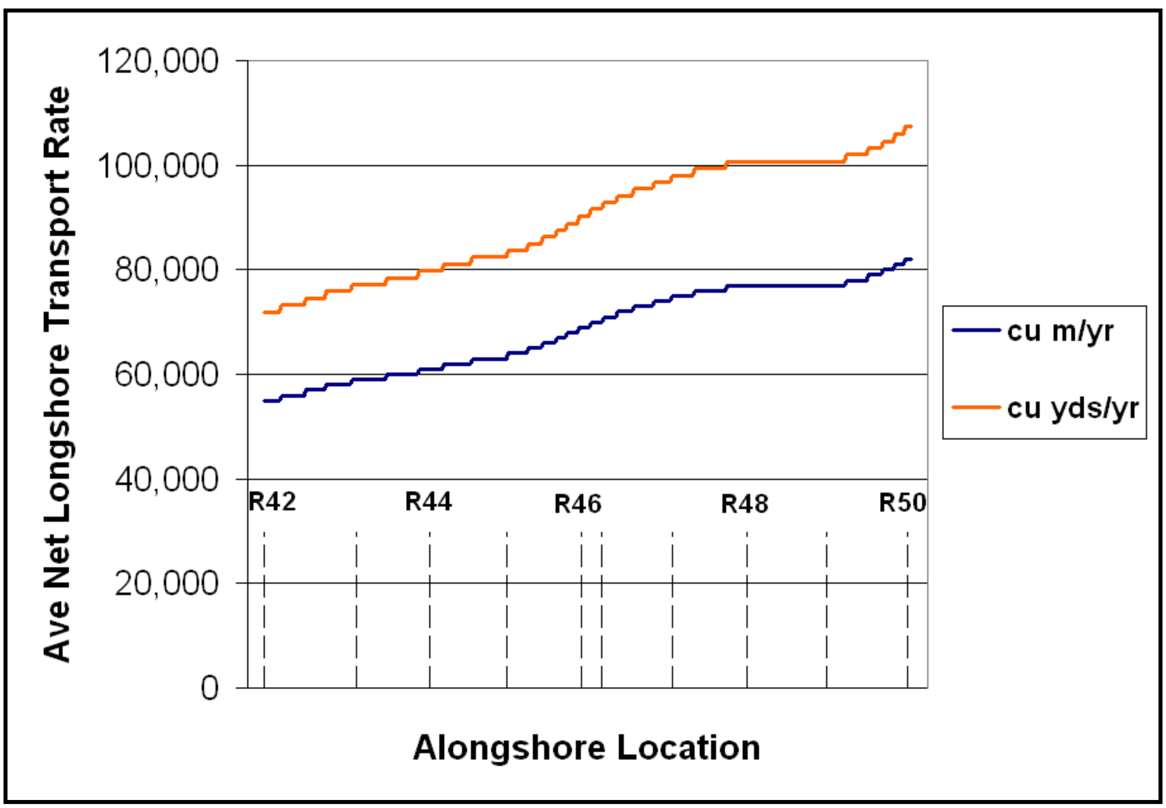


Figure 6. GENESIS calibration results for longshore transport rate.

Verification was performed by running the model using the 1992 shoreline as the initial shoreline and comparing the model results with the 1996 shoreline. Other model parameters were the same as in Tables 2 and 3. Results are shown in Figure 7.

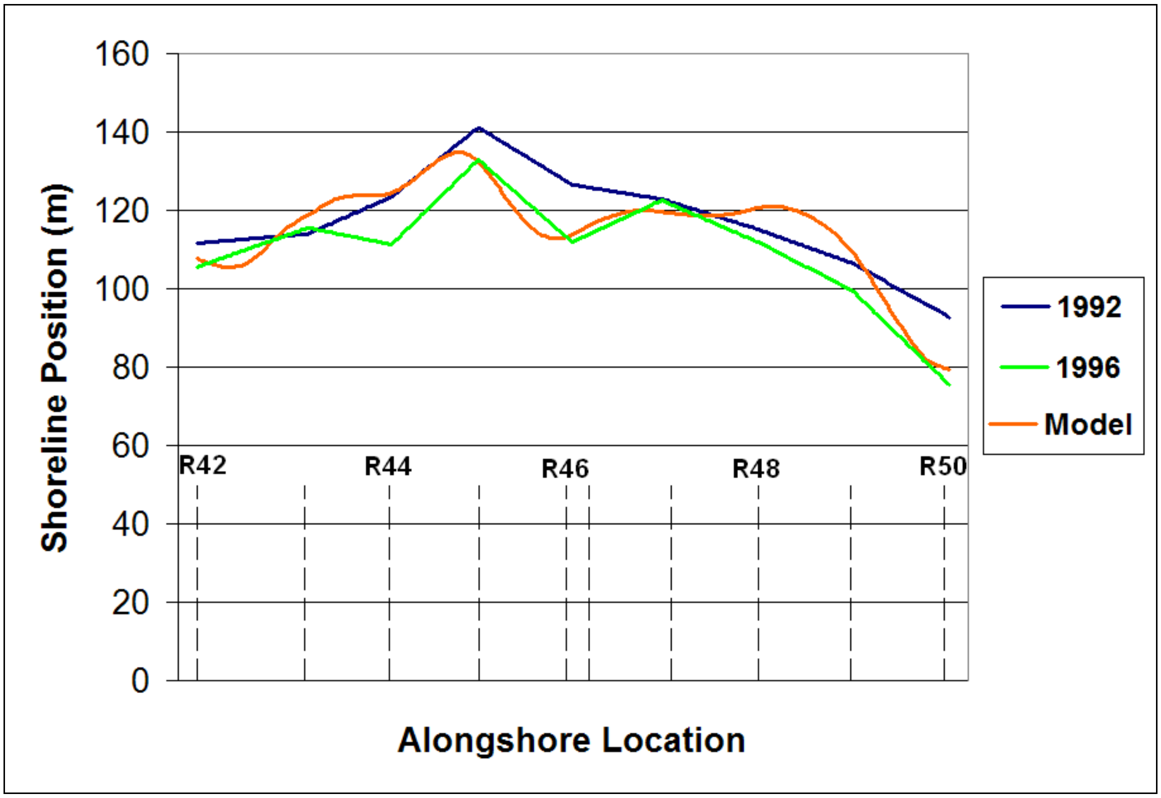


Figure 7. Verification Shoreline.

There is a marked seasonality in the wave climate. In winter the waves tend to be larger and are more likely to come from strongly oblique northerly angles. Milder summer waves are more likely to some from the southeast. This seasonal variation in wave angle is shown in Figure 8 by binning the WIS Atl470 wave data into 10-degree bins. In this figure "Winter" is the months from September through February, and "Summer" is March through August. Calm and offshore-directed waves have been removed from the 20 year record.

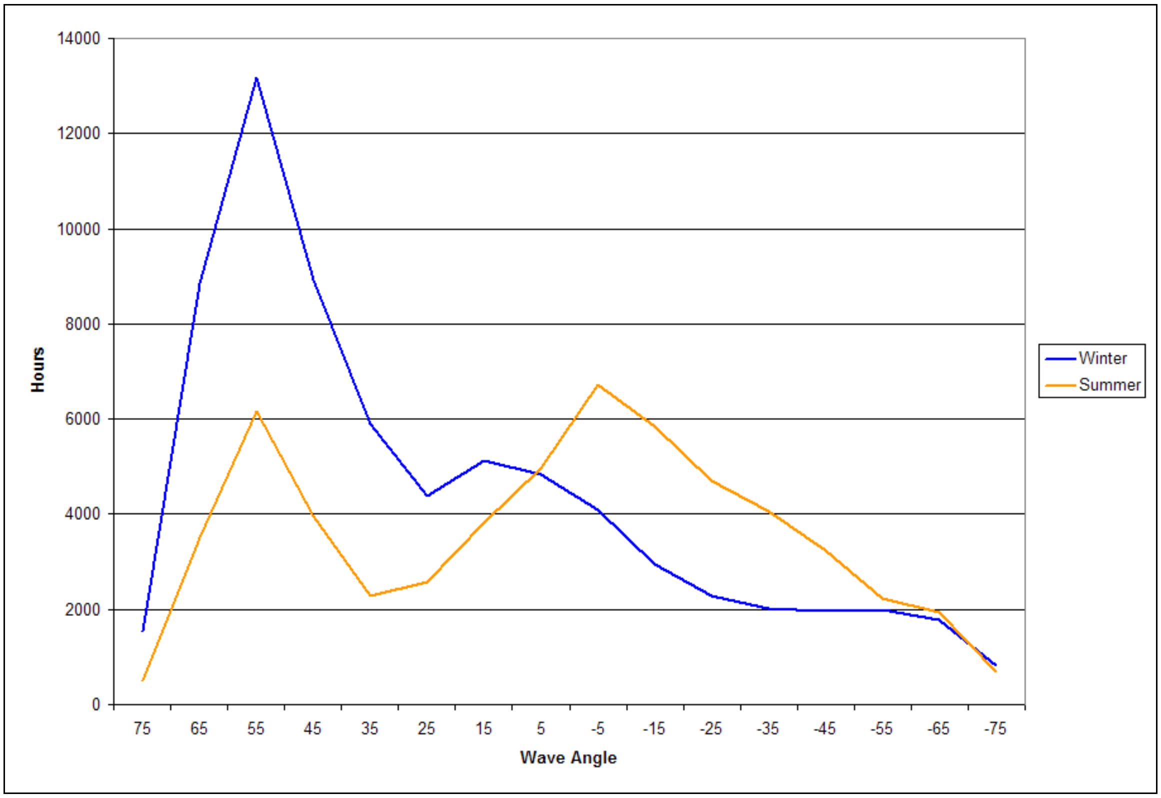


Figure 8. Seasonal variation in offshore wave angle.

In addition to the seasonal variation in wave climate, there are also year-to-year variations. These were analyzed to determine their impact on the longshore transport. The 20 years of WIS data were examined on a year-by-year basis to determine simple sediment transport rates using the method described in Gravens (1989). These results were used to assemble year blocks of wave data using the following criteria: Ave - the five years whose net sediment transport rates were nearest to the 20 year average net rate. Max - the two years with the maximum gross transport rates. Min - the two years with the minimum gross sediment transport rate, North - the two years with the maximum amounts of net northerly transport (transport to the north), and South - the two years with the maximum amounts of net southerly transport. The years selected for each block are shown in Table 4. These five different wave data blocks were used to drive the GENESIS model. The calibration and verification results (along with most of the breakwater analysis modeling discussed below) were produced using the 5-year Ave wave block. GENESIS results using the other four blocks with the calibration shorelines are shown below in Figure 9. The differences in these wave years produce variations in shoreline position of generally less than 10 meters.

Table 4. GENESIS Wave Year Groupings

Year	Ave	Max	Min	N	S		Year	Ave	Max	Min	N	S
1980	X						1990	X				
1981							1991			X		
1982	X						1992	X				
1983							1993					
1984					X		1994					
1985							1995					
1986	X						1996		X			X
1987							1997				X	
1988							1998				X	
1989			X				1999		X			

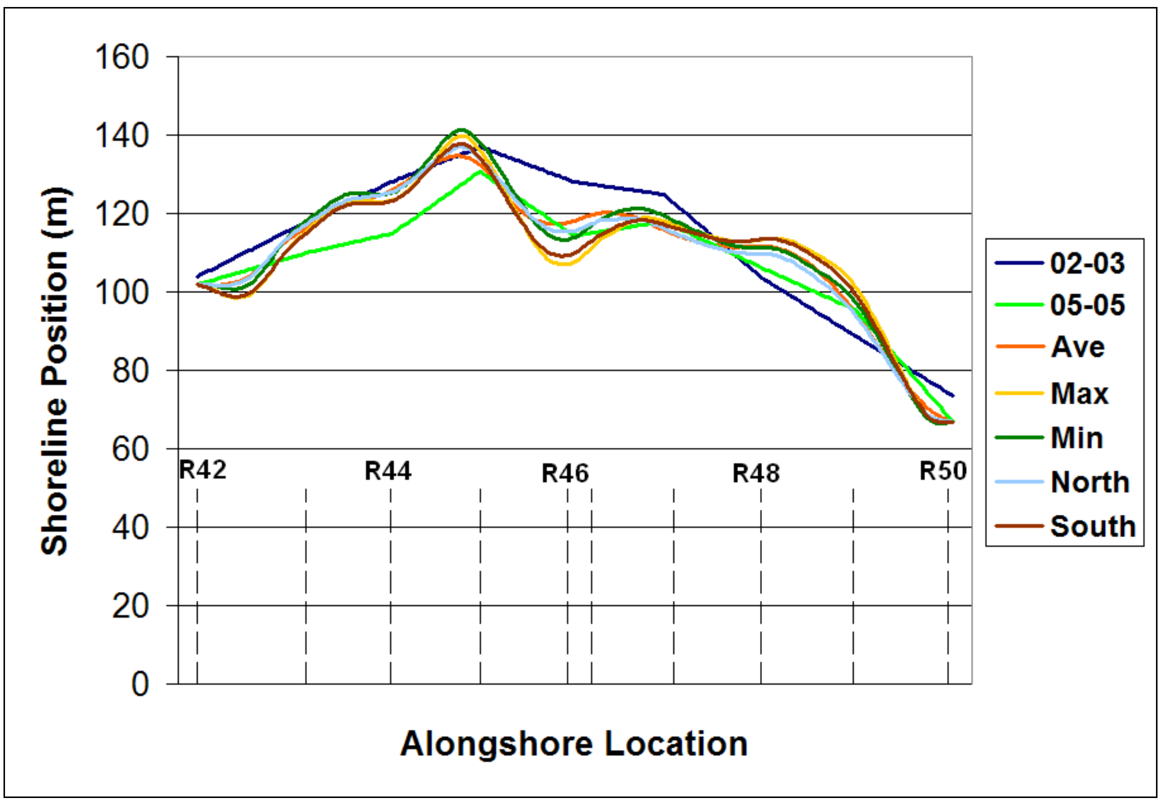


Figure 9. Shoreline change for different wave years.

VI. BREAKWATER MODELING

The breakwater has been designed as a submerged structure. Safety concerns for swimmers mandated that the tops of the 6 ft reefball structures have 1.5 ft of submergence at MLLW. Thus, at mean tide the reefballs would have 2.9 ft of submergence and be in a water depth of 8.9 ft. This is equivalent to an NGVD27 depth of 8.2 ft. These considerations and the site bathymetry largely dictated the offshore position of the breakwater. Beach conditions indicated that the southern terminus of the breakwater should be at DEQ range line R-046 +250. The nominal length of the breakwater was planned to be 1250 ft, at DEQ range Line R-045 and near the southern end of the 63rd Street Park.

Figure 10 shows the offshore bathymetry at the breakwater location. The datum for this figure is NGVD27. The straight white line running just seaward of -8 ft contour line (in red) is the breakwater location used for GENESIS modeling. Table 5 gives the coordinates of the endpoints of this line in FL State Plane ft. The line runs 4° east of north. This position puts the breakwater nominally 104 meters (341 ft) seaward of the present shoreline and 78 meters (224 ft) seaward of the beach fill shoreline.

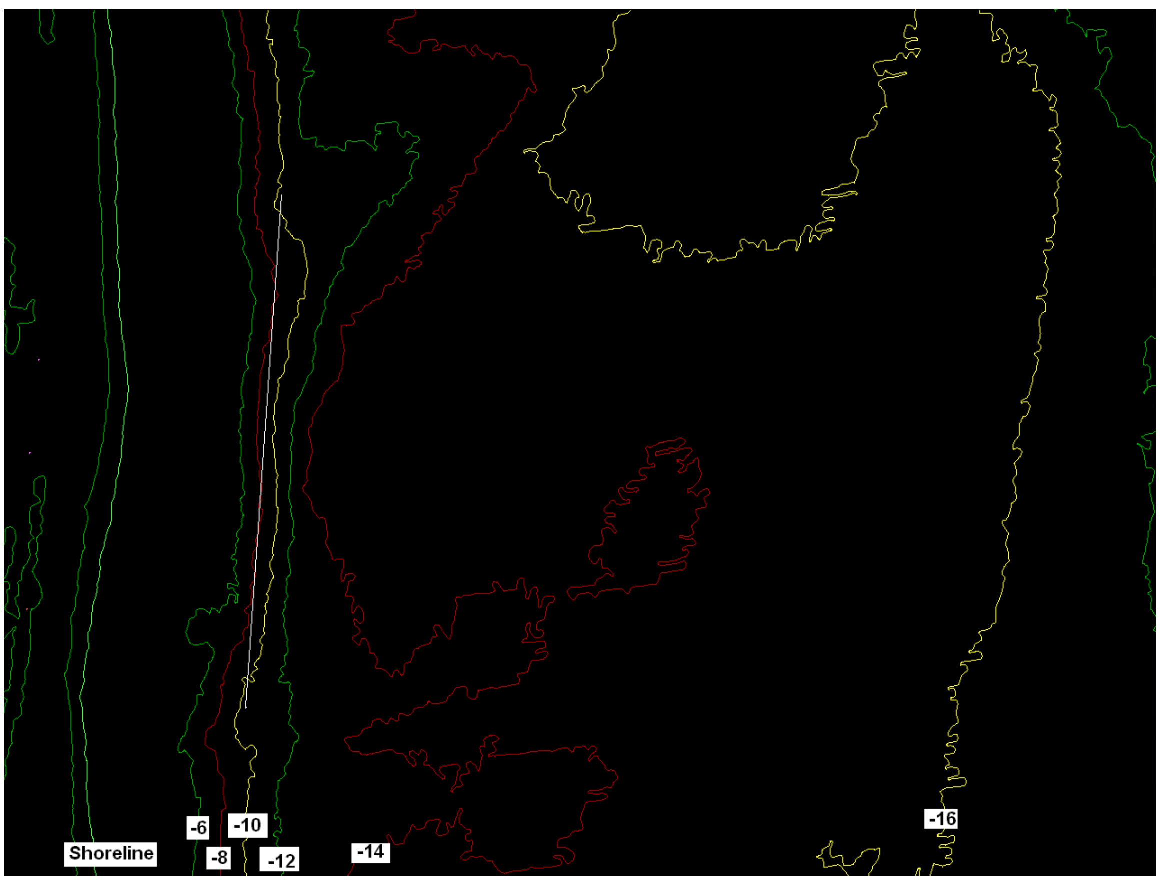


Figure 10. Offshore bathymetric contours at the proposed breakwater location.

Table 5. Breakwater Location		
	Northing	Easting

N end	551163	946461
S end	549913	946375

Physical modeling at ERDC provided the wave transmission coefficients for the reefball breakwater given in Table 6. The transmission coefficients were calculated as the wave height at a point landward of the reefball breakwater divided by the wave height at the same location if the breakwater was not there. Table 7 lists the standard elements used in the GENESIS model runs.

Table 6. Reefball Wave Transmission Coefficients

Submergence (ft)	Wave Period (s)	Wave Height (ft)	K_p - Transmission Coefficient
1.0	5.0	2.5	0.56
1.0	5.0	5.0	0.74
1.0	8.0	2.5	0.58
1.0	8.0	5.0	0.84
3.4	5.0	2.5	0.92
3.4	5.0	5.0	0.88
3.4	8.0	2.5	0.90
3.4	8.0	5.0	0.87

Table 7. Standard Condition Model Run Parameters

Runtime	10 years
Wave Year Group	Ave (per Table 4)
Beach fill	
Location	Between R-042 and R-046 +250
Added Berm Width	25.9 m
When	At start of run
Breakwater	
Location	Between R-045 and R-046 +250 (1250 ft)
Offshore Distance	~104 m (341 ft) from present shoreline
Approx Water Depth	-7.5 ft MLLW, -8.9 ft MSL
Number segments	various (between 1 and 5)
Transmission Coefficient	held constant for a run - values varied between 0.5 and 0.95

The breakwater was first modeled as a continuous 1250 ft long structure. A substantial salient formed at high transmission coefficient values ($K_p \approx 0.9$). A tombolo formed within the first few years for K_p values in the vicinity of 0.5 (Figure 11). USACE (2002) (the Coastal Engineering Manual,Part V, Chapter 3, pg 54) indicates that tombolos can be expected to form for values of L_s/Y of the order of one or greater, where L_s is the length of the breakwater segment and Y is the distance from shore. For this configuration $L_s/Y = 5.6$.

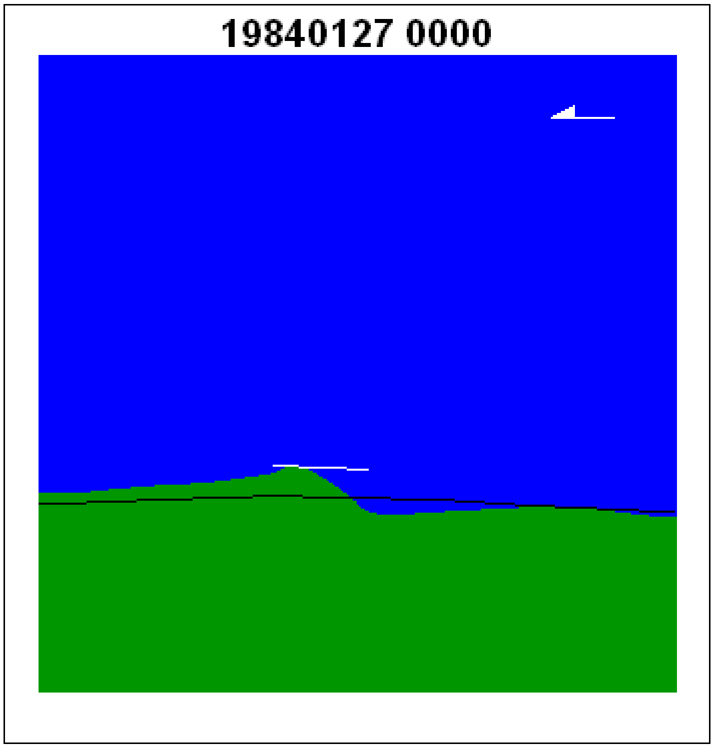
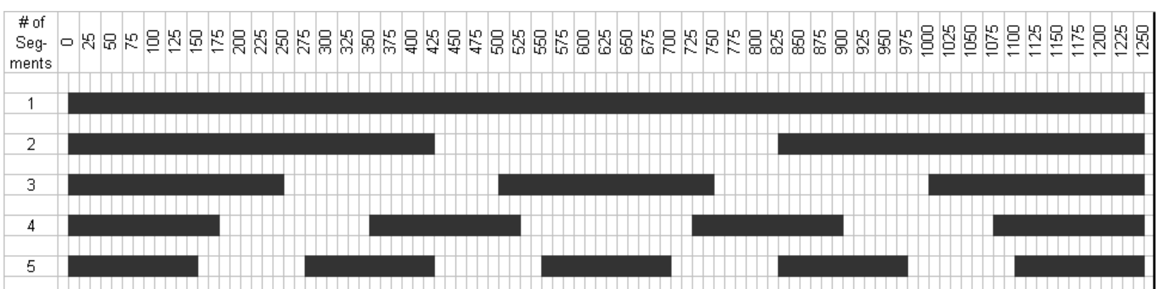


Figure 11. Tombolo formation for single segment breakwater: Kp=0.5, Year 4.

Thereafter, several segmented breakwater designs were modeled. The total length of the segments and the gaps generally spanned the 1250 ft footprint shown in Figure 10. Segments were of equal or nearly equal lengths, and gap lengths were nominally the same length as the breakwater segments. Figure 12 shows a schematic of several of the designs that were modeled in GENESIS. As the number of breakwater segments increased, the salients became less pronounced and tombolos failed to form for low (≈ 0.5) transmission coefficient values. Figure 13 shows the 10-year shoreline for a 5-segment breakwater with a target (0.9) transmission coefficient.



Segments	1	2	3	4	5
Seg len	1250	425	250	175	150
Gap len	0	400	250	175	125

Figure 12. Representative schematic of segmented breakwater designs modeled in GENESIS. Lengths are in feet.

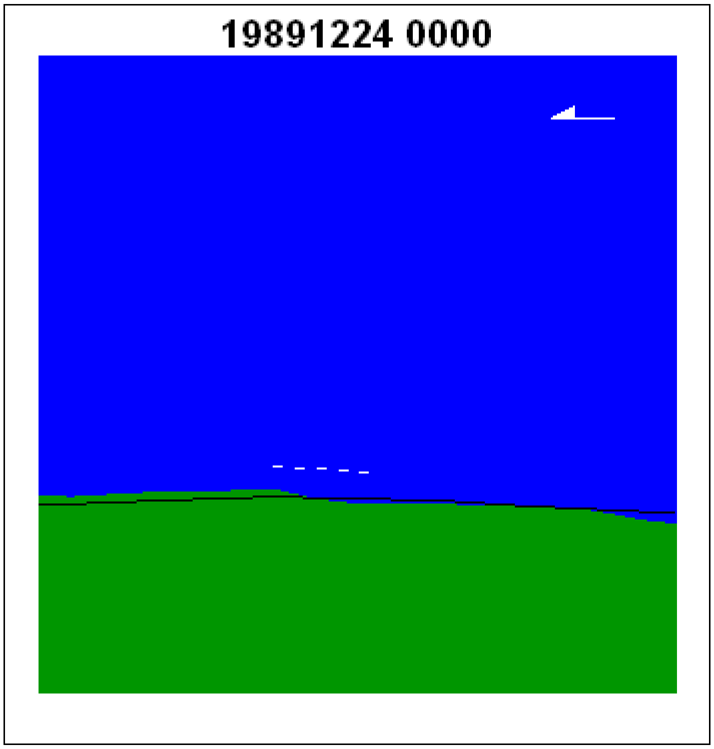


Figure 13. End of 10 year run, 5 segment breakwater, K_p = 0.9.

Thereafter, a series of segmented breakwaters were modeled that had different length segments. The final design (Config S3-I) selected was a 3 segment breakwater. From north to south the segment lengths are 100, 250, and 400 ft. The two gaps are each 250 ft long. The location of these segments in FL State Plane ft coordinates is given in Table 8. A GENESIS output example of this configuration is shown in Figure 14.

Table 8. Breakwater Segment Locations (Config S3-I)

	Easting (x)	Northing (y)
North End North Breakwater	946461.6	551163.0
South End North Breakwater	946454.7	551063.0
North End Center Breakwater	946437.4	550813.0
South End Center Breakwater	946420.0	550563.0
North End South Breakwater	946402.7	550313.0
South End South Breakwater	946375.0	549913.0

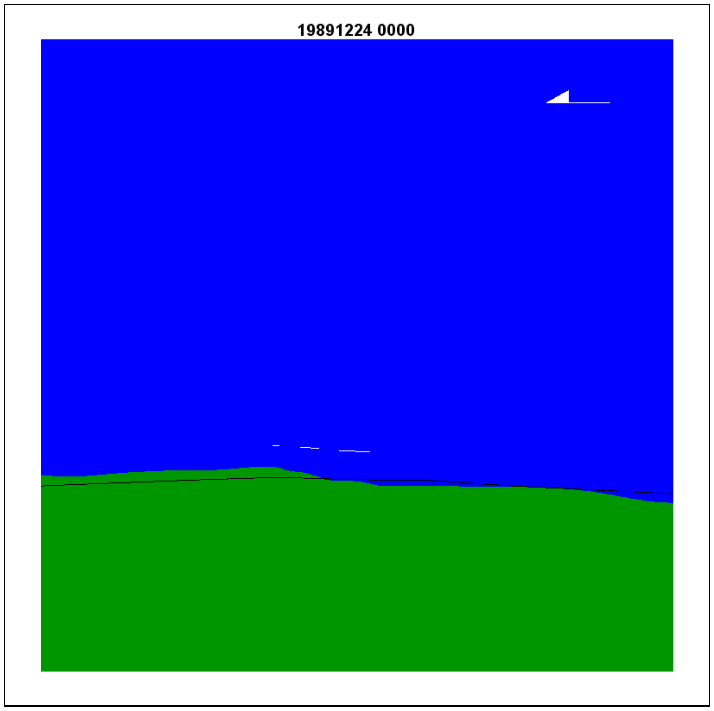


Figure 14. Config S3-I, end of 10 year run, K_p = 0.9.

Figure 15 shows the effect of this configuration upon the shoreline position. The 5 light blue lines show the shoreline effect at 5 time periods (after 2, 4, 6, 8, and 10 years) assuming a transmission coefficient for the breakwater of 0.95. Other color line sets correspond to different K_p values. Each line represents the effect of the breakwater by showing the difference in the shoreline position with and without the breakwater. These differences are obtained by subtracting the estimated without-breakwater shoreline from the with-breakwater shoreline. The alongshore location of the range lines is shown at the bottom of the figure and the alongshore location of the three breakwater segments is shown as heavy line segments on the zero difference line. This figure shows that for a transmission coefficient in the range of 0.85 to 0.90, the effect of the breakwater is to have the shoreline up to 10-15 meters seaward of where it would be without the breakwater. It also shows that to the south of the breakwater the shoreline will be a maximum of 10-15 meters landward of where it would be without the breakwater. However, comparing the beach fill only shoreline to the no fill shoreline shows that in this area (south of the breakwaters and the end of the fill) that the shoreline will be up to about 10 meters seaward of where it would be without the fill. Thus these two effects (the beach fill and the breakwater) largely cancel out in this region, and the shoreline is predicted to be in approximately the same position with the beach fill and with the breakwater as it would be without the fill and without the breakwater.

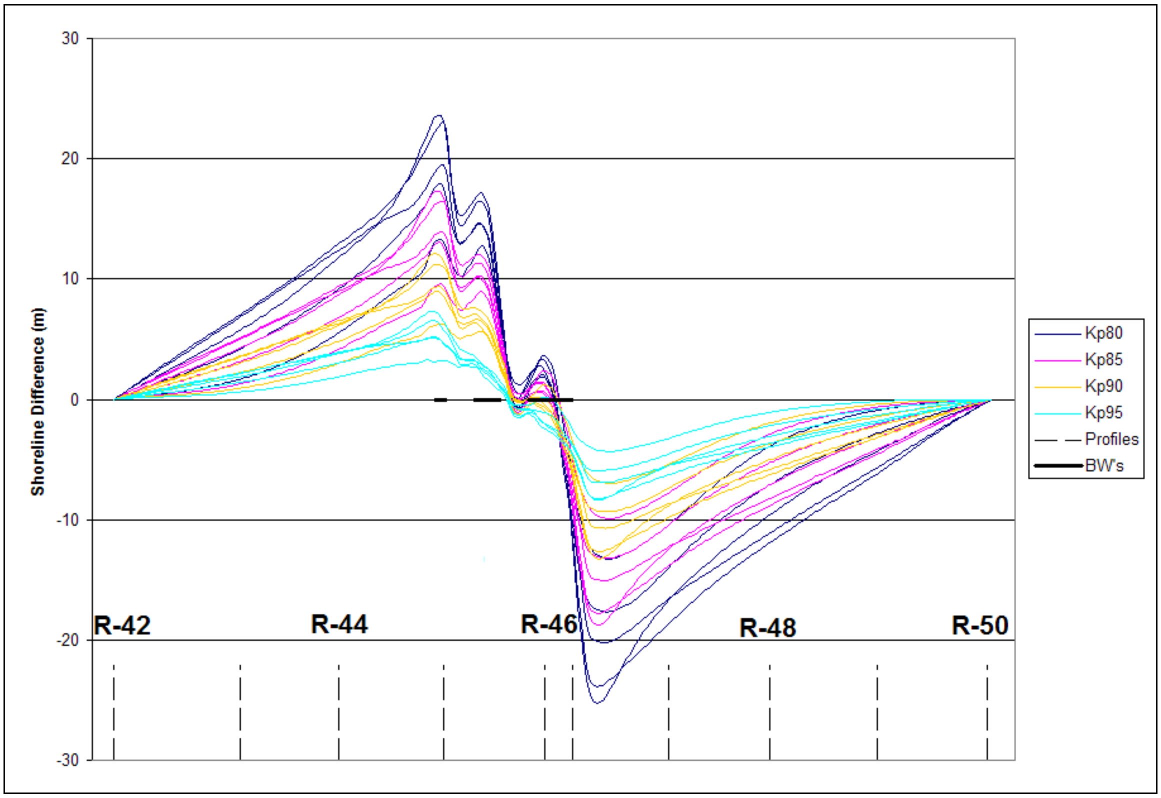


Figure 15. Effect of (Config S3-I) breakwater on shoreline position.

VII. RECOMMENDATIONS

The reefball breakwater needs to produce a "light touch" on the shoreline. To do this, care must be taken to ensure that the average transmission coefficient is in the range of 0.85 to 0.9. A lower value of the transmission coefficient is likely to cause too much progradation of the beach behind the breakwater and too much negative impact south of the breakwater. A transmission coefficient in this range will allow the shoreline to be on the order of 10 meters seaward of there it would otherwise be, and will help ameliorate the hotspot problem in the vicinity of the 63rd Street Park.

The breakwater needs to either be segmented or be moved substantially seaward of its current design location. An unsegmented breakwater at the present design location causes large salients in its lee and has the potential to create a tombolo.

Modeling results indicate that a breakwater similar to Config S3-I, described in Table 8, will produce satisfactory results and is recommended.

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USACE. 2006. Regional Sediment Budgets for Florida's Central Atlantic and Southeast Atlantic Coasts.

APPENDIX E – PHYSICAL AND BIOLOGICAL MONITORING PROGRAM

TEST PLAN
SECTION 227 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM
63[RD] STREET "HOTSPOT"
MIAMI BEACH, DADE COUNTY, FLORIDA

TEST PLAN
SECTION 227 NATIONAL SHORELINE EROSION CONTROL DEVELOPMENT AND DEMONSTRATION PROGRAM
63RD STREET "HOTSPOT"
MIAMI BEACH, DADE COUNTY, FLORIDA

TABLE OF CONTENTS

1 INTRODUCTION AND BACKGROUND

The Miami-Dade County Department of Environmental Resources Management (DERM) and the US Army Corps of Engineers (USACE), plan to install an approximately 1,250-foot long segmented SubMerged Artificial Reef Training (SMART) structure approximately 500-foot offshore of the mean low water (MLW), adjacent to the 63rd Street erosional "Hotspot" of Miami Beach, Florida. The SMART structure would be installed as an erosion control and wave attenuation measure and would be placed in approximately 8-foot of water (mean lower low water reference). The U.S. Army Engineer Research and Development Center (ERDC) would also be involved with the proposed SMART structure monitoring effort.

The proposed project is authorized by the Water Resources Development Act (WRDA) of 1996, Section 227, National Shoreline Erosion Control Development and Demonstration Program. In WRDA 2007, this program is section 2038. Under Section 227 and 2038, innovative technologies are developed to demonstrate shoreline erosion abatement in a cost-effective and environmentally friendly manner. Performance metrics are developed to measure the successfulness of the demonstration project. The proposed structures can be modified or removed at any time if it is determined that the project is having detrimental effects.

The monitoring program acts as the mechanism to "demonstrate" whether the SMART structure can provide a benefit, or is detrimental to the system. This test plan establishes the criteria against which the performance of the SMART structure would be measured and evaluated. This could have implications on how the Miami-Dade County beaches are managed in the future (i.e., renourishment interval and treatment of "hot spots"). This in turn could have environmental impacts or benefits. The coastal engineering and environmental aspects of shore protection are inter-related.

The development and implementation of a monitoring plan is conducted to gather data and analyze it to provide a comprehensive and unbiased documentation of the performance of the proposed SMART structure. The application of this 3-year experimental test plan as prepared by the USACE/ERDC and reviewed by DERM would provide an unbiased evaluation of the performance of the SMART structure. ERDC develops innovative science and technology solutions to support warfighting, infrastructure, environmental, water resources and disaster operations. The local sponsor, DERM, would implement the following monitoring plan, which has been appropriately scaled to the proposed project and based on other coastal monitoring plans, research and conversations with scientists, biologists, and engineers.

The monitoring program contains several elements designed to test the effectiveness of the SMART structure on the local coastal environment, including determinations of:

a) the functional ability of the SMART structure to retain sand and stabilize the shoreline as measured through shoreline change;
b) the functional ability of the SMART structure to attenuate wave energy as measured through wave gauging;

c) the structural stability of the SMART structure to include structural integrity, settlement and scour resistance;
d) the environmental effects of the SMART structure on sea turtle beach access for nesting, fish and fouling communities, interaction of juvenile sea turtles;
e) a storm event contingency monitoring plan to include nearshore and offshore surveys, structure elevation surveys and scour measurements.

Long-term research to address US Fish and Wildlife Service concerns of cumulative secondary affects would include site visits and visual inspections. Coordination of this information would be made available to interested resource agencies.

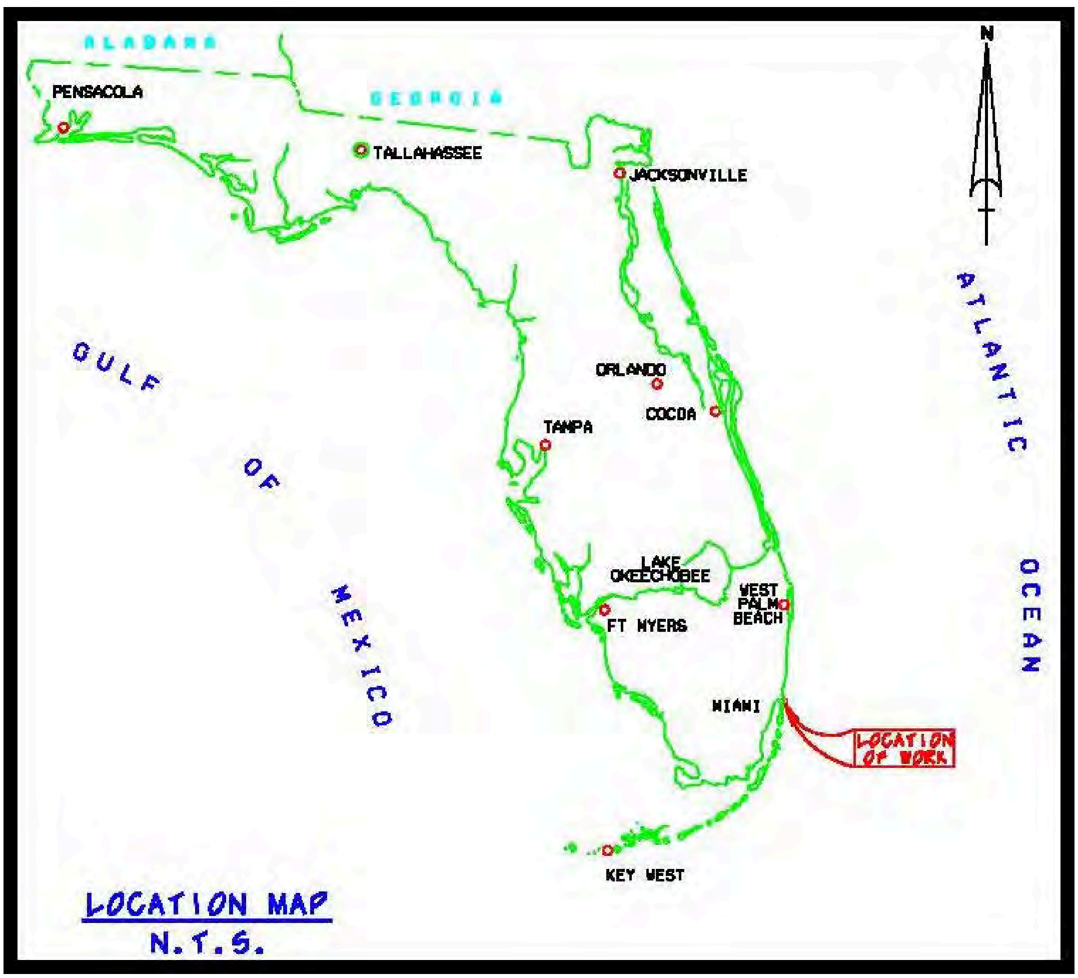

Figure 1: Location Map

2 EXPERIMENTAL DESIGN

This chapter presents the concepts associated with the design and rationale for the proposed monitoring plan of the experimental SMART structure in Miami Beach, Florida.

2,1 General Structure Design

ReefBalls™ are hollow concrete hemispheres designed for habitat enhancement. ReefBalls™ are also capable of dissipating wave energy by generating turbulence in flow through holes in the sides of the units. It is proposed that a series of ReefBalls™ be placed offshore of the 63rd St. hotspot to function as on offshore breakwater to reduce the incident wave energy and reduce the shoreline erosion.

Due to concerns of the ReefBalls™ sinking into the sand, it is proposed that the ReefBalls™ will be placed on concrete pads that will be connected together with segments of an articulating concrete mat to distribute the weight over a large area. A set of four large ReefBalls™ on pads connected together in a line is referred to as a SubMerged Artificial Reef Training (SMART) structure. Each SMART structure is about 6.5 ft wide by 41 ft long.

Physical modeling was used to determine the energy dissipation provided by the ReefBalls™ and numerical modeling was used to determine the optimum placement of the SMART structures. The result is a 1,250-ft-long reef consisting of a 100-ft-long segment, a 250-ft-long segment, and a 400-ft-long segment with 250-ft-long gaps between the segments. The units are about 500-ft offshore the mlw shoreline, at a depth of about 8 ft mllw. The structure crest will be about 1.5 ft below the still water surface at mllw.

2.2 Objectives

Principle design objectives include:

1) The structure will slow volumetric erosion and shoreline retreat in vicinity of the 63rd Street hot spot without adverse effects to the adjacent shorelines. This ultimately will allow for longer intervals between nourishments.
2) The structure will cause wave energy reduction in its lee during both normal and storm wave conditions.
3) The structure will not experience significant settling, movement, deterioration, or induce scour to a point at which the stability and performance of the structure become affected.
4) The structure will result in habitat enhancement and will not cause adverse effects to the environment.
5) The structure will not present any undue hazard to normal water activities.

2.3 Concepts and Rationale

The monitoring plan has been designed to focus on the first three objectives above while also considering the structure’s influence concerning the environment and public interests.

The primary data collection efforts of the monitoring plan are beach profile surveys and wave measurements. Profile data will be used to determine sediment volume and shoreline change in the project area due to the structure. Wave data will be used to determine the structure’s effectiveness in reducing wave energy.

Structure stability will be monitored by visual inspection and direct measurements of settlement, scour, shifting, and deterioration. Instability in the structure may result in the failure of the structure to meet objectives.

Other matters that will be assessed include the environmental response and public safety issues associated with the structure. The monitoring and analysis to evaluate effectiveness and impacts of the SMART structure are included in this document.

3 PERFORMANCE PARAMETERS AND METRICS

This chapter attempts to quantify the design objectives and establish agreed-upon preset limits which will establish whether the structure has met expectations, not met expectations, or caused adverse impacts to the coastal system. This plan will set forth criteria against which the performance of the structure will be measured and evaluated. Performance criteria are grouped into three categories:

1) "Functional" criteria are associated with design objectives 1 & 2. Criteria will evaluate how the structure performs concerning its effect on changes in sediment volumes, shoreline change, and wave reduction. Evaluation of functional performance will be based on comparison to control areas and comparison to expectations of modeling results.
2) "Structural" criteria are associated with design objective 3. Criteria will evaluate the physical stability of the structure itself. Structural performance will be evaluated by parameters representing the limits at which structure instability is expected to result in unsuccessful functional performance.
3) "Secondary" criteria are associated with design objectives 4 & 5. Criteria will be used to evaluate how the structure is impacting public and environmental interests. These criteria will be evaluated based on monitoring observations and will be considered unsuccessful if adverse impacts are identified.

The performance criteria set forth will judge if the structure has performed as expected. Evaluation will be based on averages of each survey period as well as the cumulative averages over the three year monitoring period. Failure of the structure to meet specific criteria does not imply that the overall project is not a success. Success criteria are summarized in **Table 1**. If the structure does not achieve success based on these criteria it does not necessarily mean that the coastal system has been adversely impacted. Contingency plans or corrective actions for adverse impacts or if the structure is found to be detrimental will be developed in concert with the U.S. Army Corps of Engineers, the Flordia DEP and Dade County Department of Environmental Resource Management (DERM). The plans would consider options such as realignment or removal if necessary.

3.1 Functional Performance

Assessment of the functional performance of the SMART structure will be based on protecting the 63rd Street shoreline erosional "Hotspot" area. In the event the beach fill project is not completed, the SMART Reef will be assessed on how effective the site-specific shoreline is stabilized. However, it is assumed that the beach fill will eventually take place. No net loss of beach shoreline is expected. Some shift of shoreline width may result in net gain of beach.

Functional performance focuses on the degree to which the SMART structure retains sand and reduces sand loss from the shoreline. Sand loss may occur, to a lesser degree, to cross-shore processes (post-construction equilibration, seasonal beach profile change, and storm-induced beach erosion) and, to a greater degree, to longshore processes (natural gradients in longshore sand transport, and interruption of sand transport by structures). In order to predict performance, it has been assumed that cross-shore losses are negligible.

It is difficult, even in ideal conditions, to predict the long-term fate of the beach fill, either with or without the SMART structure. To this end, GENESIS numerical modeling was utilized to predict shoreline evolution for both cases: beach fill stabilization with and without the structure. The GENESIS model has been run with a previously proposed 2,000-ft-long structure and re-runs have been made with the currently proposed 1,250-ft-long structure. Based on the results of these runs, a 1,250-ft long structure including three segments with 250-ft-wide gaps between the segments is recommended.

Inputs for the model include local shoreline positions obtained from LADS surveys (~2000), shoreline erosion rates from USACE reports (Martin 2001) and Wave Information Study hindcast data (Station 470, 1990-2000, including storms). Several assumptions concerning the beach fill must be made as the project has not yet been awarded and the sand source is unknown at the time of this writing. The median grain size, construction or design template, and the volume of fill/LF are all unknown. Some data has been provided, such as a probable design template; this data has been used, with the assumption that the as-built construction profile may vary significantly from the proposed fill profile. Analysis addressing the potential error generated from the differences in planned vs. constructed templates is offered.

Comparisons of numerical results of the GENESIS shoreline model will be made with data collected during post-construction monitoring. Functional performance can then be evaluated following each beach profile survey, starting from initial construction and continuing throughout the monitoring program. Performance should be evaluated over both incremental (survey to survey) and cumulative time scales.

Volumetric Changes / Sediment Accumulation –If the volumetric loss behind the structure is no more than 80% of the volumetric loss at the control sites, then the project will be considered successful in reducing loss of sand. If sand accumulates at the control site, and if at least 20% greater volume of sand accumulates behind the structure, then the project will be considered successful in retaining sand.

Shoreline Changes – If the beach width loss behind the structure is less than 80% of the beach width loss at the control sites, then the project will be considered successful in retaining dry beach width.

Wave Height Reduction – If the general wave height reduction remains at 10% or above (transmission coefficient, KT, less than 90%), the structure shall be considered successful for the purposes of wave height reduction.

3.2 Structural Performance

Scour – The structure is designed to accommodate some scour on the seaward side, with the seaward end of the mattress designed to bend into any scour that develops there. However, if local scour exceeds 2 ft, the structure will be considered unsuccessful for structural stability.

Settling – If the structure settles more than 2 ft at any point along the entire structure or the average settlement of the entire structure is more then 1 ft, it will be considered unsuccessful for structural stability.

This parameter is determined from baseline elevation surveys along the crest of the structure immediately following construction. The parameter measures any decrease in elevation of mean structure crest due to settlement or translation.

Alignment – If any segment of the structure shifts more than 2 ft out of its constructed position in any direction or any gaps between the 40-ft by 8-ft mats form to result in structural instability, then the structure will be considered unsuccessful for structural stability.

3.3 Secondary Performance

Marine Turtle Impacts – If it is determined by monitoring that the structure is having an adverse impact on marine turtles (including hatchlings) or their activities, then corrective action will need to take place.

Biological Impacts – If it is determined by monitoring that the structure is having an adverse biological impact then corrective action will need to take place.

Public Safety – If data shows that the structure has caused increased rip or other currents which are determined to be hazardous to swimmers, then the structure will be considered to be detrimental and corrective action will need to take place. If it is determined that the structure is creating any type of public safety hazard, then it will be considered to be detrimental and corrective action will need to take place.

Table 1: Performance Criteria Summary

Category	Parameter	Success Criteria
Functional	Volumetric Changes	volume loss < 80% control site
	Shoreline Changes	beach width loss < 80% control sites
	Wave Reduction	general wave height reduction of > 10% storm wave height reduction of > 15%
Structural	Scour	local scour < 2 ft
	Settling	max settlement < 2 ft average settlement < 1 ft
	Alignment	shifting < 2 ft
Secondary	Marine Turtles	no adverse biological impacts
	Biological Impacts	habitat enhancement for marine species no adverse impacts to marine species
	Public Safety	< 1 ft/s increase in rip currents no adverse impacts to public safety

4 MEASURES OF SMART PERFOMANCE AND MONITORING PLAN - FIELD DATA COLLECTION PROGRAM

Field data collection would begin during the period immediately prior to installation and for three years following installation. Each of the elements and their role in accomplishing the objectives outlined in Chapter 3 of the test plan are described below.

4.1 Activity 1 - Topographic and Bathymetric Surveys

Beach and offshore surveys would be conducted to document the topographic and bathymetric changes that occur throughout the project test area during the three-year monitoring period. Survey data will be used in determining volume changes, sediment accumulation, and shoreline changes in the project vicinity. These surveys would be conducted immediately prior to the installation of the SMART structure, periodically as described below, throughout the three year monitoring, after a significant storm event, and after placement of any fill within the monitoring area.

The survey monitoring area would extend approximately 5,000-foot north and south of the SMART structure terminus. Approximately 46 profile lines would be surveyed. Profile lines would be surveyed within the SMART structure limits at a spacing of 100 ft. The north and south 1,000-foot reaches adjacent to the structure and the north and south control areas would be surveyed at a spacing of approximately 200 ft. Profile lines between the adjacent reaches and control areas would be surveyed with a spacing of approximately 500-feet. All profiles would extend to 3,000-feet offshore or –30-foot depth (whichever is less). All work activities and deliverables shall be conducted in accordance with the latest update of the Bureau of Beaches and Coastal Systems (BBCS) *Monitoring Standards for Beach Erosion Control Projects, Sections 01000 and 01100*.

Figure 2 shows the FDEP reference monuments, the intermediate profiles' points of beginning along a project survey baseline; all profile lines and bearing, and the approximate location of the breakwater.

Loss or gain of volume will be computed over time between the landward point of profile closure and to a distance offshore defined by the depth of closure (in absence of an offshore structure). The volumes will be determined from beach profile surveys. Volume change will be analyzed for the following littoral cells:

a. North Control Area
b. North 1,000-ft Adjacent Reach
c. Landward of the structure
d. South 1,000-ft Adjacent Reach
e. South Control Area

Furthermore, volume change will be analyzed over the following cross-shore dimensions within each littoral cell

a. Dune to mean high water line (MHWL)
b. Dune to depth contour at landward toe of structure
c. Depth contour at landward toe of structure to depth of closure
d. Dune to depth of closure

A MHWL will be determined from each survey event, and this line will measure shoreline change in the project vicinity over time.

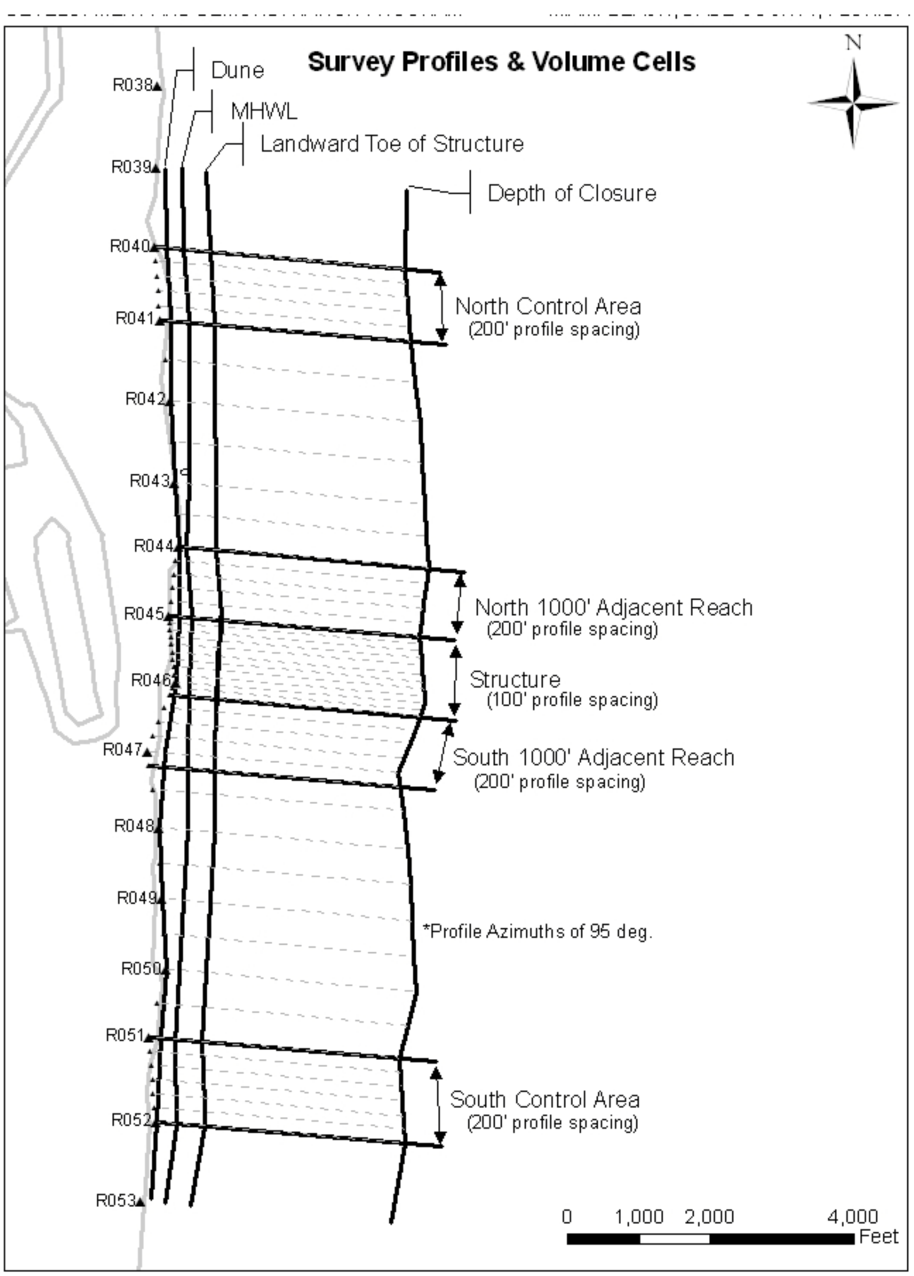

Figure 2: Shows the volume compartments to be used in analyzing volume change and sediment accumulation.

4.1.1 Pre- and Post-Installation Surveys.

Pre- and post-installation beach and offshore surveys would be conducted immediately prior to and within three weeks following the SMART structure installation. A comparison of these surveys would be used to document the changes resulting from SMART structure installation. The post-installation survey would be used as the baseline survey to compare with subsequent surveys. In addition, in the event that a significant change in the bathymetry occurs between the pre-installation and the post installation period, an additional survey would be undertaken immediately following the event. The pre- and post-installation surveys would survey all profile lines to the distance specified for an annual survey, as described above.

An easement will be established prior to construction in accordance with State of Florida requirements. The FDEP would be provided with two prints of a surveyor's signed/sealed sketch, or a full survey. A guidance document for this is found at the following link:
http://www.dep.state.fl.us/lands/surv_map/096ProffSketchRequirements429-05.pdf

4.1.2 Beach Fill Surveys

Beach fill in the project area associated with Contract E nourishment will require a construction pay survey that will be used in quantifying the beach fill volume. A beach fill survey would be required in the event that DERM, City of Miami Beach, or private property owners place fill within the project area. DERM would survey the fill area within one week prior to and following placement of the fill and the quantity and location of the material would be verified by a professional engineer or surveyor.

4.1.3 Frequency of Surveys

Beach and offshore surveys would be conducted just prior to commencement of construction and within three weeks of completion of the SMART structure, and thereafter, semi-annually with a winter monitoring event each January and a summer monitoring event each July for the remaining three years of the monitoring period.

4.1.4 Storm Contingency Surveys

A storm contingency survey will be performed as deemed necessary by ERDC and DERM. A courtesy copy will be provided the FDEP. This beach and offshore survey would be performed immediately following a significant storm event, when wave conditions permit. The storm contingency survey will include all survey profile lines and coverage specified for the annual summer and winter surveys. Storm contingency surveys will not include structure surveys or scour measurements unless they are deemed necessary based on the severity of the storm and timing of the storm relative to regularly scheduled monitoring.

4.1.5 Structure Elevation Surveys

Structure elevation surveys will be conducted on an annual basis during the summer monitoring event. The structure elevation will be measured with a boat survey using a rod and/or 'high-resolution multi-beam' fathometer with RTK-GPS control or comparable equipment.

4.2 Activity 2 – Wave Measurements

Two self-recording portable directional wave gages (PUy) will be deployed for a period beginning 3 months prior to installation and lasting for 2 years immediately following installation. Data will be downloaded from the gages every three months following deployment. Prior to installation of the structure and for the first one year after installation the two gages will be located 1) just seaward (approximately 75 feet) of the breakwater in an area not affected by reflected waves to measure incident conditions; and 2) landward of the breakwater (approximately 30 feet). Both gages will be moored by attaching the gage to a concrete block or piling which will be jetted into the subsurface. Durign the second year following installation of the structure, the gages may be moved to new locations to best document the effect of the segmented breakwater. The new locations shall be approved by FDEP.

Each wave gage will consist of a bottom-mounted P_{uv} gage including a high resolution pressure sensor to measure wave height and water level, a bidirectional electromagnetic current meter to measure wave direction, and a flux gate compass. These sensors will be interfaced with a data logger with sufficient memory for the data retrieval intervals. The temporal sampling scheme will be designed to resolve the direction wave field in a least four 20-minute sampling bursts per day. In addition, when not sampling the wave field, the sensors will sample average water depth and average current velocity at 30-minute intervals. One of the gages will include a tide gage to measure tidal level. Tidal level measurements will be performed every hour.

“General wave height reduction” as used here denotes the reduction of the overall wave energy between the seaward and landward sides of the structure as determined by the wave energy spectra. “Wave height” is represented by the wave height of the zeroth moment of the energy spectra, or H_{m0} . The wave height transmission coefficient, K_T, is determined as:

$$K_T = (H_{m0})_T / (H_{m0})_I$$

In which $(H_{m0})_T$ and $(H_{m0})_I$ are the transmitted and incident wave heights of zeroth moment, respectively. The analysis will correlate wave energy reduction with various water levels (freeboard) and wave heights so as to provide a basis for predicting wave energy reduction under storm conditions or large tides. The natural shoaling effects occurring between the two wave gage locations due to the change in bathymetry shall be taken into consideration in determining the wave energy reduction.

The test to be applied to the transmission coefficients will be that the computed average over a one year period of the test must be less than 90% and the storm average must be les then 85% (storm conditions occur when incident wave heights are greater than 3-ft.). The same criteria shall be applied separately to the highest 1% of the incident waves occurring over a one year period. Transmission coefficients will also be computed as the data is downloaded from the gages every three months.

4.3 **Activity 3 - Scour Measurements**

Scour measurements will be performed following breakwater installation for a period of 3 years during the project life. Measurement shall be performed on a biennial basis coinciding with the summer and winter beach and offshore surveys. The post-installation scour survey will act as the baseline survey.

A total of 13 scour rods will be placed immediately following construction. Rods will be placed 15 ft to the north, south, landward, and seaward sides of each segment of the structure. Additionally a scour rod will be placed 300 ft south of the structure to measure ambient conditions. The scour data will be compared with profile data, and wave and current data to assess physical conditions which occurred during different periods of scouring.

Rods will be place permanently in the sand. An aluminum washer will be placed on each rod, which will follow the scoured bottom elevation down during scour events and remain at the deepest scour horizon during subsequent deposition. Scouring is quantified by measuring the distance from the top of the rod to the sand level, and to the washer and comparing this reading to the distance from the top of the rod to both the sand surface and the washer elevation at a later time. After recording the depth of scour by fanning away the sediment, the scour hole created around the rod is replaced to its surrounding elevation. The washer is reset on the sand surface.

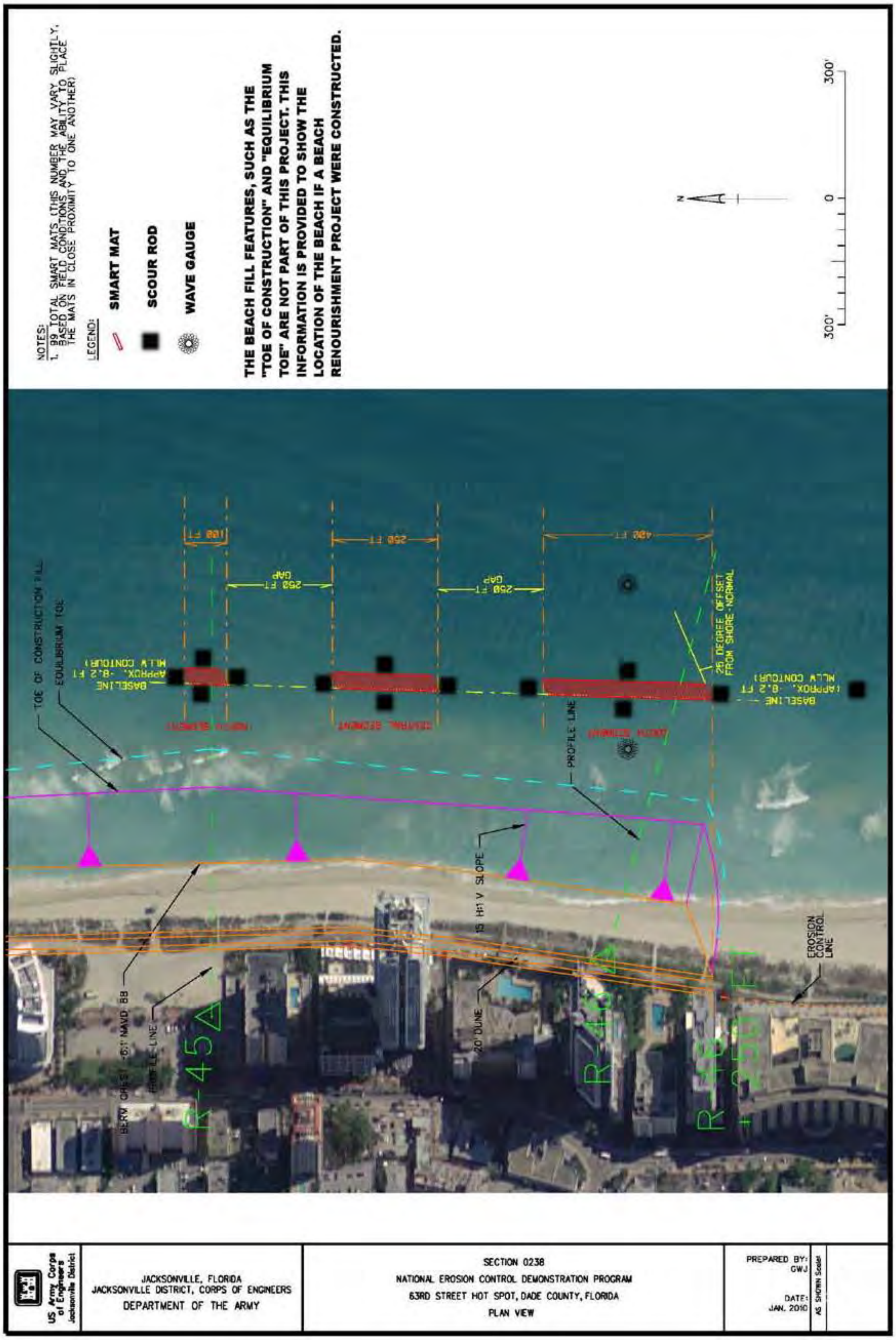

Figure 3: Example location of wave gages and scour rods.

4.4 **Activity 4 - Environmental Monitoring**

4.4.1 Impacts to Marine Turtles

A 2004 study conducted by Stewart and Wyneken looked at predation risks to loggerhead hatchlings emerging from nests on Juno Beach in Florida. Specifically, the study analyzed the predation rates of hatchlings during their offshore migration over three distinctly different substrates; sand, transitional, and reef. The study followed 217 hatchlings at the various locations (Figure 4), and concluded that there is no significant difference in survival rates for hatchlings at the three site types. This suggests that a reef environment does not significantly increase the risk of predation on hatchlings. The study also drew a comparison between a natural beach environment and a hatchery environment, concluding that predation risk is greater at the hatchery location due to the higher concentration of hatchlings emerging from the same location. As mentioned in the EA, sea turtle nests in the location of the proposed project area average four a season. This small density of nests in the project area in combination with the relatively compact design of the SMART structure and recent literature suggesting the insignificant impact of reefs on hatchling predation suggests that the SMART structure is not likely to cause an impact to nesting sea turtles and emerging hatchlings in the project area.

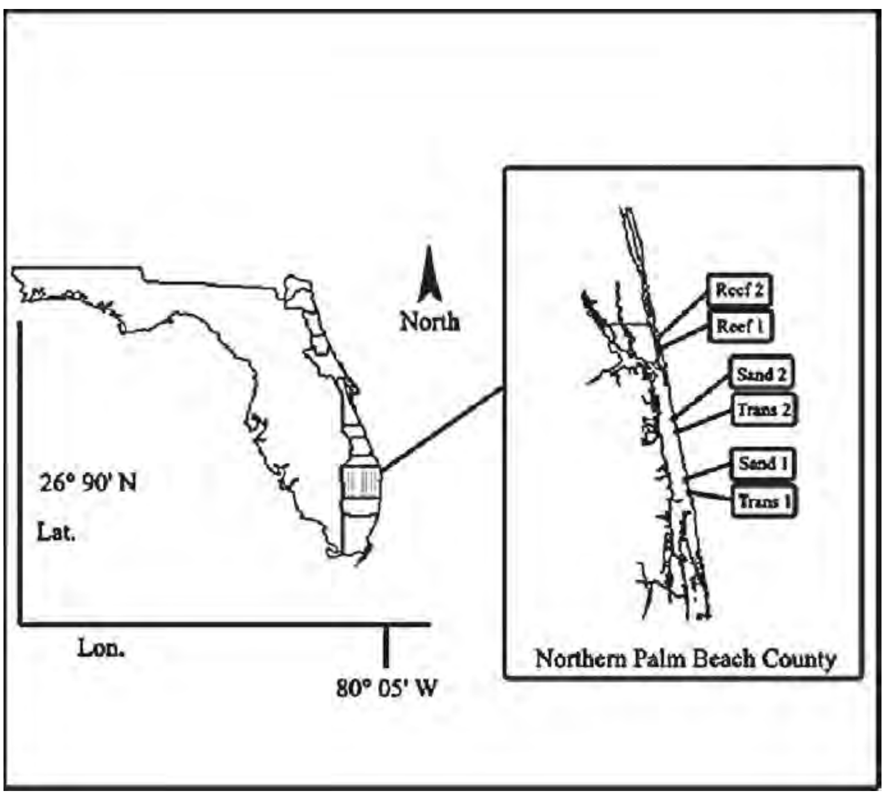

Figure 4: Location of study sites in Palm Beach County, FL. (Stewart et al, 2004)

Studies conducted by Lohmann et. al., 1996 and Wyneken et. al., 1996, concluded that sea turtle hatchlings use wave direction as an orientation cue during the frenzy swimming period. In addition these studies found that hatchling remain within the top 1 m of water during the frenzy swim and rarely dive below 3 m of the surface. A study conducted in 2001 by Abe et. al., followed hatchlings as they swam into open ocean using GPS tracking devices. Their study concluded that during calm conditions hatchlings will take the path of least resistance such as through a reef channel versus going over the reef. During rougher conditions, hatchlings cannot decipher wave cues and generally take as straight a path as possible but ultimately drift due to wave direction. The amount of drift from initial hatchling nest emergence is due to wave direction and magnitude. The amount of divergence the hatchlings take from the straight path from nest to open ocean is thus a factor of wave conditions, during the calm conditions Abe et al predicted that the hatchling could sense the difference in wave coming off the reef system and used it as a cue for traversing the reef system. From nest to open ocean the study showed a large cone of paths due to the various influences.

The predicted cone of influence for this study is in reference to the proposed SMART structure and is defined as the potential range of paths for hatchlings to take from nest to open ocean. The predicted cone of influence's vertex is situated on the nest location and as a result of findings from Abe et. al., 2001, the cone's base is located approximately 800m (2,600ft) offshore with a total length (north south) of 400m (1,300ft) (Figure 5). This suggests that the cone of influence from the nest to the proposed SMART structure, given its proposed location, is approximately 300 feet in base width. Therefore, nests located south or north of the structure by more 150 feet are not expected to be influenced by the SMART structure at all, based on the current location of the shoreline. With future beach renourishment, the shoreline would move eastward and the cone of influence would be reduced to less than 150 feet. Since, this will be a submerged, segmented structure, and with hatchlings remaining near the surface during the frenzy, the structural design minimizes any type of influence to hatchlings.

To further insure any impact of the reef is minimal, "turtle lanes" through the reef will be included in each of the longer reef segments. The turtle lanes will be created by leaving off the large ReefBalls™ on every tenth SMART structure. Articulating mat segments will be placed within the turtle lanes to prevent scour, and ReefBalls™ no more than 3 ft in height will be placed on the mat segments as ballast to prevent any movement of the mat. The resulting turtle lanes will be a minimum of 6.5-ft wide and 5.5-ft-deep at mllw, and will be located every 65 ft along the larger reef segments. The 100-ft-long reef segment will not have a turtle lane due to its short length and concerns that opening a channel through the short segment would negatively affect the performance of the reef. Of course, the 250-ft-wide gaps between segments also provide unhindered ingress and egress.

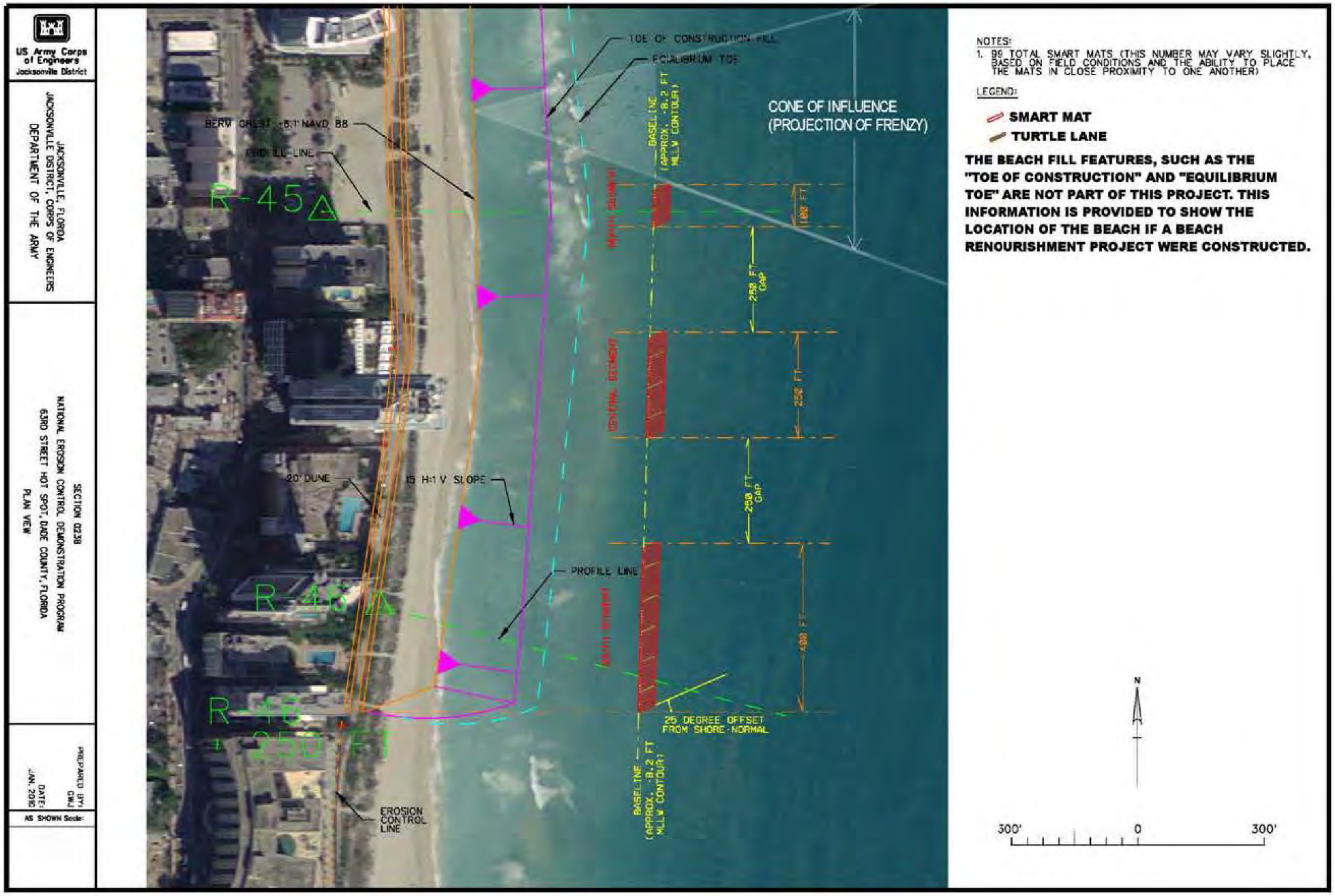

Figure 5: Predicted Cone of Influence of SMART on Sea Turtle Hatchlings

4.4.2 Impacts to Biological Communities

The proposed biological monitoring program provides a scientifically credible analysis of biological issues resulting from the installation of a SMART structure in the near shore of Miami Beach, Florida, while keeping monitoring costs to a minimum. The proposed monitoring program focuses on fish and fouling (hard substrate dwelling) communities associated with the reef modules. The monitoring would utilize quantitative scientific data to analyze the responses of fish and fouling organism communities that are attracted to the SMART structure modules. Collection of quantitative data would also be available to respond to the public in the event of any changes to near shore fishing resources, which might be attributed to the presence of the reefs.

After installation, the SMART structure modules would presumably function as typical hard substrata and would develop a fouling community that would progressively increase in its abundance and diversity over time. Similarly, the physical structure provided by the reefs should provide an attractant for fishes. Studies on the development of the fouling and fish communities have not been done within the shallow, near shore region in the Miami Beach area. The precise nature of the development of these communities is important in several regards.

First, installation of the reef modules would involve the placement of reef modules on top of existing sand bottom areas with the consequent destruction of the natural communities at these locations. It is important to quantitatively document that the SMART structure modules themselves actually are providing habitat.

Secondly, the natural world is extremely variable. Changes in fish populations occur for natural reasons, and may occur during or after the project. It is always tempting to attribute change to an obvious factor such as the SMART structure, even if there is no functional relationship. Quantitative studies of fish populations would provide data to evaluate the potential role of the SMART structure versus natural factors should any major changes take place.

Third, fouling community development may be significant in terms of the long-term integrity of the SMART modules, which may be influenced by whether boring sponges and urchins become established. Evaluation of bioerosion rates would assist in projections of project lifetime. A common near shore sponge species (*Cliona lampa*) can bioerode 3 kg per square meter per year on carbonate substrata in Bermuda (Rutzler, 1975).

Fourth, the interaction of sea turtles with the SMART structure is potentially important. Juvenile turtles are known to utilize near shore natural reefs as a food resource (Ehrhart, pers. comm.}, and local availability of benthic invertebrates for food may influence selection of nesting beaches for loggerheads (D. Nelson, 1988). Sharks, barracuda, snook, jacks, snapper, and other larger predatory species may potentially consume hatchling turtles (D. Nelson, 1988). While small artificial reefs located farther offshore in deeper water in the Miami Beach area did not develop large populations of predators over a two year period (Vose, 1990), the situation for large reef modules inshore may be quite different. Direct observation of predation events on sea turtles is extremely difficult, and therefore the best approach is to attempt to estimate the potential increase in predation pressure via estimation of changes in fish populations associated with reef installation.

4.4.3 Reef Modules Surveys

Quarterly underwater surveys of reef modules would also be conducted to estimate coverage of encrusting and boring organisms. Benthic growth would be assessed using digital video transects using the protocols outlined in the Florida Marine Research Institutes "Standard Operating Procedures Field and Laboratory Operations: Florida Keys National Marine Sanctuary Coral Reef/Hardbottom Monitoring Project" (http://www.cofc.edu/~coral/epacrmp/crmp.htm). Sponge coverage would be estimated as percent coverage. The quarterly sampling would evaluate changes in species, composition and numerical abundance, which occur in this community over time.

4.4.4 Fish Surveys

Quarterly daytime underwater fish surveys would be undertaken by SCUBA divers utilizing two census techniques. Transect surveys would be carried out along sections of the SMART structure and would provide primarily qualitative data on overall fish community composition. Stationary census data would be collected from fixed positions on the SMART structure to provide quantitative estimates of fish abundance.

4.4.5 Transect Studies

Transect studies would consist of swimming the length of the SMART structure proceeding either along the inshore side and returning on the offshore side of the structure or vice versa. Three SMART nearshore and three SMART offshore survey points would be recorded for further data collection and comparison. During these surveys, additional effort would be made to survey crevices for cryptic species or for newly settled larval or juvenile fishes. Comparison would be made to three transects surveyed on randomly selected natural rock reefs offshore of the project area.

Data would be analyzed with two-way ANOVA (ANalysis Of VAriance between groups) to determine whether significant differences in the main factors of time and substrate type (natural versus SMART structure segments) occur.

5 DATA COLLECTION, ANALYSIS, AND SUBMITTAL RESPONSIBILITIES

As part of the monitoring plan, ERDC and DERM will participate in various monitoring activities or be responsible for contracting of work associated with field data collection, data analyses and products including reports and presentations.

FDEP will be provided with monitoring data and reports, and will have a role in ensuring that work is performed in accordance with state policy. The Department will also have a role in approving any changes to the monitoring plan, and in determining the applicability of contingency plans should they be needed.

A special scientific third party consultant will have the role of assisting in the review of the project and to provide an assessment of results and appropriate recommendations.

5.1 Data Analysis

All data collected in accordance with this test plan would be completed in a form suitable for analysis, would be reduced by the data collector and provided to DERM within thirty days after each data collection effort. ASCII versions of the data are required in accordance with this test plan and would conform to FDEP format. All work activities and deliverables shall be conducted in accordance with the latest update of the Bureau of Beaches and Coastal Systems (BBCS) *Monitoring Standards for Beach Erosion Control Projects, Sections 01000 and 01100*.

Periodic meetings would be held with all interested parties to discuss data and the interpretation of findings to date. Adjustments or refinements to the monitoring techniques may be proposed periodically. Any change to the monitoring plan would be approved by the FDEP.

5.2 Reporting Results

Results would be documented in interim, annual and final reports. Interim reports would be submitted within thirty days following receipt of the field data by the parties listed above. Annual and Final reports would be submitted within forty-five (45) days upon receipt of the field data by the parties listed above. The analyses would focus on quantifying: 1) the general effect of the SMART structure on waves and currents and its interaction with these hydrodynamic elements; 2) the effect of the SMART structure on sediment transport with special emphasis on the seasonal and annual cumulative volumetric changes and patterns of sediment trapped behind the SMART structure, and the seasonal and annual patterns of shoreline and volumetric changes adjacent to the SMART structure; 3) the effect of waves and currents on the structure with special reference to settlement or movement; 4) the effect of the SMART structure on storm wave activity; 5) the results of the colonization studies and fish censusing; and 7) the results of the marine turtle monitoring.

5.3 Additional Monitoring

DERM with assistance from ERDC would oversee the collection of nearshore surveys (including structure elevation surveys) and make data available to FDEP in both ASCII and ISRP (Interactive Survey Reduction Program) format. DERM would also process data by producing line drawings of profile cross sections. Processing and reporting of data in reports would be performed by DERM. Information to be contained in these reports includes shoreline change maps associated with the nearshore surveys and structure change maps/diagrams associated with the structure elevation surveys, also to be provided by DERM.

Environmental monitoring data would be collected, processed and analyzed by DERM with assistance from ERDC and provided in quarterly and annual reports.

DERM would be responsible for the collection of data associated with the storm contingency plan (including nearshore surveys/structure elevation surveys; aerial photography; and scour measurements).

FDEP/DERM/ERDC/SAJ Meeting	FDEP/DERM/ERDC/SAJ
Pre-Notice Permit Conditions	FDEP/SAJ
FDEP Notice to Proceed	FDEP
Wave Gage Deployment	DERM/ERDC
Fabricate SMART Units	Reef Innovations, Inc.
Install SMART Units	TBD by competitive bid
Pre-Installation Survey	DERM/ERDC
Post-Installation Survey	DERM/ERDC
Data Collection by Wave Gages	DERM/ERDC
Download Wave Gage Data	DERM/ERDC
Beach & Offshore Surveys	DERM/ERDC
Elevation Surveys	DERM/ERDC
Scour Measurements	DERM/ERDC
Marine Turtle Surveys	DERM
Biological Surveys	DERM
Annual Reports	DERM/ERDC
Final Report	DERM/ERDC

Table 2: Activity Responsibilities

6.0 **EXAMPLE TEST** PLAN SCHEDULE (TABLE 3)

#	Activity	Year of Installation												Year 1												Year 2												Year 3											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
I. Preliminary Tasks																																																	
1	FDEP/DERM/ERDC/SAJ Meeting			X																																													
2	PrePermit Conditions&Easement	X																																															
3	FDEP Notice to Proceed					X																																											
4	Wave Gage Deployment			X																																													
II. SMART Structure Fabrication and Placement																																																	
5	Fabricate ReefBall Units			X	X	X																																											
6	Install ReefBall Units						X	X	X																																								
III. Monitoring Program																																																	
7	Pre-Installation Survey					X																																											
8	Post-Installation Survey									X																																							
9	Data Collection by Wave Gages			X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																
10	Download Wave Gage Data						X						X			X			X			X			X			X			X			X															
11	Beach & Offshore Surveys													X						X						X						X						X						X					
12	Multi-beam Elevation Surveys																			X												X												X					
13	Scour Measurements													X						X						X						X						X						X					
14	Marine Turtle Surveys				X	X	X	X	X	X	X						X	X	X	X	X	X	X						X	X	X	X	X	X	X						X	X	X	X	X	X			
15	Biological Surveys													X						X						X						X						X						X					
IV. Data Analysis and Reporting																																																	
16	Annual Reports																							X												X													
17	Final Report																																															X	

7 TEST PLAN CONTINGENCIES; REPAIR, MAINTENANCE, AND REMOVAL PROTOCALS

Planned contingencies for this demonstration project will ensure for a path forward if certain situations arise during the implementation of the project. The below sub-sections provide “if…then…” protocol on how this project may need to be adjusted because of issues that may arise.

7.1 Beach Fill

If the beach fill associated with the Dade County BEC project nourishment does not get placed prior to the scheduled construction of the SMART structure, then additional modeling will be used to re-assess how the structure will need to be modified to function properly, or the installation of the SMART structure will be delayed until the nourishment takes place.

If DERM, the City of Miami Beach, or private property owners place fill within the project area, then a beach fill survey as described in section 4.1.2 would be conducted. The results of this survey would be included in the monitoring data collection and used in the performance analysis of the project.

7.2 Settlement

If monitoring reveals that the SMART structure undergoes settlement not meeting structural success criteria and that the settlement of the structure is causing harm to the coastal and environmental system, then the structure will be modified or removed. However, if the structure settles beyond the success criteria, it is possible that the structure will continue to provide a reduced level of wave attenuation such that there is still some benefits to the shoreline, or the environmental benefits created by the SMART structure could make it beneficial to leave the structure in place.

7.3 Structure Displacement or Module Destruction

If the structure becomes displaced or a module of the structure gets destructed to an extent where it is causing harm to the coastal and environmental system, then the structure will be removed.

If portions of the structure break apart creating a public safety or environmental hazard, then the displaced pieces will need to be removed or re-attached to the structure.

7.4 Public Safety Protocols

Signage will be utilized to identify the location of the structure for the general public (swimmers, boaters, etc.). However, if the structure is determined to be a public safety hazard, then either additional signage will be provided or the structure would be modified or removed to correct the problem.

7.5 Failure of individual components of the Breakwater structure

If it is determined that an individual component or components of the breakwater structure are causing detrimental impacts, then the specific component or components causing the problem will be modified or removed as is necessary to correct the problem.

7.6 Adverse Shoreline Impacts

If the structure directly causes recession to the extent that the MHWL shifts and remains landward of the ECL (or some other littoral baseline to be determined) in the project area or adjacent shorelines, then corrective actions, to include modification or removal of the structure, will need to be taken by the responsible parties.