ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

SHORE PROTECTION AND BEACH RENOURISHMENT PROJECT FOR OCEAN RIDGE, DELRAY BEACH, AND BOCA RATON

SOUTHERN PALM BEACH COUNTY, FLORIDA

Prepared by
Department of the Army
Jacksonville District Corps of Engineers

August 2013

FINDING OF NO SIGNIFICANT IMPACT
SHORE PROTECTION AND BEACH RENOURISHMENT PROJECT FOR
OCEAN BEACH, DELRAY BEACH, AND BOCA RATON
SOUTHERN PALM BEACH COUNTY, FLORIDA

I have reviewed the Environmental Assessment (EA) for the proposed action. This Finding incorporates by reference all discussions and conclusions contained in the EA enclosed hereto. Based on information analyzed in the EA, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement (EIS). Reasons for this conclusion are, in summary:

a. The proposed action will be conducted in accordance with the Endangered Species Act, and specifically in compliance with the Statewide Programmatic Biological Opinion issued by the U.S. Fish and Wildlife Service and Biological Opinion issued by the National Marine Fisheries Service. The work will not jeopardize the continued existence of any threatened or endangered species or impact any designated critical habitat.

b. This project has been coordinated with the State of Florida, and all applicable water quality standards will be met.

c. The proposed work is being coordinated through the State of Florida and is expected to be consistent with the Florida Coastal Zone Management Program upon receipt of the DEP Permit.

d. The proposed work has been coordinated with the Florida State Historic Preservation Officer and federally recognized tribes. It has been determined that the proposed dredging will not adversely affect any properties eligible for or listed on the National Register of Historic Places.

e. There are no known sources of hazardous, toxic, or radioactive wastes in the project area. Sediments and materials for the areas to be excavated during construction have been evaluated to be sandy material, with no indication of contaminants.

f. Public benefits will be provided with a renourished beach.

g. Measures will be in place during construction to eliminate, reduce, or avoid adverse impacts below the threshold of significance to fish and wildlife resources.

In view of the above, I conclude that the proposed action for the Ocean Ridge, Delray Beach, and Boca Raton segments for shore protection will not result in a significant adverse effect on the human environment. This Finding incorporates by reference all discussions and conclusions contained in the EA herewith and do not require an EIS.

Alan M. Dodd
Colonel, Corps of Engineers
Commanding

Date

ENVIRONMENTAL ASSESSMENT
SHORE PROTECTION AND BEACH RENOURISHMENT PROJECT
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SOUTHERN PALM BEACH COUNTY, FLORIDA

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SOUTHERN PALM BEACH COUNTY, FLORIDA

1.0 PROJECT PURPOSE AND NEED

1.1 PROJECT AUTHORITY

This is a federally authorized storm protection and beach renourishment project. The 2013 renourishment is authorized under the Flood Control and Coastal Emergency (FCCE) rehabilitation, PL 84-99, and meets the FCCE justification criteria spelled out in section 5-20.e of ER 500-1-1.

This report provides an Environmental Assessment (EA) of the Ocean Ridge, Delray Beach, and Boca Raton segments of the Palm Beach County, Florida Shoreline Protection Project (SPP). This EA is being prepared according to the authority provided by Section 506 and Section 934 of the Water Resources Development Act (WRDA) of 1996. Delray Beach was previously authorized for 50 years pursuant to Section 934, WRDA 1986 via the Secretary of the Army (ASA) approval, received 1 March 1991; North Boca was authorized for 50 years pursuant to Section 506(b)(2) WRDA 1996 via ASA approval, received 30 September 1997; and Ocean Ridge was authorized for 50 years pursuant to Section 506(b)(2) WRDA 1996 via ASA approval.

The Ocean Ridge segment, first authorized in 1962, provides for construction along 1.1 miles of shoreline (R153-R159) with a design berm width of 100' at elevation 9.0' NGVD. The Delray Beach segment, first authorized in 1962, provides for initial construction and periodic renourishment at 8-year intervals along 1.9 miles of shoreline (R175-R188a) with a design berm width averaging 100' at elevation 9.0' NGVD. The north Boca Raton segment was first authorized in 1962 and now allows for construction of a 50' wide berm at elevation 9.0' NGVD along 1.42 miles from R205-R212.

1.2 PROJECT LOCATION

The project area is defined as all areas to be affected directly or indirectly by the action and not merely the immediate areas involved in the action. The project area includes the beach fill placement area; the area of projected beach fill equilibration; unvegetated softbottom within the offshore borrow areas; and shallow- water nearshore hardbottom and softbottom habitats within the proposed turbidity mixing zone. The proposed project, in addition to past projects and any future actions within the project area, primarily affects the sandy dry beach, nesting and foraging habitat for sea turtles, nearshore softbottom benthic communities, nearshore hardbottom habitat, offshore softbottom communities, and foraging habitat for shorebirds and surf zone fishes. The beach will continue to be maintained as an area suitable for shoreline protection, recreation and wildlife habitat. Descriptions of the three project segments are provided below.

1.2.1 Ocean Ridge Segment

The Town of Ocean Ridge (Boynton Beach municipality) is located on a barrier island on the southeast coast in Palm Beach County, 45 miles north of Miami and southeast of Lake Okeechobee. The maximum width of the barrier island in the project area is approximately 0.4 miles. Palm Beach County's ocean front beaches extend for 40 miles between Martin County (Stuart) to the north and Broward County (Ft. Lauderdale) to the south. The authorized Ocean Ridge segment involves beach renourishment along approximately 1.1 miles of shoreline from approximately 165 ft south of the Florida Department of Environmental Quality (FDEP) reference monuments R-153 to R-159 (**Figure 1**). Design berm widths vary between 28 and 168 ft with a berm height of +7.45 ft (NAVD88) with a seaward construction slope of 1V:15H.

1.2.2 Delray Beach Segment

The City of Delray Beach is located in southern Palm Beach County on the southeast Atlantic coast of Florida (**Figure 2**), about 50 miles north of Miami. It is influenced by the South Lake Worth Inlet to the north and the Boca Raton Inlet to the south. The City encompasses about 2 miles of shoreline and is characterized by public beach access, residential, and commercial property. State Road AIA (SRA1A) runs along the public access beachfront. The project area is not part of the Coastal Barrier Resources System. The project provides for the restoration of the federally authorized design section and replacement of eight years of advance nourishment. The Delray portion of the project limits extend from R-175 south 1.9 miles to FDEP reference monuments R-188A (500 feet south of Atlantis Dunes Park). The design cross section provides for a berm width extension of 100 feet (30.5 m) from the Erosion Control Line (ECL) at an elevation of +7.5 feet (2.29 m), NAVD, and a seaward slope of 1V to 10H.

1.2.3 Boca Raton Segment

The City of Boca Raton is located at the southern end of Palm Beach County (**Figure 3**). The City is comprised of portions of two barrier islands which are bordered by approximately five miles of coastline and an inlet which opens to the Atlantic Ocean. The federally-authorized North Boca Raton Beach Renourishment Project is referred to as Segment 1 (R-205 to R-212+181 ft). An estimated total of approximately 800,000 cy of beach- compatible sand will be placed within the Segment 1 template from FDEP monuments R-205 to R-212+181' including tapers. The placement templates extend approximately 7,700 feet for Segment 1.

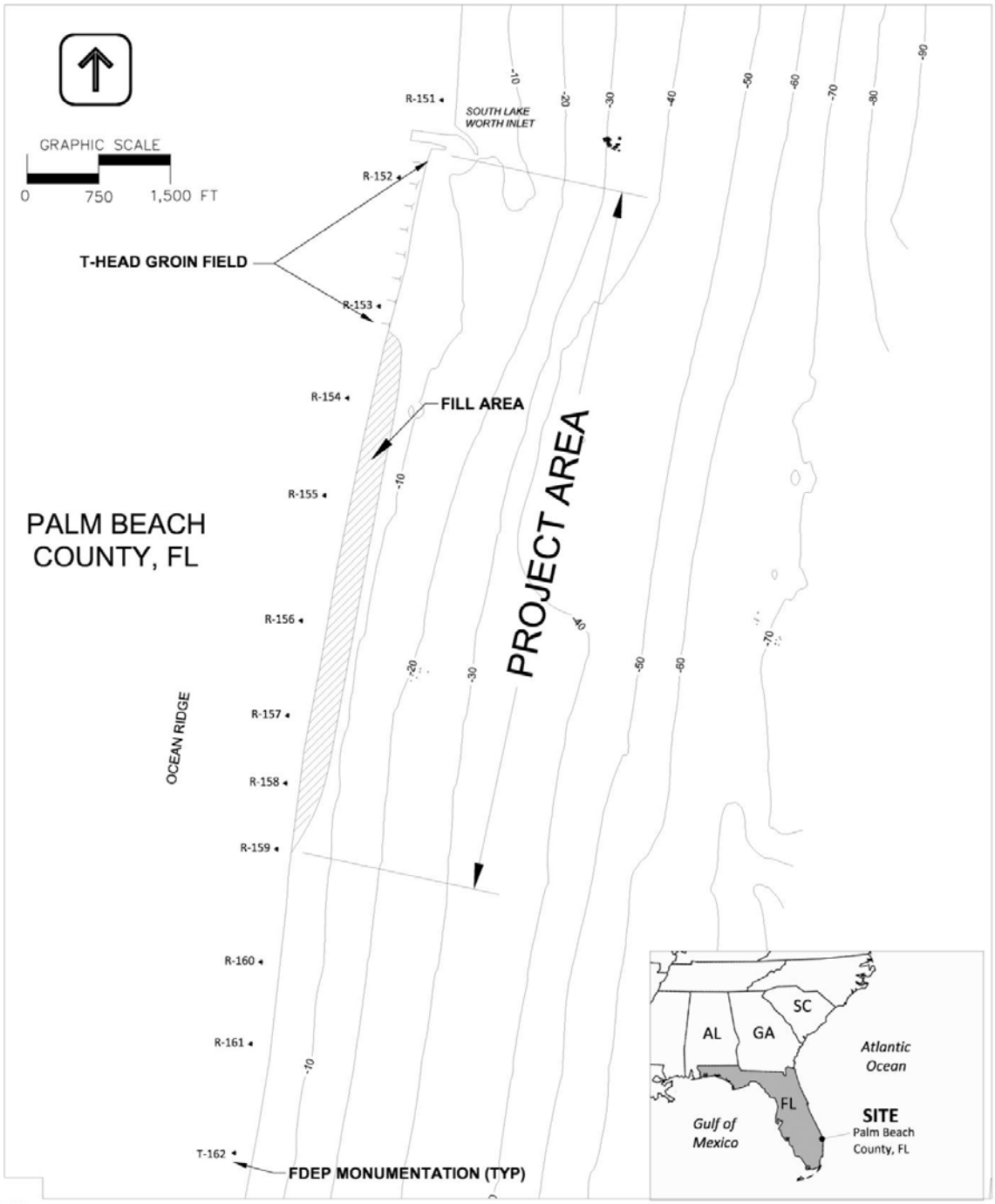

Figure 1: Location of the Ocean Ridge Beach Renourishment Segment (R-153 to R-159) (Coastal Eco-Group Inc, March 2013)

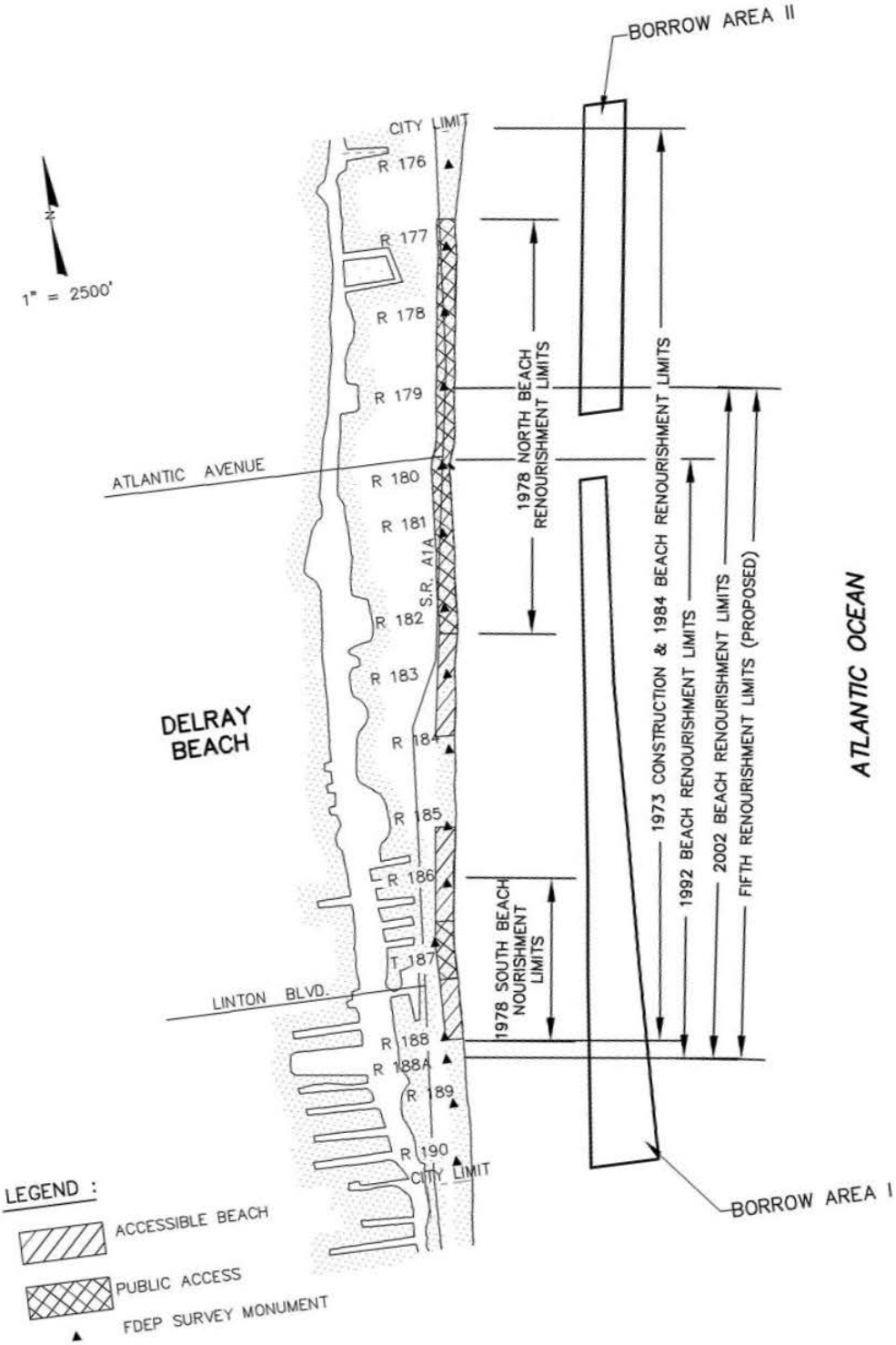

Figure 2: **Location of the Delray Beach Renourishment Segment (R-175 to R-188) and Offshore Borrow Areas (Coastal Planning and Engineering, Inc, November 2011)**

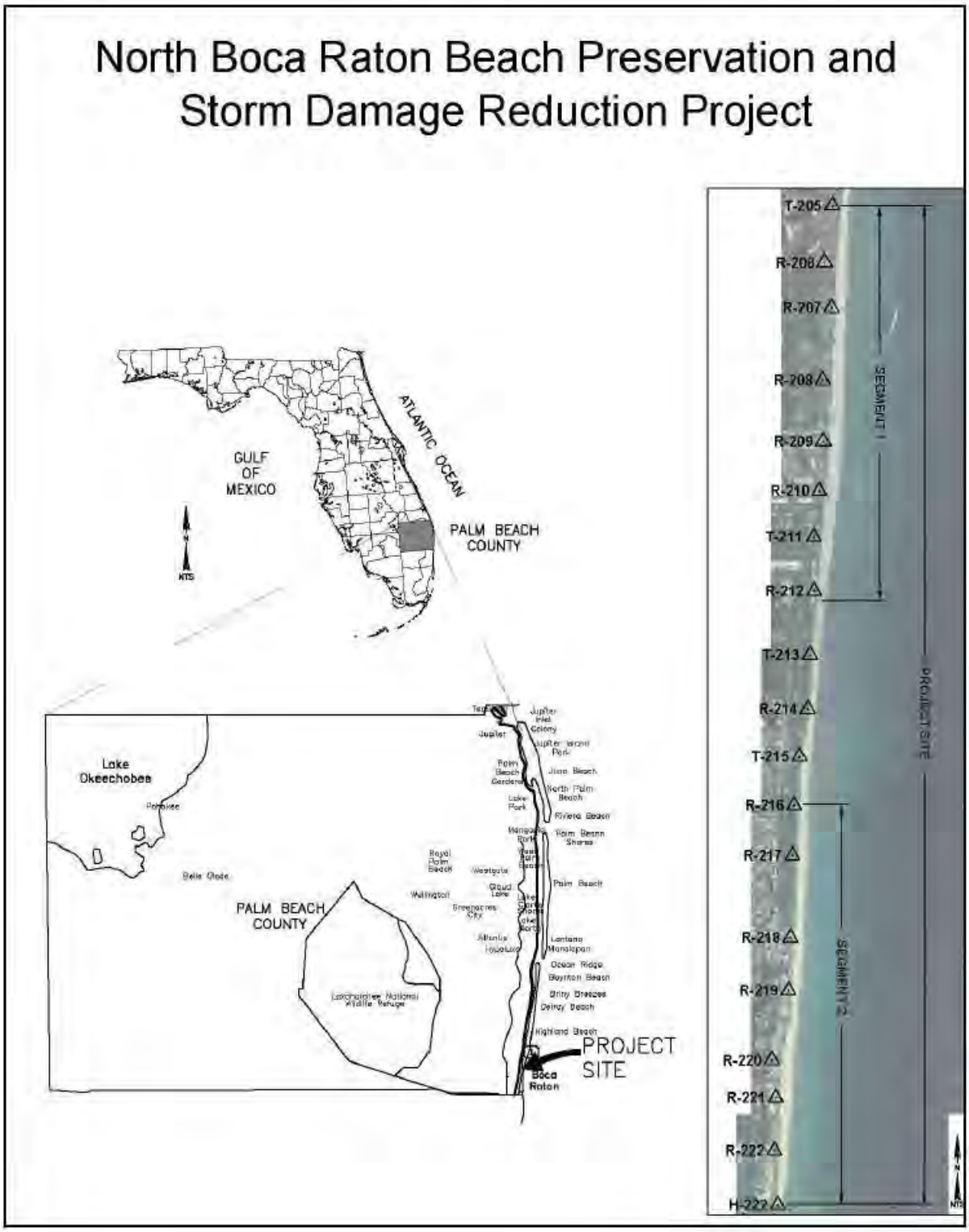

Figure 3: **Location of the North Boca Raton Project Segment (R-205 to R-212+181')**

1.3 PROJECT HISTORY AND NEED

1.3.1 Project History

1.3.1.1 Ocean Ridge

The 1998 Ocean Ridge Shore Protection Project involved placement of approximately 784,300 cubic yards of beach-compatible sand along 6,780 feet of shoreline from 850 ft north of FDEP monument R-153 to 110 feet south of monument R-159 and construction of eight T-head rock groins spaced about 240 feet apart along the northern 1,800 feet of the project area shoreline. Sand was dredged from an offshore borrow area located offshore of the beach fill area between R-152 and R-156. The FDEP adopted the South Lake Worth Inlet Management Plan on March 5, 1999. The 1998 Ocean Ridge Shore Protection Project was included in the adopted plan, as were subsequent renourishment projects, provided that they satisfied the plan's annual sand bypassing requirements. The strategic beach management plan for the South Lake Worth Inlet (SLWI) shoreline (R-151 to R-152) is continued bypassing of beach-compatible sand to downdrift beaches in order to meet an annualized bypassing objective of 88,000 cubic yards. This objective is partially satisfied by ensuring that a minimum of 60,000 cubic yards are mechanically bypassed by the sand transfer plant on an annual basis. It was anticipated that following completion of groin field construction in 1998, all sand placement associated with the SLWI sand bypass operation would occur south of the groin field. Due to opposition from upland interests, Palm Beach County was unable to relocate the sand bypass discharge location. As a result, all bypassed sand has been and continues to be discharged within the limits of the groin field. The first renourishment of the 1998 project was constructed in 2005. Approximately 584,900 cubic yards of sand were placed between the southernmost T-head groin (about 1,050 ft south of the 1998 limit) and R-159 (110 ft north of the 1998 limit). Sand was dredged from a previously unused portion of the offshore borrow area delineated for the 1998 project.

1.3.1.2 Delray Beach

The initial federal authorization was included in Section 101 of the River and Harbors act (October 23, 1962 (PL87-874)). The project described in House Document 164/87/1 provided for the restoration and periodic nourishment of the beaches extending from the Martin County line to Lake Worth Inlet and from South Lake Worth Inlet to Boca Raton Inlet. The restored beach has a general width of 100 ft and a berm elevation of 10 ft above mean low water. This project included a 3-mile segment of shore, which extended along the oceanfront of the City of Delray Beach. At the time of construction of the Initial Project in 1973, the Chief of Engineers approved a reduction of the project length from 3 miles to 2.7 miles, and a beach berm elevation of +9 ft (NGVD). Also, because of severe erosion that occurred at Delray Beach during the 11-year period between authorization and construction of the project and the uneven nature of the erosion control line, the width of the constructed project was adjusted to provide plan view continuity and the authorized scope of protection within the 1992 GDM. Prior to the initial project construction, the beach along the project area was eroding at a rate of about 1 cubic yard (cy) of sand per foot of beach per year. As a result, the protection provided by the beach fronting the city was greatly reduced. On several occasions, modest storms severely damaged sections of S.R. A1A. Emergency measures taken to protect upland property included the construction of over 3,600 ft of revetments and seawalls. The City's Beach Nourishment

Maintenance Program was developed to maintain the recreational and storm protection benefits offered by a stable beach and dune system. The program includes periodic beach renourishment projects and native dune vegetation planting to recreate and enhance a viable dune ecosystem along the Municipal Beach areas.

1.3.1.3 Boca Raton

The 2010 North Boca Raton Beach Nourishment Project was the third nourishment event of the federally cost-shared North Boca Raton Shore Protection Project. The project was constructed between January 23, 2010 and March 4, 2010 with placement of approximately 782,000 cubic yards (cy) of beach-compatible sand along 1.45 miles of shoreline between FDEP control monuments R-205 south to 181 ft (~55 m) south of R-212. The project area beach was initially restored between July and August 1988 with placement of approximately 1,104,000 cubic yards (cy) of sand along the 1.45-mile project shoreline. The borrow site for the 1988 project was located approximately 2,500 ft (762 m) offshore of the beach fill area. The second nourishment project was constructed between March and April of 1998 with placement of approximately 680,000 cy of sand dredged from a portion of the original borrow site dredged in 1988. The borrow site for the 2010 project was located approximately 2,500 ft (~762 m) offshore of the project fill area between FDEP monuments R-201 and R-205. The Central Boca Raton Beach Nourishment Project was initially constructed by the City of Boca Raton between February and April 2004. Approximately 500,000 cubic yards of beach-compatible sand were placed over the 1.5 mile project area from FDEP monument R-216 to approximately 1,000 feet south of H-222 (Boca Raton Inlet). Following completion of this project, Hurricanes Frances and Jeanne impacted the Boca Raton shoreline in August/September 2004. The Central Boca Raton Beach Hurricane Repair Project was constructed from February 28 through March 21, 2006 to mitigate the losses from Hurricanes Frances and Jeanne; approximately 364,000 cubic yards of sand were back-passed to the project area shoreline from the Boca Raton Inlet ebb shoal.

1.3.2 Project Need

The 1987 GDM and 1987 FEIS identified specific shorelines in Palm Beach County as critically eroded. The FDEP currently identifies the Ocean Ridge, Delray Beach, and Boca Raton segments as critically eroded beaches (FDEP, 2008). The Palm Beach County SPP increases the level of storm protection in the project area and feeds sand to beaches south of the project.

1.4 PROJECT GOALS AND OBJECTIVES

As outlined in the countywide 1987 FEIS, planning objectives for this project include reducing expected storm-induced damage, reestablishing beaches suitable for current and future recreational beach activity demand, maintaining a suitable beach (sand) habitat for sea turtle nesting, supporting invertebrate and shorebird species, and maintaining recreational uses (including tourism). This EA excludes any additional planning objectives.

This EA updates the 1994 SEIS with current information concerning the project activities and associated environmental evaluations performed since the 1994 SEIS. Specifically, this EA intends to

1) Verify that impacts presented in the original project environmental documentation were accurately and adequately projected.
2) Address the environmental implications of any unanticipated or unforeseen impacts.
3) Address project impacts relative to any changed conditions or requirements (i.e., new endangered species, new environmental legislation, slight modifications or refinements to the project, etc.).
4) Incorporate documentation of coordination with Federal and state agencies and others. Coordination should identify any significant environmental reasons why the project should not continue and provide opportunities to identify "new" (previously un-identified) environmental concerns. Comments from the following agencies are key to satisfactory coordination for the proposed project: US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the Florida Department of Environmental Protection (FDEP).

1.5 RELATED ENVIRONMENTAL DOCUMENTS

The 1987 General Design Memorandum (GDM), included the 1987 Final Environmental Impact Statement (FEIS) for beach erosion control projects within Palm Beach County, Florida. The 1994 GDM supplemented the 1987 GDM and included a Supplemental Environmental Impact Statement (1994 SEIS).

1.6 PERMITS, LICENSES, AND ENTITLEMENTS

Before start of construction, the project will achieve full compliance with the Clean Water Act, the Fish and Wildlife Coordination Act, and the Magnuson-Stevens Fishery Conservation and Management Act. The FDEP and the Corps must issue environmental permits for the proposed action.

Placement of sand on the beach and dredging in the coastal waters of the State of Florida by the Corps requires compliance with Section 401 of the Clean Water Act (33 USC §1251 et seq.) as amended or 401 Water Quality certification. The FDEP issues this certification. The proposed action requires review by the Florida State Clearinghouse, Florida State Historic Preservation Office (SHPO), and the FDEP to receive the certification. Issuance of the FDEP permit represents compliance with the Federal mandate for CWA compliance.

A joint coastal permit application for the Boca Raton segment was submitted to the FDEP and the Corps in April 2013 (FDEP JCP Application No. 0261499-004- JM and USACE Application No. SAJ-1986-00479). The combined project is consistent with previously authorized projects and the FDEP Strategic Beach Management Plan. A joint coastal permit application for the Ocean Ridge Beach segment was submitted to the FDEP and the Corps in April 2012 (FDEP JCP Application No. 0311339-001-JC and USACE Application No. SAJ-2012-01244 (IP-AAZ). A joint coastal permit application for the proposed Delray Beach segment was submitted to the FDEP and the Corps in February 2012 (FDEP JCP Application No. 0303553-001-JC and USACE Application No. SAJ-1989-90053 (IP-AAZ).

Consultation with the State Historic Preservation Officer has been completed as required. The proposed project is subject to the provisions of the Coastal Zone Management Act, and the State of Florida will evaluate the project for consistency with the goals and objectives of the Act.

The USFWS, NMFS, the U.S. Environmental Protection Agency (EPA), and the Florida Fish and Wildlife Conservation Commission (FWC) will also coordinate and evaluate the proposed action. The USFWS has declared that projects along the shoreline of southeast Florida will require consultation for potential impacts to overwintering piping plovers in addition to consultation on potential impacts to marine turtles. The Cities of Ocean Ridge, Delray Beach, and Boca Raton in Palm Beach County have initiated consultation with the USFWS and NMFS regarding effects of the project on listed/protected species under the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA). A Biological Assessment was submitted to the USFWS and NFMS in October 2012. The sponsors have agreed to implement the Reasonable and Prudent Measures and the Terms and Conditions outlined in the U.S. Fish and Wildlife Service's Statewide Programmatic Biological Opinion for sand placement activities in Florida dated August 22, 2011, for: (a) projects that include sand placement from beach renourishment, sand bypass, and sand back pack pass activities primarily for shore protection; and for: (c) projects that include groin or jetty repair or replacement. To avoid potential encounters with swimming sea turtles, the contractor will be required to implement NOAA's Vessel Strike Avoidance Measures and the NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions.

1.7 DECISIONS TO BE MADE

The Delray Beach, Ocean Ridge and Boca Raton segments of the Palm Beach County Shoreline Protection Project have already been authorized for periods of federal participation extending through 2023, 2047 and 2038, respectively. This EA analyzes the FCCE placement and provides a sound rationale for federal participation.

1.8 SCOPING AND ISSUES

1.8.1 Impact Measurement

The environmental issues relevant to the decision to extend project authorization and considered in detail in the EA include: hardbottom habitat; essential fish habitat (EFH); fish and wildlife resources; threatened and endangered species; water quality; and recreation resources.

The proposed action should not affect the following issues; thus, this EA does not analyze in detail the following issues: aesthetic resources; vegetation; energy requirements and conservation; scientific resources; Native Americans; hazardous, toxic, and radioactive wastes (HTRW); reuse and conservation potential; urban quality; solid waste; drinking water; historic properties; air quality; noise; and navigation.

This EA compiles information from a variety of sources, including other National Environmental Policy Act (NEPA) documents prepared for this project and other similar projects in the region, Palm Beach County monitoring reports, and Biological Opinions. Information was obtained from literature search and coordination with federal, state, and local resource agencies having expertise in certain areas.

2.0 ALTERNATIVES

2.1 INTRODUCTION

The 1987 FEIS and 1994 SEIS provide full evaluations of reasonable alternatives to the proposed Ocean Ridge, Delray Beach, and Boca Raton segments of the SPP. The alternatives considered in this EA include the no-action alternative and the proposed action.

2.2 NO-ACTION ALTERNATIVE

The no-action alternative assumes that the current conditions will continue unabated and provides no solution to existing erosion and shore protection problems. The existing shoreline will continue to erode without placement of fill sand. This would result in the loss of existing beach and possible exposure of previously buried structures.

Prior to the 1998 project, the uplands, State Road A1A, parks, dunes, and dune vegetation were significantly threatened by storm impacts and saltwater inundation. In the absence of a shore stabilization project, shoreline retreat and storm-driven erosion would have exposed upland properties to negative impacts and resulted in the loss of valuable nesting habitat for shorebirds and sea turtles. The project area lies along a segment of shoreline designated as a "Critically Eroded Area" by the FDEP Bureau of Beaches and Coastal Systems (FDEP, 2012). A beach with a critical erosion designation from the FDEP has been deemed insufficient to provide adequate storm protection to upland properties and limits recreational, economic, and natural resource benefits. For this reason, the No-Action Alternative does not meet the needs of Palm Beach County to maintain the shorelines of Ocean Ridge, Delray Beach, and Boca Raton.

2.3 PROPOSED PROJECT

The proposed action would continue the authorized Palm Beach County SPP. Each of the separable elements has different start dates. The initial construction dates for Ocean Ridge, Delray and Boca Raton were 1997, 1973, and 1988, respectively. Delray, Ocean Ridge, and Boca Raton are already authorized for 50 years, with periods of Federal participation extending through 2023, 2047, and 2038, respectively. A dredge will excavate and transport the fill material to the project site. The dredge will moor within approved contractor work areas and pump the material through a pipeline to the beach. Upon reaching the shorefront, the pipeline will extend along the beach either north or south, depending on construction progress. The contractor will relocate the pipeline discharge point as the project advances. Replacement of sea oats (*Uniola paniculata*) and other native plants lost due to any erosion of the dune will occur as required as part of each beach renourishment project. Details of each project segment are as follows:

2.3.1 Ocean Ridge

Consistent with the original project objectives of the 1998 shore protection project and the 2005 first maintenance nourishment, the proposed placement of approximately 550,000 cy of beach-compatible sand along the 1.1-mile project shoreline from 165-ft south of FDEP monument R-153 south to monument R-159 is necessary to increase the level of storm protection to the existing dune system, upland habitat, and infrastructure. Proposed improvements to the existing groins include removal of the top layer of armor stone from the shore-perpendicular stems of the

5 southernmost T-head groins. This is expected to lower the crests by about 2 ft to elevations varying between +0.45 and +2.45 ft (NAVD88) at the seaward and landward portions of the groin stems, respectively. The shore-parallel head portion of the groins would not be modified. Armor stone excavated from the stem structures will be removed from the beach.

2.3.2 Delray Beach

This project segment is the Fifth Periodic Renourishment Project for the City of Delray Beach. This project will utilize the same construction template as the Fourth Periodic Renourishment Project, extending 1.9 miles south from R-175 to R-188a. The design cross section provides for a berm width extension of 100 ft with a crest elevation of +7.5 ft (NAVD) and a seaward slope of 1V to 10H. There is no deviation in design or borrow area for the Fifth Renourishment Project from the previously permitted and constructed Fourth Renourishment project. The project is proposed to utilize two borrow areas (Borrow Areas I and II) that run parallel to shore and are located approximately 2000 ft offshore of the project area. The borrow areas are approximately 2 miles long with a width ranging between 450 to 1000 ft. The volume of material required is estimated to be 1,208,000 cy based on the November 2008 survey and anticipated losses before construction. An updated survey will be conducted prior to construction and placement values will be adjusted accordingly. The depth of closure is approximately -25.5 ft NAVD. This depth marks the seaward limit of significant sediment movement but is recognized to be storm dependent.

2.3.3 Boca Raton

This segment involves emergency restoration of the Palm Beach North Boca Raton project to pre-storm conditions. This will involve the placement of approximately 234,000 (Lost volume pre to post storm) cubic yards of sand and will affect the upper beach, dune, intertidal and nearshore environments. No portion of this beachfill placement will extend beyond the original construction template. The sand will be obtained from a borrow area that was previously permitted and used for the project. The placement sites, project profiles, quantities, and methods will be within the scope of that authorized by current permits and certifications. Restoration of the pre-hurricane condition would occur on 1.42 miles of the North Boca Raton segment between DNR monuments R-205 and R-212

2.4 CHANGES TO THE AUTHORIZED PROJECT

Since publication of the 1994 SEIS, changes to the recommended plan have included the location and uses of additional borrow areas.

2.5 PROPOSED BORROW AREA

2.5.1 Ocean Ridge Borrow Area

The two proposed borrow areas are located immediately adjacent to the offshore borrow area utilized for the 2005 and 1998 projects (**Figure 4**). The average distance of the borrow areas from the shoreline is approximately 2,100 ft. Sediment conditions within the borrow areas are similar to the beach fill placed along the project area shoreline in 1998 and 2005. The southern borrow area is approximately 108.2 acres in size while the northern borrow area is

approximately 17.8 acres. Maximum dredge depths vary from approximately -44.6 to -51.6 ft (NAVD 88), and the maximum volume available is approximately 2.6 million cubic yards of beach-compatible sand.

2.5.2 Delray Beach Borrow Area

The Delray portion of the project limits extend from R-175 south 1.9 miles to FDEP reference monuments R-188A (500 feet south of Atlantis Dunes Park) (**Figure 5**). The design cross section provides for a berm width extension of 100 feet (30.5 m) from the Erosion Control Line (ECL) at an elevation of +7.5 feet (2.29 m), NAVD, and a seaward slope of 1V to 10H. The design is the same as the previously authorized Fourth Renourishment project constructed in 2002, as described in the 2001 Limited Reevaluation Report. It is anticipated that this project will use sand from the same offshore, shore-parallel borrow areas that were permitted for the federal project in 2002. The estimated construction volume based on the November 2008 survey was 1,208,000 cy. The total volume may be changed at the time of construction, due to possible shoreline changes since November 2008. An updated survey will be conducted prior to construction and placement volumes will be adjusted accordingly. The area of influence of this segment will include the beach front within the Delray Beach city limits and an area approximately 1 mile offshore.

2.5.3 Boca Raton Borrow Area

Sand will be dredged from one of three borrow areas located offshore of the project fill shoreline. Borrow Area 1 is the northernmost borrow area (**Figure 6**) and will be used for Segment 1. Borrow Area 1 overlaps a previously dredged borrow area and extends the site of new dredging to the north, east, and west. The average distance of the borrow areas from the shoreline is approximately 2,100 ft. Water depths within the three borrow areas range from approximately -40 ft to -60 ft (NAVD88). The minimum distance from the eastern edge of Borrow Areas 1 and 2 to the western edge of the outer linear reef is approximately 960 ft. Sediment conditions within the borrow areas are similar to the beach fill placed along the project area shoreline in 2010 and 2004. Previous dredge cuts in Borrow Area 1 range from -45 ft to -70 ft (NAVD88). The City of Boca Raton has requested a turbidity mixing zone at the beach discharge site which extends 300 m (~984 ft) offshore and 1,000 m (~3,281 ft) down current during project construction. This mixing zone is identical in dimensions to the mixing zone variance issued for construction of the 2010 North Boca Raton Beach Restoration Project (FDEP Permit No. 0261499-001-JC).

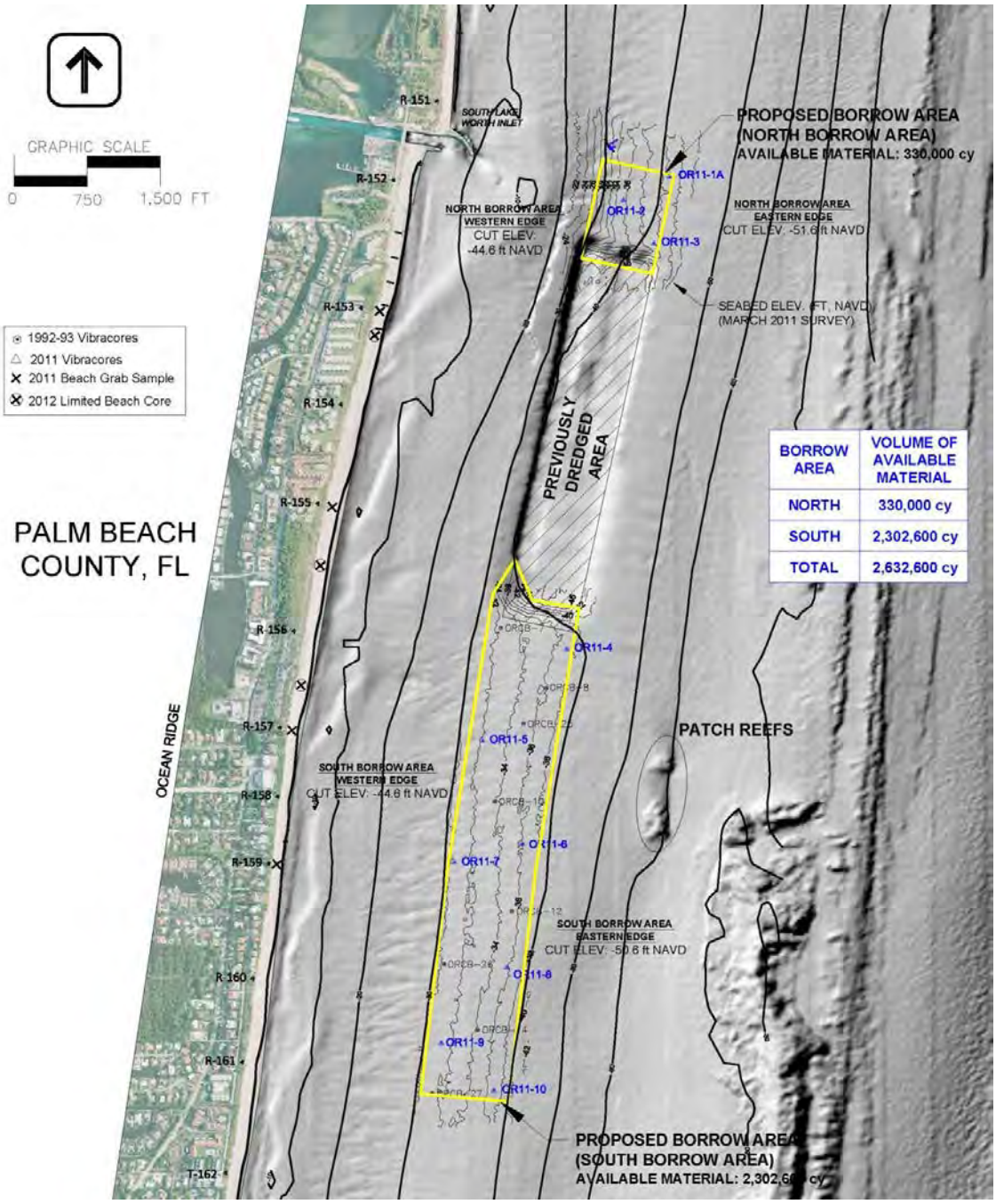

Figure 4: **Location of the Ocean Ridge Beach Renourishment Offshore Borrow Areas (Coastal Eco-Group Inc, March 2013)**

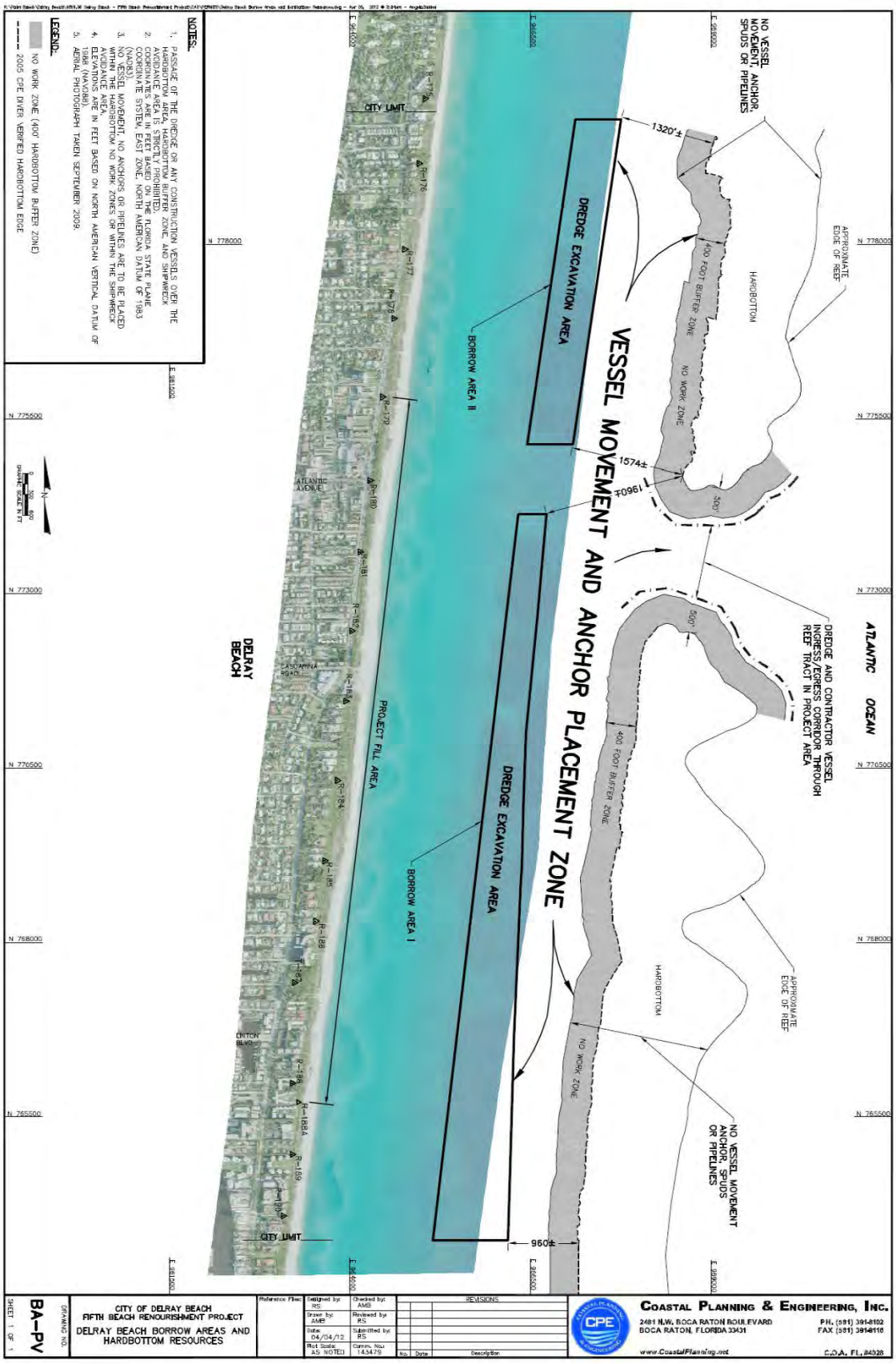

Figure 5: Location of the Delray Beach Renourishment Offshore Borrow Areas

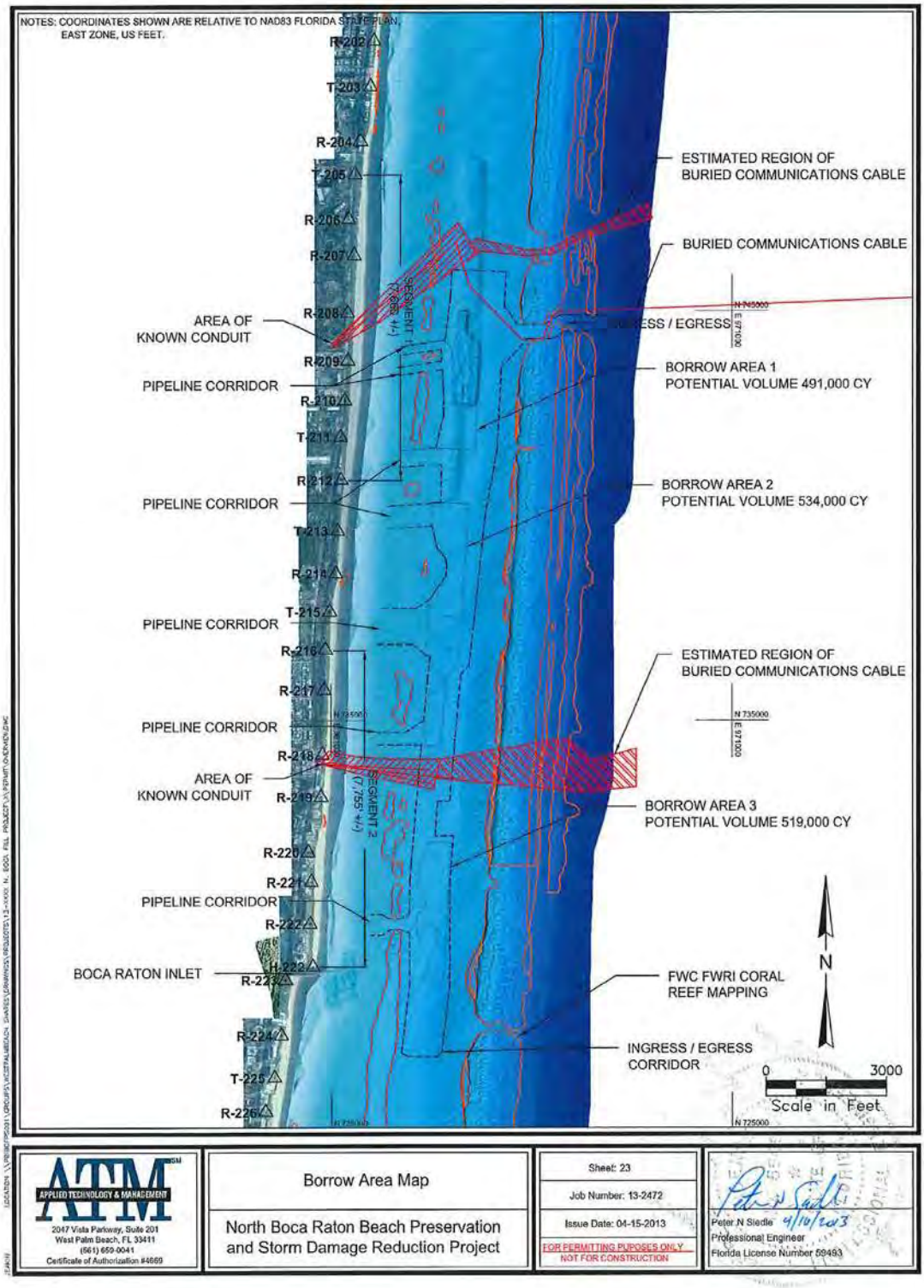

Figure 6: **Location of the Boca Raton Beach Renourishment Borrow Areas including proposed pipeline and equipment corridors through reef gaps (ATM, 2013).**

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

The Affected Environment section describes the environmental resources affected by the no-action or preferred action alternative.

3.2 GENERAL ENVIRONMENTAL SETTING

3.2.1 Geology

The State of Florida lies on the Floridian Plateau. Exposure of the plateau has occurred during periods of relatively low sea level. Each historic sea level retreat left behind a wide variety of hard marine deposits, which waves and currents have subsequently moved about. These deposits formed the current sandy beaches, offshore bars, and barrier Islands (Kennett, 1982). South of Jupiter Inlet, the Atlantic shoreline presents a sandy beach with abundant sedimentary deposits offshore. Relatively thin (2 m thick or less) sandy beach deposits perch over a limestone base exposed as expanses of hardbottom in the nearshore and offshore of the beach (Finkl and Andrews, 2008). Historically, the shoreline dunes merged into extensive marshes to the west, which merged with upland areas. Much of the marshland has undergone development. Remaining marshland generally occurs as relatively isolated areas through which the ICWW runs and within which stormwater ponds have been constructed.

The stretch of shoreline from Key West to northern Palm Beach County is a chain of coastal barriers that do not migrate in response to sea level change as most sandy barrier islands do because they are cored by the Anastasia Formation (Finkl *et al.*, 2003). The pre- Holocene bedrock of the Anastasia Formation and Miami Limestone, along with Pleistocene coral reefs strongly affects the morphology of the coastline (Finkl *et al.*, 2003).

The continental reef tract of southeast Florida was formed during backstepping of coral reefs in response to sea level rise. The reef tract extends from southern Miami-Dade County to central Palm Beach County as three shore-parallel ridges made up of relict Holocene reefs and lithified sand ridges (Banks *et al.,* 2007). From nearshore to offshore, the three ridges that make up the reef tract are known as the Inner, Middle, and Outer Reefs. The Outer Reef is a relict *Acropora palmata* framework barrier reef (Macintyre and Milliman, 1970) which terminated growth about 7,000 years ago (Lighty *et al.,* 1978) and is the only hardbottom formation offshore of Delray Beach. Here, the reef forms a low ridge that crests in 15-30 m water depth and is located approximately 3,000 ft from the Delray Beach shoreline.

The continental shelf off Palm Beach County has extensive nearshore and offshore sand flats (Finkl and Andrews, 2008). Sands in these deposits accumulate to a thickness of 15 m between the shore-parallel reef tracts to form inter-reefal sands (Finkl and Warner, 2004). Sand flat areas are located on the surface of a sedimentary wedge that infills a structural trough between karstified bedrock in the nearshore and coral reef offshore. The central portion of the sand flat has historically been the primary sediment resource for beach nourishment along the southeast coast of Florida due to its low silt content (Finkl, Benedet and Andrews, 2005).

3.2.2 Climate

The project area's subtropical climate is greatly influenced by the proximity of the Gulf Stream. Annual precipitation averages approximately 60 inches per year in West Palm Beach, Florida. Temperatures typically range between approximately 92˚ Fahrenheit (F) and 58˚ F (Arrington, 2008).

3.2.3 Vegetation

3.2.3.1 Dune Vegetation

Barrier islands are dynamic environments with topographic and vegetation profiles dictated by the interaction of plant growth habits and physical processes such as wind- driven sand movement and salt spray, and wave-driven erosion and accretion (Myers and Ewel, 1990). In southeast Florida, the upper beach and foredune are often characterized by pantropical halophytes such as sea purslane (*Sesuvium portulacastrum*) and beach dropseed (*Sporobolus virginicus*), and railroad vine (*Ipomoea pes-caprae*) and seashore paspalum (*Paspalum distichum*) on erosional foredunes (Myers and Ewel, 1990). Some plant species grow extensive root systems, allowing for prolific growth in unconsolidated beach sand. Common dune plants species in the Ocean Ridge project area include sea oats (*Uniola paniculata*), beach bean (*Canavalia maritima*), beach elder (*Iva imbricata*), dune sunflower (*Helianthus debilis),* sea purslane, and railroad vine. Sea grape (*Coccoloba uvifera*) is present throughout the project area. Most of the native dune habitat in Palm Beach County has been impacted by development, beach erosion, and/or encroachment by exotic plants. The exotic inkberry, beach naupka (*Scaevola frutescens*), dominates portions of the landscaped dune crest and back dune in the project area.

3.2.3.2 Seagrasses

Seagrasses do not occur within the proposed offshore borrow areas or beach fill placement and projected fill equilibration areas. Seagrasses were not observed within the project area during nearshore hardbottom surveys conducted from May 7 through 10, 2012 by Coastal Eco-Group Inc. or during any other survey conducted since 1990. Extensive seagrass beds comprised of Johnson's seagrass (*Halophila johnsonii),* Paddle grass (*H. decipiens)*, and Shoal grass (*Halodule wrightii)* occur immediately west, north, and south of SLWI in Lake Worth Lagoon.

3.3 FISH AND WILDLIFE RESOURCES

3.3.1 Dune and Beach Habitat

Common wildlife in the dune, coastal strand, and maritime hammock habitats include small mammals such as raccoons, opossum, fox and squirrel. The beach provides foraging and resting habitat for numerous migratory birds, seabirds and shorebirds such as terns, gulls sandpipers, plovers, and skimmers. Fish and invertebrates within the intertidal zone are the staple diet for these species. The most common species include sanderling, ruddy turnstone, ring-billed gull, Sandwich tern, least tern, brown pelican and yellow-crowned night heron (PBCERM, 1996).

Eroded material from the dune system contributes to the dry beach located between the toe of dune (scarp) and the mean high water (MHW) line. The dry beach area does not support much

vegetation and is susceptible to wind and storm surge. However, this habitat type provides recreational areas for humans and roosting and nesting grounds for shorebirds and sea turtles. In the dry beach, burrowing organisms, such as sand fleas, isopods, ghost crabs (*Ocypode quadrata*) and transient organisms dominate the fauna.

The upper portion of the beach is dominated by talitrid amphipods and ghost crab (*Ocypode quadrata*). Polychaetes, isopods, and haustoriid amphipods are the dominant organisms in the midlittoral zone. Coquina clams (*Donax* spp.) and mole crabs (*Emerita talpoida*) typically dominate the beach fauna in the surf zone. In the supralittoral zone, ghost crabs (*Ocypode quadrata*) and mole crabs (*Emeria talpoida*), are the most visible and motile inhabitants of the sandy substrate.

The intertidal zone, or wet beach, of oceanfront barrier island beaches is the area periodically exposed and submerged by waves, varying with frequency and with lunar tide cycles. These areas are comprised mainly of sandy bottoms and are influenced by tidal changes. This high energy area is habitat to many benthic and infaunal organisms and offers foraging grounds for birds and finfish. The benthic and infaunal organisms found within the intertidal zone include polychaetes, isopods, haustoriid amphipods and interstitial organisms that feed on bacteria and unicellular algae. The dominant fauna in this zone includes polychaete worms, coquina clams (*Donax spp*.), and mole crabs (*Emerita talpoida*). The surf zone is home to shellfish, foraging fish, predatory fish and occasional offshore migratory predators (Greene, 2002). Biological abundance varies seasonally and is generally highest in summer and lowest in winter (Gorzelany and Nelson, 1987; Matta, 1977; Reilly and Bellis, 1983).

3.3.2 Unconsolidated Substrate (Softbottom Communities)

The intertidal swash zone and the majority of the subtidal habitat in the project area consist of unconsolidated sand substrate beginning in the beach swash zone and continuing in subtidal areas. These zones lack dense populations of sessile plant and animal species (FNAI, 1990). The intertidal and subtidal zones consist of sand of varying thickness overlying rock outcrop; occasional rock outcrop exposure occurs as the sand shifts. Inhabitants in the intertidal swash zone must cope with a tide that leaves many of these organisms aerially exposed for up to six hours at a time, as well as exposed to the high energy of the ocean waves. Typically, these habitats have low species diversity because of the harsh environmental conditions. Within the swash zone, a few mollusks (e.g., *Donax variabilis*), small crustaceans such as haustorid amphipods, and a variety of polychaete worms dominate the environment.

Shallow subtidal soft bottom habitat (< 3 ft [1 m]) is dominated by a relatively even mix of polychaetes (primarily spionids), gastropods (*Oliva* sp., *Terebra* sp.), portunid crabs (*Arenaeus* sp., *Callinectes* sp., and *Ovalipes* sp.) and burrowing shrimp (*Callianassa* sp.). In slightly deeper water (3 to 10 ft [1 to 3 m]), the dominant fauna are polychaetes, haustoriid and other amphipod groups, and bivalves (*Donax* spp. and *Tellina* sp.) (Marsh *et al*., 1980; Goldberg *et al.,*1985; Gorzelany and Nelson, 1987: Nelson, 1985; Dodge *et al*., 1991).

The substrate within the borrow areas is composed of unconsolidated softbottom habitat. Similar to the nearshore softbottom community, epibenthic and infaunal organisms inhabit this area and are an important element in the food web. Infaunal monitoring was conducted in

the borrow areas used in conjunction with the 1992 renourishment of Delray Beach, which fall within the confines of the proposed borrow areas for this project. The program compared infaunal populations between pre-construction, mid-construction and four years of post-construction data (CPE, 1997). Throughout sampling, annelids were most abundant, with arthropods, nemerteans and mollusks the second, third and fourth most abundant groups, respectively. The most common species observed during infauna monitoring included: *Cirrophorus* sp., *Paraonis fulgens, Nemertea* sp., *Lumbrineris tenuis, Bushia elegans, Sthenelais* sp., *Aricidea philbinae, A. taylori, Xenanthura brevitelson, Metharpinia floridana, Prionospio cristata, Pitar albidus, Divaricella quadrisculata, Leitoscoloplos robustus,* and the family Naididae. Members of the Phyla Cnidaria, Echinodermata, Bryozoa, Sipuncula and Chordata were also observed, but in very low numbers.

3.3.3 Worm Reef

Worm reef may occur in the shallow nearshore environment along the Atlantic coast of Florida, south of Cape Canaveral. Large colonial conglomerates of rigid sabellariid worm tubes of the species *Phragmatopoma lapidosa* comprise the worm reef community. This species constructs its tubes on a hardbottom substrate from grains of sand, which results in large structures that serve a larger community of other species. These shallow water "reefs" generally occur in the lower reaches of the intertidal zone or upper reaches of the subtidal zone. Worm reefs provide shelter for a diverse assortment of small benthic vertebrate and invertebrate organisms, which increases the faunal diversity of the area (FNAI, 1990).

3.3.4 Hardbottom

The term "hardbottom" refers to areas of rock or consolidated sediments in temperate, subtropical, and tropical regions, generally located in the ocean rather than in the estuarine system. Hardbottom provides habitat for an abundance of reef organisms and fish. Nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. An irregular surface allows larvae to settle into the interstitial spaces, voids and overhangs, while providing protection from the scouring action of waves and predators.

3.3.4.1 Ocean Ridge

Hardbottom habitats within the Ocean Ridge segment of the project area include nearshore hardbottom, patch reefs, and outer linear reef. Nearshore hardbottom in the project area consists of Anastasia formation limestone outcrops (coquina rock). Epibenthic communities are algal dominated with presence of scleractinian corals and octocorals, hydroids, tunicates, and sponges. Aerial photography of the Ocean Ridge project area obtained in 1994 revealed 11.6 acres of exposed nearshore hardbottom in two segments. The first segment contained 9.6 acres in the northern project area between South Lake Worth Inlet and FDEP Range Monument R-154. This hardbottom feature was characterized as low to moderate relief (less than 1 m in height) with sparse biotic cover. Of the 9.6 acres in the northern segment, 7.3 acres were expected to be impacted by the 1998 beach restoration project and groin field construction. A 2.1-acre limestone-boulder artificial reef was constructed between R-166 and R-167.5 in a water depth of approximately 10.8 ft (3.3 m) as mitigation for these impacts. The second segment of impacted hardbottom was identified as a 2-acre section located directly offshore of R-156. This

hardbottom was characterized as low to moderate relief [less than 2 ft (0.6 m], and the dominant benthic community was an algal/octocoral community with biotic cover described as varying from sparse to dense. Palm Beach County constructed an additional 2 acres of mitigation artificial reef at Boynton Beach Oceanfront Park between R-156 to 157 to offset impacts to this hardbottom formation. Project permits for the 2005 renourishment project required construction of an additional 2.25 acres of artificial reef, 25% of the 9 acres existing prior to the 1998 beach restoration project, as mitigation for potential downdrift impacts between R-160 and R-162. In addition to the compensatory mitigation requirement, a nearshore hardbottom biological monitoring program was implemented to evaluate the effects of the 2005 beach renourishment on nearshore hardbottom between R-160 and R-164. The nearshore hardbottom between R-160 and R-164 exhibits very low relief, typically less than 20 cm, and periodic burial/exposure of intertidal and shallow subtidal hardbottom due to its proximity to the shoreline. Post-construction biological monitoring surveys for the 2005 project demonstrated significant seasonal and storm-related variability in intertidal and shallow sub-tidal hardbottom exposure (Prekel, 2009). Between 2004 and 2011, hardbottom exposure interpreted from aerial photograph ranged from a low of 2.04 acres in July 2010 to a high of 19.13 acres in July/August 2005. The doubling of hardbottom acreage between 2004 and 2005 suggests that 2005 pre-construction conditions were a direct result of the erosional effects caused by intense hurricane activity in 2004 and 2005 (Prekel, 2009). The hardbottom acreages between 2009 and 2011 from R-160 through R-164 are comparable to hardbottom exposure as delineated in aerial photography by PBCERM from 2000 to 2003 (4.08 acres in 2001; 7.7 acres in 2001; and 0.83 acres in 2003). Following the 2005 project, persistently exposed hardbottom (i.e. hardbottom areas exposed during all three aerial surveys, 2006 through 2008) was 1.43 acres while 3.24 acres were consistently exposed in 2004 and 2005 (Prekel, 2009). These acreages are also comparable to the exposed hardbottom delineated from aerial photography between 2009 and 2011 (2.04 to 3.50 acres) (CEG, 2012). Sand cover is naturally variable in the shallow water depths of the Ocean Ridge study area and shifts according to wave action. Although the 2007 and 2008 aerial-delineated hardbottom acreages were similar between Transects TS-1 and OR-3 (R-160 through R-164), the location of exposed hardbottom was clearly different (Prekel, 2009). The location of exposed hardbottom shifted between subtidal exposure along the eastern edge of the study in 2004 and 2005 to intertidal exposure along the beach face in 2006 and 2007 and then back to subtidal exposure in 2008. The area of hardbottom exposed in the July 2011 aerial photography is more consistent with and overlaps the subtidal areas that were exposed in 2004, 2005, and 2008.

3.3.4.2 Delray Beach

There are no hardbottom resources located within the nearshore fill area or the offshore borrow area of the Delray Beach segment. The nearest reef formation is a shore-parallel reef tract in 60 ft of water located approximately 960 ft seaward from the nearest borrow area. Monitoring of biological communities on the reef occurred from 1993 through 1996 in conjunction with the 1992 renourishment project. A 4-year post-construction hardbottom monitoring report was submitted by CPE in 1997 (CPE, 1997). The report describes the reef community observed offshore of the borrow areas as typical of the southeast Florida coast, with octocorals and sponges being the dominant fauna both in size and density. Common octocorals included *Eunicea* spp., *Gorgonia ventalina*, *Iciligorgia schrammi*, *Muricea* sp., *Plexaura flexuosa*, *Pseudoplexaura* sp., and *Pseudopterogorgia* spp. Common sponges included the giant barrel sponge *Xestospongia muta*, vase sponges such as *Ircinia campana* and *Niphates digitalis*, rope

sponges like *Aplysina* sp., *Iotrochota birotulata* and *Niphates erecta*, and tube sponges such as *Agelas* sp., and *Callyspongia vaginalis*. Hard corals observed included *Meandrina meandrites*, *Montastrea cavernosa*, and *Siderastrea siderea*. Hardbottom observations were again conducted by CPE in 2005, this time in conjunction with the 2005 Storm Damage Repair Project (CPE, 2005). Similar flora and fauna assemblages were reported.

3.3.4.3 Boca Raton

Patch reefs and outer linear reefs are within the vicinity of the borrow areas and nearshore habitats of the Boca Raton segment of the project area. Nearshore hardbottom has been documented between DEP monuments R-204 and R-214, along with rock formations near R-216.

3.3.5 Coral Reefs

3.3.5.1 Ocean Ridge

The outer linear reef (barrier reef) is located more than 1,800 ft to the east of the proposed Ocean Ridge borrow areas; the closest distance is at a location east of the south borrow area offshore of R-158 (**Figure 7**). The majority of the barrier reef is more than 2,000 ft from the eastern edge of the borrow areas. There are two small patch reefs within a 1,000-ft buffer distance from the borrow areas. These patch reefs are referred to as "Lynn's Patch Reefs West" (labeled as West Patches on **Figure 7**). A survey of the offshore patch reefs was performed by the Palm Beach County Reef Research Team (PBCRRT) on June 26, 2011. The West Patches consist of two areas of reef structure surrounded by sand in water depths of approximately 53 ft. Path size of the southern West Patch is reported to be approximately 240 x 400 ft (73 x 122 m). The second patch is located about 310 ft (94 m) to the north of the southern patch ref and is approximately 250 x 170 ft in size (76 x 52 m). These patches are reported to be relatively low-profile with maximum relief of about 2 ft (0.6 m). Benthic cover was sparse with areas of sand observed among sponges, octocorals, and hydroids (PBCRRT, 2011). Lynn's Patch Reefs North consists of a series of reef patches surrounded by sand extending north for almost 3,100 ft (945 m). The southernmost patch is approximately 2,100 ft (640 m) north of Lynn's Reef. There appear to be ten patches of reef structure; the three southernmost patch reefs are more extensive and rugose, exhibiting relief features of 3 ft (1 m) with small ledges. Benthic cover was reported to be dense and representative of a typical reef system on these reef patches; multiple scleractinian corals, octocorals, sponges, and hydroids were present. The first reef was approximately 250 x 240 ft (76 x 73 m), the second 250 x 345 ft (76 x 105 m), and the remaining patch reefs to the north are much smaller in size. Water depths are approximately 65 to 69 ft. The seven northern patch reefs were comparable to the west patches with sparser benthic cover and flatter profiles (PBCRRT, 2011).

3.3.5.2 Delray Beach

No coral reef habitat has been observed directly within or immediately adjacent to the project area of the Delray Beach segment. Reef resources in proximity to the Delray Beach project area are displayed in **Figure 8**.

3.3.5.3 Boca Raton

Patch reefs and outer linear reefs within the vicinity of the Boca Raton project area segment are located within designated critical habitat for Acroporid corals. The patch reefs and outer linear reefs adjacent to the proposed offshore borrow areas were surveyed in March and April 2013 using the NMFS "Recommended Survey Protocol for *Acropora* spp. in support of Section 7 Consultation." Pursuant to the approved protocol, sampling was conducted at one sampling site per every 10,000 m2 on hardbottom adjacent to the proposed offshore borrow sites and seaward of the 6-ft contour within designated critical habitat. Fifteen (15) patch reef sites and 13 outer linear reef sites were surveyed during the Tier 1 survey (**Figure 9**); survey methods consist of two SCUBA divers performing a 20-minute swim at each site, searching for colonies within a 100-m2 area. Acroporid corals were not observed at any of the 28 sites. Colonies of *Acropora* spp. have not been observed on the patch reefs and outer linear reefs during any of the biological monitoring surveys conducted for the 1988, 1998, and 2010 North Boca Raton Beach Nourishment Projects (Segment 1) and 2004 and 2006 Central Boca Raton Beach Nourishment Projects (Segment 2). In addition to the Acropora surveys conducted in March and April 2013, the seven candidate scleractinian species were included for presence/absence in the Tier 1 survey. The most frequently observed species at both the patch reefs and outer linear reef sites was *Dichocoenia stokesii* (369 of 406 colonies).

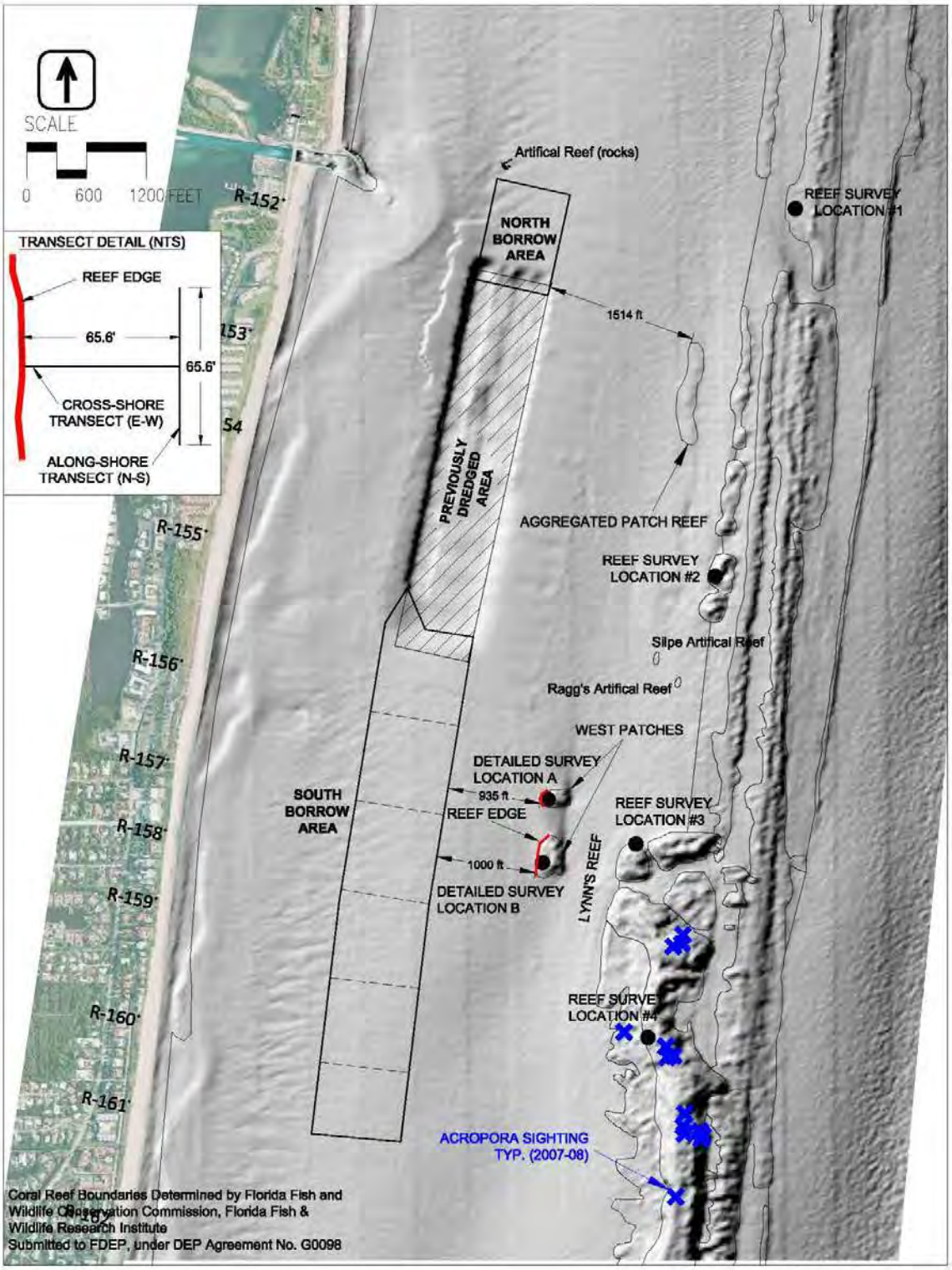

Figure 7: **Proximity of Ocean Ridge offshore reefs to the proposed borrow areas and reported *Acropora cervicornis* sightings on the offshore barrier reef. Proposed monitoring stations and transects are also shown.**

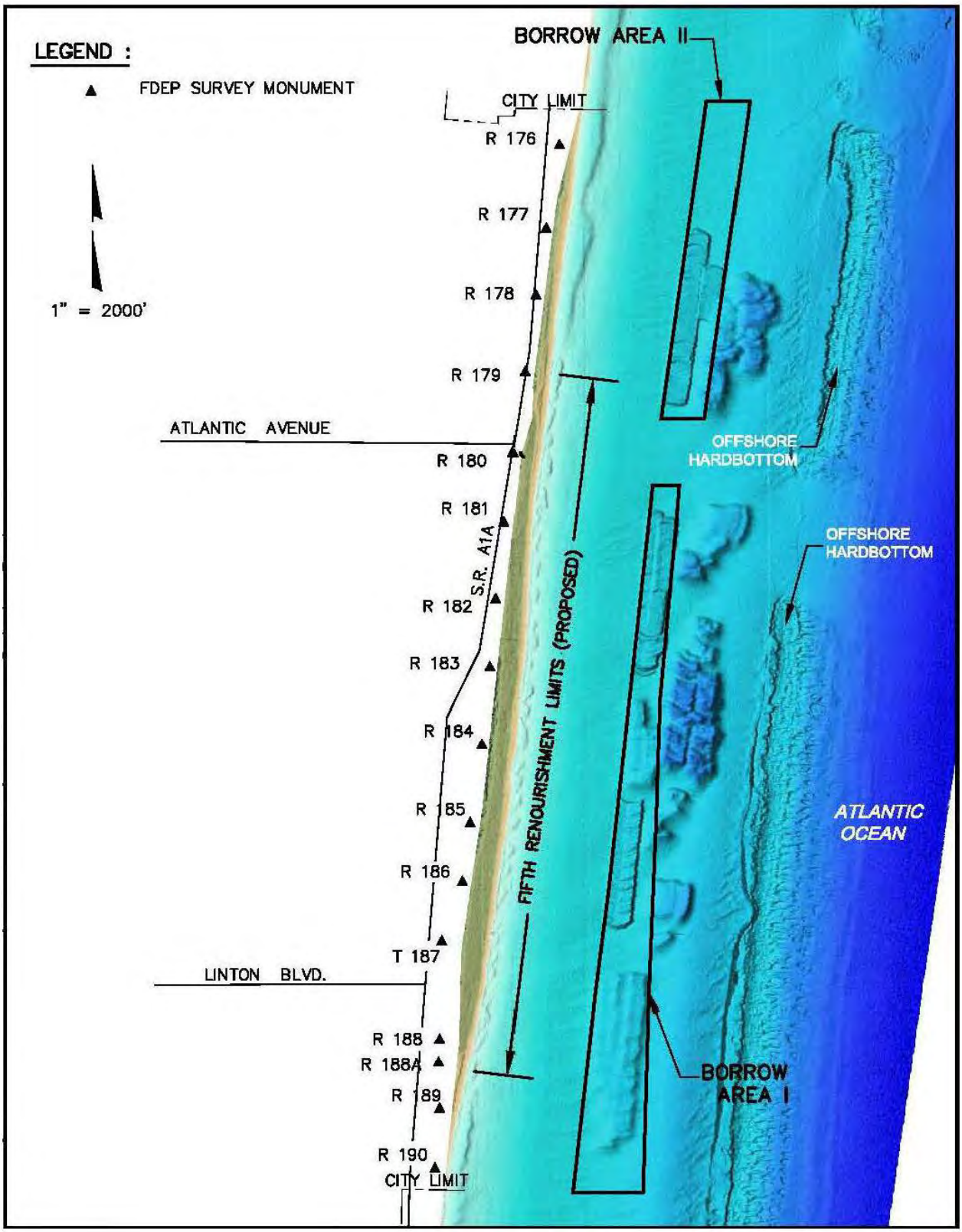

Figure 8: Reef resources in proximity to the Delray Beach Renourishment Project Area..

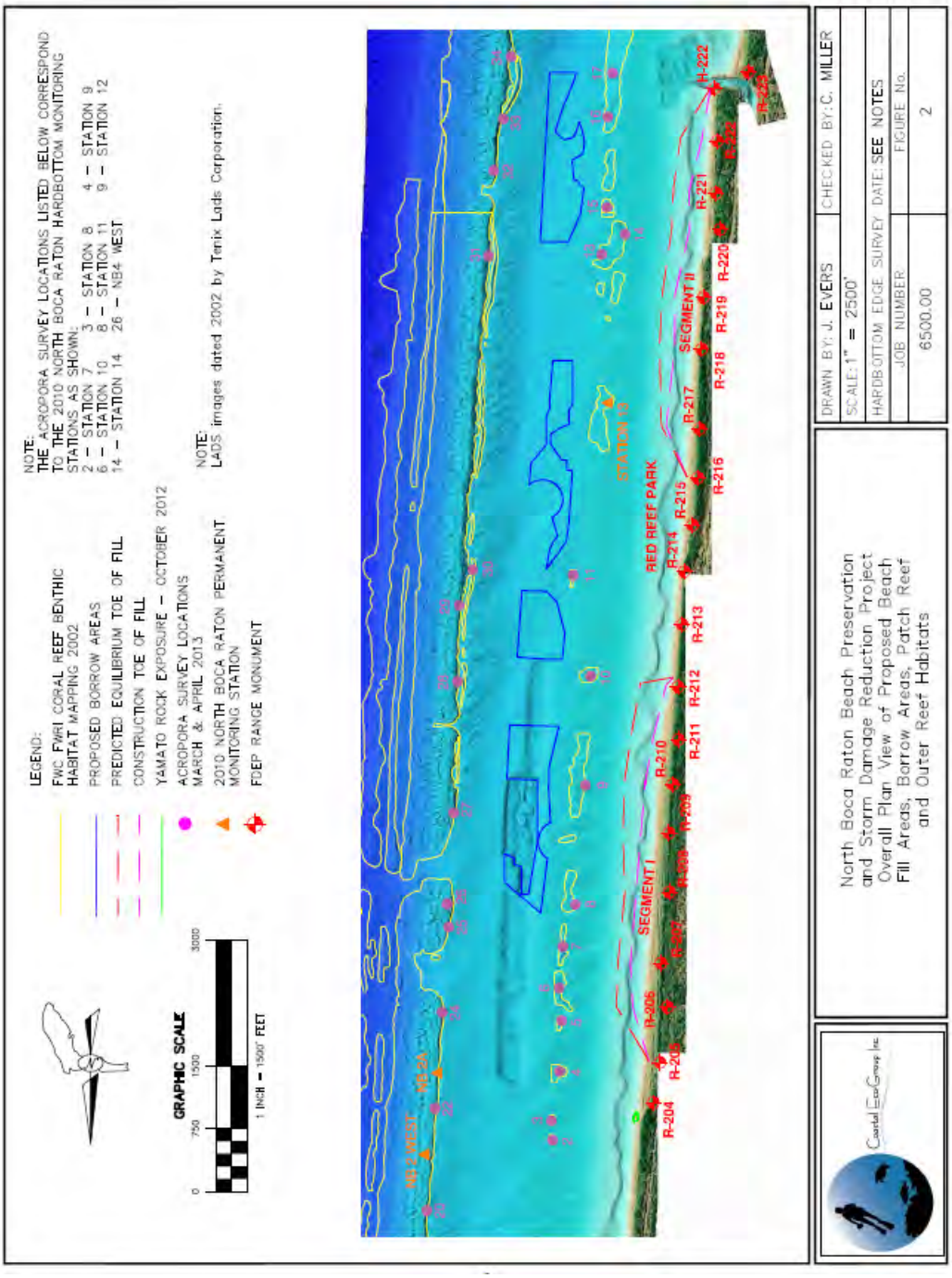

Figure 9: Proposed beach fill areas, patch reefs, and outer reef habitat in the Boca Raton project area.

3.4 THREATENED OR ENDANGERED SPECIES

A number of threatened and endangered species may occur in the general project area (**Table 1**). Several threatened and endangered species in Palm Beach County may use project-affected habitats. These include the piping plover, least tern, green sea turtle, hawksbill sea turtle, leatherback sea turtle, loggerhead sea turtle, Kemp's ridley sea turtle, West Indian manatee, staghorn coral, elkhorn coral, humpback and North Atlantic right whales, and smalltooth sawfish. A determination of effects for the project has been prepared and coordinated with the USFWS and the NMFS, pursuant to Section 7 of the Endangered Species Act of 1973.

Table 1: **Threatened and endangered species with the potential to occur in the project vicinity**

Common Name	Scientific Name	Status	Agency	May Affect, Likely to Adversely Effect	May Affect, Not Likely to Adversely Effect	No Effect
Mammals						
West Indian Manatee	*Trichechus manatus*	E	Federal		X	
Blue whale	*Balaenoptera musculus*	E	Federal			X
Fin whale	*Balaenoptera physalus*	E	Federal			X
Humpback whale	*Megaptera novaeangliae*	T	Federal			X
Sei whale	*Balaenoptera borealis*	E	Federal			X
Sperm whale	*Physeter macrocephalus*	E	Federal			X
Right Whale	*Eubalaena glacialis*	E	Federal			X
Reptiles						
Green sea turtle	*Chelonia mydas*	E	Federal		X	
Leatherback sea turtle	*Dermochelys coriacea*	E	Federal		X	
Hawksbill sea turtle	*Eretmochelys imbricata*	E	Federal		X	
Loggerhead sea turtle	*Caretta caretta*	T	Federal		X	
Kemp's Ridley sea turtle	*Lepidochelys kempii*	E	Federal		X	
Fish						
Smalltooth sawfish*	*Pristia pectinata*	E	Federal		X	
Invertebrates						
Elkhorn coral*	*Acropora palmata*	T/CH	Federal		X	
Staghorn coral*	*Acropora cervicornis*	T/CH	Federal		X	
Plants						
Johnson's seagrass*	*Halophila johnsonii*	E/CH	Federal			X
Birds						
Piping plover	*Charadrius melodus*	T	Federal		X	
Least tern	*Sterna antillarum*	NL	Federal		X	

* Critical habitat designated for this species
E: Endangered
T: Threatened

3.4.1 Smalltooth Sawfish

The smalltooth sawfish (*Pristis pectinata*) has been protected in Florida since 1992, and since April 1, 2003, the species has been listed as endangered under the Endangered Species Act (68 FR 15680) (FWC, 2011e). Smalltooth sawfish were once prevalent throughout Florida and were commonly encountered from Texas to North Carolina. Currently, smalltooth sawfish are regularly found in south Florida between the Caloosahatchee River and the Florida Keys. Based on the contraction in range and anecdotal data, it is likely that the population is currently at a level less than 5% of its size at the time of European settlement (NMFS, 2006).

The smalltooth sawfish is a circumglobal species and a year-round resident of peninsular Florida (FWC, 2011e). In general, smaller sawfish inhabit coastal waters in muddy and sandy substrates rarely deeper than 10 meter while larger sawfish occur regularly beyond 10 meters (NMFS, 2006). It has been reported that nearly half of all sawfish less than 3 meters in length were found in water less than 10 meters deep and 46% of encounters with adult sawfish in Florida Bay and the Florida Keys occurred at depths between 70 to 122 meters (NMFS, 2006).

Critical habitat for sawfish was designated on October 2, 2009. Critical habitat consists of two units: the Charlotte Harbor Estuary Unit, which consists of approximately 221,459 acres of coastal habitat; and the Ten Thousand Islands/Everglades Unit, which comprises approximately 619,013 acres of coastal habitat. The two units are located along the southwestern coast of Florida between Charlotte Harbor and Florida Bay (74 FR 45353). There is no designated critical habitat for sawfish within the Project Action Area.

A search of the National Sawfish Encounter Database revealed 7 reports representing 11 individuals between May 2010 and May 2011 in Palm Beach County; an overall total of 392 encounters representing 501 individuals were recorded within the state of Florida during this period (Burgess *et al*., 2011).

3.4.2 Sea Turtles

There are five species of sea turtles that occur in the coastal waters of Palm Beach County. The loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and leatherback (*Dermochelys coriacea*) sea turtles constitute the highest nesting densities on the southeast coast from Brevard to Palm Beach County. Hawksbill (*Eretmochelys imbricata*) and Kemp's ridley (*Lepidochelys kempii*) sea turtles nest infrequently on Palm Beach County beaches. The nesting season for all species of sea turtles is between March 1 and October 31 in Palm Beach County.

3.4.2.1 Loggerhead Sea Turtle

The loggerhead turtle (*Caretta caretta*) was listed by the USFWS as threatened throughout its range on July 28, 1978 (43 FR 32808). On 22 September 2011 (76 FR 58868), nine population segments were listed as threatened (4) or endangered (5). The northwest Atlantic population is considered threatened. Critical habitat is proposed for Loggerhead sea turtles throughout much of the Atlantic along and off the coast of the Southeast United States and in the Gulf of Mexico (25 March 2013, 76 FR 17999 and 18 July 2013, 78 FR 42921). The loggerhead sea turtle occurs in open water as far as 500 miles from shore, but is mainly found over the continental shelf, and in bays, estuaries, lagoons, creeks, and mouths of rivers. More than 90% of the loggerhead nesting

in the United States occurs in Florida with a nesting aggregation considered to be one of the two largest remaining in the world (FWC, 2012a).

Based upon nesting data collected on core index nesting beaches in Florida from 1998 to 2011 (excluding the Florida panhandle population), the total annual number of loggerhead nests laid along the Atlantic and Gulf coasts ranged from 28,074 nests to 59,918 nests. A detailed analysis of Florida's long-term loggerhead nesting data (1989-2011) revealed that, after an increase in nest counts by 24% between 1989 and 1998, nest counts declined 16% between 1998 and 2011. The recent trend suggests stabilization; in 2011, loggerhead sea turtle nest counts were close to the average for the preceding 5-year period (FWC, 2012a). Loggerheads are found in the open ocean offshore areas of Palm Beach County due to warm water temperatures and foraging habitat provided by reefs and nearshore hardbottom substrata. The loggerhead sea turtle nests regularly along the County's shoreline and is the predominant species in the area. Palm Beach County beaches have supported the second highest nesting density of loggerheads in Florida since annual nesting counts have been performed.

3.4.2.2 Green Sea Turtle

The green turtle (*Chelonia mydas*) was listed on July 28, 1978 as threatened except for Florida and the Pacific Coast of Mexico (including the Gulf of California) where the species was listed as endangered (43 FR 32808). The green turtle primarily utilizes shallow habitats such as lagoons, bays, inlets, shoals, estuaries and other areas with an abundance of marine algae and seagrasses. Individuals observed in the open ocean are believed to be migrating to feeding grounds or nesting beaches (Meylan, 1982). Hatchlings often float in masses of algae (*Sargassum* spp.) in convergence zones. Coral reefs and rock outcrops are often used as resting areas. Since adult green sea turtles are primarily herbivorous, feeding on algae and seagrasses, most individuals utilize nearshore primary foraging grounds (Ernst *et al*., 1994).

Juvenile green sea turtles are commonly found in the nearshore waters of Palm Beach County (FWC, 2011a) and in Lake Worth Lagoon west of the project area (IRG, 2012). Green turtles have historically nested in the Florida Keys and Dry Tortugas, but primarily nest on selected beaches along the coast of eastern Florida from Brevard south through Broward County. The majority of nesting occurs during the months of June, July and August in the southeastern United States. Nesting occurs nocturnally at 2, 3, or 4-year intervals, and females only occasionally produce clutches in successive years.

3.4.2.3 Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*) was listed as endangered throughout its range on June 2, 1970 (35 FR 8495) with critical habitat designated in the U.S. Virgin Islands on September 26, 1978 and March 23, 1979 (43 FR 43688–43689 and 44 FR 17710–17712, respectively). The leatherback sea turtle is mainly pelagic, inhabiting the open ocean and diving nearly continuously to great depths, and seldom approaches land except for nesting (Eckert, 1992). In the Atlantic and Caribbean, the largest nesting assemblages occur in the U.S. Virgin Islands, Puerto Rico, and Florida (NMFS, 2007). Palm Beach County typically has the highest nesting in the continental United States.

The leatherback is probably the most wide-ranging of all sea turtle species; its distribution has been linked to thermal preference and seasonal fluctuations in the Gulf Stream and other warm water features (Fritts *et al*., 1983). During the summer, leatherbacks tend to occur along the east coast from the Gulf of Maine south to southeast Florida. Distribution of foraging leatherbacks may be dependent on the distribution of their prey item, gelatinous jellyfish. Leatherback turtles remain in the open ocean until the females move inshore to nest. Leatherbacks nest on average 5 to 7 times within a nesting season with females remaining in the general vicinity of the nesting habitat for up to 4 months (Eckert *et al*., 1989; Keinath and Musick, 1993).

3.4.2.4 Hawksbill Sea Turtle

The hawksbill sea turtle (*Eretmochelys imbricata*) was federally listed as endangered on June 2, 1970 (35 FR 8495) with critical habitat designated in Puerto Rico on 24 May 1978 (43 FR 22224). In 1998, NMFS designated critical habitat near Isla Mona and Isla Monito, Puerto Rico, seaward to 5.6 km (63 FR 46693-46701). The hawksbill is circumtropical, occurring in tropical and subtropical seas of the Atlantic, Pacific, and Indian oceans (Witzell, 1983). This species is probably the most tropical of all marine turtles, although it does occur in many temperate regions. The hawksbill sea turtle is widely distributed in the Caribbean Sea and western Atlantic Ocean with representatives of at least some life history stages regularly occurring in southern Florida and the northern Gulf (especially Texas), south to Brazil (NMFS, 2007). In the continental U.S., the hawksbill sporadically nests in Florida.

Hawksbills generally inhabit coastal reefs, bays, rocky areas, passes, estuaries, and lagoons in water depths of less than 70 ft. Similar to green sea turtles, hatchlings are sometimes found floating in masses of pelagic marine algae (e.g., *Sargassum* spp.) (NFWL, 1980). When they reach a carapace length of approximately 20 to 25 centimeters, hawksbill juveniles reenter coastal waters. Coral reefs are widely recognized as the resident foraging habitat of juveniles, subadults, and adults. This habitat association is likely related to their diet of sponges, which need solid substrate for attachment. Hawksbills are observed on the reefs off Palm Beach, Broward, Miami- Dade, and Monroe Counties (NMFS, 2012a). Although they are common inhabitants of the shallow nearshore waters of southern Florida, hawksbill sea turtles nest infrequently on Palm Beach County beaches (FWC, 2006).

3.4.2.5 Kemps Ridley Sea Turtle

Kemp's ridley sea turtle (*Lepidochelys kempii*) was listed as endangered throughout its range on December 2, 1970 (35 FR 18320). Of the seven extant species of sea turtles, the Kemp's ridley has declined to the lowest population level. Recent studies suggest increased nesting activities and an overall increase in population size due to increased hatchling production and survival rates of immature turtles (USFWS, 2000). Adults are primarily restricted to the Gulf of Mexico (Miller, 1997), although juveniles may range throughout the Atlantic Ocean since they have been observed as far north as Nova Scotia (Musick, 1979). Nearly the entire population of Kemp's ridleys nests on an 11- mile stretch of coastline near Rancho Nuevo, Tamaulipas, Mexico, approximately 190 miles (306 km) south of the Rio Grande. Additional nesting aggregations occur at Tuxpan, Veracruz and along the Texas coastline. Juveniles and sub-adults have been found along the eastern seaboard of the U.S. and in the Gulf of Mexico. Studies suggest that the benthic stage, juvenile turtles stay in shallow, warm nearshore waters in the northern Gulf until cooling waters force them offshore or south along the Florida coast (Renaud, 1995). Kemp's

ridley sea turtle nests have not been recorded in Palm Beach County in the last 22 years; however, 5 false crawls have been documented (FWC, 2006; 2011b).

Sea Turtle Nesting Habitat

During the 2011 nesting season, loggerhead females represented 78% of the nests surveyed in Palm Beach County (FWC, 2011c). A total of 431 loggerhead nests were recorded in 2011 for an overall density of 189 nests per mile. During the past 5 years, the earliest loggerhead nest recorded within the project area was April 24, and the latest nest was recorded on September 7 (FWC, 2011c).

In 2011, the total number of green sea turtle nests in Palm Beach County was 3,733, representing approximately 19% of the total nests in Palm Beach County for the season (FWC, 2011a). A total of 41 nests were recorded in 2011 for a nesting density of 18 nests per mile. Within the Ocean Ridge survey area, the earliest green turtle nest recorded in the last five years occurred on June 4, and the latest nest was on September 28 (FWC, 2011a).

A total of 517 leatherback sea turtle nests were recorded in Palm Beach County in 2011, representing approximately 3% of the total nests (FWC, 2011d). The earliest leatherback nest recorded in the last 5 years occurred on March 23, and the latest nest was laid on June 26 (FWC, 2011d). Eleven nests were recorded during the 2011 season, accounting for a nesting density of approximately 5 nests per mile.

Nearshore Habitat

Nearshore hardbottom habitat provides important development habitat for sub-adult green sea turtles and juvenile/sub-adult loggerhead turtles along the east coast of Florida. Principal foraging areas include nearshore hardbottom habitat from Brevard County south through Broward County (Wershoven and Wershoven, 1992; Guseman and Ehrhart, 1992; Ehrhart *et al*., 2001; Holloway-Adkins *et al*., 2002). Juvenile green sea turtles are commonly found in the nearshore waters of Palm Beach County (FWC, 2011d).

In a study performed by the Caribbean Conservation Corporation and Sea Turtle Survival League, satellite transmitters were attached to juvenile green sea turtles (70 to 90 cm size class) to track their movements. When juvenile green sea turtles are encountered, they are nearly ready to leave the central east coast of Florida and travel to the next level of developmental habitat, which may be the adult foraging grounds (CCC and Sea Turtle Survival League, 2011). The southeast coast of Florida is believed to be a major migratory pathway for green turtles, which move down the east coast of Florida from the north towards the Florida Keys as part of a developmental pathway (small juveniles to large subadults). Upon returning to nearshore waters from a pelagic existence, it appears that juvenile green turtles move through several developmental habitats before reaching adult foraging grounds at or near maturity (CCC and Sea Turtle Survival League, 2011). Adult female green turtles can also migrate from feeding areas in the Florida Keys back to the Florida southeast coast to nest.

3.4.3 Piping Plover

The piping plover (*Charadrius melodus*), a state and federally listed species, generally winters in a variety of areas of Florida, including the Atlantic coast. Piping plovers migrate south to Florida as early as late July and remain as late as early April (non-breeding season). This small shorebird may be found inland but prefers sandy beaches and tidal mudflats where it forages along the waterline or high up the beach along the wrack line. Piping plovers primarily use intertidal habitats within estuaries, but sightings along the Atlantic Coast intertidal area have occurred (Robert Ernest, Ecological Associates, Inc., June 2009). Piping plovers feed within the intertidal zone on invertebrates such as marine worms, insect larvae, crustaceans, and mollusks (Atlantic Coast Piping Plover Recovery Team, 1995). Piping plovers overwinter along the majority of the Florida coastline. Piping plovers were documented between 2006 and 2008 within one mile of the project area with the majority of observations located near South Lake Worth Inlet.

The piping plover is listed as an endangered species in Canada (by the Canadian Government) and the inland United States (by the U.S. Fish and Wildlife Service), and is listed as threatened along the United States Atlantic coastline. Declines in population have resulted from direct and unintentional harassment by people, dogs, and vehicles; destruction of beach habitat for development; and changes in water level regulation (Haig, 1992). Florida Atlantic coast designated critical habitat for wintering piping plovers locates around St. Lucie and Ponce de Leon inlets, and near the northern border of Florida on Fort George Island within Huguenot Memorial Park, Jacksonville, Florida (http://www.fws.gov/plo http://www.fws.gov/plover/ver/).

Piping plovers overwinter along the majority of the Florida coastline. Piping plovers were documented between 2006 and 2008 within one mile of the Ocean Ridge project area with the majority of observations located near South Lake Worth Inlet (Davis, Palm Beach County ERM, personal communication, October 17, 2012). Piping plovers were not observed during the weekly shorebird surveys conducted in the Ocean Ridge survey area in 2009 and 2010 (DB Ecological Services, 2009; 2010). Piping plovers were documented in 2011 and 2012 within the Boca Raton project area by staff from the Gumbo Limbo Nature Center. The project area does not contain designated piping plover critical habitat, nor does it contain "optimal" Piping Plover Habitat as defined in the Programmatic Piping Plover Biological Opinion of 22 May 2013. (http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#P3BO).

3.4.4 Least Tern

The least tern (*Sterna antillarum*) is listed as threatened by the State of Florida (FWC 2003) and is protected federally under the Migratory Bird Treaty Act. Least terns are the smallest members of the subfamily Sternidae. Populations within Florida are migratory and are not federally listed.

The least tern is a colonial nesting species, and typically nests on barren beaches of sand, gravel or shells, on dry mudflats and salt-encrusted soils (salt flats), and on sand and gravel pits along rivers. Least terns have also been known to nest on dredge spoil mounds and often nest in large colonies with black skimmers (*Rhynchops niger*). Fish is the primary food item along with crustaceans and insects. Least terns feed on small fish and crustaceans taken by diving from the air into shallow water.

Least terns arrive in Florida from their South American wintering grounds each year from mid-March through April and typically choose open sandy substrates to form breeding colonies.

Although typically nesting on open, sandy beach areas, an increasing number of colonies are located on open, flat, artificial surfaces (e.g., warehouse roof tops). Least terns utilize their colony sites year after year; however, colony sites are occasionally abandoned due to a variety of factors. Although some vegetation is beneficial as cover for chicks, colonies will abandon sites that become too vegetated. Other factors that are correlated with abandonment are human disturbance; presence of mammalian predators such as raccoon, fox, coyotes and feral cats; and flooding. Of these, human disturbance is probably most responsible for recent declines.

Least tern nesting begins in mid-April in the southern portion of the state. Nesting sites have been documented along the Palm Beach County coast (FWC, 2003). Shorebird surveys were conducted weekly beginning in March and ending in October for the 2006 through 2010 nesting season years. Least terns were observed most frequently in flight; however, they were also observed foraging and resting during the 2009 surveys. The least tern is not present in Florida between November and February (Florida Natural Areas Inventory, 2012).

3.4.5 West Indian Manatee

The Florida manatee (*Trichechus manatus latirostris*) is a distinct subspecies of the West Indian manatee (*Trichechus manatus*) and has been listed as a protected mammal in Florida since 1893. The manatee is also federally protected under the Marine Mammal Protection Act of 1972 and the ESA of 1973. Critical habitat was designated in 1976 for the Florida subspecies (*Trichechus manatus latirostris*) (50 CFR 19.95(a). There is no designated critical habitat in the proposed project area. In addition, no designated Important Manatee Area (IMA) would be affected.

The Florida manatee population is divided into four sub-populations: the Upper St. Johns River (4% of the population); Atlantic Coast (46%); Southwest Florida (38%); and Northwest Florida (12%) (USFWS, 2012). Based on published data for the survival rates, reproduction, and population growth, the Upper St. Johns River and Northwest Florida sub-populations are expanding and doing well. The Atlantic Coast sub-population is likely stable and little information exists on the status of the Southwest Florida sub- population (USFWS, 2012).

Based on the January 2011 statewide aerial synoptic survey, the minimum population was estimated at 4,834 individuals (FWC, 2012b). Aerial surveys were flown between February 5, 2009 and March 31, 2011 in compliance with the Palm Beach County Manatee Protection Plan (2007); a total of 4,869 manatees were observed during 51 aerial surveys. Manatees were most frequently sighted in Lake Worth Lagoon (3,550 individuals), and 323 individuals were observed in the ocean, mainly in the vicinity of the Palm Beach Inlet or further north (Sea to Shore Alliance, 2012).

In the last decade, the average annual mortality rate in Palm Beach County was approximately 10 manatees per year. **Table 2** shows the number of manatee deaths in Palm Beach County between 1990 and 2012 (FWC, 2012c). Approximately 33% of the deaths recorded in the last decade are due to collisions with watercrafts, particularly mortality of calves. Population growth and increased visitation in Florida have contributed to a steady increase in the number of watercrafts in Florida waters. In 2011, 922,491 vessels were registered in the State of Florida, a 42% increase since 1993 (FLHSMV, 2012). The Florida Department of Community Affairs estimates that between 300,000 and 400,000 boats registered in other states use Florida waters each year.

Manatees are common year-round residents in canals and waterways in Palm Beach County. The Atlantic subpopulation is highly migratory, and Palm Beach County serves as an important warm water refuge and travel corridor between summer and winter habitats. Aerial surveys confirm that populations are highest during the winter. The north section of Lake Worth Lagoon is an area of particular importance for manatee habitat. Extensive seagrass beds occur in this area serving as an attractant to manatee populations (CUES/EAI, 2007). In Palm Beach County, critical habitat for manatees includes all of Lake Worth, from its northernmost point immediately south of the intersection of U.S. Highway 1 and Florida State Highway A-1-A southward to its southernmost point immediately north of the town of Boynton Beach, Palm Beach County; the Loxahatchee River and its headwaters, Martin and west Palm Beach Counties; that section of the Intracoastal Waterway from the town of Seawalls Point, Martin County to Jupiter Inlet, Palm Beach County (50 CFR Ch. 1,§17.95). There is no designated critical habitat for the Florida manatee within the Project Action Area. Manatees are regularly found along the Project Action Area beaches in the summer months and year-round in Lake Worth Lagoon with greater abundance in the winter months.

Table 2: Manatee mortality (1990- 2013) and cause of death in Palm Beach County.

Year	Watercraft	Gate/Lock	Other Human	Perinatal	Cold Stress	Natural	Undetermined	Year Total
1990	3	0	0	0	0	1	2	**6**
1991	1	0	1	0	0	1	3	**6**
1992	0	0	0	1	0	2	0	**3**
1993	3	0	1	0	0	1	0	**5**
1994	2	0	0	1	0	0	0	**3**
1995	2	0	0	0	0	3	1	**6**
1996	3	0	0	0	0	2	2	**7**
1997	1	0	2	1	0	2	0	**6**
1998	2	0	0	1	0	1	1	**5**
1999	2	0	2	1	0	1	1	**7**
2000	3	0	0	2	2	1	1	**9**
2001	3	0	0	0	0	2	3	**8**
2002	6	1	0	3	1	1	2	**14**
2003	5	0	0	2	2	0	3	**12**
2004	3	0	1	0	2	1	2	**9**
2005	6	0	0	1	1	0	0	**8**
2006	0	0	0	1	1	1	4	**7**
2007	0	0	0	0	1	1	1	**3**
2008	6	0	0	0	2	0	0	**8**
2009	4	0	1	1	3	1	6	**16**
2010	2	0	0	2	6	1	7	**18**
2011	3	0	0	0	5	0	3	**11**
2012	2	0	1	0	1	1	3	**8**
*2013	2	0	1	0	1	0	0	**4**
Total	**64**	**1**	**10**	**17**	**28**	**24**	**45**	**189**

*Preliminary Data from FWC through April 2013 (FWC, 2013h)

3.4.6 Whales

Six endangered whale species are listed by NMFS as occurring in the Atlantic waters offshore of Florida: North Atlantic right whale (*Eubalaena glacialis*), sperm whale (*Physeter macrocephalus*), humpback whale (*Megaptera novaeangliae*), blue whale (*Balaenoptera musculus*), finback whale (*Balaenoptera physalus*), and sei whale (*Balaenoptera borealis*). Of these species, sperm whales, blue whales, finback whales, and sei whales are unlikely to be found in the project vicinity as the project is located in nearshore coastal waters. NMFS addressed potential impacts to whales from dredging projects and determined that due to the unlikelihood of their occurrence in nearshore waters, these whales would not be adversely affected by dredging operations (NMFS, 2003). Sperm whales occur in the Atlantic Ocean but are rare in inshore waters. Blue, finback and sei whales are deepwater species unlikely to be found near dredging sites (NMFS, 2003; 2008; 2010a). Therefore, these species are not anticipated to be impacted by project related activity and will not be included in the impacts section of this environmental analysis. Only the humpback and North Atlantic right whale may be potentially present within the project area since both frequent coastal waters.

3.4.6.1 North Atlantic Right Whale

Right whales (*Eubalaena glacialis*) are the rarest of all large whale species and among the rarest of all marine mammal species with an estimated population of 300-400 right whales in the North Atlantic. Listed as endangered under the Endangered Species Conservation Act in June 1970, the precursor to the ESA, the species was subsequently listed as endangered under the ESA in 1973 (NMFS, 2012b). Populations are now mostly threatened by vessel collisions and entanglement in fishing gear. As reported by Kraus (1990), at least one third of the western Atlantic population mortalities are a result of human activities. Other threats include habitat degradation, noise pollution, contaminants, underwater explosives, and climate change (NMFS, 2012b). A recent model predicts that under current conditions, the population will be extinct in less than 200 years (NMFS, 2005).

North Atlantic right whales inhabit the Atlantic Ocean mainly between 20° and 60° latitude. Physical oceanographic features and the topography of feeding areas play a major role in where right whales preferably feed by skimming waters to filter zooplankton, primarily copepods. Cool water temperatures and deep water depths (100-200 m) adjacent to steep sloping topography are preferable areas for feeding (NMFS, 2005; Winn *et al*., 1986; Clapham *et al*., 1999).

Two critical habitat areas for the North Atlantic right whale were established in 1994. The northeast critical habitat area is located off the coast of Massachusetts, and the southeast critical habitat includes waters located at Brunswick, GA to the east coast of Florida at Sebastian Inlet. Right whales may be found in ocean waters off the coast of Palm Beach County from December through March as they gather on calving grounds in coastal and shelf waters along the coast of Georgia and Florida. Migrations south to the calving grounds occur by pregnant females during mid-November (FWC, 2012d). Due to their coastal nature, right whales are often visible from the beach (FWC, 2012d).

3.4.7 Staghorn and Elkhorn Corals

Staghorn coral (*Acropora cervicornis*) and elkhorn coral (*A. palmata*) were listed as threatened under the Endangered Species Act of 1973, as amended, on May 9, 2006 (71 FR 26852).

Both elkhorn and staghorn are shallow water coral species, often growing in zones of high wave action or currents. *A. palmata* typically grows on the seaward face of a reef (turbulent shallow water), including the reef crest and shallowest depths of the fore reef (Aronson and Precht, 2001). The tops of extremely shallow colonies may even be exposed at low tide. *A. cervicornis* requires less light than *A. palmata* and can grow at rapid rates at depths of 4 to 12 m (13 to 40 ft), depending on water clarity and light attenuation (Adey, 1978).

Acroporid corals are found throughout the Florida Keys, Bahamas, and Caribbean islands. In southeastern Florida, *A. cervicornis* historically occurred on the outer reef platform at intermediate depths (Goldberg, 1973; Aronson and Precht, 2001), on spur and groove bank reefs and transitional reefs, and on octocoral-dominated hardbottom (Goldberg, 1973). Staghorn coral is reported to range in depths from < 1 m to 60 m, but is typically found in shallower depths (5 to 15 m). Goldberg (1973) documented *A. cervicornis* on the outer reef platform in approximately 16 to 20 m off Boca Raton, FL.

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In general, elkhorn and staghorn corals have the same geographic distribution along the southeast coast of Florida; however, the current northern extent of staghorn coral (Town of Palm Beach, Palm Beach County) is slightly farther north than that of elkhorn coral (Lauderdale by the Sea, Broward County).

Additional coral species are proposed for listing including several species which might occur along portions of South Florida. During *Acropora* surveys conducted on patch reefs and outer linear reefs in the Boca Raton project in April 2013, several candidate scleractinian coral species were observed (**Table 3**).

Table 3: Summary of the candidate scleractinian coral species observed at 28 sample sites on the patch reef and outer reefs adjacent to the proposed offshore borrow areas in Boca Raton; April 2013 (Coastal Eco-Group Inc. 2013).

Species	Patch Reef	Outer Reef	Total
Agaricia lamarcki	0	9	9
Dichocoenia stokesii	161	208	369
Montastraea annularis	1	9	10

Montastraea faveolata	0	8	8
Mycetophyllia ferox	1	9	10
Total	**163**	**243**	**406**

3.4.7.1 Presence in the Project Area

Nearshore hardbottom habitat, patch reefs, and outer linear reefs are located within designated critical habitat for Acroporid corals.

Surveys for the presence of *Acropora* corals were conducted extensively in each of the project segments. The results concluded that no *Acropora* colonies were observed in or directly adjacent to the project boundaries. Specific details are provided below.

Elkhorn coral, *A. palmata*, has not been documented in Palm Beach County. The northernmost known occurrence of *A. palmata* is in Broward County. During a comprehensive survey of nearshore hardbottom and the nearshore ridge complex between Hillsboro Inlet and Port Everglades Inlet in 2011, a total of 8 *A. palmata* colonies were identified in 4 of 714 sites surveyed. Two sites were located offshore Ft. Lauderdale, one on the south end and one on the north end, and two sites were offshore Lauderdale by the Sea (Gilliam *et al*., 2012).

3.4.7.1.1 Ocean Ridge

Nearshore hardbottom habitat is located within the designated critical habitat boundaries for Acroporid corals. Sixteen nearshore hardbottom sites were surveyed on 7 and 8 May 2012 within the turbidity mixing zone and downdrift of the project fill area within designated critical habitat (**Figures 10-13**). Survey methods followed the NMFS "Recommended Survey Protocol for *Acropora* spp. in support of Section 7 Consultation" which recommends a sampling density of one site every 10,000 m². Prior to the field survey, a sampling grid was developed in ArcGIS 10 using the July 2011 aerial photography. Due to the relatively narrow width of exposed nearshore hardbottom in the study area, spacing between some of the sampling points was slightly less than the suggested 100-m spacing.

A 20-minute timed swim was conducted at 13 of the 16 sites due to the possibly of the PCE for *Acropora* spp. The 20-minute timed swims were not performed at 2 sites due to the lack of the PCE: Sites 2 and 14 were mostly sand-covered hardbottom and did not provide exposed hard substrate for the attachment of *Acropora* colonies. Water depth at Site 5 was approximately 5 ft., and most of the hardbottom was inshore of the site in water depths of less than 4 ft, landward of the 6-ft critical habitat boundary limits for *Acropora* spp. *Acropora* spp. colonies were not observed at any of the 16 nearshore hardbottom sites during the survey.

The offshore patch reefs within the Ocean Ridge project area are designated as critical habitat for Acroporid corals. A survey of the offshore patch reefs was performed by the Palm Beach County Reef Research Team (PBCRRT) on June 26, 2011. Survey protocol followed the NMFS recommended protocol described above. These patch reef sites, referred to as "Lynn's Patch Reefs West" and "Lynn's Patch Reefs North," are located offshore of the proposed borrow areas

between FDEP reference monuments R-153 and R-156 in water depths ranging from 53 to 69 ft. The "West Patches" are located within 1,000 ft of the borrow areas (**Figure 7**).

Acroporid corals were not observed at these locations during the survey (PBCRRT, 2011). Figure 11 presents the reported sightings of staghorn coral, *Acropora cervicornis*, on the outer linear reef located east of the Ocean Ridge project area; the closest reported sighting is more than 2,300 ft east of the east edge of the proposed borrow areas.

3.4.7.1.2 Delray Beach

No coral reef habitat has been observed within or immediately adjacent to the project area of the Delray Beach segment.

3.4.7.1.3 Boca Raton

Patch reefs and outer linear reefs within the vicinity of the Boca Raton project area are located within designated critical habitat for Acroporid corals. The patch reefs and outer linear reefs adjacent to the proposed offshore borrow areas were surveyed in March and April 2013 using the NMFS "Recommended Survey Protocol for *Acropora* spp. in support of Section 7 Consultation." Pursuant to the approved protocol, sampling was conducted at one sampling site per every 10,000 m^2 on hardbottom adjacent to the proposed offshore borrow sites and seaward of the 6-ft contour within designated critical habitat. Fifteen (15) patch reef sites and 13 outer linear reef sites were surveyed during the Tier 1 survey (**Figures 14-16**); survey methods consist of two SCUBA divers performing a 20-minute swim at each site, searching for colonies within a 100-m^2 area. Acroporid corals were not observed at any of the 28 sites. Colonies of *Acropora* spp. have not been observed on the patch reefs and outer linear reefs during any of the biological monitoring surveys conducted for the 1988, 1998, and 2010 North Boca Raton Beach Nourishment Projects (Segment 1) and 2004 and 2006 Central Boca Raton Beach Nourishment Projects (Segment 2).

3.4.7.2 Critical Habitat

Critical habitat was designated for *A. cervicornis* and *A. palmata* on December 26, 2008. Four specific areas were designated: the Florida area, which comprises approximately 1,329 sq. miles (3,442 sq. km) of marine habitat; the Puerto Rico area, which comprises approximately 1,383 sq. miles (3,582 sq. km) of marine habitat; the St. John/St. Thomas area, which comprises approximately 121 sq. miles (313 sq. km) of marine habitat; and the St. Croix area, which comprises approximately 126 sq. miles (326 sq. km) of marine habitat.

The northern boundary of the Florida area was designated at Boynton Inlet, Palm Beach County 26° 32′42.5"N. The final rule designated the shoreward boundary of the Florida area at the 6-ft (1.8 m) contour from the north boundary at Boynton Inlet south to Government Cut, where the boundary moves inshore to MLW. Additionally, the final rule excluded the Dania Beach Restricted Anchorage Area due to national security impacts.

The physical or biological feature of *Acropora* critical habitat essential to the conservation of *Acropora* spp., referred to as the primary constituent element (PCE), is substrate of suitable

quality and availability: natural consolidated hard substrate or dead coral skeleton that is free from fleshy and turf macroalgae and sediment cover to maximize the potential for successful recruitment and population growth.

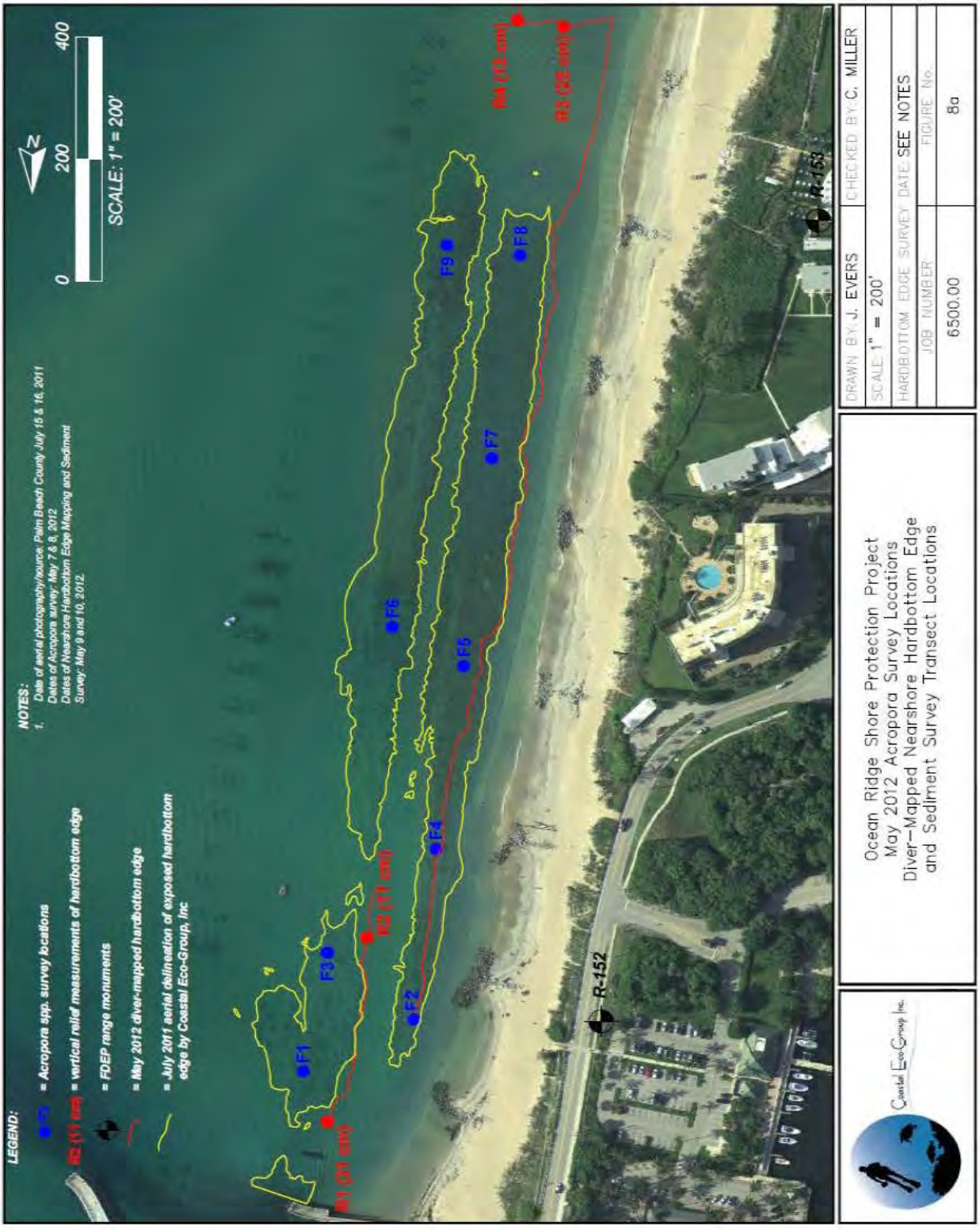

Figure 10: *Acropora* spp. survey locations and hardbottom habitat delineations in the Ocean Ridge project area.

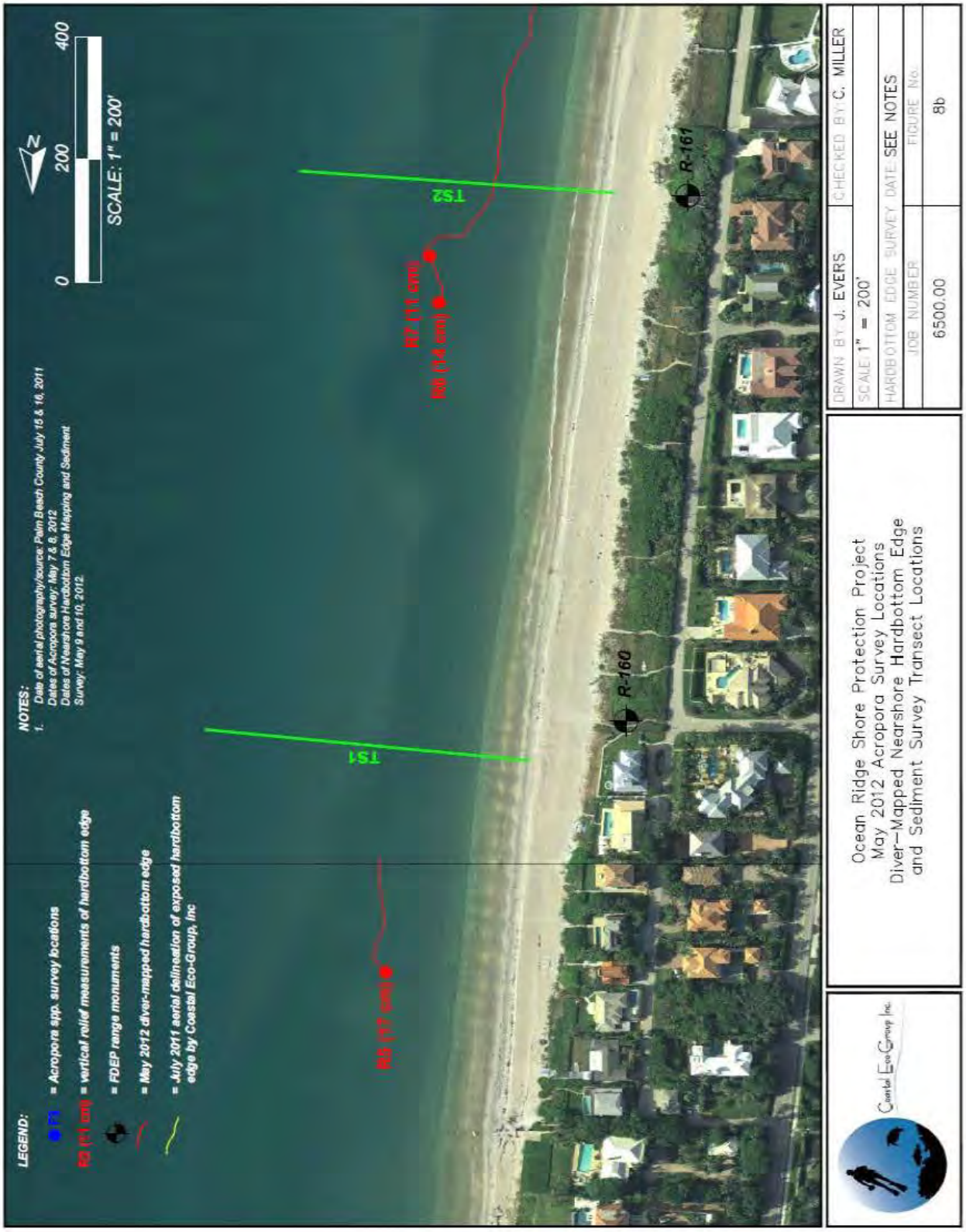

Figure 11: ***Acropora*** **spp. survey locations and hardbottom habitat delineations in the Ocean Ridge project area.**

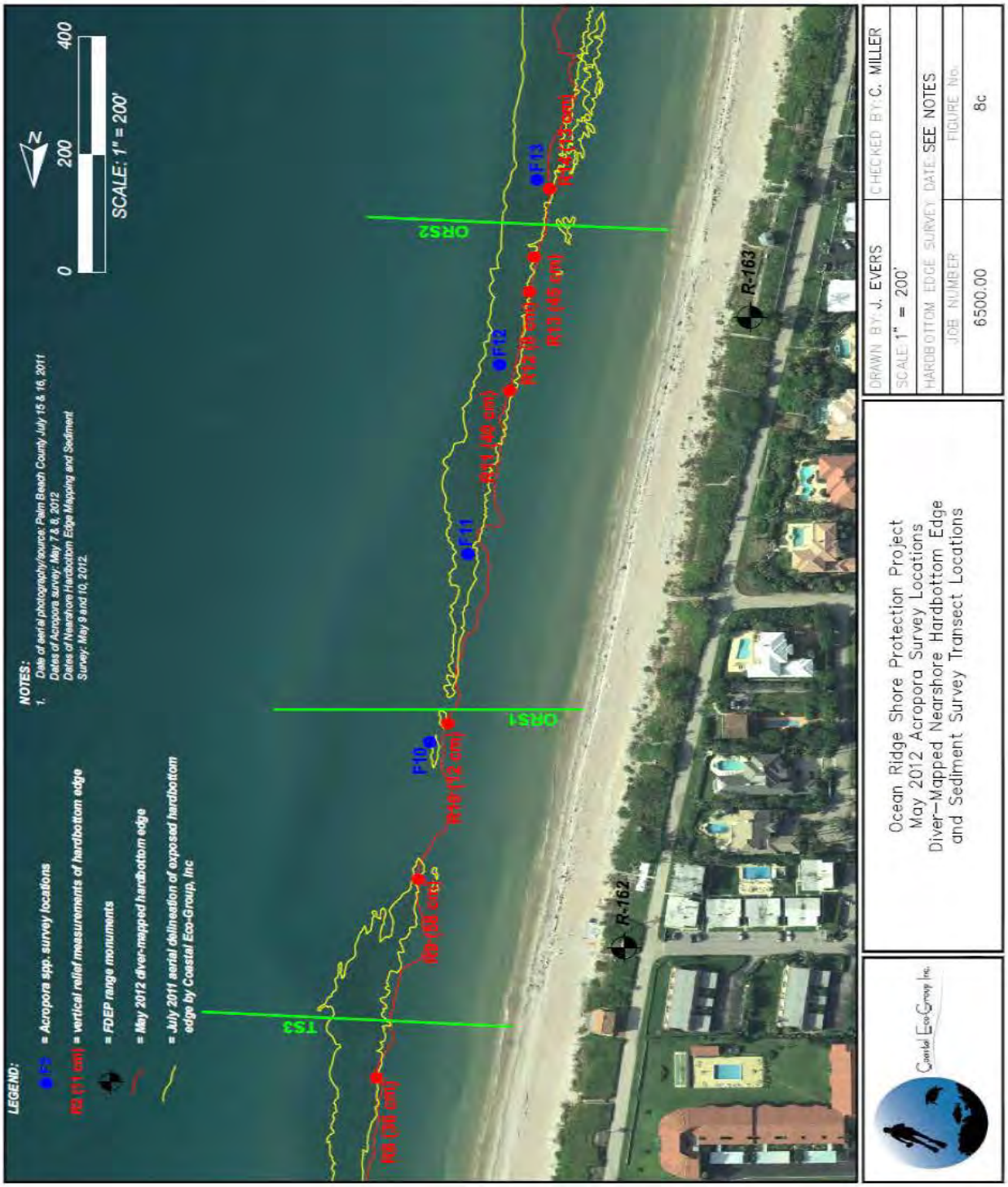

Figure 12: ***Acropora*** **spp. survey locations and hardbottom habitat delineations in the Ocean Ridge project area.**

Figure 13: *Acropora* **spp. survey locations and hardbottom habitat delineations in the Ocean Ridge project area.**

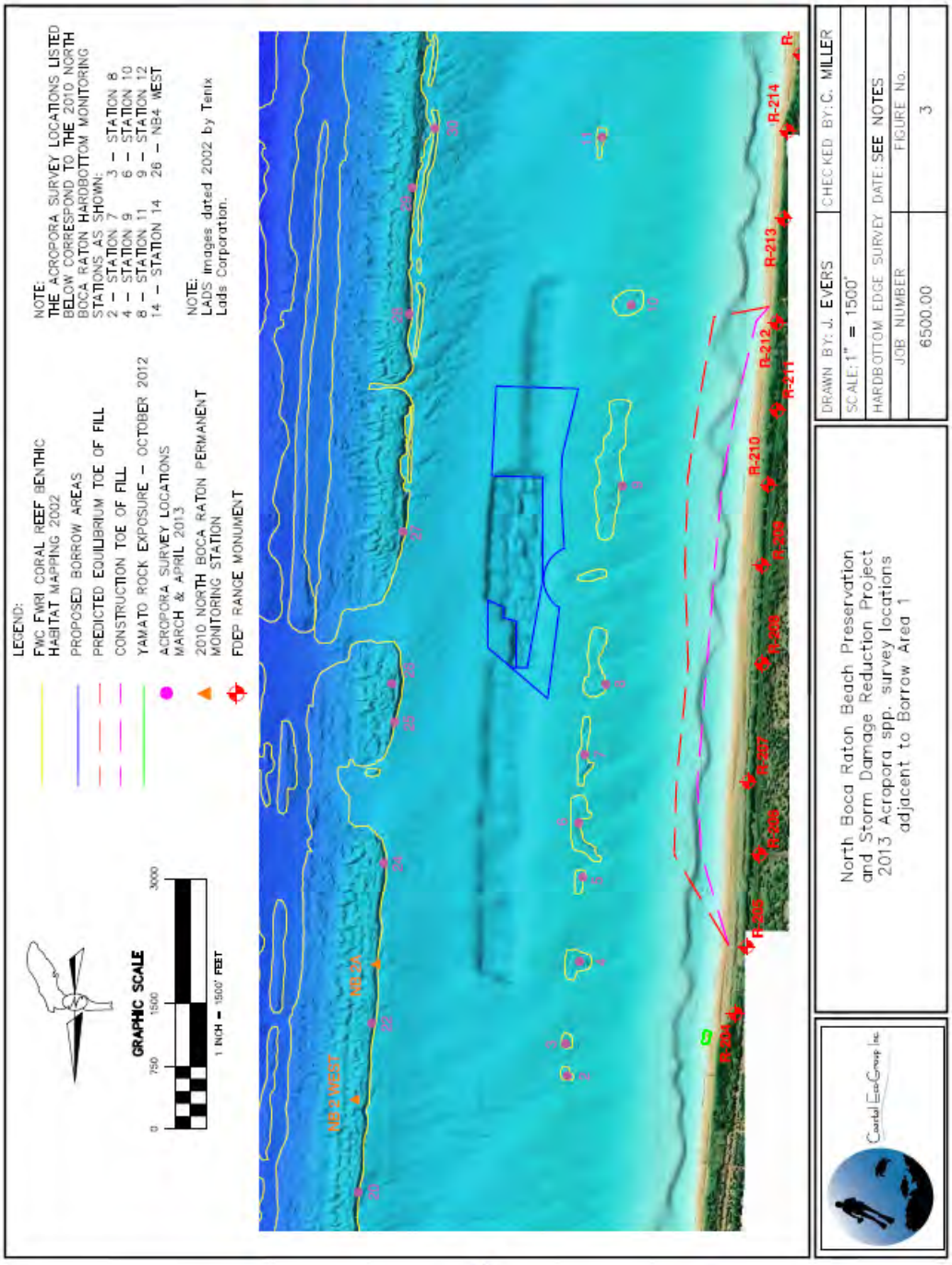

Figure 14: ***Acropora*** **spp. survey locations adjacent to borrow area 1 in the Boca Raton project area.**

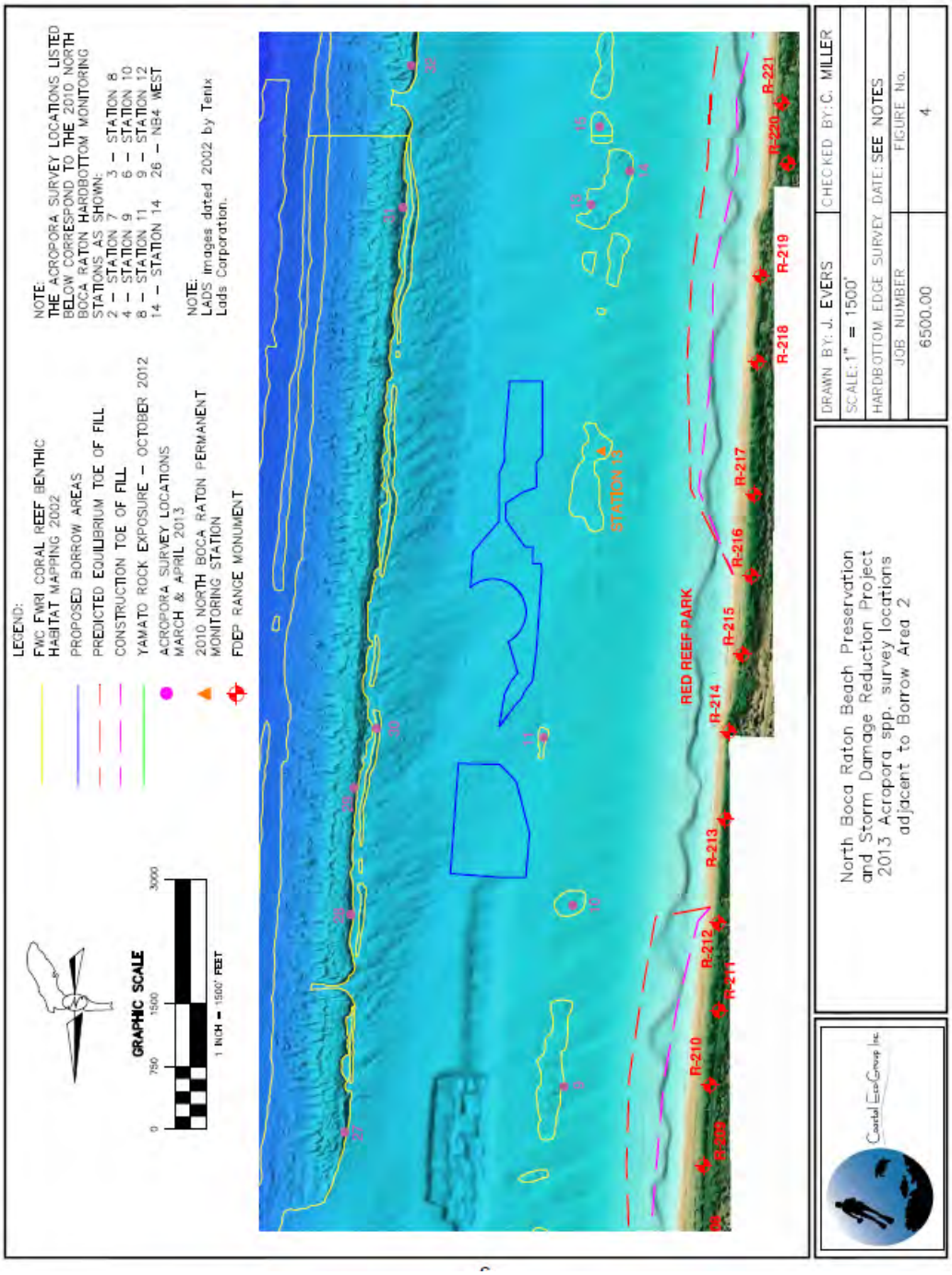

Figure 15: ***Acropora* spp. survey locations adjacent to borrow area 2 in the Boca Raton project area.**

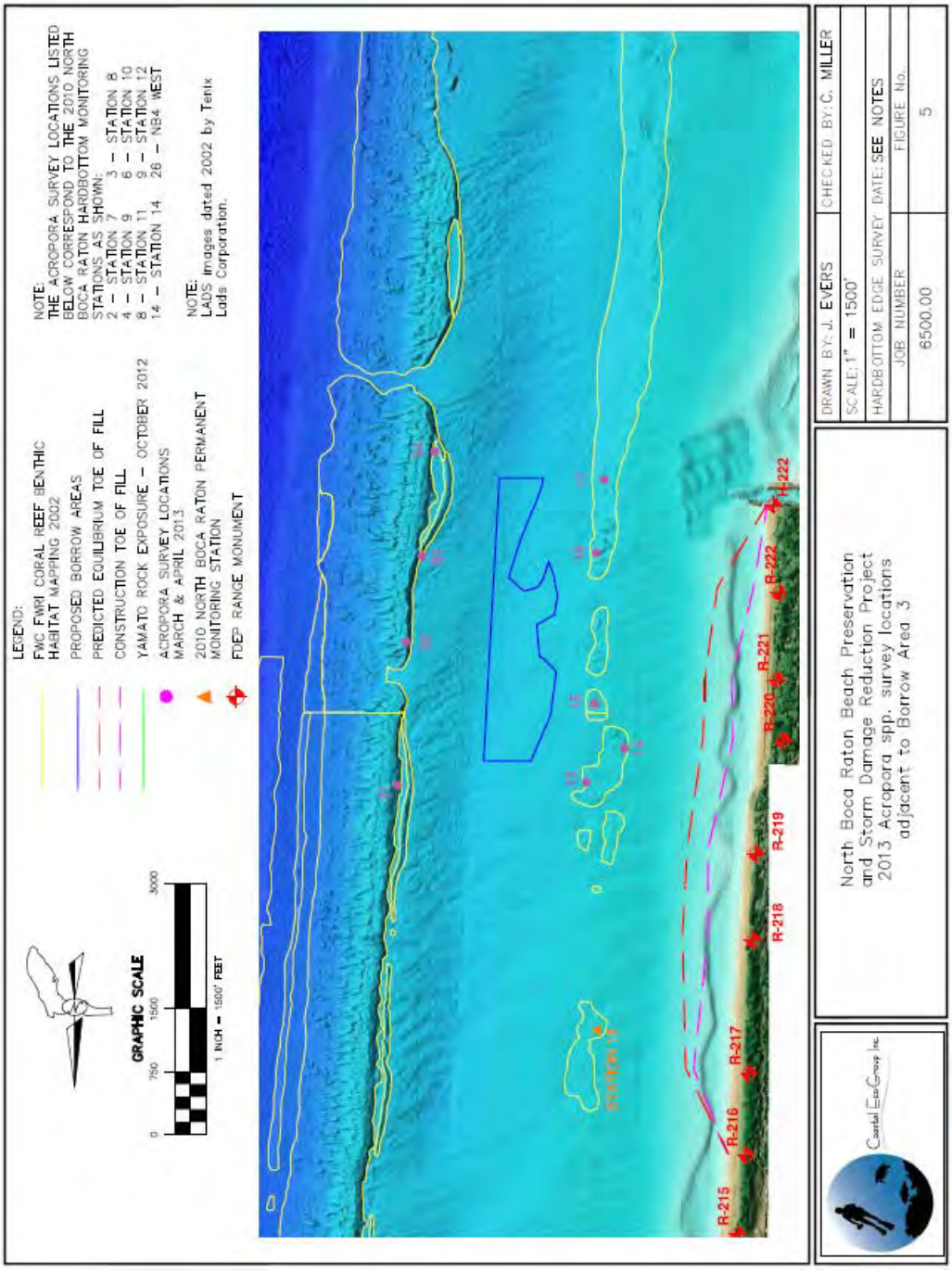

Figure 16: ***Acropora*** **spp. survey locations adjacent to borrow area 3 in the Boca Raton project area.**

3.4.8 Johnson's Seagrass

Johnson's seagrass is a rare plant (50 CFR Part 226, Section 226.213, Vol. 65, 5 April 2000) that may have the most limited distribution of any seagrass in existence. It frequently occurs in small isolated patches from centimeters to a few meters in diameter. Johnson's seagrass appears to reproduce only through asexual branching. There are no known seed banks. The leaves are generally two to five centimeters in length, and the rhizome internodes rarely exceed three to five centimeters in length. Johnson's seagrass prefers to grow in coastal lagoons in the intertidal zone, or deeper than many other seagrasses. It fares worse in the intermediate areas where other seagrasses thrive. The species has been found in coarse sand and muddy substrates and in areas of turbid waters and high tidal currents. Johnson's seagrass is more tolerant of salinity, temperature, and desiccation variation than other seagrasses in the area. It has a disjunct and patchy distribution along the east coast of Florida from central Biscayne Bay to Sebastian Inlet. The largest patches have been documented inside Lake Worth Inlet. The southernmost distribution is reported to be in the vicinity of Virginia Key in Biscayne Bay. Seagrasses do not typically occur in the high-energy, ocean facing shorelines of south Florida including the borrow areas and placement sites for these project segments.

3.5 ESSENTIAL FISH HABITAT (EFH)

The Magnuson-Stevens Fishery Conservation and Management Act requires identification of habitats necessary for sustainable fisheries and comprehensive fisheries management plans. The Act also requires preparation of an EFH assessment when impacts to EFH are likely to occur.

3.5.1 Essential Fish Habitat in the South Atlantic

EFH is defined in the MSFCMA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". EFH is separated into estuarine and marine components. EFH in the South Atlantic Region includes estuarine inshore habitats, including North Carolina, South Carolina, Georgia, and the Florida east coast as well as adjacent offshore marine habitats (e.g. coral, coral reefs, and live/hard bottom habitat, artificial reefs, *Sargassum* habitat and the water column) (SAFMC, 1998).

3.5.2 Essential Fish Habitat Found Within the Project Area

There is no estuarine EFH within the project area. The marine water column, unconsolidated bottoms (soft sediments), and live/hardbottoms are the designated marine EFH that falls within the project area. The water column from Dry Tortugas to Cape Hatteras serves as habitat for many marine fish and shellfish. Most marine fish and shellfish spawn pelagic eggs and, thus, most species utilize the water column during some portion of their early life history (e.g. egg, larvae, and juvenile stages). Larvae of shrimp, lobsters, crabs, and larvae of reef, demersal and pelagic fishes are found in the water column (SAFMC, 1998). According to the South Atlantic Fisheries Management Council (SAFMC), nearshore shelf/oceanic waters provide EFH for the spiny lobster FMP (SAFMC, 2010). Unconsolidated bottom (soft sediments) is essential fish habitat for several species such as spiny lobster, red drum and snapper-grouper complex. The offshore hardbottom resources and marine water column above those resources provide EFH for the snapper-grouper FMP. There is also designated EFH within the project area for several shark

species (managed as Highly Migratory Species), including, but not limited to, great hammerhead, nurse shark, and tiger shark.

3.5.3 Nearshore and Offshore

The SAFMC has designated the entire nearshore bottom of southeastern Florida (including the project area) as EFH habitat areas of particular concern (EFH -HAPC) (SAFMC, 1998).

Managed species that commonly inhabit the project area include pink shrimp (*Penaeus duorarum*) and spiny lobster (*Panularis argus*). Members of the 73-species snapper-grouper complex that commonly use the hardbottom habitats during their adult life include blue stripe grunts (*Haemulon sciurus*), French grunts (*Haemulon flavolineatum*), mahogany snapper (*Lutjanus mahogoni*), yellowtail snapper (*Ocyurus chysurus*), red grouper (*Epinephelus morio*), gray triggerfish (*Balistes capriscus*), and hogfish (*Lachnolaimus maximus*). Coastal migratory pelagic species also commonly use the offshore area adjacent to the project area, and may occur in the project area. In particular, the king mackerel (*Scomberomorus cavalla*) and the Spanish mackerel (*Scomberomorus maculatus*) are the most common. As many as 60 species of corals can occur off the coast of Florida (SAFMC, 1998) and are under the Coral Fishery Management Plan.

3.5.4 Water Column

SAFMC (1998) states that gradients and discontinuities in temperature, salinity, density, nutrients, light, etc., define specific habitats within the water column. The marine water column is defined as the open water (ocean) environment. It extends vertically from the water surface to the ocean bottom. The water column provides habitat for phytoplankton to carry out the processes of primary productivity. Zooplankton also utilize the water column for habitat, thus creating the foundation of the ocean food web and ecosystem. Some benthic invertebrates living on or in the ocean floor filter the water column to collect suspended food particles. Most marine fish and shellfish broadcast spawn pelagic eggs; thus, most species use the water column during some portion of their early life history (e.g., egg, larvae, or juvenile stages). Higher vertebrates (fishes, marine mammals, and sea turtles) use the water column for foraging, migration, and breeding.

Turbidity is a key water quality factor in coastal waters of South Florida. Turbidity may result from planktonic organisms in the water column and from fine materials suspended in the water column from wave and current action. Turbidity levels typically follow a seasonal pattern of low (clearer water) levels during low-wind early summer months and increasing to annual maxima during windier winter months. Florida standards restrict turbidity values associated with dredging and beach placement to a maximum of 29 NTU above ambient conditions in Class III Marine waters.

3.5.5 Hardbottom Habitat

Beginning at the shoreline, the nearshore hardbottom habitat in the project area runs in roughly shore-parallel zones. The first zone of intermittently exposed hardbottom typically occurs seaward of a short sandy zone containing the shoreline surf area. A sand and rubble zone locates between the first and second hardbottom zones, and abundant sand occurs between the second

and third hardbottom zones. The hardbottom habitat at most locations in the project area undergoes cycles of sand coverage and exposure caused by tides and storm events.

The hardbottom habitat includes areas with patches of limerock outcropping with or without sessile floral and faunal populations, within the larger unconsolidated substrate habitat (FNAI, 1990). A variety of hardbottom habitats or reefs may occur along the coast of Florida. The potential distribution of these habitats and actual occurrences are typically patchy, and become more widely separated north of the project area. Many commercially, recreationally, and ecologically important fish species inhabit the nearshore hardbottom area of the east coast of Florida. The biological and physical complexity of hardbottom habitats attracts both commercial and recreational fish species. Colonies of tube-building polychaete worms and other invertebrates and macro-algae species increase the habitat complexity of these hardbottom communities (Kirtley and Tanner, 1968), (Goldberg, 1973; Nelson, 1989; Nelson and Demetriades, 1992). Nearshore and offshore limestone outcrops and ridges provide significant hardbottom habitat for a variety of invertebrate and vertebrate species. These habitats serve an important function as nurseries for fish and juvenile marine turtles (Bresette et al., 1998).

The nearshore hardbottom is composed of flat platforms and rounded boulders and fins exposed within the larger bare sand bottom. The limerock hardbottom habitats are often referred to as "live bottoms" because they generally support a diversity of sessile invertebrates such as corals and sponges. The biological communities in and adjacent to hardbottom areas are relatively consistent, although species composition may vary from site to site based on physical parameters such as distance from shore, hard ground profile, and burial history.

There are no hardbottom resources located within the nearshore fill area or the offshore borrow area of the Delray Beach segment. However, nearshore hardbottom habitats have been documented within the Ocean Ridge and Boca Raton segments of the project area; including patch reefs, and outer linear reefs within the vicinity of the borrow areas. Details, including the locations and extent of hardbottom habitat are presented in Section 3.3.4.

3.6 WATER QUALITY

Eastern Palm Beach County is one of the more heavily urbanized areas in the State of Florida. The rapid population growth is a suspected contributor to the degradation of water quality along the coast, mainly through the discharge of nutrient-laden sewage and stormwater runoff into canals (FDEP, 2003). Three major drainage canals of eastern Palm Beach County discharge into the Lake Worth Lagoon Intracoastal Waterway (ICW). From the ICW, inlets provide discharge access to the Atlantic Ocean. Runoff can carry bacteria, viruses, oil and grease, toxic metals, and pesticides (FDEP, 2003). In addition to contributions from canals, nutrients and coliform bacteria can be introduced via septic tanks and disposal well discharges on Florida's east coast (USGS, 1992). Since 1964, the South Central Regional Wastewater Treatment and Disposal Plan operated by Delray Beach and Boynton Beach pumped approximately 13 million gallons per day of treated sewage out its 30-inch diameter ocean outfall (Koopman et. al., 2006). This nutrient-rich wastewater discharge has caused a profuse growth of filamentous red algae on the reef which has affected coral health (Koopman et. al., 2006). In response to this, the Delray Beach outfall was closed in early April 2009 (Palm Beach Post, 2009).

Both South Lake Worth Inlet and Boca Raton Inlet provide a mechanism for flushing and exchange between the ICW and the coastal waters of Palm Beach County. One of the major limiting factors to coastal water quality within Palm Beach County is turbidity. Turbidity is measured in Nephelometric Turbidity Units (NTU), which measures the light scattering characteristics of water. Turbidity in this region is generally lowest in the summer months and highest in the winter months, which is due to re-suspension of organic matter and sediments by wave action during storm events. High turbidity is generally temporary and returns to background conditions within several days to several weeks. Water quality data collected by the South Florida Water Management District (SFWMD) near the Ocean Avenue Causeway in Boynton Beach, just north of Delray Beach indicated good water quality: turbidity averaged 4.3 NTU, dissolved oxygen averaged 5.9 mg l-1, and Chlorophyll-a averaged 5.9 mg l-1 (DBHYDRO database, 2010).

Limited turbidity monitoring data are available from the 1998 Ocean Ridge Beach Restoration Project. Turbidity data from about 50% of the total number of daily logs indicate that there was one measurement recorded on April 21, 1998 which exceeded 29 NTU above background. Approximately 22% of the measurements suggest down current turbidity which was in excess of 10 NTUs above background. About 14% of the compliance samples were more than 15 NTUs above background. The turbidity data suggest that the allowable variance was appropriate for the 1998 project, which was completed under what are expected to be similar operating conditions to the proposed nourishment project. Higher turbidity levels are typically expected around inlet areas, and particularly in estuarine areas, due to high nutrient and suspended sediment levels. Although some colloidal materials 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 and magnitude of the perturbation (storm event or other) and on the amount of suspended fines (USACE, 1996).

3.7 COASTAL BARRIER RESOURCES

Coastal Barrier Resources Act (CBRA), Public Law 97-348 (96 Stat. 1653; 16 U.S.C. 3501 et seq.), enacted October 18, 1982, designated various undeveloped coastal barrier islands, depicted by specific maps, for inclusion in the Coastal Barrier Resources System (CBRS). Areas so designated are ineligible for direct or indirect Federal financial assistance that might support development, including flood insurance, except for emergency life-saving activities. The Act includes exceptions for activities such as fish and wildlife research. The Act also excludes National Wildlife Refuges and other, otherwise protected areas from the system. There are no CBRA units in or near the project area.

3.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES (HTRW)

Residential and public land uses have fully developed the shoreline, with a substantial portion dedicated to publicly owned and accessible open space and recreational areas. There are currently no hazardous, toxic, and radioactive waste producers adjacent to the project site that discharge effluents near the project area shoreline.

3.9 AIR QUALITY

Palm Beach County is an attainment area for six criteria pollutants listed by the EPA under the Clean Air Act: carbon monoxide, lead, ozone, nitrogen dioxide, and airborne particulate matter: particulate matter of 10 micrometers or less and particulate matter of 2.5 micrometers or less. Palm Beach County is within the Southeast Florida Area for ozone, which is comprised Broward, Dade, and Palm Beach counties, and maintenance plans ensure attainment of the 8-hour ozone national ambient air quality standards through 2014 in the Southeast Florida Areas. Air quality in the project area is generally good. The popularity of the beaches contributes to vehicular traffic on roads adjacent to the beach; these vehicles may produce airborne pollutants in the project area. However, persistent ocean breezes readily disperse these pollutants.

3.10 NOISE

Ambient noise levels in Palm Beach County are low to moderate and are typical of recreational and commercial environments. The major noise producers near the project site include the breaking surf, adjacent residential areas, private and commercial vehicular traffic, and recreational boat traffic.

3.11 AESTHETIC RESOURCES

The shoreline along Palm Beach County has been highly developed by residential and commercial interests. The clean beach and nearshore hardbottom habitats provide a visually pleasing environment to beachgoers, swimmers, and divers.

3.12 RECREATIONAL RESOURCES

Common water related activities in southeast Florida include fishing, recreational diving, swimming, surfing, sunbathing and boating. The majority of boating activity is concentrated in close proximity to the inlets, which serve as the access points for recreational diving and fishing vessels.

3.13 ECONOMICS

The project area provides extensive opportunities for local recreational activity, vacation and eco-tourism, and seasonal residency in addition to full-time residency. These activities generate a significant portion of the local economy.

3.14 CULTURAL RESOURCES

3.14.1.1 Ocean Ridge

Tidewater Atlantic Research Inc. (TAR) conducted an underwater remote sensing survey of the two offshore borrow areas adjacent to Ocean Ridge in March 2010. TAR identified 35 magnetic anomalies and eight sonar targets during the investigation; one sonar target was located in the northern portion of the borrow area and seven were in the southern portion. TAR determined that 18 magnetic anomalies and all sonar images were indicative of small pieces of modern debris. The remaining 17 anomalies had complex signatures; but were not identified in a previous remote sensing survey, and are therefore likely to represent materials deposited in the area since 1993 (TAR, 2011).

3.14.1.2 Delray Beach

In compliance with federal mandates established in the National Historic Preservation Act of 1966, as amended, the Archaeological and Historic Preservation Act of 1979, as amended, the Abandoned Shipwreck Act of 1987, the Advisory Council on Historic Preservation revised 36 CFR, Part 800, Regulations, and the BOEMRE Guidelines for Archaeological Resource Field Surveys, an archeological remote-sensing survey of the borrow areas in state waters off Delray Beach was conducted by TAR in December 2010, which included magnetometer, side-scan sonar and sub-bottom profiling (TAR, 2011). Analysis of the borrow sites remote-sensing data identified a total of 149 magnetic anomalies and 12 sonar targets. Seventy-six magnetic anomalies along with four associated sonar targets are associated with modern debris and isolated objects. Nineteen magnetic anomalies are associated with a sewer outfall line that will be avoided by a 900-ft wide buffer. Thirteen magnetic anomalies are associated with the wreck of the steamer *Inchulva* and should be avoided by a 500-ft radius buffer centered on the strongest magnetic signature and a 200-ft radius buffer conforming to the shape of other scattered anomalies. Twenty-eight magnetic anomalies and one associated sonar target produced signature characteristics and spatial associations typically associated with shipwreck scatters. These anomalies should be avoided by a 200-ft radius buffer. The remaining 13 anomalies and two sonar targets exhibit signature characteristics suggestive of potentially significant cultural material, and should also be avoided by a 200-ft radius buffer. The remaining five sonar targets contained no magnetic signature and are suggestive of small pieces of isolated modern, debris (TAR, 2011).

3.14.1.3 Boca Raton

The proposed borrow area for the North Boca Raton project was surveyed for cultural resources in 2003 by TAR. Their 2006 report *Archaeological Remote Sensing North Boca Raton Beach Renourishment Project, Boca Raton, Palm Beach County, Florida* identified four magnetic anomalies that appeared similar to historic shipwrecks (BR06-01, BR06-05, BR06-06, and BR06-08). Consultation with the Florida State Historic Preservation Officer (DHR No. 2007-4129) determined no effect to cultural resources based on a 100 meter avoidance buffer or the results of a follow up diver identification. The existing cultural resource survey is acceptable for the current project; with the 100 meter buffers the project will have no effect on historic properties. An updated SHPO consultation is in progress.

4.0 IMPACTS OF THE PROPOSED ACTION

4.1 INTRODUCTION

Changes to the existing environment can include direct, indirect, and cumulative impacts. This section describes how the implementation of the no-action and proposed project alternatives would affect the environmental resources in the project area.

Direct impacts result from an action and occur at the same time and place as the action. Indirect impacts result from an action and occur later in time or farther removed in distance, but are still reasonably foreseeable. Indirect impacts may include impacts related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and

other natural systems, including ecosystems. (40 CFR § 1508.8). 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 time. (40 CFR § 1508.7)

This section provides a means to assess the environmental impact of the proposed project on natural resources in the project area. Implementation of the no-action plan and the proposed action are assessed for their expected environmental impact.

4.2 GENERAL ENVIRONMENTAL SETTING

4.2.1 No-Action Alternative

The no-action alternative would result in cumulative impacts due to erosion that would eventually threaten the existence of the beach, dunes, adjacent uplands, and any development in those areas. Loss of sand from the project area would ultimately result in reduced sand transport to downdrift areas and thus significantly reduce or eliminate sea turtle nesting habitat in the project area and beyond. Indirect effects may include loss of recreational opportunities and reduced local economy from reduced beach uses.

4.2.2 Proposed Project

The proposed project is expected to have a negligible effect upon coastal processes and natural resources. The excavation of offshore borrow areas and subsequent beach sand placement represent an injection of "new" sand into the littoral system. Potential impacts as a result of project implementation are discussed below.

4.2.2.1 Ocean Ridge

The beneficial effects of beach fill placement along the Ocean Ridge segment of the project area shoreline include establishment of a larger buffer area for protection against storms and creation of additional dry beach for recreational activities. Beach sand placement may increase the amount of available sea turtle nesting habitat due to the compatibility of borrow area sediments with the existing beach sand and adherence to the Terms and Conditions and Reasonable and Prudent Measures of the USFWS Statewide Programmatic Biological Opinion.

Concerns for potential adverse impacts to nesting sea turtles include changes to the incubation environment, increased exposure to light, increased erosion of nests during equilibration, timing of construction activities, potential burial and mechanical destruction of sea turtle nests, encounters with construction equipment/pipes on the beach during nesting/hatching activities, and increased beach sand compaction due to the presence of heavy equipment and sand deposition. Many of the potential direct adverse effects to sea turtle nesting will be avoided due to project construction outside of the main portion of the sea turtle nesting season.

Temporary turbidity increases at the beach fill site and offshore borrow site will occur during project construction. The presence of construction equipment and personnel will temporarily detract from the aesthetics of the beach. Shore-parallel temporary toe dikes will be utilized as needed to control hydraulic effluent and reduce turbidity along the beach fill area. Immediately after placement, the color of the dredged sand will be slightly darker than the existing beach sediments; the dredged sand is typically a medium grey color.

The direct placement of sand will result in the burial and nearly complete mortality of benthic infauna along the 5,658 linear feet of shoreline at the project fill site. The majority of infaunal loss will be in the shallow waters of the surf zone. Sediments within the proposed borrow area are compatible with the existing beach sediments in terms of sediment grain size characteristics. Given the compatibility of the proposed borrow site sediments with the existing beach, it is anticipated that the significant impacts to softbottom invertebrate communities at the project fill site would be limited in duration to the first summer following project completion.

4.2.2.2 Delray Beach

In general, dredge and fill activities temporarily suspend sediments and increase turbidity within the immediate vicinity of the operation. Turbidity within the water column undergoes dispersion through plumes that drift passively with the moving currents. The extent of this dispersion depends on a variety of factors: sediment composition, sediment transport processes, the type of dredging equipment (hopper or cutterhead suction dredge), amount (volume and duration) of dredging, thickness of dredged layer, etc. Suspended non-nutritive particles may interfere with the respiratory and food gathering processes of filter feeding invertebrates. At both the fill site and the dredge site, direct effects include mortality and reduced energy efficiency, while indirect effects include a reduction in reproduction success and a decreased ability to avoid predation (Sherk, 1971).

During the dredging process, accidental leaks and spills of fuel, lubricants, and other contaminants from dredges, scows, and work vessels could occur. This project proposes to dredge sediments that have been approved for placement on the beach, partly on the assumption of very low pollutant concentrations and negligible toxicity. Accordingly, the proposed project is not expected to have significant impacts on water resources related to chemical pollutants.

4.2.2.3 Boca Raton

The proposed activity involves emergency restoration of the Palm Beach North Boca Raton project to pre-storm conditions. This will involve the placement of approximately 234,000 (Lost volume pre to post storm) cubic yards of sand and will affect the upper beach, dune, intertidal and nearshore environments. No portion of this beachfill placement will extend beyond the original construction template. The sand will be obtained from a borrow area that was previously permitted and used for the project. The placement sites, project profiles, quantities, and methods will be within the scope of that authorized by current permits and certifications. Restoration of the pre-hurricane condition would occur on 1.42 miles of the North Boca Raton segment between DNR monuments R-205 and R-212.

The purpose of re-nourishing the previously nourished beach is to restore and maintain the hurricane protection and storm damage reduction benefits of the project. Shore protection projects are typically designed to provide a minimum level of protection plus additional nourishment to optimize the renourishment interval (typically enough sand to achieve a renourishment interval of 3 to 7 years). The "construction profile" undergoes a period of reworking by waves and currents. An "equilibrium profile" is achieved in about a year following the re-nourishment event. Direct burial of shoreline bottom (benthic) habitat would occur within this "equilibrium profile". During the first year following the re-nourishment event, there would be a high potential for greater than normal erosion of the dry beach along with possible loss of sea turtle nests. Some elevation in turbidity for the near shore waters might also be expected during the re-nourishment event and during the first year following the event as the beach profile equilibrates. To reduce impacts, the sand used for re-nourishment is required to be similar to the "natural" or "existing" beach, the level of "fines" (material passing through a #200 sieve) must not exceed 5%, the beach is tilled if compaction exceeds 500 psi, scarps are removed just prior to sea turtle nesting season, and re-nourishment occurs outside the sea turtle nesting window or sea turtle nests are relocated to a "safe hatchery" as required by the biological opinion from FWS. Monitoring for escarpments and compaction is typically on an annual basis just prior to sea turtle nesting season for three years following construction.

The borrow site(s), quantity, and work will fall within the scope of that authorized by these permits and WQC. Borrow sites are selected for quality and quantity of sand, proximity to the beach, minimizing impact to valuable underwater resources (reef, hard ground, potential historic/cultural resources). A buffer zone between the borrow site boundary and such resources is typically required to minimize or avoid impacts. Buffer zones are specified in both the South Atlantic and Gulf of Mexico Regional Biological Opinions from NMFS. If required to deliver sand to the beach, pipeline corridors are selected to minimize impact to benthic resources. The same pipeline corridor is used for subsequent re-nourishment events to limit impacts to one specific location.

4.3 FISH AND WILDLIFE RESOURCES

4.3.1 No-Action Alternative

The no-action alternative would result in continuing beach erosion, which would reduce the supralittoral area beach and dune habitat. Species affected would include those that use the supralittoral zone and dune zones for resting, feeding, and breeding. Dynamic coastal processes, including sea level rise, influence erosion rates. Human interference with these natural processes occurs through coastal development and associated activities.

4.3.2 Proposed Project

The proposed project would temporarily impact fish and wildlife species that use the project area. Species with sufficient motility would avoid the project area during construction and return after completion of construction activities. Dredging and beach placement of sand would disrupt organisms living in the dredged sediments and bury those organisms at the beach placement site before construction.

Other potential negative impacts to fish and wildlife from beach restoration may include

- Destruction of wildlife nests by operation of heavy equipment
- Disruption of nesting, resting, or foraging birds by excessive vehicle noise or movement
- Destruction of vegetation suitable for food, protective cover, or nesting sites
- Degradation or destruction of habitat resulting from placement of unsuitable material or excessive turbidity
- Death or injury of sea life due to contact, entanglement, or collision with the dredge draghead, equipment, and vessels
- Destruction or degradation of habitat

A list of possible methods to minimize environmental impacts to fish and wildlife includes

- Educating the contractor and employees on possible environmental impacts and ways to minimize these impacts
- Ensuring construction methods and materials provide the least impact
- Policing the effects of construction via turbidity monitoring and turbidity control measures
- Constructing during periods when affected populations are lowest in the project area

Dredging and beach placement would result in significant mortality of non-motile benthic organisms. However, these organisms typically adapt well to the dynamic coastal environment. With their high fecundity and recruitment potential, they should repopulate the affected areas in a relatively short time usually less than a year.

A review of the readily available literature concerning the potential effects of beach nourishment on benthos and benthic habitats identified a number of reports detailing effects of beach placement and dredging on benthic communities. Key findings included

- The recovery rate of benthic invertebrate community depends on the season in which the fill activities occur and to the grain size of the nourished sediments
- The majority of the articles suggested that nourishing a beach in winter has less of an impact on the benthic habitat than nourishing in other seasons. The articles also suggest that selecting sediments for a nourishment project that match the receiving beach's native sand should lessen the impacts to benthic habitat (e.g., Atlantic States Fisheries Commission, 2002; Ray and Burlas, 2003).
- Research suggested that benthic habitat within nourished areas typically recover in one to two seasons (e.g. Saloman and Naughton, 1984; Ray et al., 2003).

4.3.3 Dune and Beach Habitat

4.3.3.1 No-Action Alternative

The no-action alternative would result in continuing beach erosion, which would reduce nesting habitat for threatened or endangered marine turtles, including loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and leatherback (*Dermochelys coriacea*). Loss of nesting habitat may occur from reduced area of beach above mean high tide elevation. In addition, loss of nesting

opportunities above the high tide line may result in turtle nesting at lower elevations where nests may wash out.

4.3.3.2 Proposed Project

Sand placement on the beach will widen the beach and protect the dune and associated vegetation. A wider beach provides a tourist and recreational attraction which can result in an increase to the local economy. During construction, impacts to dune vegetation will be minimal, since operations will avoid placing sand directly onto the vegetation and construction vehicles will utilize already-existing access corridors. The project will provide dune accretion allowing for the development of a more complex and stable dune habitat, which will offer a higher level of protection for the upland property. The project will also reduce the need for hardened structures such as seawalls in order to protect upland property.

4.3.4 Seagrasses

Seagrasses do not occur within the proposed offshore borrow areas or beach fill placement and projected fill equilibration areas. Seagrasses were not observed within the Ocean Ridge project area during nearshore hardbottom surveys conducted from May 7 through 10, 2012 by Coastal Eco-Group Inc. or during any other survey conducted since 1990. Extensive seagrass beds comprised of Johnson's seagrass (*Halophila johnsonii),* Paddle grass (*H. decipiens)*, and Shoal grass (*Halodule wrightii)* occur immediately west, north, and south of SLWI in Lake Worth Lagoon.

4.3.5 Unconsolidated Substrate (Soft Bottom Habitat)

4.3.5.1 No-Action Alternative

The no action alternative would result in no impact to unconsolidated substrate.

4.3.5.2 Proposed Project

Several factors appear to influence the effects of recruitment/recolonization of infaunal populations at a beach fill site. These factors include the size and type of fill sediment and compatibility of fill with the existing beach. Coarser grains allow for more efficient burrowing and low content of fines minimizes the effects on feeding efficiency. Some studies have suggested that changes in the geomorphology and sediment characteristics may have a greater influence on the recovery rate of invertebrates than direct burial or mortality (USDOI/FWS, 2000). Donoghue (1999) found that the timing of beach fill placement episodes, size and type of fill sand, and compatibility of fill material to the native sediments are critical in preventing long-term impacts to beach invertebrate populations. Peterson *et al*. (2000) documented a reduction of 86-99% in invertebrate populations, five to ten weeks following beach nourishment on Bogue Banks, NC. This extreme decrease in the population of beach infauna following nourishment was attributed to the poor match in grain size between the fill sand and natural beach. The sand source in the Bogue Banks project contained a very high shell content that was not comparable to the natural beach (Peterson *et al.*, 2000).

Studies which have not demonstrated substantial and long-lasting impacts of beach nourishment on the benthic infaunal populations (Peterson *et al*. (2000) appear to have used more compatible sediments and were performed on beaches characterized by high rates of long-shore sediment transport (Peterson *et al.,* 2006). In contrast, projects which showed longer-lasting impacts (Reilly and Bellis, 1983; Peterson *et al*. 2000; Manning, 2003; Versar, 2003) were conducted at locations characterized by low long-shore sediment transport rates. Long-shore transport may enhance immigration of benthic invertebrates by increasing the rate of dispersal from adjacent beaches (Peterson *et al.*, 2006).

Peterson *et al*. (2006) observed significant reductions in the use of nourished beaches by shorebirds during the six months following completion of beach nourishment (March through September 2002) on Bogue Banks, NC. The dramatic depression of abundance of feeding shorebirds persisted from March through September, but by November 2002, seven to twelve months after the completion of nourishment, the difference between counts on filled and controlled beaches was no longer statistically significant (Peterson *et al*., 2006).

Most of the infauna inhabiting the beach fill placement site will be unavoidably lost during the proposed beach nourishment project. The loss of benthic infaunal populations is not expected to result in long-term adverse impacts to foraging habitat for shorebirds. Given the compatibility of borrow area sediments with the existing beach and expected recolonization rate of prey species, it is anticipated that impacts to the benthic communities at the project fill site would be minimal and short term, limited in duration to the first summer following project completion.

4.3.6 Worm Reef

4.3.6.1 No-Action Alternative

The no-action alternative would not impact worm reef.

4.3.6.2 Proposed Project

Impacts to worm reef from burial during placement of sand and subsequent equilibration of the beach project area may occur. Palm Beach County has mitigated for the impacts to worm reef and other hardbottom habitats of the initial project; previous nourishment efforts did not impact hardbottom beyond the originally projected impact area. The proposed project does not anticipate any additional impact to worm reef habitats.

4.3.7 Hard Bottom

4.3.7.1 No-Action Alternative

If no-action is taken, the project area shoreline would continue to erode, potentially resulting in greater exposure of intertidal and shallow subtidal hardbottom within and downdrift of the beach nourishment template.

4.3.7.2 Proposed Project

The proposed project will pump material through a pipeline from a dredge to the beach, where bulldozers will grade the material to the design elevations. Offshore equipment employed for the proposed project includes mechanical or hydraulic dredges, pipeline, equipment barges, marker buoys, and small tugs.

4.3.7.2.1 Ocean Ridge

For the Ocean Ridge segment, impacts to approximately nine acres of nearshore hardbottom south of the project area between R-160 and R-162 was mitigated by the construction of 4.1 acres of artificial reef during the initial 1998 beach restoration project, and 2.25 acres of artificial reef following the 2005 nourishment project. A nearshore hardbottom biological monitoring program was implemented to evaluate the effects of the 2005 beach renourishment on nearshore hardbottom between R-160 and R-162. The biological monitoring results did not indicate additional post-construction impacts to downdrift hardbottom communities between R-160 and R-162 which would require mitigation in excess of the 2.25 acres required by the project permits (Prekel, 2009).

4.3.7.2.2 Delray Beach

There are no hardbottom resources located within the nearshore fill area or the offshore borrow area of the Delray segment. The nearest reef formation is a shore-parallel reef tract in 60 ft of water located approximately 960 ft seaward from the nearest borrow area (**Figure 8**). Due to the lack of nearshore hardbottom in the project area and the distance between dredging activities and the reef tract, no direct impacts to these communities are anticipated from either the No Action alternative or the Proposed Action alternative for the Delray Beach segment. There is always the potential for an unanticipated accident to occur during the proposed action that may result in damage to hardbottom and reef communities. This is highly unlikely since there are no hardbottom resources located between the borrow area and the fill area, and there is a buffer of nearly 1000 ft between the borrow area and the offshore reef. Nonetheless, unanticipated incidents may include dragging of equipment such as anchors, dredge spuds, ropes, or cables across reef resources.

4.3.7.2.3 Boca Raton

Hardbottom habitat has been identified and mapped at the Boca Raton segment of the project area (**Figure 9**). At the request of the NMFS, anomalies in the "no dredge" areas were confirmed to be archaeological sites or debris and not hard bottom habitat. Divers also verified that the pipeline corridors do not contain hard bottom or coral resources. To ensure avoidance of impacts, a vessel tracking plan was provided and a biological monitoring is being developed in concert with FDEP. Any potential impacts to nearshore hard bottom communities from the proposed project were previously mitigated by constructing an artificial reef at Red Reef Rock under a permit issued by FDEP. No additional hard bottom areas are expected to be impacted by the proposed project.

4.3.8 Coral Reefs

4.3.8.1 No-Action Alternative

Under the No-Action alternative, no impacts to patch reefs or barrier reefs are anticipated unless excessive erosion causes exposure of shallow subtidal hardbottom that contain coral colonies.

4.3.8.2 Proposed Project

4.3.8.2.1 Ocean Ridge

Sixty reef pods consisting of limestone boulders were installed between September and December 2009, and two pre-fabricated reef modules were installed on September 6, 2011 to fulfill the 2.25-acre mitigation requirement for the 2005 project. Biological monitoring of the mitigation artificial reef modules is being conducted under the FDEP nearshore hardbottom study in compliance with the approved reef monitoring and mitigation plan (PBCERM, 2009). In addition, Palm Beach County has proposed biological monitoring of the offshore linear and patch reef habitats following to provide reasonable assurance that reef communities adjacent to the borrow areas will not be adversely affected by turbidity and sedimentation during dredging.

4.3.8.2.2 Delray Beach

No coral reef habitat has been observed within or immediately adjacent to the project area of the Delray Beach segment. Therefore, no impacts to coral reefs or coral colonies are expected.

4.3.8.2.3 Boca Raton

The proposed project would not result in any direct impacts to coral colonies during project construction. Outer linear reef and patch reef habitats will be protected during project construction by a 400-ft exclusionary buffer zone into which anchoring and dredging is prohibited. The pipeline and ingress/egress corridors have been sited between reef habitats to avoid direct (i.e. mechanical) impacts. The corridors shall be surveyed by marine scientists prior to pipeline placement to verify that hardbottom resources are not present within the corridor. If exposed hardbottom is found, the hardbottom will be mapped for avoidance through establishment of appropriate buffer distances or measures to elevate the pipeline above hardbottom (collars) if the hardbottom is newly exposed and/or sparsely populated by reef biota.

4.4 THREATENED AND ENDANGERED SPECIES

4.4.1 Smalltooth Sawfish

4.4.1.1 No Action Alternative

The no-action alternative would not impact the smalltooth sawfish.

4.4.1.2 Proposed Project

Increased turbidity during dredging or any burial of hardbottom resources are unlikely to impact sawfish as a minimal amount of sawfish encounters occur over rock and reef formations

(4% each) compared to observations over mud (61%) (Poulakis and Seitz, 2004). NMFS has determined that there has never been a reported take of a smalltooth sawfish by a dredge and impact to the species during dredging activities is unlikely due its affinity for shallow estuarine habitats. If any risk of impacts to smalltooth sawfish exist, it would be greater near the borrow area as this habitat is similar to the sawfish preferred habitat of sand and mud substrate (Poulakis and Seitz, 2004). However, the actions proposed at borrow areas and within the fill area are not anticipated to adversely affect, directly or indirectly, the smalltooth sawfish due to the low likelihood of occurrence within the project area. Additionally, compliance will be maintained by implementing the NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions.

4.4.1.3 Conservation Measures

Palm Beach County will implement the NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions to ensure that sawfish are not adversely affected by the proposed project:

(1) The permittee shall instruct all personnel associated with the project of the potential presence of this species and the need to avoid collisions with smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

(2) The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

(3) All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

(4) If a smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

(5) Any collision with and/or injury to a smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized rescue organization.

4.4.2 Marine Turtles

Although five species of sea turtle are known to occur within Florida, only three species have been documented to utilize Palm Beach County shorelines as nesting grounds. These include loggerhead, leatherback, and green sea turtles (FWRI, 2011).

4.4.2.1 4.4.2.1 No-Action Alternative

The no-action alternative would result in continuing beach erosion, which would reduce nesting habitat for threatened or endangered marine turtles, including loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and leatherback (*Dermochelys coriacea*). Loss of nesting habitat may occur from reduced area of beach above mean high tide elevation. In addition, loss of nesting opportunities above the high tide line may result in turtle nesting at lower elevations where nests may wash out.

4.4.2.2 Proposed Project

Sea turtle nesting season extends from March 1 through October 31 in Palm Beach County. Construction of the beach nourishment project is expected to take approximately 8 to 10 weeks (including mobilization/demobilization activities). Dredging operations are expected to take approximately 6 to 8 weeks; the duration of dredging is dependent on weather conditions during the winter months. Project construction is proposed between November 2013 and March 2014.

The Project Action Area provides important nesting habitat for loggerhead, green and leatherback sea turtles. The nearshore patch reefs adjacent to and landward of the borrow areas may provide potential foraging habitat for loggerhead, green, hawksbill, and Kemp's ridley sea turtles. These hardbottom habitats will be protected from potential turbidity and sedimentation impacts during dredging by a 400-ft. buffer distance from the borrow area boundaries; however, these habitats are also located within the turbidity mixing zone. Reef habitats within 600 ft of the borrow areas will be monitored for potential sedimentation impacts during project construction with appropriate triggers for cessation of dredging if sediment deposition over reef biota exceeds permit-required thresholds.

Concerns for effects to sea turtles include timing of construction activities, potential burial and mechanical destruction of sea turtle nests, encounters with construction equipment/pipes on the beach during nesting/hatching activities, and increased beach sand compaction due to the presence of heavy equipment and sand deposition. Many of the potential adverse direct effects to sea turtle nesting will be avoided during the proposed project due to construction outside of sea turtle nesting season.

The beach nourishment project will most likely be constructed using a hydraulic cutterhead dredge. Adverse effects to sea turtles are highly unlikely during dredging of the offshore borrow areas if a hydraulic dredge is used for project construction. In the unlikely event that a hopper dredge is utilized, the Terms and Conditions of the 1997 Regional Biological Opinion (RBO) on hopper dredging for beach nourishment on the South Atlantic Coast would apply. Hopper dredge entrainment is a documented source of sea turtle mortality. Project construction outside of sea turtle nesting season will minimize the potential for incidental take. The RBO discusses the potential intake of sea turtles by the drag-arms of hopper dredges during movement across the dredge area; this RBO led to development and implementation of improved mechanical turtle exclusion devices and a set of protocols for avoidance of take.

The proposed nourishment project may affect the nesting loggerhead sea turtle, green sea turtle, leatherback sea turtle, Kemp's ridley sea turtle, and hawksbill sea turtle. The County of Palm

Beach has agreed to implement the Terms and Conditions and Reasonable and Prudent Measures of the U.S. Fish and Wildlife Service's Statewide Programmatic Biological Opinion (SPBO) for Shore Protection Activities along the Florida east coast dated August 22, 2011 (USFWS, 2011), the Environmental Commitments described in Section 4.23.2 and the Conservation Measures outlined in Section 4.4.23. Incidental take for nesting sea turtles has been authorized by the SPBO. The proposed project will not jeopardize the continued existence of these species or adversely modify proposed critical habitat for nesting loggerhead sea turtles.

Permanent degradation or alteration of sea turtle foraging habitat on the patch reefs adjacent to the borrow areas is not expected. Based on the temporary nature of the elevated turbidity within the turbidity mixing zone during dredging operations, the proposed project may affect, but is not likely to adversely affect, foraging habitat for loggerhead, green, hawksbill and Kemp's ridley sea turtles.

Provided adherence to the Conservation Measures described below, the proposed project activities will have no effect on swimming sea turtles if a hydraulic cutterhead dredge is used for project construction. Incidental take of loggerhead, green, Kemp's ridley, or hawksbill sea turtles due to hopper dredging has been authorized in the NMFS 1997 RBO on hopper dredging along the South Atlantic coast. The 1997 RBO authorized annual incidental take, by injury or mortality, of 35 loggerheads, 7 Kemp's ridleys, 7 green turtles, and 2 hawksbills.

4.4.2.3 Conservation Measures

The City of Boca Raton has agreed to implement the Reasonable and Prudent Measures and the Terms and Conditions outlined in the U.S. Fish and Wildlife Service's Statewide Programmatic Biological Opinion (USFWS, 2011) for sand placement activities in Florida dated August 22, 2011, for: (a) projects that include sand placement from beach renourishment, sand bypass, and sand back pack pass activities primarily for shore protection; and for: (c) projects that include groin or jetty repair or replacement.

Beach sand placement projects conducted under the Terms and Conditions of the USFWS Statewide Programmatic Biological Opinion for the U.S. Army Corps of Engineers planning and regulatory sand placement activities (including post-disaster sand placement activities) in Florida are not expected to result in adverse modification of proposed critical habitat for the loggerhead sea turtle (50 CFR Part 17, Vol 78, No. 57, March 15, 2013).

If a hopper dredge is utilized for construction of the proposed North Boca Raton Shore Protection and Preservation Project, the Terms and Conditions of the 1997 South Atlantic Regional Biological Opinion on hopper dredging for beach nourishment on the South Atlantic Coast would apply. To avoid potential encounters with swimming sea turtles, the contractor will be required to implement NOAA's Vessel Strike Avoidance Measures described below and the NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions.

NOAA Vessel Strike Avoidance Conditions

1. In order to avoid causing injury or death to marine mammals and sea turtles, the following measures should be taken when consistent with safe navigation:

2. Vessel operators and crews should maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.

3. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.

4. When sea turtles or small cetaceans (marine mammals) are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.

5. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.

6. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel should attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.

7. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

4.4.3 Piping Plover

4.4.3.1 No-Action Alternative

The no-action alternative would result in continuing beach erosion, which would reduce piping plover resting habitat. Intertidal foraging habitat area would remain relatively constant, although shifting spatially as the beach eroded.

4.4.3.2 Proposed Project

The proposed project is not located within critical habitat or "optimal" habitat for the wintering piping plover; therefore, there could be minimal impacts to critical wintering habitat associated with the proposed beach nourishment project.

There have been a few sightings of piping plovers within the project area during the past several years. These sightings were generally recorded outside of the anticipated construction schedule for the proposed project (one on March 30), and the late observations suggest that piping plovers may use the project area beaches as a migratory stopover location. Although direct adverse effects to piping plovers in the Project Action Area are unlikely based on recent sighting data, potential direct effects to foraging piping plovers during beach nourishment projects include harassment in the form of disturbing or interfering with plovers attempting to forage within the construction area or on adjacent beaches and behavior modification of migrating or wintering plovers due to disturbances created by construction activities.

Construction activities may also directly disturb wintering piping plovers from roosting and loafing areas. Such disturbance can result in unnecessary expenditure of energy and force birds to seek alternative areas which may be less suitable and increase their exposure to predation.

Direct placement of sand will result in the burial and nearly complete mortality of benthic infauna along the 15,000 feet of shoreline at the project fill site. The majority of infaunal loss will be in the shallow waters of the surf zone. Research by Peterson *et al*. (2006) suggests that impacts to foraging habitat for shorebird species may be short-term due to temporary depletion of the intertidal food base.

Project construction is proposed between November 1, 2013 and March 31, 2014. Construction of the beach nourishment project is expected to take approximately 8 to 10 weeks including mobilization/demobilization activities. Dredging operations are expected to take approximately 6 to 8 weeks; the duration of dredging is dependent on weather conditions during the winter months. Project construction would occur outside of shorebird nesting season and would therefore avoid direct impacts to nesting shorebirds including least terns.

4.4.4 Least Tern

4.4.4.1 No-Action Alternative

Least terns are not expected to occur in the project vicinity; however, impacts may occur to habitat they could potentially utilize. Continued erosion would eliminate potential roosting and foraging habitat for least terns.

4.4.4.2 Proposed Project

Least tern nesting begins in mid-April in the southern portion of the state. Nesting sites have been documented along the Palm Beach County coast (FWC, 2003). Shorebird surveys were conducted weekly beginning in March and ending in October for the 2006 through 2010 nesting season years. Least terns were observed most frequently in flight; however, they were also observed foraging and resting during the 2009 surveys. Nests were not recorded in the Ocean Ridge survey area (DB Ecological Services 2009; 2010). The least tern is unlikely to be directly affected by project activities since construction will occur during the period when the species is not present in Florida (November through February).

4.4.5 West Indian Manatee

4.4.5.1 No-Action Alternative

The no-action alternative would not impact the West Indian manatee.

4.4.5.2 Proposed Project

The proposed beach nourishment project would occur during manatee season (November 15 through March 31). The greatest likelihood for encounters with manatees would be with support boats within the barge staging/off-load area as well as movement of these vessels through South Lake Worth Inlet. The south portion of Lake Worth Lagoon lies to the west of the barrier island,

adjacent to the Ocean Ridge project area, and is of particular importance due to extensive seagrass beds in the area. Manatees forage where seagrass beds may be locally abundant and although seagrass has been observed growing adjacent to nearby hardbottom communities in Boca Raton. It is possible, but unlikely, that manatees could come into close proximity to dredge activities at the offshore borrow areas.

Provided adherence to the Standard Manatee Protection Conditions (see below), the proposed project is not likely to adversely affect the Florida manatee and will not jeopardize the continued existence of the species. There is no designated critical habitat for the Florida manatee within the Project Action Area.

4.4.5.3 Conservation Measures

To avoid contact and potential injury to manatees, the applicant will adhere to the Standard Manatee Protection Conditions included in the State and Federal permits.

1) The contractor will advise all personnel associated with the construction of the project about the potential presence of manatees in the project area and the need to avoid collisions with manatees. All construction personnel shall be responsible for observing water-related activities for the presence of manatees and shall implement appropriate precautions to ensure the protection of manatees.

2) All construction personnel shall be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammals Protection Act of 1972, the Endangered Species Act of 1973, and the Florida Sanctuary Act. The contractor shall be held responsible for any manatee harmed, harassed, or killed as a result of the construction of the project.

3) Prior to the commencement of construction, the construction contractor shall construct and install at least two temporary signs concerning manatees. One sign, for all vessels, with a size of at least 8.5" x 11", shall read "Caution: Manatee Habitat. Idle Speed is Required if Operating a Vessel in the Construction Area". A second temporary sign, at least 8.5" x 11", shall read "Caution: Manatee Habitat. Equipment Must be Shutdown Immediately if a Manatee Comes Within 50 feet of Operation." A collision with and/or injury to manatee shall be immediately reported to the Florida Marine Patrol at 1-800-DIAL FMP (1-800-342-5367) and the U.S. Fish and Wildlife Service at 1-561-562-3909", the second sign shall be located adjacent to the displayed construction permit.

4) All vessels associated with the project will be required to operate at "no wake" speeds at all times while in the waters where the draft of the vessel provides less than four feet of clearance from the bottom. All vessels shall follow routes of deep water whenever possible.

5) If a manatee is sighted within a hundred yards of the construction area, appropriate safeguards will be taken, including suspension of construction activities, if necessary, to avoid injury to manatees. These precautions shall include the immediate shutdown of all moving equipment when a manatee is sighted within 50 feet of construction. Construction activities shall not resume until the manatee has departed from the construction area on its own violation.

6) The contractor shall maintain a log detailing sightings, collisions, or injuries to manatees should they occur during the contract. Within 90 days after the contract period, a report summarizing incidents and sightings shall be submitted to the Florida Fish and Wildlife Conservation Commission (FWC) Bureau of Protected Species Management and to the U.S. Fish and Wildlife Service.

7) Any collision with and/or injury to a manatee shall be reported immediately to the Florida Marine Patrol at 1-800-DIAL-FMP (1-800-342-5367) and U.S. Fish and Wildlife Service in Vero Beach.

4.4.6 Whales

4.4.6.1 No-Action Alternative

The no-action alternative would not impact any whale species potentially occurring in the project area.

4.4.6.2 Proposed Project

Of the six endangered whale species **(Table 1**), only the humpback and North Atlantic right whale would be potentially present within the project area. Both species frequent coastal waters where dredging and its associated disposal operations occur on a regular basis, such as along the southeastern U.S. Ship strikes would be the primary threat associated with dredging operations since there has never been a report of a whale taken by a hopper dredge (NMFS, 2003). Along with the potential for ship strikes, noise in the marine environment may impact these species. Noise has been responsible for displacement of several marine mammal species from critical feeding and breeding habitat (Weilgart, 2007). Richardson *et al.* (1990) studied bowhead whale reactions to dredge noise and found a decrease in call rates, cessation of feeding and changes in surfacing and respiration cycling in some (but not all) individuals. These impacts are unlikely as these species are highly mobile and would be expected to avoid dredges and other vessels which operate at a slow speed.

To avoid potential encounters with whales, the contractor will be required to implement NOAA's Vessel Strike Avoidance Measures outlines in Section 4.4.2.3.

4.4.7 Staghorn and Elkhorn Corals

4.4.7.1 No-Action Alternative

The no-action alternative would not impact any staghorn or elkhorn (Acroporids) coral colonies potentially occurring in the project area.

4.4.7.2 Proposed Project

Nearshore hardbottom habitat, patch reefs, and outer linear reefs are located within designated critical habitat for Acroporid corals.

Elkhorn coral, *Acropora palmata*, has not been documented in Palm Beach County; the northernmost known occurrence of *A. palmata* is in Broward County offshore Ft. Lauderdale (Gilliam *et al*., 2012).

Surveys for the presence of *Acropora* corals were conducted extensively in each of the project segments. The results concluded that no *Acropora* colonies were observed in or directly adjacent to the project boundaries. Specific details are provided below.

4.4.7.2.1 Ocean Ridge

The proposed project would not result in any direct impacts to staghorn or elkhorn coral colonies during project construction. *Acropora* colonies were not observed on nearshore hardbottom within the turbidity mixing zone during *Acropora* surveys and hardbottom mapping/sedimentation surveys in May 2012 or during annual post- construction surveys of nearshore hardbottom conducted for the 2005 nourishment project. The offshore patch reefs, Lynn's Patch Reefs West and Lynn's Patch Reefs North, are located offshore of the proposed borrow area in water depths ranging from 53 to 69 ft; only the "West Patches" are located within 1,000 ft of the borrow area (**Figure 10**). Acroporid corals were not observed on these patch reefs during the survey in June 2011 (PBCRRT, 2011). These reef habitats will be protected during project construction by an 800-ft exclusionary buffer zone into which anchoring and dredging is prohibited.

4.4.7.2.2 Delray Beach

No coral reef habitat has been observed within or immediately adjacent to the project area of the Delray Beach segment. Therefore, no impacts to staghorn or elkhorn are anticipated in this segment of the project area.

4.4.7.2.3 Boca Raton

The proposed project would not result in any direct impacts to staghorn or elkhorn coral colonies during project construction. *Acropora* colonies were not observed at the 15 patch reef sites and 13 outer linear reef sites adjacent surveyed in March and April 2013. *Acropora* spp. have not been observed on the patch reefs and outer linear reefs during any of the biological monitoring surveys conducted for the 1988, 1998, and 2010 North Boca Raton Beach Nourishment Projects (Segment 1) and 2004 and 2006 Central Boca Raton Beach Nourishment Projects (Segment 2).

Outer linear reef and patch reef habitats will be protected during project construction by a 400-ft exclusionary buffer zone into which anchoring and dredging is prohibited. The pipeline and ingress/egress corridors have been sited between reef habitats to avoid direct (i.e. mechanical) impacts (**Figure 6**). The corridors shall be surveyed by marine scientists prior to pipeline placement to verify that hardbottom resources are not present within the corridor. If exposed hardbottom is found, the hardbottom will be mapped for avoidance through establishment of appropriate buffer distances or measures to elevate the pipeline above hardbottom if the hardbottom is newly exposed and/or sparsely populated by reef biota.

Based on the short-term nature of potential elevated turbidity during project dredging and the buffer distances to adjacent offshore reef habitats designated as critical habitat for Acroporid corals, the proposed project may affect, but is not likely to affect *Acropora cervicornis* and *A. palmata* and will not adversely modify critical habitat for these species.

4.4.7.3 Conservation Measures

If any Acroporid corals are found during the station reconnaissance dives or station establishment/pre-construction surveys of the offshore patch reefs adjacent to the borrow areas, a monitoring plan will be implemented to evaluate the potential short-term secondary effects of turbidity and sedimentation before, during, and after project construction. The maximum duration of dredging activities is expected to be 4 weeks, but the dredging timeline is dependent on weather conditions during the winter months. Individual colonies will be tagged during the pre-construction survey and monitored during each subsequent survey. Data collection for each colony will include photographic documentation, largest linear dimension (branch length, width, and height), and evaluation of percent live tissue.

4.4.8 Johnson's Seagrass

Johnson's seagrass has not been documented in the project area. Likewise, critical habitat has not been designated within the project area. Therefore, it is not anticipated to be impacted by either the No Action or the Proposed Action.

4.5 ESSENTIAL FISH HABITAT (EFH)

4.5.1 No-Action Alternative

The no-action alternative would not affect EFH in the project area.

4.5.2 Proposed Project Nearshore/Offshore

The proposed project would alter the bathymetric characteristics of the borrow area. Dredging would increase turbidity from sediment disturbance during dredging operations. Dredging would entrain sedentary species living on and in the dredged sediment and planktonic species living in the water column. Dredging could also entrain slow-moving vertebrate species (i.e. marine turtles). The dredging would affect fish feeding and movement; fishes and other highly mobile marine organisms would likely avoid the area of dredge operation.

NMFS believes that dredging offshore shoals could result in adverse impacts to the shoreline and living marine resources and those shoals serve as a benthic nursery, refuge, and feeding ground for a variety of fishery resources (USACE 2009 – NMFS 2007 EIS scoping letter). SAFMC identifies sandy shoals as EFH for migratory pelagic fish including king mackerel, Spanish mackerel, cobia, and dolphin. The geomorphology of some offshore shoals could provide a unique assembly of microhabitats that facilitate high biological productivity (Michel et al., 2001).

The proposed borrow areas, however, may best be described as a surface deposit of sand, characterized as a gently sloping area with relatively little vertical relief. The EFH functions of

such areas are less understood than locations such as shoals, which are similar to underwater sand "dunes" with significant vertical relief. Shoals with significant vertical relief present a variety of microhabitats that may not occur in the surface deposit area proposed for use in this project.

Shoal and surface deposit removal could alter local wave climate, causing erosion that could affect EFH (Hayes and Nairn, 2004). Wave climate changes could result in alteration of erosion and accretion rates along the shore. Such changes could affect nearshore hardbottom and worm reefs, identified as EFH.

To minimize dredging effects on fisheries, Tomlinson et al. (2006) recommended that offshore dredging operations consider a number of actions to minimize and avoid impacts to fisheries and EFH including:

- Imposing seasonal restrictions on dredging to minimize impacts to key reproductive behaviors and life stages
- Zoning of dredging operations to dredge only one portion of an area at a time to allow access to other parts of a borrow area
- Reducing sediment plumes through more thorough site investigation and planning around environmental conditions
- Ensuring better stakeholder participation and interaction between the dredging and fishing interests
- Eliminating exposure of bedrock
- Clearly and broadly informing the public about vessel movements, and
- Instituting better monitoring programs

Coastal migratory species, such as cobia, jacks, king and Spanish mackerels, round scad, and Spanish sardine have an affinity for man-made and natural structures. As such, they could be attracted to a dredge. In addition, the likely long-term change in the bathymetry of a shoal could preclude quick recovery for species dependent on specific relief features removed during dredging (Hammer et al., 2005). In addition, a dredge hole provides relief, which attracts fish, and can lead to concentrated fishing similar to artificial reefs.

Snapper-grouper complex species likely exist on hardbottom areas local to the project area. The proposed project could impact these species via burial of hardbottom, entrainment, and turbidity.

Threats to nearshore and offshore red drum habitats include dumping and mining of sand resulting in burial of bottom habitat, harmful increases in turbidity levels, and hydrologic alterations that could result in diminished habitat quality (SAFMC, 2003).

Turbidity generated during a dredging project could impact highly migratory species. The proposed project, however, will create turbidity plumes of relatively short duration and will not likely alter normal feeding or migratory patterns.

4.5.3 Proposed Project Water Column

4.5.3.1 No-Action Alternative

The no-action alternative would not result in impacts to water column within EFH.

4.5.3.2 Proposed Project

Construction activities will impart temporary water quality effects on the EFH by producing temporary, localized increases in turbidity in the project area. Elevated turbidity levels resulting from dredging and beach placement, however, should not have a significant negative effect on organisms inhabiting the project area. Given the naturally dynamic waters of the Atlantic Ocean, organisms inhabiting the nearshore zone adapt well to reasonable environmental changes such as moderate increases in turbidity. Fish and other mobile species may temporarily leave the adjacent surf zone if turbidity becomes too great. Construction noise may also drive fish away from the project area.

Additionally, sediments disturbed during beach fill placement activities would settle on adjacent habitats. Loss of benthic fauna during these activities would temporally affect fish feeding habitat in the project area. With their high fecundity and recruitment potential, the benthic fauna should repopulate the affected areas in a relatively short time. See comments in Section 4.8.2 for results from past studies on long term affects on benthic communities from beach restoration.

4.5.4 Proposed Project Hardbottom Habitat

4.5.4.1 No-Action Alternative

If no-action is taken, the project area shoreline would continue to erode, potentially resulting in greater exposure of intertidal and shallow subtidal hardbottom within some areas of EFH.

4.5.4.2 Proposed Project

Impacts to hardbottom from burial during placement of sand and subsequent equilibration of the beach project area may occur. However, the project template has not changed from the authorized project template. Palm Beach County has mitigated for the impacts to worm reef and other hardbottom habitats of the initial 1995 project (Continental Shelf Associates, 2005), and the 2002 nourishment did not impact hardbottom beyond the originally projected impact area. A survey for the presence of Acroporid corals was conducted offshore adjacent to the proposed borrow areas of Delray Beach on 6-8 June 2011. No colonies of *Acropora* spp. were observed throughout the reef habitat community (**Figure 7**). Additionally, patch reefs and the outer linear reef adjacent to the proposed borrow sites in Boca Raton were surveyed on March 5, 6 and 28, 2013 and April 3, 2013. Acroporid corals were not observed on the patch reefs and outer linear reefs during any of the monitoring surveys. The proposed project does not anticipate any additional impacts to hardbottom habitat including scleractinian corals.

4.5.5 EFH Conclusion

Motile fish that utilize the water column will be able to temporarily avoid areas of dredging and fill placement, and will return to these areas following construction. Other motile species such as larger crabs and lobsters also have the ability to avoid disturbance by

construction activities. The number of fish that may be entrained or experience physical damage from dredging is insignificant and, as such, these fisheries will not be adversely impacted. Benthic fauna within the non-vegetated bottom habitat will be removed from borrow areas and buried in fill placement areas, but studies have shown that impacts are temporary, and that recovery of benthic communities in both areas can occur quickly. Increased turbidity at the dredge and fill placement sites will also be temporary, lasting only as long as construction. As supported by hardbottom surveys completed in 2011, the Corps does not expect any hardbottom habitat to be negatively affected by the proposed project.

Because the origin of the project fill is from sandy bottoms with minimal elevation change, and placement of the fill is directly onto the sandy beach, minimal short-term impacts associated with dredging and fill placement are expected. However, based on the project design, long-term significant adverse effects to EFH from the proposed project are not anticipated.

4.6 WATER QUALITY

4.6.1 No-Action Alternative

Turbidity in Palm Beach County waters are generally lowest in the summer months and highest in the winter months, which corresponds to winter storm events. With the No Action alternative, turbidity events will continue to fluctuate naturally. The intertidal areas are subject to periodic increases in turbidity resulting from storms and wave activity. As a result, the biological communities found in the intertidal and nearshore zone are comprised of stress tolerant, opportunistic species. Turbidity levels near the dredge site will not be affected if the no action alternative is taken.

4.6.2 Proposed Project

The proposed action would temporarily impact water quality at the borrow site and in the intertidal swash zone at the sand placement site. Dredging and sand placement activities may temporarily increase turbidity by introducing additional fine material into the water column. The increased fines may increase biological oxygen demand, thus reducing water column oxygen levels. The FDEP rules, however, require the fill material to be very similar to existing beach sand to ensure minimization of turbidity during construction. Dredging and discharges from sand placement may also alter water temperatures in the immediate dredging and sand placement areas.

The FDEP requires intensive monitoring of turbidity at dredging and sand placement locations during project operations. If the monitoring detects turbidity exceeding permitted levels, the construction activity must halt until the contractor takes appropriate steps to reduce the turbidity to acceptable levels and the turbidity returns to those levels. Monitoring results demonstrating project performance are submitted to the FDEP regularly during the construction period. Given the naturally dynamic waters of the Atlantic Ocean, organisms inhabiting the nearshore zone adapt to environmental changes such as moderate increases in turbidity. Fish and other mobile species may temporarily leave the dredging site or surf zone adjacent to the beach placement site if turbidity becomes too great.

4.7 COASTAL BARRIER RESOURCES

4.7.1 No-Action Alternative

The no-action alternative will likely result in a minimization or elimination of coastal barrier resources due to continued beach erosion.

4.7.2 Proposed Project

The project will result in the maintenance of a protective beach for the Coastal Barrier Resource System Units associated with the project beach. The project will not encourage additional development, as the area is already fully developed outside the park areas.

4.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

4.8.1 No-Action Alternative

No sources of HTRW have been identified in the project area. The No Action alternative would not result in any sources of pollutants occurring in the project area.

4.8.2 Proposed Project

Dredging equipment, staging areas, construction equipment, and other motorized vehicles used during construction have the potential to spill gasoline and lubricating oils. Accident and spill prevention plans provided in contract specifications should help avoid most spills. All motorized vehicles will be maintained and stored offsite the project area and the contractor will take appropriate precautions to avoid accidental spills.

4.9 AIR QUALITY

4.9.1 No-Action Alternative

The No-Action alternative would not affect air quality in the project area.

4.9.2 Proposed Project

The short-term impact from emissions by the dredge and other construction equipment associated with the proposed beach nourishment project will not significantly impact air quality. Exhaust emissions from construction equipment, both along the project area shoreline and in the offshore borrow areas, would have a temporary effect on air quality during the 2 to 4 week construction period.

4.10 NOISE

4.10.1 No-Action Alternative

The No-Action alternative would not affect the noise levels in the project area.

4.10.2 Proposed Project

The proposed project would cause a temporary increase in noise, primarily from heavy equipment. Increases to the ambient noise levels because of the project would only occur during construction.

4.11 AESTHETICS

4.11.1 No-Action Alternative

The no-action alternative would reduce aesthetics because of loss of beach width and natural habitat.

4.11.2 Proposed Project

During construction, aesthetic qualities of the project beach will be diminished with the operation of construction equipment and with construction activities. In the longer term, the renourishment of the beach in accordance with the design considerations will result in an improved aesthetic quality after completion of the project. The placement of material on the shore would restore the natural pleasing visual appearance of the shoreline. During construction, short-term construction impacts will include turbidity in the immediate vicinity of the dredge and discharge point on the beach, construction equipment on the beach along with their associated audio impacts, pipeline placement on the beach, and fill containment berms. For safety reasons, access to certain parts of the beach will be temporarily restricted. No other adverse impacts to aesthetics are expected from nourishment of the project beach. Sand samples of borrow site material were generally slightly darker in color than the existing beach sand. The placed and the existing beach sand are expected to eventually blend so that the net result will not detract from the long-term aesthetic appearance of the beach. The project protects existing dunes and restores those sections of dune destroyed by storm erosion. Dune restoration will include replanting with appropriate native vegetation.

4.12 RECREATIONAL RESOURCES

4.12.1 No-Action Alternative

Loss of beach associated with erosion would result in less beach width available for recreation along the project area.

4.12.2 Proposed Project

Beach use will be temporarily restricted over short lengths of the beach during project construction for safety reasons. The temporary loss of recreational beach includes no swimming zones and beach closures within 500 ft of the construction site. The presence of construction equipment will create a public safety risk for swimming in the immediate construction area. Recreational boating may be detoured during construction and restricted from the dredge area. These are temporary effects limited to the duration of construction activity; no long-term effects are anticipated.

Recreational benefits are the most common incidental benefit produced by the nourishment project. These benefits result from an increased capacity for recreational activity by the new beach surface. Permanent impacts to recreational or commercial fisheries, diving regions, or other recreational uses are not anticipated as a result of this project.

4.13 SOCIO-ECONOMIC

4.13.1 No-Action Alternative

The no-action alternative would significantly affect the local economy. The beaches would continue to erode and provide less width for recreation. The no-action alternative would likely lead to a decrease in tourism revenue.

4.13.2 Proposed Project

The beaches of Palm Beach County play an important economic role in the recreational resources of the area. The tourist dollars brought into the county each year account for a significant portion of the county's revenue base. Particularly along the coast, many tourist-oriented businesses rely on revenue generated from tourists. This project will maintain and enhance the use of the beach by residents and tourists. Construction will temporarily curtail use of the beach and nearshore areas for beachgoers and surfers.

4.14 HISTORICAL AND CULTURAL RESOURCES

4.14.1 No-Action Alternative

The no-action alternative would likely have no impact on historical and cultural resources. Continuing erosion could uncover cultural artifacts. The historic and cultural resources identified in each of the project footprints are described below.

4.14.2 Proposed Project

4.14.2.1 Ocean Ridge

By letter dated September 8, 2011, the Florida State Historic Preservation Officer concurred with the findings of the report prepared by Tidewater Atlantic Research and found the report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code*. The proposed project will have no adverse effect on cultural resources listed or eligible for listing in the *National Register of Historic Places*, or otherwise of historical or archaeological value.

4.14.2.2 Delray Beach

Based on the survey results, proposed dredging will not impact any National Register of Historic Places eligible, nor any submerged cultural resources if the buffered magnetic anomalies and sonar targets are avoided. A 500 ft buffer will be employed around the wreck Inchulva, and a 200 ft buffer around all other documented cultural resources in the project area.

4.14.2.3 Boca Raton

The proposed borrow area for the Boca Raton project was surveyed for cultural resources in 2003 by Tidewater Atlantic Research, Inc. Their 2006 report *Archaeological Remote Sensing North Boca Raton Beach Renourishment Project, Boca Raton, Palm Beach County, Florida* identified four magnetic anomalies that appeared similar to historic shipwrecks (BR06-01, BR06-05, BR06-06, and BR06-08). Consultation with the Florida State Historic Preservation Officer (DHR No. 2007-4129) determined no effect to cultural resources based on a 100 meter avoidance buffer or the results of a follow up diver identification.

The most recent remote sensing survey (Panamerican Consultants, July 2013) focused on two separate borrow areas just north of Boca Raton Inlet, both approximately 2,000 feet from shore. Results of the survey identified 96 magnetic anomalies, 13 sidescan sonar targets, and no subbottom impedance contrast features within the proposed project areas. Largely representing single-source objects of modern origin, only two clusters of magnetic anomalies are considered potentially significant, and are recommended for avoidance or further investigation. The first cluster, located in the northern central portion of Borrow Area 1, is comprised of anomalies T17, T26, and T37, which are associated with sonar contacts SS0 and SS2. A second cluster is comprised of anomalies T5 and T9, but it is actually located between the two borrow areas outside the project areas. With the exception of SS0 and SS2, analysis of the sidescan data indicates that of the 13 contacts, none are thought to retain characteristics that could potentially represent historically significant cultural resources. The Corps has determined that avoidance of these anomalies by employing a 100-meter buffer zone, the project will have no effect on historic properties. The results of this investigation have been submitted to SHPO for review and concurrence.

4.15 PUBLIC SAFETY

4.15.1 No-Action Alternative

As the beach continues to erode, the no-action alternative could lead to decreased public safety because of reduced storm protection to upland shorefront structures.

4.15.2 Proposed Project

The proposed project would provide for an increase in public safety because of increased storm protection from the widened beach. Dredging and beach restoration construction operations, however, would temporarily decrease public safety due to operation of the dredge and large earthmoving equipment.

Dredging operations and beach restoration mandate rigid application of safety and health requirements. Dredging with deep draft equipment, operating in relatively shallow water, requires extreme skill to stay within safe operating tolerances. Additionally, heavy equipment and transport operators must employ the same extreme caution on the beach, where the public may not truly appreciate the inherent danger. Accordingly, the project sponsors require contractors to submit extensive health, safety, and accident prevention plans to protect the onsite personnel, public, and environment.

4.16 NATURAL OR DEPLETABLE RESOURCES

4.16.1 No-Action Alternative

The no-action alternative would result in no impact to natural resources.

4.16.2 Proposed Project

Removing sand from the borrow area would deplete the sand from the borrow area. Over a long period, the excavated borrow area may at least partially refill with sand.

4.17 INDIRECT IMPACTS

4.17.1 No-Action Alternative

As the shoreline continues to erode, the no-action alternative may result in indirect impacts to the environment due to the loss of storm protection and subsequent storm damage to buildings and other infrastructure, resulting in debris being deposited on the beach during storms. Other losses would include loss of natural habitat, loss of recreational area, and loss of the visual amenity that the beach offers.

4.17.2 Proposed Project

The proposed project should not result in adverse indirect effects. Beach nourishment may result in indirect impacts such as formation of scarps, sand migration over time, and long-term changes in sand composition. Because a large portion of the beachfront is within county-owned parks and most of the remainder is already developed, the project will not likely cause significant additional development to occur.

Appropriate post-nourishment management (also required by state and federal permits) will ensure scarp knockdown occurs. Monitoring of turtle nesting since the original 1995 nourishment project have indicated that nourishment may result in a temporary reduction in turtle nesting (although this does not always occur) and a temporary loss of benthic communities. The last two project nourishments have not resulted in decreased nesting. Marine turtle nesting frequency and success are clear indicators of habitat quality. Continuing careful conduct of future projects will ensure that future nourishment projects will not result in indirect impacts.

4.18 CUMULATIVE IMPACTS

4.18.1 No-Action Alternative

The no-action alternative would have the cumulative impact of reducing turtle nesting habitat, dune habitat, recreational opportunities, and storm protection for upland areas landward of the beach.

4.18.2 Proposed Project

Overall cumulative impacts, defined as 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" (40 CFR 1508.7), may result in both beneficial and adverse impacts. Primary benefits from beach and dune management mainly consist of beach or dune habitat restoration previously eroded by natural and artificial causes. Secondary benefits may include mitigation planting, wildlife species monitoring, and habitat enhancement.

Beach management can also result in environmental impacts to species and the areas they inhabit. However, a thorough understanding of the habitat and the species involved can help minimize or avoid environmental impacts. Methods to minimize environmental impacts caused by beach management practices include species observation, trapping and relocation, relocation of nest, nest identification/marking, avoidance of species and/or sensitive areas, lighting restrictions, noise abatement, and project time constraints. If one implements adequate environmental protection measures, environmental impacts from beach management activities are generally short-term and minimal.

4.19 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.19.1 Irreversible

For the proposed action, the fossil fuels for construction and public funds represent an irreversible commitment of resources, defined as forever losing the ability to use and/or enjoy the resource.

4.19.2 Irretrievable

Temporary reductions of benthic communities, aesthetics, recreational opportunities, water quality, and air quality represent irretrievable commitments of resources, defined as opportunities lost for a period to use or enjoy the resource, as they presently exist, for the proposed action.

4.20 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Unavoidable adverse environmental impacts resulting from the proposed action include a temporary loss of beach habitat, a localized increase in turbidity levels, a temporary reduction in sea turtle nesting, and a temporary loss of benthic communities in the nearshore area and in the borrow area.

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

The Ocean Ridge, Delray Beach, and Boca Raton segments of the Palm Beach County SPP site will experience localized, temporary turbidity plumes, and sedimentation adjacent to the beach fill and offshore borrow areas. Beach fill projects have short-term impacts on benthic and fishery communities, and marine turtle nesting. However, the impacts are typically short-lived; benthos recover quickly and extended periods of improved conditions for turtle nesting follow re-

equilibration of the beach profile. Appropriate mitigation and monitoring should ensure that these populations remain sustainable.

4.22 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

Palm Beach County objectives include (1) maintaining beaches as suitable recreational areas; (2) sustaining restored beaches by means of inlet sand bypassing to "feed" those beaches which are sand-starved because of the presence of stabilized inlet; (3) maintaining suitable beach habitat for nesting sea turtles, invertebrate species, and shorebirds; and (4) avoiding impacts to navigation. The Ocean Ridge Shore Protection Project is consistent with local objectives and with the State's Coastal Zone Management Plan.

4.23 ENVIRONMENTAL COMMITMENTS

The local sponsors commit to avoiding, minimizing, or mitigating for adverse effects during construction activities by employing the following practices and all environmental permit requirements.

4.23.1 Migratory Birds

The local sponsors will require the contractor to conduct construction activities in such a way as to prevent impacts to migratory birds and their nests in accordance with the USACE Jacksonville District's Migratory Bird Protection Policy. Additionally, the Florida Endangered and Threatened Species Act of 1977, Title XXVIII, Chapter 372.072, and the U.S. Fish and Wildlife Service (USFWS) pursuant to the Migratory Bird Treaty Act of 1918 and the Endangered and Threatened Species Act of 1982, as amended, protect migratory birds.

4.23.2 Marine Turtles

Monitoring of the construction area will continue daily from March 1 through October 31, if construction activities occur during that period. If nesting occurs within the construction area, the contractor will implement guidelines set forth in the FDEP and Department of the Army permits.

4.23.3 Manatees

Implementation of the following protection measures would minimize potential impacts to manatees:

- The contractor shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees
- The contractor shall advise all construction personnel that one will face civil and criminal penalties for harming, harassing, or killing manatees, which the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, and the Florida Sanctuary Act of 1978 protect. The local sponsors may hold the contractor responsible for any manatee harmed, harassed, or killed as a result of construction activities;
- All vessels associated with the project shall operate at "no wake/idle" speeds at all times while in water where the draft of the vessel provides less than four feet clearance from the bottom and that vessels shall follow routes of deep water whenever possible

- If one sights a manatee within 100 yards of the project area, the contractor shall implement all appropriate precautions to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 ft of a manatee. If a manatee is closer than 50 ft to moving equipment or the project area, the contractor shall shut down the equipment and cease all construction activities. Construction activities shall not resume until the manatee has departed the project area;
- The contractor shall immediately report any collision with and/or injury to a manatee to the "Manatee Hotline" at 1-800-DIAL-FMP (1-800-342-5367). The contractor should also report any collision and/or injury to the U.S. Fish and Wildlife Service at the Vero Beach - South Florida Field Office at 561-562-3909.
- The contractor shall post temporary signs concerning manatees prior to and during construction activities. The contractor shall remove all signs upon completion of the project; and
- If nighttime construction occurs, the contractor must place lights that illuminate a 100-ft radius around the construction site.

4.23.4 Turbidity

To help avoid/minimize turbidity related impacts, the contractor shall monitor water quality at the frequency required by project permits both at the dredging and sand placement sites. If turbidity values at the dredging site exceed permitted values, the contractor shall suspend all dredging activities. Dredging shall not continue until water quality meets state standards.

4.24 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.24.1 National Environmental Policy Act Of 1969

Environmental information on the proposed project has been compiled and incorporated into an Environmental Assessment and subsequent Finding of No Significant Impact (FONSI). This document will be circulated to appropriate local, state, and federal agencies, as well as interested academic institutions and citizens for a 30-day review in accordance with NEPA.

4.24.2 Endangered Species Act Of 1973

Consultation was initiated with NMFS on 21 June 2013, and is presently on-going. Consultation was initiated with USFWS on 5 June 2013, and completed on 28 June 2013 through a concurrence letter applying the Statewide Programmatic Biological Opinion and the Programmatic Piping Plover Biological Opinion to the proposed Flood Control and Coastal Emergency sand placement and navigation dredging projects (see Appendix C). This project was fully coordinated under the Endangered Species Act and is therefore, in full compliance with ESA.

4.24.3 Fish and Wildlife Coordination Act Of 1958

This project has been coordinated with USFWS. This project has been fully coordinated with respect to and will remain in full compliance with the Fish and Wildlife Coordination Act of 1958.

4.24.4 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 work, and consultation with 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. In a March 13, 2009 letter, SHPO (2009) concurred with the Corps no adverse effect determination. In July 2013, a remote sensing survey was conducted verifying previous results. Subsequently, the project will not affect historic properties included in or eligible for inclusion in the National Register of Historic places. Therefore, the project complies with each of the federal laws cited in this paragraph.

4.24.5 Clean Water Act Of 1972

The project complies with the Clean Water Act. A Section 401 water quality certification will be issued by FDEP. All State water quality standards would be met. A Section 404(b) evaluation is included in this report as Appendix B.

4.24.6 Clean Air Act Of 1972

No air quality permits would be required for this project.

4.24.7 Coastal Zone Management Act Of 1972

A federal consistency determination in accordance with 15CFR930 Subpart C is included in this report as Appendix A. State consistency review was performed during the coordination of the EA and the state has determined that the project was consistent with the Florida Coastal Zone Management Program (see letter dated June 24, 2013 from the Florida State Clearinghouse concurring with our consistency determination in Appendix A).

4.24.8 Farmland Protection Policy Act Of 1981

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

4.24.9 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.

4.24.10 Marine Mammal Protection Act Of 1972

Incorporation of the safeguards used to protect threatened or endangered species during dredging and disposal operations will also protect any marine mammals in the area, therefore, this project complies with the Marine Mammal Protection Act of 1972.

4.24.11 Estuary Protection Act Of 1968

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

4.24.12 Federal Water Project Recreation Act

The principles of the Federal Water Project Recreation Act (Public Law 89-72), as amended, have been fulfilled by complying with the recreation cost-sharing criteria as outlined in Section 2 (a), paragraph (2). Another area of compliance includes the public beach access requirement on which the renourishment project hinges [Section 1, (b)].

4.24.13 Fishery Conservation and Management Act Of 1976

The project is being coordinated with NMFS and will comply with the Fishery Conservation and Management Act.

4.24.14 Submerged Lands Act Of 1953

The project would occur on submerged lands within of the State of Florida. The project has been coordinated with the State and complies with the Submerged Lands Act of 1953.

4.24.15 Coastal Barrier Resources Act and Coastal Barrier Improvement Act Of 1990

This project complies with the Coastal Barrier Resource Act and Coastal Barrier Improvement Act of 1990.

4.24.16 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 public notice, public hearing, and other evaluations normally conducted for activities subject to the Rivers and Harbors Act of 1899. The project is in full compliance.

4.24.17 Anadromous Fish Conservation Act

Anadromous fish species would not be affected. The project has been coordinated with NMFS and complies with the Anadromous Fish Conservation Act.

4.24.18 Migratory Bird Treaty Act & Migratory Bird Conservation Act

Impacts to migratory birds will be mitigated by implementation of the Migratory Bird Treaty Act and the Migratory Bird Conservation Act; thus the project will comply with both acts.

4.24.19 Marine Protection, Research and Sanctuaries Act

The term "dumping" as defined in the Marine Protection, Research and Sanctuaries Act {3[33 U.S.C. 1402](f)} does not apply to the disposal of material for beach nourishment or to the placement of material for a purpose other than disposal (i.e., placement of rock material as an artificial reef or the construction of artificial reefs as mitigation). Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project. The disposal activities addressed in this EA have been evaluated under Section 404 of the Clean Water Act.

4.24.20 Magnuson-Stevens Fishery Conservation and Management Act

This act requires preparation of an EFH assessment and coordination with NMFS. An independent EFH was provided to NMFS on 10 June 2013 (Appendix C).

4.24.21 Executive Order 11990, Protection of Wetlands

No wetlands would be affected by project activities. This project complies with the goals of this Executive Order 11990.

4.24.22 Executive Order 11988, Flood Plain Management

No activities associated with this project will take place within a riparian, lacustrine, or estuarine floodplain; therefore, this project complies with the goals of Executive Order 11988.

4.24.23 Executive Order 12898, Environmental Justice

The proposed project would not result in adverse human health or environmental effects, nor would the activity impact subsistence consumption of fish or wildlife. The project complies with Executive Order 12898.

4.24.24 Executive Order 13089, Coral Reef Protection

The proposed project may affect U.S. coral reef ecosystems as defined in Executive Order 13089. The offshore borrow areas will be designed to avoid impacts to hardbottom resources by establishing a minimum 200-foot buffer around any identified resources. Additional protective measures will be implemented to minimize impacts to adjacent hardbottom resources, including turbidity monitoring with cessation of construction activities in the beach nourishment area if turbidity exceeds the state limit of 29 NTU above background, real-time sedimentation monitoring during project construction, and post-construction monitoring of nearshore hardbottom resources adjacent to the beach fill areas to evaluate potential long-term impacts of turbidity and sedimentation. A mitigation plan was developed in coordination with federal, state, and county agencies to provide full compensation for unavoidable impacts to nearshore hardbottom resources. The nearshore hardbottom epibenthic communities landward of the equilibrium toe of fill do not represent irreplaceable resources. With proper placement of artificial reefs, suitable replacement habitat has been created for nearshore epibenthic species. The proposed project will comply with Executive Order 13089.

4.24.25 Outer Continental Shelf Lands Act

The federal government administers the submerged lands, subsoil, and seabed, lying between the states' seaward jurisdiction and the seaward extent of federal jurisdiction. The Outer Continental Shelf Lands Act (OCSLA) and subsequent amendments, in later years, outlines the federal responsibility over the submerged lands of the Outer Continental Shelf. Additionally, it authorizes the Secretary of the Interior to lease those lands for mineral development. The project has been coordinated with the federal government and complies with the OCSLA.

4.24.26 Coordination

Any work performed because of this reevaluation study will be fully coordinated with all appropriate Federal, state, and local agencies. Previous consultation concerning the authorized beach nourishment has been coordinated with the USFWS, NMFS, EPA, FDEP, Florida State Clearinghouse, and the Division of Historical Resources.

5.0 LIST OF PREPARERS

5.1 PREPARERS

Table 4 presents individuals contributing to the preparation of this EA.

Table 4: List of Preparers

Name	Discipline/Company	Role
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Appendix A: Coastal Zone Management Act Federal Consistency Determination for Southern Palm Beach County Borrow Areas

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COASTAL ZONE MANAGEMENT ACT AND FLORIDA COASTAL MANAGEMENT PROGRAM FEDERAL CONSISTENCY DETERMINATION FOR SOUTHERN PALM BEACH COUNTY BORROW AREAS

Enforceable Policy. Florida State Statues considered "enforceable policy" under the Coastal Zone Management Act (www.dep.state.fl.us/cmp/federal/24_statutes.htm).

Applicability of the Coastal Zone Management Act.

The following summarizes the process and procedures under the Coastal Zone Management Act for Federal Actions and for non-Federal Applicants[1].

Item	Non-Federal Applicant (15 CFR 930, subpart D)	Federal Action (15 CFR 930, subpart C)
Enforceable Policies	Reviewed and approved by NOAA (in FL www.dep.state.fl.us/cmp/federal/24_statutes.htm)	Same
Effects Test	Direct, Indirect (cumulative, secondary), adverse or beneficial	Same
Review Time	6 months from state receipt of Consistency Certification (30-days for completeness notice) Can be altered by written agreement between State and applicant	60 Days, extendable (or contractible) by mutual agreement
Consistency	Must be Fully Consistent	To Maximum Extent Practicable[2]
Procedure Initiation	Applicant provides Consistency Certification to State	Federal Agency provides "Consistency Statement" to State
Appealable	Yes, applicant can appeal to Secretary (NOAA)	No (NOAA can "mediate")
Activities	Listed activities with their geographic location (State can request additional listing within 30 days)	Listed or Unlisted Activities in State Program
Activities in Another State	Must have approval for interstate reviews from NOAA	Interstate review approval NOT required
Activities in Federal Waters	Yes, if activity affects state waters	Same

[1] There are separate requirements for activities on the Outer Continental Shelf (subpart E) and for "assistance to an applicant agency" (subpart F).

[2] Must be fully consistent except for items prohibited by applicable law (generally does not count lack of funding as prohibited by law, 15 CFR 930.32).

Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed plans and information have been voluntarily submitted to the State in compliance with this Chapter.

Chapters 163 (part II), 186 and 187, County, Municipal, State and Regional Planning. These chapters establish the Local Comprehensive Plans, the Strategic Regional Policy Plans, and the State Comprehensive Plan (SCP). The SCP sets goals that articulate a strategic vision of the State's future. Its purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for orderly social, economic and physical growth.

Response: The proposed project has been coordinated with various Federal, State, and local agencies during the planning process. The project meets the primary goal of the SCP through preservation and protection of the shorefront development and infrastructure.

Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed project involves dredging of designated borrow areas in order to protect the shoreline conditions of the Ocean Ridge, Delray Beach, and North Boca Raton segments in Palm Beach County. Therefore, this project is consistent with the efforts of the Division of Emergency Management.

Chapter 253, State Lands. This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The proposed project complies with State regulations pertaining to the above resources. The work complies with the intent of this chapter.

Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: Lands will not be acquired by the federal government for the dredging or placement. The borrow areas have been previously used for Ocean Ridge, Delray Beach and Boca Raton renourishment.

Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: This project would not impact state parks or preserves. Natural resources will be protected to the extent practicable through use of best management practices and implementation/monitoring guidelines that are found within the State Programmatic Biological Opinion.

Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project has been coordinated with the State Historic Preservation Officer (SHPO). Because of the nature of the project and the commitment to avoid known anamolies, there is little potential for impact to historic properties. The project is consistent with this chapter.

Chapter 288, Economic Development and Tourism. This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: The maintenance dredging and placement of borrow area material encourage commercial and recreational use on the beach that in turn provides economic benefits to the area. This would be compatible with tourism for this area and therefore, is consistent with the goals of this chapter.

Chapters 334 and 339, Transportation. This chapter authorizes the planning and development of a safe, balanced, and efficient transportation system.

Response: The dredging and placement of borrow area material would not improve or degrade transportation.

Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: The dredging and sand placement on the shoreline would not have a substantial adverse impact on saltwater living resources. Benthic organisms may be adversely affected by the work, and full recovery may be delayed in the borrow area or at the placement areas due to the fact that dredging and sand placement is a recurring need.

However, the project footprint is relatively small and lies adjacent to similar habitat. Therefore, substantial impacts to the aquatic ecosystem are not anticipated. Based on the overall impacts of the project, the project is consistent with the goals of this chapter.

Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Fish and Wildlife Conservation Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The project would not have a substantial adverse impact on living land and freshwater resources. Use of the placement areas could temporarily adversely impact wildlife, but these areas should be re-colonized between uses.

Chapter 373, Water Resources. The waters in the state of Florida are managed and protected to conserve and preserve water resources, water quality, and environmental quality. This statute addresses sustainable water management; the conservation of surface and ground waters for full beneficial use; the preservation of natural resources, fish, and wildlife; protecting public land; and promoting the health and general welfare of Floridians. The state manages and conserves water and related natural resources by determining whether activities will unreasonably consume water; degrade water quality; or adversely affect environmental values such as protected species habitat, recreational pursuits, and marine productivity.

Specifically, under Part IV of Chapter 373, the Department of Environmental Protection, water management districts, and delegated local governments review and take agency action on wetland resource, environmental resource, and stormwater permit applications, which address the construction, alteration, operation, maintenance, abandonment, and removal of any stormwater management system, dam, impoundment, reservoir, or appurtenant work or works, including dredging, filling and construction activities in, on, and over wetlands and other surface waters. This chapter regulates the withdrawal, diversion, management and storage of surface waters, water supply, and permitting of consumption use of water.

Response: This project will temporarily increase the turbidity of water during the dredging operations. Environmental permits would be obtained prior to construction, which would keep turbidity levels within the state standards.

Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: The contract specifications will prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and will require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan will be required.

Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This project does not involve the exploration; drilling or production of gas, oil or petroleum products and therefore, this chapter does not apply.

Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development. This chapter also deals with the Area of Critical State Concern program and the Coastal Infrastructure Policy.

Response: The proposed renourishment project will not have any regional impact on resources in the area. Therefore, the project is consistent with the goals of this chapter.

Chapters 381 (selected subsections on on-site sewage treatment and disposal systems) and 388 (Mosquito/Arthropod Control). Chapter 388 provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The project shall not further the propagation of mosquitoes or other pest arthropods.

Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Protection.

Response: A final EA has been prepared and will be made available to the public and resource agencies including DEP. Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality or other environmental resources will occur. The project complies with the intent of this chapter.

Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the state soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: Agricultural lands do not occur in the vicinity of the project; therefore this chapter does not apply.

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MARJORY STONEMAN DOUGLAS BUILDING
3900 COMMONWEALTH BOULEVARD
TALLAHASSEE, FLORIDA 32399-3000

RICK SCOTT
GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

CONSOLIDATED JOINT COASTAL PERMIT AND SOVEREIGN SUBMERGED LANDS AUTHORIZATION

PERMITTEE:
Daniel Bates, Deputy Director
Palm Beach County, DERM
2300 North Jog Road, 4th Floor
West Palm Beach, FL 33411

AGENT:
Steven C. Howard, P.E.
Olsen Associates, Inc.
2618 Herschel Street
Jacksonville, FL 32204

PERMIT INFORMATION:

Permit Number: 0311339-001-JC

Project Name: Ocean Ridge Shore Protection Project

County: Palm Beach

Issuance Date: June 24, 2013

Expiration Date: June 24, 2023

REGULATORY AUTHORIZATION:

This permit is issued under the authority of Chapter 161 and Part IV of Chapter 373, Florida Statutes (F.S.), and Title 62, Florida Administrative Code (F.A.C.). Pursuant to Operating Agreements executed between the Department of Environmental Protection (Department) and the water management districts, as referenced in Chapter 62-113, F.A.C., the Department is responsible for reviewing and taking final agency action on this activity. **This permit supersedes Permit 0244200-001-JC and all modifications.**

PROJECT DESCRIPTION:

The project is to nourish approximately 1.1 miles of beach with approximately 550,000 cubic yards of beach compatible sand. The berm construction design widths vary from 28 feet to 168 feet, with a berm height of +7.45 feet NAVD and a foreshore slope of 1 (vertical) to 15 (horizontal). The two offshore borrow areas have varying maximum dredge depths. The maximum dredge depths for the northern borrow area are -44.6 feet to 51.6 feet NAVD. The maximum dredge depths for the southern borrow area are -44.6 feet to 50.6 feet NAVD. The project is also to adjust the 5 southernmost groins in the project area by removing the top layer of armor stone to an elevation of +2.45 feet NAVD.

PROJECT LOCATION:

The nourishment site extends from approximately 165 feet south of DEP Range Monument R-153 to R-159, and is located in Ocean Ridge, Palm Beach County, Section 27, Township 45 South, Range 43 East, Atlantic Ocean, Class III Waters.

The two borrow areas are located approximately 2,100 feet offshore. The northern borrow area is centered off of R-152 and the southern borrow areas is centered off of R-158, in Palm Beach County, Section 22, Township 45 South, Range 43 East, Atlantic Ocean, Class III Waters.

PROPRIETARY AUTHORIZATION:

This activity also requires a proprietary authorization, as the activity is located on sovereign submerged lands held in trust by the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees), pursuant to Article X, Section 11 of the Florida Constitution, and Sections 253.002 and 253.77, F.S. The activity is not exempt from the need to obtain a proprietary authorization. The Board of Trustees delegated, to the Department, the responsibility to review and take final action on this request for proprietary authorization in accordance with Section 18-21.0051, F.A.C., and the Operating Agreements executed between the Department and the water management districts, as referenced in Chapter 62-113, F.A.C. This proprietary authorization has been reviewed in accordance with Chapter 253 Chapter 18-21, F.A.C., and the policies of the Board of Trustees.

As staff to the Board of Trustees, the Department has reviewed the project described above, and has determined that the beach nourishment activity qualifies for a Letter of Consent to use sovereign, submerged lands, as long as the work performed is located within the boundaries as described herein and is consistent with the terms and conditions herein. Therefore, consent is hereby granted, pursuant to Chapter 253.77, F.S., to perform the activity on the specified sovereign submerged lands.

The Department has also determined that the activity requires a public easement for the use of the borrow areas, pursuant to Chapter 253.77, F.S. The groin adjustments are within the existing public easement for the groins, and need no further proprietary authorization. The Department intends to issue the public easement for the borrow areas, subject to the conditions outlined in the previously issued *Consolidated Intent to Issue* and in the Recommended Proprietary Action (entitled *Delegation of Authority*).

The final documents required to execute the easement have been sent to the Division of State Lands. The Department intends to issue the easement upon satisfactory execution of those documents. **You may not begin construction of this activity on state-owned, sovereign submerged lands until the easement has been executed to the satisfaction of the Department.**

COASTAL ZONE MANAGEMENT:

This permit constitutes a finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act.

WATER QUALITY CERTIFICATION:

This permit constitutes certification of compliance with state water quality standards pursuant to Section 401 of the Clean Water Act, 33 U.S.C. 1341.

OTHER PERMITS:

Authorization from the Department does not relieve you from the responsibility of obtaining other permits (Federal, State, or local) that may be required for the project. When the Department received your permit application, a copy was sent to the U.S. Army Corps of Engineers (Corps) for review. The Corps will issue their authorization directly to you, or contact you if additional information is needed. If you have not heard from the Corps within 30 days from the date that your application was received by the Department, contact the nearest Corps regulatory office for status and further information. Failure to obtain Corps authorization prior to construction could subject you to federal enforcement action by that agency.

AGENCY ACTION:

The above named Permittee is hereby authorized to construct the work outlined in the activity description and activity location of this permit and shown on the approved permit drawings, plans and other documents attached hereto. This agency action is based on the information submitted to the Department as part of the permit application, and adherence with the final details of that proposal shall be a requirement of the permit. **This permit and authorization to use sovereign submerged lands are subject to the General Conditions and Specific Conditions, which are a binding part of this permit and authorization.** Both the Permittee and their Contractor are responsible for reading and understanding this permit (including the permit conditions and the approved permit drawings) prior to commencing the authorized activities, and for ensuring that the work is conducted in conformance with all the terms, conditions and drawings.

GENERAL CONDITIONS:

1. All activities authorized by this permit shall be implemented as set forth in the plans and specifications approved as a part of this permit, and all conditions and requirements of this permit. The Permittee shall notify the Department in writing of any anticipated deviation from the permit prior to implementation so that the Department can determine whether a modification of the permit is required pursuant to section 62B-49.008, Florida Administrative Code.

2. If, for any reason, the Permittee does not comply with any condition or limitation specified in this permit, the Permittee shall immediately provide the Bureau of Beaches and Coastal Systems and the appropriate District office of the Department with a written report containing the following information: a description of and cause of noncompliance; and the period of noncompliance, including dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

3. This permit does not eliminate the necessity to obtain any other applicable licenses or permits that may be required by federal, state, local, special district laws and regulations.

This permit is not a waiver or approval of any other Department permit or authorization that may be required for other aspects of the total project that are not addressed in this permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of sovereignty land of Florida seaward of the mean high-water line, or, if established, the erosion control line, unless herein provided and the necessary title, lease, easement, or other form of consent authorizing the proposed use has been obtained from the State. The Permittee is responsible for obtaining any necessary authorizations from the Board of Trustees of the Internal Improvement Trust Fund prior to commencing activity on sovereign lands or other state-owned lands.

5. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be considered specifically approved unless a specific condition of this permit or a formal determination under section 373.421(2), F.S., provides otherwise.

6. This permit does not convey to the Permittee or create in the Permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the Permittee. The issuance of this permit does not convey any vested rights or any exclusive privileges.

7. This permit or a copy thereof, complete with all conditions, attachments, plans and specifications, modifications, and time extensions shall be kept at the work site of the permitted activity. The Permittee shall require the contractor to review the complete permit prior to commencement of the activity authorized by this permit.

8. The Permittee, by accepting this permit, specifically agrees to allow authorized Department personnel with proper identification and at reasonable times, access to the premises where the permitted activity is located or conducted for the purpose of ascertaining compliance with the terms of the permit and with the rules of the Department and to have access to and copy any records that must be kept under conditions of the permit; to inspect the facility, equipment, practices, or operations regulated or required under this permit; and to sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules. Reasonable time may depend on the nature of the concern being investigated.

9. At least forty-eight (48) hours prior to commencement of activity authorized by this permit, the Permittee shall submit to the Bureau of Beaches and Coastal Systems (JCP Compliance Officer) and the appropriate District office of the Department a written notice of commencement of construction indicating the actual start date and the expected completion date and an affirmative statement that the Permittee and the contractor, if one

is to be used, have read the general and specific conditions of the permit and understand them.

10. If historic or archaeological artifacts, such as, but not limited to, Indian canoes, arrow heads, pottery or physical remains, are discovered at any time on the project site, the Permittee shall immediately stop all activities in the immediate area that disturb the soil in the immediate locale and notify the State Historic Preservation Officer and the Bureau of Beaches and Coastal Systems (JCP Compliance Officer). In the event that unmarked human remains are encountered during permitted activities, all work shall stop in the immediate area and the proper authorities notified in accordance with Section 872.02, F.S.

11. Within 30 days after completion of construction or completion of a subsequent maintenance event authorized by this permit, the Permittee shall submit to the Bureau of Beaches and Coastal Systems (JCP Compliance Officer) and the appropriate District office of the Department a written statement of completion and certification by a registered professional engineer. This certification shall state that all locations and elevations specified by the permit have been verified; the activities authorized by the permit have been performed in compliance with the plans and specifications approved as a part of the permit, and all conditions of the permit; or shall describe any deviations from the plans and specifications, and all conditions of the permit. When the completed activity differs substantially from the permitted plans, any substantial deviations shall be noted and explained on two paper copies and one electronic copy of as-built drawings submitted to the Bureau of Beaches and Coastal Systems (JCP Compliance Officer).

SPECIFIC CONDITIONS:

1. The terms, conditions and provisions of the required easement shall be met. The Notice to Proceed shall not be issued and construction of this activity shall not commence on sovereign submerged lands, title to which is held by the Board of Trustees, until all easement documents have been executed to the satisfaction of the Department.

2. No work shall be conducted until and unless the Department issues a Final Order of Variance (File No. 0311339-002-BV) from Rule 62-4.244(5)(c), F.A.C. to establish an expanded mixing zone for this project.

3. All reports or notices relating to this permit shall be sent to the Department's JCP Compliance Officer (e-mail address: JCP Compliance@dep.state.fl.us) unless otherwise directed by one of the Specific Conditions.

4. Prior to the initial event, and each subsequent event, the Permittee shall not commence work under this permit until the Permittee has received a written **Notice to Proceed** from the Department. At least 30 days prior to the requested date of issuance of the notice to

proceed, the Permittee shall submit a written request for a Notice to Proceed and the following items for review and approval by the Department:

a. An electronic copy of detailed ***final construction plans and specifications*** for all authorized activities. The plans and specifications must be consistent with the activity description of this permit and the attached permit drawings, and shall also be certified by a P.E., who is registered in the State of Florida. If electronic certification is not available, a hard copy of the plans and specifications would also be required. The plans and specifications shall include a description of the dredging and construction methods to be utilized and drawings and surveys that show all biological resources and work spaces (e.g., anchoring area, pipeline corridors, staging areas, boat access corridors, etc.) to be used for this project.

b. ***Turbidity monitoring qualifications.*** Construction at the project site shall be monitored closely by individual with professional experience in monitoring turbidity for beach nourishment projects. Also, an individual familiar with beach construction techniques and turbidity monitoring shall be present on site at all times during construction. This individual shall have authority to alter construction techniques or shut down the dredging or beach construction operations if turbidity levels exceed the compliance standards established in this permit. The names and documented qualifications of those individuals performing these functions, along with 24-hour contact information, shall be submitted. In order to be qualified, the person(s) conducting the turbidity monitoring shall have had formal training in water quality monitoring, with professional experience monitoring turbidity for beach nourishment projects, and experience using the Department's protocol for Field Measurement of Turbidity: http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/2008sops/ft1600.pdf

c. A ***Scope of Work*** for turbidity monitoring to ensure that the right equipment is available to accurately measure turbidity and access the appropriate sampling locations (including sites that may be in or landward of the surf).

d. ***Rock Removal Plan.*** A Rock Removal and Disposal Plan that describes the means and methods the CONTRACTOR will implement to monitor for the presence of rock in the fill material and the removal and disposal methods that will be implemented in the event non-compliant material is discharged on to the beach.

5. The available geotechnical data suggests that there could be trace amounts of rock rubble, shell, and/or coral fragments larger than three-fourths (3/4) inch within the defined sand borrow area limits.

The beach fill shall not contain coarse gravel, cobbles or material retained on the 3/4 inch sieve in a percentage or size greater than found on the native beach, nor shall the material contain rock on the surface of the beach fill in excess of 50% of background in any

10.000 square foot area (per 62B-41.007(2)(j) F.A.C.). Any such material discharged onto the beach by the dredging operations shall be removed from the beach fill.

The Rock Removal and Disposal Plan, required in the notice to proceed condition, above, shall include as a minimum the following conditions.

a. The discharged fill material shall continuously monitored for the presence of rock, rubble, or any other debris larger than three-fourths (3/4) inch in diameter. The Permittee shall perform daily random checks of fill conditions.

b. In the event non-compliant material is discharged onto the beach, the Permittee shall notify the Department immediately. The Permittee shall work with the Department to determine if remedial action is required and the scope of the action. Material determined to be non-compliant shall be removed to the satisfaction of Department.

6. **Pre-Construction Conference.** The Permittee shall conduct a pre-construction conference to review the specific conditions and monitoring requirements of this permit with the Permittee's contractors, the engineer of record, the turbidity monitoring personnel and the JCP Compliance Officer (or designated alternate). In order to ensure that appropriate representatives are available, at least twenty-one (21) days prior to the intended commencement date for the permitted construction, the Permittee is advised to contact the Department, and the other agency representatives listed below:

JCP Compliance Officer
phone: (850) 414-7716
e-mail: JCP Compliance@dep.state.fl.us

DEP Southeast District Office
Submerged Lands & Environmental Resources
400 North Congress Avenue, Suite 200
West Palm Beach, FL 33401-2913
(561) 681-6600

Imperiled Species Management Section
Florida Fish & Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, Florida 32399-1600
phone: (850) 922-4330
fax: (850) 921-4369 or email: marineturtle@myfwc.com

The Permittee is also advised to schedule the pre-construction conference at least a week prior to the intended commencement date. At least seven (7) days in advance of the pre-

construction conference, the Permittee shall provide written notification, advising the participants (listed above) of the **agreed-upon** date, time and location of the meeting, and also provide a meeting agenda and a teleconference number.

7. When discharging slurried sand onto the beach from a pipeline, the Permittee shall employ best management practices (BMPs) to reduce turbidity. At a minimum, these BMPs shall include the following:

   a. Use of shore-parallel sand dikes on the beach berm, seaward of the pipeline discharge point, to maximize settlement of suspended sediment on the beach before return water from the dredged discharge reenters the Atlantic Ocean; and

   b. A pipeline discharge point that is located at least 50 feet from open water or at the landward edge of the beach berm (if the berm width is less than 50 feet).

8. Sediment quality shall be assessed as outlined in the Sediment QA/QC plan (attached). Any occurrences of placement of material not in compliance with the Plan shall be handled according to the protocols set forth in the Sediment QA/QC plan. The sediment testing result shall be submitted to the JCP Compliance Officer within 90 days following the completion of beach construction. The Sediment QC/QA plan includes the following:

   a. If during construction, the Permittee or Engineer determines that the beach fill material does not comply with the sediment compliance specifications, measures shall be taken to avoid further placement of noncompliant fill, and the sediment inspection results shall be reported to the Department.

   b. The Permittee shall submit post-construction sediment testing results and an analysis report as outlined in the Sediment QC/QA plan to the Department within 90 days following beach construction. The sediment testing results shall be certified by a P.E. or P.G. from the testing laboratory. A summary table of the sediment samples and test results for the sediment compliance parameters as outlined in Table 1 of the Sediment QC/QA plan shall accompany the complete set of laboratory testing results. A statement of how the placed fill material compares to the sediment analysis and volume calculations from the geotechnical investigation shall be included in the sediment testing results report.

   c. A post-remediation report containing the site map, sediment analysis, and volume of noncompliant fill material removed and replaced shall be submitted to the Department within 7 days following completion of remediation activities.

Fish and Wildlife Protection Conditions for Dredging Activities:

9. The Permittee shall e-mail (MTP@MyFWC.com) weekly reports to the Imperiled Species Management section on Friday each week that trawling is conducted in Florida waters. These weekly reports shall include the species and number of turtles captured in Florida waters, general health, and release information. A summary (FWC provided Excel spreadsheet) of all trawling activity shall be submitted to the ISM by January 15 of the following year. The summary shall include non-capture trawling, all turtles captured in Florida waters, all measurements, the latitude and longitude (in decimal degrees) of captures and tow start-stop points, and times for the start-stop points of the tows, including those tows on which no turtles are captured.

10. **Hopper Dredging.** In the event a hopper dredge is utilized, the following requirements shall be met in addition to the Terms and Conditions of the applicable NMFS Regional Biological Opinion for Hopper Dredging (South Atlantic):

    a. Handling of sea turtles captured during hopper dredging projects shall be conducted only by persons with prior experience and training in these activities and who is duly authorized to conduct such activities through a valid permit issued by the Florida Fish and Wildlife Conservation Commission (FWC), pursuant to Florida Administrative Code 68E-1.

    b. *Dredging Pumps*: Standard operating procedure shall be that dredging pumps shall be disengaged by the operator when the dragheads are not firmly on the bottom, to prevent impingement or entrainment of sea turtles within the water column. This precaution is especially important during the cleanup phase of dredging operations.

    c. *Sea Turtle Deflecting Draghead*: A state-of-the-art rigid deflector draghead must be used on all hopper dredges in all channels at all times of the year.

    d. The Sea Turtle Stranding and Salvage Network (STSSN) Coordinator, Dr. Allen Foley, shall be notified at allen.foley@myfwc.com or at (904) 573-3930 of the start-up and completion of hopper dredging operations.

    e. Relocation trawling or non-capture trawling shall be implemented in accordance with the applicable NMFS Biological Opinion and Incidental Take authorization. Any activity involving use of nets in Florida waters shall require a gear exemption authorization and Marine Turtle Permit from FWC.

Fish and Wildlife Protection Conditions for Beach Placement of Material:

11. A meeting between representatives of the contractor, the U.S. Fish and Wildlife Service (FWS), the FWC, the permitted sea turtle surveyor and other species surveyors as appropriate, shall be held prior to commencement of work on projects. At least 10-business days advance notice must be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the protection

measures as well as additional guidelines when construction occurs during nesting season, such as staging equipment and reporting within the work area as well as follow up meetings during construction.

12. In the event a sea turtle nest is excavated during construction activities, the permitted person responsible for egg relocation for the project shall be notified immediately so the eggs can be moved to a suitable relocation site.

13. Upon locating a dead or injured sea turtle adult, hatchling, or egg that may have been harmed or destroyed as a direct or indirect result of the project, the Permittee shall be responsible for notifying FWC Wildlife Alert at 1-888-404-FWCC (3922). Care shall be taken in handling injured sea turtles or eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

14. All derelict concrete, metal, and coastal armoring material and other debris shall be removed from the beach to the maximum extent practicable prior to any fill placement. If debris removal activities will take place during shorebird or sea turtle nesting seasons, the work shall be conducted during daylight hours only and shall not commence until completion of daily seabird, shorebird or sea turtle surveys each day. All excavations and temporary alterations of the beach topography shall be filled or leveled to the natural beach profile prior to 9 p.m. each day.

15. **Beach Maintenance.** Beach nourishment shall be started after October 31 and be completed before May 1. For sand placement projects that occur during the period from March 1 through April 30, daily early morning surveys (before 9 a.m.) shall be conducted for sea turtle nests starting March 1 and eggs shall be relocated per the following requirements. For sand placement projects that occur during the period from November 1 through November 30, daily early morning sea turtle nesting surveys (before 9 am) shall be conducted 65 days prior to project initiation, and eggs shall be relocated per the following requirements.

    a. It is the responsibility of the Permittee to ensure that the project area and access sites are surveyed for marine turtle nesting activity. Nesting surveys and egg relocations shall only be conducted by persons with prior experience and training in these activities and who are duly authorized to conduct such activities through a valid permit issued by FWC, pursuant to FAC 68E-1. Please contact FWC's Marine Turtle Management Program in Tequesta at (561) 575-5408 for information on the permit holder in the project area. Nesting surveys shall be conducted daily between sunrise and 9 a.m.

    b. Only those nests that may be affected by sand placement activities shall be relocated. Nest relocation shall not occur upon completion of the project. Nests requiring relocation shall be moved no later than 9 a.m. the morning following

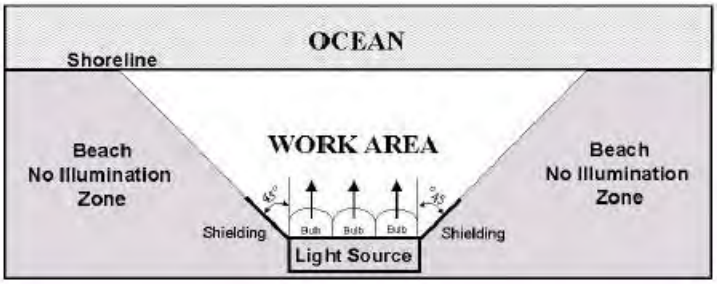
deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Relocated nests shall not be placed in organized groupings. Relocated nests shall be randomly staggered along the length and width of the beach in settings that are not expected to experience daily inundation by high tides or known to routinely experience severe erosion and egg loss, or to be subject to artificial lighting. Nest relocations in association with construction activities shall cease when construction activities no longer threaten nests.

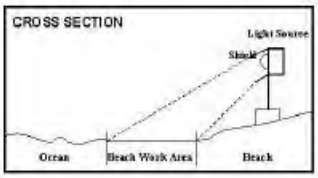
c. Nests deposited within areas where construction activities have ceased or will not occur for 65 days or nests laid in the nourished berm prior to tilling shall be marked and left in situ unless other factors threaten the success of the nest. The turtle permit holder shall install an on-beach marker at the nest site and/or a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. No activity shall occur within this area, nor shall any activities occur that could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the project activity.

d. For sand placement conducted during the period from March 1 through April 30, daytime surveys shall be conducted for leatherback sea turtle nests beginning March 1. Nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded within the project or adjacent beach area through April 30 or until completion of the project (whichever is earliest). Nightly nesting surveys shall be conducted from 9 p.m. until 6 a.m. The project area shall be surveyed at 1-hour intervals (since leatherbacks require at least 1.5 hours to complete nesting, this will ensure all nesting leatherbacks are encountered) and eggs shall be relocated per the preceding requirements.

16. All sea turtle nests deposited in the beach where the shore-parallel t-head groins are located shall be caged in accordance with FWC Marine Turtle Conservation Guidelines so that hatchlings can be retrieved and released outside the groin area unless otherwise authorized by FWC.

17. **Project Lighting.** Direct lighting of the beach and nearshore waters shall be limited to the immediate construction area during the sea turtle nesting season and shall comply with safety requirements. Lighting on offshore or onshore equipment shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the water's surface and nesting beach while meeting all Coast Guard, EM 385-1-1, and OSHA requirements. Light intensity of lighting equipment shall be reduced to the minimum standard required by OSHA for General Construction areas, in order not to misdirect sea turtles. Shields shall be affixed to the light housing and be large enough to block light from all lamps from being transmitted outside the construction area (**Figure below**).





BEACH LIGHTING SCHEMATIC

18. **Fill Restrictions.** During the sea turtle nesting season, the beach fill shall not be extend more than 500 feet along the shoreline between dusk and sunrise of the following day until the daily nesting survey has been completed and the beach cleared for fill advancement. An exception to this may occur if there is a permitted sea turtle surveyor present on-site to ensure no nesting and hatching sea turtles are present within the extended work area. If the 500-foot limit is not feasible for the project, the FWC may establish an alternative distance during the preconstruction meeting. Once the beach has been cleared, and the necessary nest relocations have been completed, the contractor will be allowed to proceed with the placement of fill during daylight hours until dusk, at which time the 500-foot length limitation shall apply.

19. **Compaction Sampling.** Sand compaction shall be monitored in the area of sand placement immediately after completion of the project and prior to March 1 for 3 subsequent years in accordance with a protocol agreed to by FWC and the Permittee. At

a minimum, the protocol provided below shall be followed. If tilling is needed, the area shall be tilled to a depth of 36 inches. Each pass of the tilling equipment shall be overlapped to allow more thorough and even tilling. All tilling activity shall be completed at least once prior to nesting season. A report on the results of the compaction monitoring shall be submitted to FWC prior to any tilling actions being taken. *NOTE: The requirement for compaction monitoring can be eliminated if the decision is made to till regardless of post-construction compaction levels. Additionally, compaction monitoring and remediation are not required in subsequent years if placed material no longer remains on the dry beach.*

a. Compaction sampling stations shall be located at 500-foot intervals along the project area. One station shall be at the seaward edge of the dune/bulkhead line (when material is placed in this area), and one station shall be midway between the dune line and the high water line (normal wrack line).

b. At each station, the cone penetrometer shall be pushed to a depth of 6, 12, and 18 inches, three times for each depth (three replicates). Material may be removed from the hole if necessary to ensure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lie over less compact layers. Replicates shall be located as close to each other as possible, without interacting with the previous hole and/or disturbed sediments. The three replicate compaction values for each depth shall be averaged to produce final values for each depth at each station. Reports shall include all 18 values for each transect line, and the final 6 averaged compaction values.

c. If the average value for any depth exceeds 500 psi for any two or more adjacent stations, then that area shall be tilled immediately prior to the dates listed above.

d. If values exceeding 500 psi are distributed throughout the project area, but in no case do those values exist at two adjacent stations at the same depth, then the Permittee shall consult with FWC to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling will not be required.

e. Tilling shall occur landward of the wrack line and avoid all vegetated areas 3 square feet or greater with a 3-foot buffer around the vegetated areas.

20. Visual surveys for escarpments along the project area shall be made immediately after completion of the dredged material placement and during the 30 days prior to March 1, for 3 subsequent years, if placed sand remains in the project area. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet shall be leveled and the beach profile shall be reconfigured to minimize scarp formation by March 1. Any escarpment removal shall be reported (by location) to the

FWC. If the project is completed during the early part of the sea turtle nesting and hatching season (March 1 through April 30), escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. Weekly surveys for escarpments shall be conducted during the three nesting seasons following completion of the project. If escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occur during the nesting and hatching season, the Permittee shall contact the FWC immediately to determine the appropriate action to be taken. If FWC determines that escarpment leveling is required during the nesting or hatching season, a brief written authorization that describes methods to be used to reduce the likelihood of impacting existing nests will be provided. An annual summary of escarpment surveys and actions taken shall be submitted as part of the annual report. *NOTE: Out-year escarpment monitoring and remediation are not required if placed material no longer remains on the dry beach.*

Post-construction Monitoring and Reporting Marine Turtle Protection Conditions:

21. Two surveys shall be conducted of all lighting visible from the beach placement area in the year following construction. The first survey shall be conducted between May 1 and May 15, and the Permittee shall provide a brief summary to FWC. The second survey shall be conducted between July 15 and August 1. A summary report of the surveys, including any actions taken, shall be submitted to FWC by December 1 of the year in which surveys are conducted. After the annual report is completed, the Permittee shall set up a meeting with the FWC to discuss the survey report, as well as any documented sea turtle disorientations in or adjacent to the project area. If the project is completed during the nesting season and prior to May 1, the lighting survey may be conducted during the year of construction.

22. Reports on all nesting activity shall be provided to the FWC for the initial nesting season and for up to three additional nesting seasons as follows:

    a. For the initial nesting season and the following year, the number and type of emergences (nests or false crawls) shall be reported per species in accordance with the attached table. An additional year of nesting surveys may be required if nesting success on the nourished beach is less than 40%, based on two previous year's survey data.

    b. For the initial nesting season, reproductive success shall be reported per species in accordance with the attached table. Reproductive success shall be reported for a statistically valid number of loggerhead nests and all green and leatherback nests.

    c. In the event that the reproductive success meets or exceeds required criteria (e.g., 60% or greater for hatch success and 80% or greater for emergence success) for all species, monitoring for reproductive success shall be recommended, but not required for the second year post-construction.

d. Monitoring of nesting activity in the seasons following construction shall include daily surveys and any additional measures authorized by the FWC. Reports submitted shall include daily report sheets noting all crawl activity, nesting success rates, hatching success of all relocated nests, hatching success of a representative sampling of nests left in place (if any), dates of construction and names of all personnel involved in nest surveys and relocation activities.

e. Data should be reported separately for the nourished areas and for an equal length of adjacent beach that is not nourished in accordance with the attached Table. Summaries of nesting activity shall be submitted in electronic format (Excel spreadsheets). All reports should submitted by January 15 of the following year.

Table. Marine Turtle Monitoring for Beach Placement of Material

Metric	Duration	Variable	Criterion
Nesting Success	Year of construction, one year to two or three years postconstruction if placed sand remains on beach and variable does not meet criterion based on previous year	Number of nests and non-nesting emergences by day by species	40% or greater
Hatching Success	Year of construction and one to three years postconstruction if placed sand remains on beach and variable does not meet criterion based on previous year	Number of hatchlings by species to completely escape egg	Average of 60% or greater (data must include washed out nests)
Emergence Success	Year of construction and one to three years postconstruction if placed sand remains on beach and variable does not meet success criterion based on previous year	Number of hatchlings by species to emerge from nest onto beach	Average must not be significantly different than the average hatching success
Disorientation	Year of construction and one to three years postconstruction if placed sand remains on beach	Number of nests and individuals that misorient or disorient	
Lighting Surveys	Two surveys the year following construction ,	Number, location and photographs	100% reduction in

	one survey between May 1 and May 15 and second survey between July 15 and August 1	of lights visible from nourished berm, corrective actions and notifications made	lights visible from nourished berm within one to two month period
Compaction	Not required if the beach is tilled prior to nesting season each year placed sand remains on beach	Shear resistance	Less than 500 psi
Escarpment Surveys	Weekly during nesting season for up to three years each year placed sand remains on the beach	Number of scarps 18 inches or greater extending for more than 100 feet that persist for more than 2 weeks	Successful remediation of all persistent scarps as needed

Manatee Protection Conditions

23. The Permittee shall comply with the following conditions intended to protect manatees from direct project effects:

    a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The Permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

    b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels shall follow routes of deep water whenever possible.

    c. If siltation or turbidity barriers are used, they shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

    d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities shall not resume until the manatee(s) has moved beyond the 50-foot radius of the project

operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

e. Any collision with or injury to a manatee shall be reported immediately to the FWC Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the FWS in Jacksonville (1-904-731-3336) for north Florida or Vero Beach (1-772-562-3909) for south Florida, and to FWC at ImperiledSpecies@myFWC.com

f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the Permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters - Watch for Manatees* must be posted. A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shutdown of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

MONITORING REQUIRED:

24. The physical monitoring and associated reporting shall be conducted in accordance with the attached approved physical monitoring plan dated **April 9, 2013**.

25. One electronic copy of the monitoring report and one electronic copy of the survey data shall be submitted to the JCP Compliance Officer. When submitting any monitoring information, please include a transmittal cover letter clearly labeled with the following at the top of each page: **"This monitoring information is submitted in accordance with Item No. [XX] of the approved Monitoring Plan for Permit No. 0311339-001-JC for the monitoring period [XX].**

26. Each placement event shall be designed to maintain at least a 600-foot buffer between the offshore borrow areas and adjacent hardbottom. The design details shall be submitted to the Department, as part of the final plans and specification for each nourishment event (see Notice to Proceed requirement in Specific Condition 4), in order to confirm the avoidance of hardbottom impacts.

27. The Permittee shall adhere to the attached Biological Monitoring Plan, which is a binding part of this permit. The Permittee shall acquire written approval from the Department prior to implementing any substantial revisions to the approved Plan. As part of the Plan, the Permittee shall monitor the artificial reef and the downdrift hardbottom with annual coastal aerial photography, and conduct in-water ground-truthing within 72 hours of the date that the aerials are taken. In addition, the Permittee shall verify the location of the landward edge of the down drift reef at previously established transect locations (from

the 2005 project). This verification of aerial photos shall occur once before the construction (2013) and once after (2014).

As long as the artificial reef continues to function as an ephemeral hardbottom, i.e., is not persistently buried between nourishment intervals, the previous hardbottom impacts identified in Permit No. 0244200-001-JC will remain offset.

TURBIDITY

28. Water Quality - Turbidity shall be monitored as follows:

Units: Nephelometric Turbidity Units (NTUs).

Frequency: The first sampling event shall occur within one hour of dredging commencement and continue approximately every four hours thereafter during dredging. Sampling shall be conducted while the highest project-related turbidity levels are crossing the edge of the mixing zone. Since turbidity levels can be related to pumping rates, the dredge pumping rates shall be recorded, and provided to the Department upon request. The compliance samples and the corresponding background samples shall be collected at approximately the same time, i.e., one shall immediately follow the other.

Location: Background: At surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above bottom, clearly outside the influence of any artificially generated turbidity plume.

Nourishment Site: approximately 500 meters upcurrent from any portion of the beach that has been, or is being, filled during the current construction event, at the same distance offshore as the associated compliance or intermediate sample.

Borrow Site: At least 500 meters upcurrent from the source of turbidity at the dredge site.

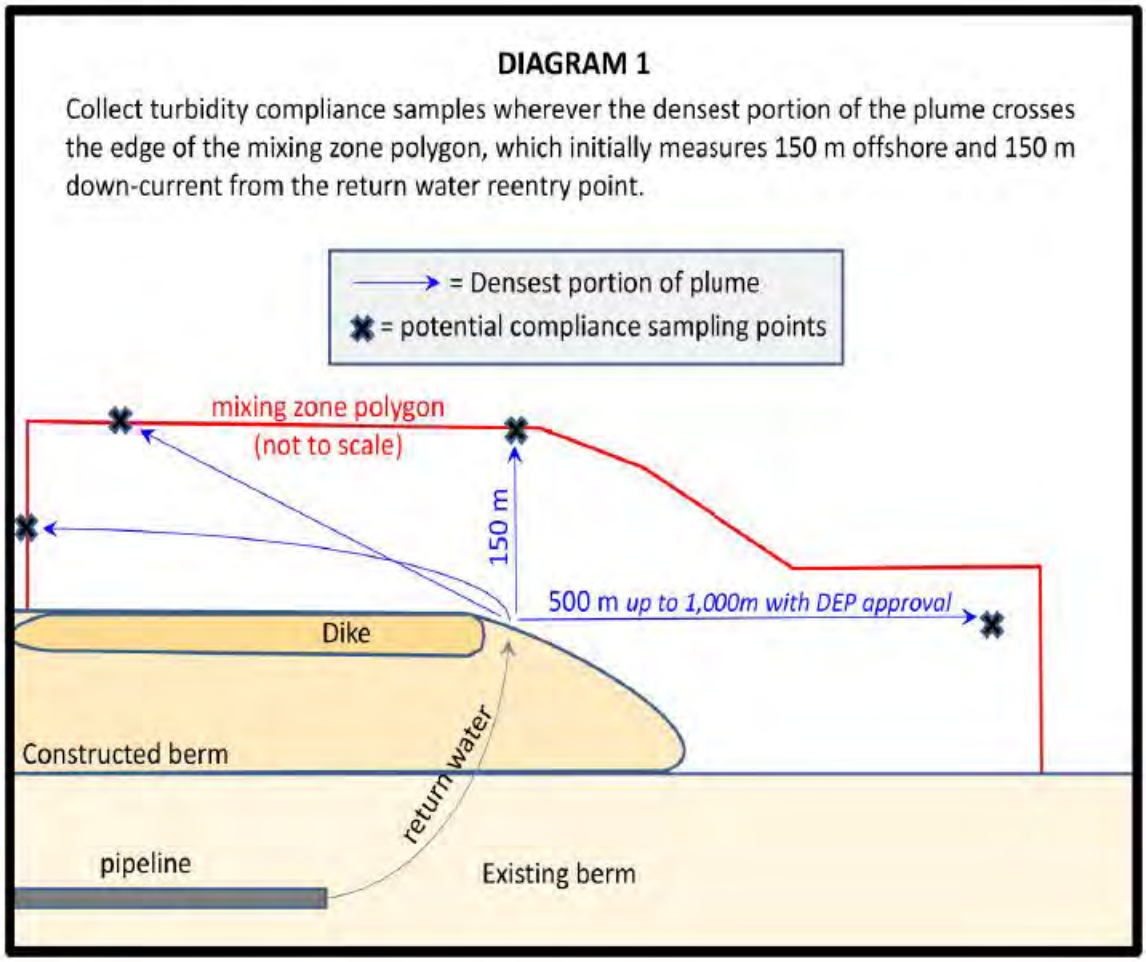
Compliance: At surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above bottom, within the densest portion of any visible turbidity plume generated by this project.

Nourishment Site: Samples shall be collected where the densest portion of the turbidity plume crosses the edge of the mixing zone polygon, which measures up to 150 meters offshore and up to 500 meters downcurrent from the point where the return water from the dredged discharge reenters the Atlantic Ocean. For each sampling

event, compliance samples shall be collected within the area of highest turbidity at both the rip current location and the longshore drift location. *Note: If the plume flows parallel to the shoreline, the densest portion of the plume may cross the mixing zone polygon at a distance less than less than the maximum offshore dimension of the mixing zone. In that case, it may be necessary to access the sampling location from the shore, in water that is too shallow for a boat. If the plume flows offshore, it may cross the mixing zone polygon at a distance less than the maximum alongshore dimension of the mixing zone, and the sample would be collected at that point. See Diagram 1.*

If the 500-meter alongshore dimension of the mixing zone is insufficient to adequately contain project-related turbidity levels, i.e., if turbidity levels require cessation of construction (as required in Specific Condition 30) more than twice a week, the Permittee may submit a request to the Department to increase the alongshore dimension of the mixing zone to 1,000 meters. Upon confirmation that turbidity levels require cessation of construction more than twice a week, the Department will provide written confirmation that the alongshore dimension of the nourishment site mixing zone is increased to 1,000 meters for the remainder of that nourishment event.

Borrow Site: Samples shall be collected 150 meters downcurrent from the cutterhead, **and** from any other source of turbidity generated by the dredge, in the densest portion of any visible turbidity plume. If no plume is visible, follow the likely direction of flow.



Intermediate Monitoring (required when using a mixing zone that exceeds 150 meters in size): At surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above bottom, within the densest portion of any visible turbidity plume generated by this project. At points approximately 150 meters and 250 meters downcurrent from the point where the return water from the dredged discharge reenters the Atlantic Ocean (if those points are located inside the mixing zone), within the densest portion of any visible turbidity plume. These measurements will be used to calibrate the size of the mixing zone for future events. In the event that a 1,000 meter mixing zone is necessary and has been approved by Department staff, the required intermediate monitoring points shall be extended to 250 meters, 500 meters, and 750 meters.

Analysis of turbidity samples shall be performed in compliance with DEP-SOP-001/01 FT 1600 Field Measurement of Turbidity:

http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/2008sops/ft1600.pdf

Calibration: The instruments used to measure turbidity shall be fully calibrated with primary standards within one month of the commencement of the project, and at least once a month throughout the project. Calibration with secondary standards shall be verified each morning prior to use, and after each time the instrument is turned on, and after field sampling using two secondary turbidity "standards" that bracket the anticipated turbidity samples. If the post-sampling calibration value deviates more than 8% from the previous calibration value, results shall be reported as estimated and a description of the problem shall be included in the field notes.

29. If the turbidity monitoring protocol specified above prevents the collection of accurate data, the person in charge of the turbidity monitoring shall contact the JCP Compliance Officer to establish a more appropriate protocol. Once approved in writing by the Department, the new protocol shall be attached to the permit and shall be implemented without the need for a permit modification.

30. The compliance locations given above shall be considered the limits of the temporary mixing zone for turbidity allowed during construction. If monitoring reveals compliance turbidity levels greater than 29 NTUs above the associated background at the dredge site or at the beach nourishment site construction activities shall **cease immediately** and not resume until corrective measures have been taken and turbidity has returned to acceptable levels. Any such occurrence shall also be immediately reported to the Department via email at JCP Compliance@dep.state.fl.us. The subject line of the email shall state "TURBIDITY EXCEEDANCE".

Any project-associated discharge other than dredging or fill placement (e.g., scow or pipeline leakage) shall be monitored as close to the source as possible. If the turbidity level exceeds 29 NTUs above background, the construction activities related to the exceedance shall **cease immediately** and not resume until corrective measures have been taken and turbidity has returned to acceptable levels. This turbidity monitoring shall continue every hour until background turbidity levels are achieved or until otherwise directed by the Department. The Permittee shall notify the Department, by separate email to the JCP Compliance Officer, of such an event within 24 hours of the time the Permittee first becomes aware of the discharge. The subject line of the email shall state "PROJECT-ASSOCIATED DISCHARGE-OTHER".

When reporting a turbidity exceedance, the following information shall also be included:

a. the Project Name;

b. the Permit Number;

c. location and level (NTUs above background) of the turbidity exceedance;

d. the time and date that the exceedance occurred; and

e. the time and date that construction ceased.

Prior to re-commencing the construction, a report shall be emailed to the Department with the same information that was included in the "Exceedance Report", plus the following information:

a. turbidity monitoring data collected during the shutdown documenting the decline in turbidity levels and achievement of acceptable levels;

b. corrective measures that were taken; and

c. cause of the exceedance.

31. **Turbidity Reports**. All turbidity monitoring data shall be submitted within one week of analysis. The data shall be presented in tabular format, indicating the measured turbidity levels at the compliance sites for each depth, the corresponding background levels at each depth and the number of NTUs over background at each depth. Any exceedances of the turbidity standard (29 NTUs above background) shall be highlighted in the table. In addition to the raw and processed data, the reports shall also contain the following information:

a. time of day samples were taken;

b. dates of sampling and analysis;

c. GPS location of sample

d. depth of water body;

e. depth of each sample;

f. antecedent weather conditions, including wind direction and velocity;

g. tidal stage and direction of flow;

h. water temperature;

i. a map (overlaid on an aerial photograph) indicating the sampling locations, dredging and discharge locations, and direction of flow;

j. a statement describing the methods used in collection, handling, storage and analysis of the samples;

k. a statement by the individual responsible for implementation of the sampling program concerning the authenticity, precision, limits of detection, calibration of the meter and accuracy of the turbidity and GPS data;

l. When samples cannot be collected, include an explanation in the report. If unable to collect samples due to severe weather conditions, include a copy of a current report from a reliable, independent source, such as an online weather service.

Monitoring reports shall be submitted by email to the JCP Compliance Officer. In the subject line of the reports, on the cover page to the submittal and at the top of each page, include the Project Name, Permit Number and the dates of the monitoring interval. Failure to submit reports in a timely manner constitutes grounds for revocation of the permit.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Martin K. Seeling, Administrator
Beaches, Inlets, and Ports Program

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to Section 120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Lauren Wild 6/24/13

Deputy Clerk Date

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Appendix B – Section 404 (b)(1) Evaluation Southern Palm Beach County Shore Protection Project 2013

I. PROJECT DESCRIPTION

a. Location. This is a federally authorized storm protection and beach renourishment project consisting of three segments in Southern Palm Beach County, Florida. The Town of Ocean Ridge (Boynton Beach municipality) is located on a barrier island on the southeast coast in Palm Beach County, 45 miles north of Miami and southeast of Lake Okeechobee. The maximum width of the barrier island in the project area is approximately 0.4 miles. The City of Delray Beach is located in southern Palm Beach County on the southeast Atlantic coast of Florida, about 50 miles north of Miami. It is influenced by the South Lake Worth Inlet to the north and the Boca Raton Inlet to the south. The City of Boca Raton is located at the southern end of Palm Beach County. The City is comprised of portions of two barrier islands which are bordered by approximately five miles of coastline and an inlet which opens to the Atlantic Ocean (see Environmental Assessment (EA) for figures 1 and 2).

b. General Description. The Ocean Ridge segment, first authorized in 1962, provides for construction along 1.4 miles of shoreline (R152-R159) with a design berm width of 100' at elevation 9' NGVD. The Delray segment, first authorized in 1962, provides for initial construction and periodic renourishment at 8-year intervals along 1.9 miles of shoreline (R175-R188) with a design berm width averaging 100' at elevation 9' NGVD. The federally-authorized North Boca Raton Beach Renourishment Project is referred to as Segment 1 (R-205 to R-212+181 ft). An estimated total of approximately 800,000 cy of beach- compatible sand will be placed within the Segment 1 template from FDEP monuments R-205 to R-212+181' including tapers.

c. Authority and Purpose. See section 1.1 of the associated project EA.

d. General Description of Dredged Material

(1) General Characteristics of Material: The material is comprised of mainly sand and rock.

(2) Quantity of Material: It is estimated that 491,000 cubic yards of material will be removed and placed in the disposal site in Ocean Ridge; approximately 1,208,000 cubic yards in Delray Beach; and 800,000 cubic yards in North Boca Raton..

(3) Source of Material: Material will be dredged from established borrow areas.

e. Description of the Proposed Discharge Site(s)

(1) Location. Dredged material would be placed along the beach between DEP monuments R152-R159 in Ocean Ridge; R175-R188 in Delray Beach; and R205 to R212+181' in North Boca Raton.

(2) Size. The beach placement size is approximately 1.1 miles along Ocean Ridge; 1.9 miles in Delray Beach; and 1.42 miles in Boca Raton.

(3) Type of Site. Beach placement.

(4) Type(s) of Habitat. Beach placement would be sandy slopes with a vegetated berm.
(5) Timing and Duration of Discharge. The exact timing of dredging operations is not known, although dredging activities are expected to occur in the winter months.

f. Description of Disposal Method. Disposal could be either from a pipeline via hydraulic dredging or clamshell dredge and transport barge.

II. Factual Determinations

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope: In Ocean Ridge, the design berm widths vary between 28 and 168 ft with a berm height of +7.45 ft (NAVD88) with a seaward construction slope of 1V:15H. At Delray Beach, the design cross section provides for a berm width extension of 100 feet (30.5 m) from the Erosion Control Line (ECL) at an elevation of +7.5 feet (2.29 m), NAVD, and a seaward slope of 1V to 10H. A Boca Raton, an estimated total of approximately 800,000 cy of beach- compatible sand will be placed within the Segment 1 template.

(2) Sediment Type. The material to be disposed on the beach will only be of beach quality sand.

(3) Dredged Material Movement: Material will settle and remain within boundaries of upland site or be moved to downdrift beaches by wave action if placed in beach placement.

(4) Physical Effects on Benthos: Some benthic organisms that are not mobile may be may be covered by the beach material. Recolonization soon after project completion is expected to replace those organisms that do not survive project construction. It is anticipated that no long-term adverse impacts will occur.

(5) Other Effects: Not applicable.

(6) Actions Taken to Minimize Impacts: BMPs and other benthic protection measures have been coordinated with the resource agencies to minimize impacts.

b. Water Circulation. Fluctuation and Salinity Determinations

Water column: During beach or nearshore disposal operations, turbidity will increase temporarily in the water column adjacent to the project. The increased turbidity will be short-term; therefore beach placement or nearshore placement will have no long-term or

significant impacts, if any, on salinity, water chemistry, clarity, color, odor, taste, dissolved gas levels, nutrients or eutrophication

Current Patterns and Circulation: Net movement of water is from the north to the south. The project will have no significant effect on existing current patterns, current flow, velocity, stratification, or the hydrologic regime in the area.

Normal Water Level Fluctuations: Mean tidal range in the project area is 3.5 feet with a spring tide range of approximately 4.1 feet.

Salinity Gradients: Salinity is that of oceanic water. Dredged material placement will not affect normal tide fluctuations or salinity.

Actions That Will Be Taken to Minimize Impacts: BMPs and other benthic protection measures have been coordinated with the resource agencies to minimize impacts.

c. Suspended Particulate/Turbidity Determinations

Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site: There may be a temporary increase in turbidity levels in the project area along the disposal site during discharge. Turbidity will be short-term and localized and no significant adverse impacts are expected. State water quality standards for turbidity outside an allowable mixing zone would not be exceeded.

Effects (degree and duration) on Chemical and Physical Properties of the Water Column: The sea floor, at this location, is characterized by a sandy beach. There would be little, if any adverse effects to chemical and physical properties of the water as a result of placing clean beach compatible sand on the beach.

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

(b) Dissolved Oxygen: Dissolved oxygen levels will not be altered by this project due to the high energy wave environment and associated adequate re-aeration rates.

(c) Toxic Metals and Organics: No toxic metals or organics are expected to be released by the project.

(d) Pathogens: No pathogens are expected to be released by the project.

(e) Aesthetics: The aesthetic quality of the water in the immediate area of the project will be reduced during construction due to increased turbidity. This will be a short-term and localized condition. The placement of clean beach compatible sand on an erosive beach will likely improve the aesthetic quality of the immediate area. Material placed in the nearshore would likely provide improved beach width downdrift.

(f) Others as Appropriate: None.

Effects on Biota

Primary Production, Photosynthesis: Primary productivity is not a recognized, significant phenomenon in the surf zone, where a temporarily increased level of suspended particulates will occur. There will be no effect on the nearshore productivity as a result of the proposed disposal area.

Suspension/Filter Feeders: An increase in turbidity could adversely impact burrowing invertebrate filter feeders within and adjacent to the immediate construction area. It is not expected that a short-term, temporary increase in turbidity will have any long-term negative impact on these highly fecund organisms.

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.

Actions taken to Minimize Impacts: BMPs and other benthic protection measures will be coordinated with the resource agencies to minimize impacts.

d. Contaminant Determinations: The material that will be disposed will not introduce, relocate, or increase contaminants at the area. The material would be clean sand meeting the sand specification and compatible with the existing beach or sandy material with some silt in the nearshore or upland.

e. Aquatic Ecosystem and Organism Determinations: The material that will be placed on the beach is similar enough to the existing substrate so that no impacts are expected. The materials meet the exclusion criteria, therefore, no additional chemical-biological interactive testing will be required.

Effects on Plankton: No adverse impacts on autotrophic or heterotrophic organisms are anticipated.

Effects on Benthos: The material will bury some benthic organisms. Recolonization is expected to occur within a year after construction activities cease. No adverse long-term impacts to non-motile or motile benthic invertebrates are anticipated.

Effects on Nekton: No adverse impacts to nektonic species are anticipated.

Effects on Aquatic Food Web: No adverse long-term impact to any trophic group in the food web is anticipated.

Effects on Special Aquatic Sites: Hardbottom resources are located near the project site. Previous sand placement activities have already mitigated for those impacts, however,

buffers would need to be established if any new hardbottoms were encountered. Section 4 of the EA offers a more detailed discussion on impacts.

Threatened and Endangered Species: Appropriate measures to avoid, minimize, and mitigate for impacts to listed species have been coordinated with NMFS and FWS.

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

Actions to Minimize Impacts: BMPs along with terms and conditions associated with ESA Biological Opinions will be followed.

f. Proposed Disposal Site Determinations

Mixing Zone Determination: Clean sand, compatible with the existing beach, would be placed on the beach. This will not cause unacceptable changes in the mixing zone water quality requirements as specified by the State of Florida's Water Quality Certification permit procedures. No adverse impacts related to depth, current velocity, direction and variability, degree of turbulence, stratification, or ambient concentrations of constituents are expected from implementation of the project. Rock will need to be screened from the sand, and rock placement is yet to be determined. All appropriate permits will be attained prior to rock disposal.

Determination of Compliance with Applicable Water Quality Standards: Because of the inert nature of the material to be to be disposed, Class III water quality standards will not be violated.

Potential Effects on Human Use Characteristic

Municipal and Private Water Supply: No municipal or private water supplies will be impacted by the implementation of the project.

Recreational and Commercial Fisheries: Fishing in the immediate construction area will be prohibited during construction. Otherwise, recreational and commercial fisheries will not be impacted by the implementation of the project.

Water Related Recreation: Beach/water related recreation in the immediate vicinity of construction will be prohibited during construction activities. This will be a short-term impact.

Aesthetics: The existing environmental setting will not be adversely impacted. Construction activities will cause a temporary increase in noise and air pollution caused by equipment as well as 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 will return to pre-project levels.

Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves: No such designated sites are located within the project area.

g. Determination of Cumulative Effects on the Aquatic Ecosystem: There will be no cumulative impacts that result in a major impairment in water quality of the existing aquatic ecosystem resulting from the placement of material at the project site.

h. Determination of Secondary Effects on the Aquatic Ecosystem: There will be no secondary impacts on the aquatic ecosystem as a result of the dredging.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

a. Adaptation of the Section 404(b)(l) Guidelines to this Evaluation: No significant adaptations of the guidelines were made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem: No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States. Further, no less environmentally damaging practical alternatives to the proposed actions exist. To test the suitability of upland sand sources, the borrow areas proposed by the contractor will be used for this project. In addition, the impacts of using other sources on cultural resources, protected species, and other environmental factors would likely be equal to or greater than the impacts of the proposed action.

c. Compliance with Applicable State Water Quality Standards: After consideration of disposal site dilution and dispersion, the discharge of dredged materials will not cause or contribute to, violations of any applicable State water quality standards for Class III waters.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition: Under Section 307 Of the Clean Water Act: The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

e. Compliance with Endangered Species Act of 1973: The disposal of dredged material will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended. Standard conditions for monitoring and relocating turtle nests would be employed.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972: No marine sanctuaries are located within the project area.

g. Evaluation of Extent of Degradation of the Waters of the United States: The placement of dredged material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem: Appropriate steps have been taken to minimize the adverse environmental impact of the proposed action. The material proposed as beach has low silt content, therefore, turbidity due to silt will be low when discharging. Turbidity will be monitored so that if levels exceed State water quality standards of 29 NTU's above background, the contractor will be required to cease work until conditions return to normal. In the vicinity of reef and other hard grounds, measures would be taken to minimize sediment deposition on sensitive reef organisms.

i. On the basis of the guidelines, the proposed dredging and disposal sites are specified as complying with the requirements of these guidelines.

Appendix C – Coordination
Southern Palm Beach County Shore Protection Project 2013

United States Department of the Interior

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

June 28, 2013

Colonel Alan M. Dodd
District Commander
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service CPA Code: 2013-CPA-0183
Date Received: April 4, 2013
Formal Consultation Initiation Date: June 5, 2013
Project: Dredging and Sand Placement
Counties: Broward, Lee, Miami-Dade, Palm Beach, St. Lucie

Dear Colonel Dodd:

This document transmits the U.S. Fish and Wildlife Service's (Service) decision to apply the August 22, 2011, Statewide Programmatic Biological Opinion (SPBO) (Service 2011) and the May 22, 2013, Programmatic Piping Plover Biological Opinion (P^3BO) (Service 2013) to the proposed Flood Control and Coastal Emergency (FCCE) sand placement and navigation dredging projects. The U.S. Army Corps of Engineers (Corps) determined on April 4 and 5, 2013, the proposed projects located in South Florida "may affect" the threatened loggerhead sea turtle (*Caretta caretta*), endangered leatherback sea turtle (*Dermochelys coriacea*), endangered green sea turtle (*Chelonia mydas*), endangered hawksbill sea turtle (*Eretmochelys imbricata*), and endangered Kemp's ridley sea turtle (*Lepidochelys kempii*); "may affect, but is not likely to adversely affect" the endangered West Indian manatee (*Trichechus manatus*), and threatened piping plover (*Charadrius melodus*); and will have "no effect" on beach mice. Additionally, in a letter dated May 20, 2013, the Corps added three navigation channel dredging projects (Bakers Haulover, Jupiter Inlet, and Fort Pierce Inlet) to the list of proposed FCCE projects. Furthermore, in this letter, the Corps determined whether the proposed FCCE projects were located in optimal or non-optimal piping plover habitat as outlined in the P^3BO. This document is provided in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*), the Marine Mammal Protection Act of 1972, as amended (16 U.S.C. 1361 *et seq.*), and the provisions of the Fish and Wildlife Coordination Act of 1958, as amended (FWCA) (48 Stat. 401; 16 U.S.C. 661 *et seq.*).

The Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) share Federal jurisdiction for sea turtles under the Act. The

Service has responsibility for sea turtles on the nesting beach and NOAA Fisheries has jurisdiction for sea turtles in the marine environment. Our analysis will only address activities that may impact nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. The Corps will assess and consult with NOAA Fisheries concerning potential impacts to sea turtles in the marine environment.

PROJECT DESCRIPTION

The Corps proposes to conduct nine FCCE navigation dredging and/or sand placement projects in Broward, Lee, Miami-Dade, Palm Beach, and St. Lucie counties, Florida (Table 1). Using a cutterhead, hopper, or hydraulic dredge, the authorized volume of beach compatible material will be dredged from an authorized borrow area, navigation channel, or upland mine and placed in the sand placement fill templates (Table 1). Once the beach compatible material has been deposited in the fill template, it will be graded to the authorized profile using bulldozers. Non-beach compatible material may be placed in nearshore waters or in an offshore dredge material disposal site.

The proposed projects will take place during day and nighttime hours with a construction timeframe varying between 3 and 6 months (Table 1). All staging areas and beach access corridors will be sited to avoid impacts to upland habitat. If impacts are incurred, all impacted areas and vegetation will be restored to preconstruction condition and elevation.

The action area is defined as all areas to be affected directly or indirectly by the action and not merely the immediate area involved in the action. The Service identifies the action area to include the staging areas, pipeline corridors, beach access corridors, offshore borrow areas, sand placement fill templates, downdrift areas, and navigation channel dredge templates associated with the proposed FCCE projects. The intent of the proposed FCCE projects is to address shoreline erosion and navigation channel shoaling from damage incurred from Tropical Storm Debby or Hurricane Sandy.

The Service has determined the SPBO is appropriate to apply to the proposed FCCE projects. That said, the Service and Corps predicted emergency events to occur once every 10 years as outlined in the amount or extent of anticipated take for sea turtles reflected in the SPBO. Given the proposed FCCE projects are scheduled to be completed sooner than the 10-year frequency, the Service, in a letter dated May 2, 2013, analyzed effects, provided additional conditions, and modified the take for emergency projects to occur once every 7 years. The Corps has agreed to follow and implement the minimization measures, Reasonable and Prudent Measures, and Terms and Conditions in the SPBO and those included in the May 2, 2013, letter (Enclosure), as they relate to nesting sea turtles. Therefore, the Service has determined the proposed projects are consistent with the SPBO and the Service concurs with the Corps' determinations. That said, the Corps has requested an exception to Term and Condition A11 in the SPBO and Term and Condition 3 in the May 2, 2013, letter relating to lighting surveys. Lighting surveys will be conducted just prior to construction and immediately post-construction; however, due to timing and funding restraints, the Corps cannot commit to additional lighting surveys as outlined in the above referenced Terms and Conditions. The requested exception is authorized by the Service provided the Corps expedites the lighting survey report to the Service and the Florida Fish and Wildlife Conservation Commission (FWC), and sets up a meeting with the Service and FWC

within a week after the survey has been completed. This will enable all parties to take appropriate measures to minimize lighting impacts.

In addition, the Standard Manatee Conditions for In-Water Work (FWC 2011) and the minimization measures outlined in the SPBO shall be implemented to avoid potential impacts on manatees. Because the proposed projects specific to the South Florida Ecological Services Office are outside the range of all five beach mice species covered in the SPBO, the Service concurs with the Corps' "no effect" determination.

Please note the provisions of this consultation do not apply to sea turtles in the marine environment such as swimming juvenile and adult sea turtles. If applicable, you are required to consult with NOAA Fisheries on these projects. For further information on Act compliance with NOAA Fisheries, please contact Ms. Cathy Tortorici, Chief of the Interagency Cooperation Branch, by e-mail at cathy.tortorici@noaa.gov or by phone at 727-209-5953.

The Service has also determined the proposed FCCE projects are appropriate to apply to the P^3BO. The conservation measures are applicable for projects located in both non-optimal and optimal piping plover habitat, and the Reasonable and Prudent Measures, and Terms and Conditions for those projects located in optimal piping plover habitat as outlined in the P^3BO (Table 1). The Corps has agreed to follow and implement the conservation measures, Reasonable and Prudent Measures, and the Terms and Conditions that apply to the proposed projects. Therefore, the Service has determined the proposed projects are consistent with the P^3BO and the Service concurs with the Corps' determinations. That said, the Corps has requested an exception to Term and Condition 8 in the P^3BO relating to piping plover monitoring. Due to time and funding restraints, the Corps cannot conduct monitoring for 1 year prior to construction and 2 years post-construction, respectively. The requested exception is authorized by the Service.

In order to comply with the Migratory Bird Treaty Act (16 U.S.C. 701 et seq.) and address the potential for the proposed projects to impact nesting shorebirds, the Corps shall comply with FWC's standard shorebird protection guidelines to protect against impacts to nesting shorebirds during implementation of these projects on the Gulf Coast during the periods from February 15-August 31, or on the Atlantic Coast from April 1-August 31. All sand placement events could impact nesting shorebirds protected under the MBTA.

FISH AND WILDLIFE RESOURCES

This section is provided in accordance with the FWCA of 1958, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq.*) to address other fish and wildlife resources in the project area.

Hardbottom reef habitat and seagrasses

The FCCE projects involve fill templates previously constructed; hence, hardbottom and seagrass issues have been addressed and appropriately mitigated. Furthermore, the Corps will continue to consult with NOAA Fisheries, who will assess all potential effects to hardbottom habitat and submerged aquatic vegetation within the dredge and sand placement templates, and shoreline downdrift areas. In addition, the Corps will assess and consult with NOAA Fisheries

concerning potential impacts to foraging and swimming sea turtles, and all other marine species under their jurisdiction within the action area.

Please submit a report by July 31 of the year immediately following construction, as described in Term and Condition A22 or B19 in the SPBO and 9 in the P^3BO.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

1. The amount or extent of incidental take outlined in the SPBO, P^3BO, or the May 2, 2013, letter is exceeded. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation;
2. New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion;
3. The agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or
4. A new species is listed or critical habitat designated that may be affected by the action.

Thank you for your cooperation in the effort to conserve fish and wildlife resources. Should you have additional questions or require clarification regarding this letter, please contact Jeff Howe at 772-469-4283.

Sincerely yours,

for Victoria A. Foster

Larry Williams
Field Supervisor
South Florida Ecological Services Office

Enclosure

cc: electronic only
Corps, Jacksonville, Florida (Ken Dugger)
DEP, Tallahassee, Florida (Lanie Edwards, Liz Yongue)
EPA, West Palm Beach, Florida (Ron Miedema)
FWC, Tallahassee, Florida (Robbin Trindell)
NOAA Fisheries, West Palm Beach, Florida (Jocelyn Karazsia)
NOAA Fisheries, Fort Lauderdale, Florida (Audra Livergood)
NOAA Fisheries, St. Petersburg, Florida (Mark Sramek, Dennis Klemm)
Service, Atlanta, Georgia (Ken Graham)
Service, Panama City, Florida (Patty Kelly)
Service, St. Petersburg, Florida (Anne Marie Lauritsen)
USGS, Gainesville, Florida (Susan Walls)

LITERATURE CITED

Florida Fish and Wildlife Conservation Commission (FWC). 2011. Standard Manatee Conditions for In-Water Work 2011. Tallahassee, Florida [Internet]. [cited March 6, 2013]. Available from: http://myfwc.com/wildlifehabitats/managed/manatee/permit-review/#Main

U.S. Fish and Wildlife Service (Service). 2011. Statewide programmatic biological opinion to the U.S. Army Corps of Engineers (Service Log No. 41910-2011-F-0170) for shore protection activities along the coast of Florida (August 22, 2011). Jacksonville, Panama City, and Vero Beach Field Offices, Florida.

U.S. Fish and Wildlife Service (Service). 2013. Programmatic piping plover biological opinion to the U.S. Army Corps of Engineers (Service Consultation Code 04EF1000-2013-F-0124) for shore protection activities in the geographical region of the north and south Florida Ecological Services Field Offices (May 22, 2013). Jacksonville and Vero Beach Field Offices, Florida.

Table 1. List of proposed 2013 FCCE sand placement and dredging projects located within the South Florida Ecological Service Office.

PROJECT	COUNTY	DESCRIPTION	FILL TEMPLATE	SAND VOLUME (cubic yards [cy])	SAND SOURCE	PIPING PLOVER HABITAT DESIGNATION[1]
Atlantic Coast						
Bakers Haulover	Miami-Dade	Hopper dredge. Project duration: approximately 3 months.	R-28 to R-32 (4,224 linear feet)	50,000 cy	Channel dredge material.	Non-optimal
Broward Segment II	Broward	Truck haul. Material placed above the mean high water line. Project duration: approximately 4.5 months.	R-26 to R-53 (26,928 linear feet)	113,500 cy	Upland sand source (Ortona or Witherspoon mines).	Non-optimal
Delray Beach	Palm Beach	Hopper dredge. Project duration: approximately 6 months.	R-175 to R-188 (14,784 linear feet)	1,358,000 cy	Offshore borrow area 1 and 2.	Non-optimal
Fort Pierce Inlet	St. Lucie	Cutterhead dredge. Project duration: approximately 3 months.	Beach placement (R-34 to R-41; 7,392 linear feet), and/or in the nearshore, upland, or at an offshore dredge material disposal site.	580,000 cy	The channel and the inlet sediment basin.	Optimal
Jupiter Carlin	Palm Beach	Hopper dredge. Project duration: approximately 4 months.	R-13 to R-19 (5,808 linear feet)	822,000 cy	Offshore borrow area.	Optimal
Jupiter Inlet	Palm Beach	Hopper dredge. Project duration: approximately 3 months.	R-13 to R-19 (5,808 linear feet)	150,000 cy	Intracoastal waterway dredge material.	Optimal
North Boca Raton	Palm Beach	Hopper dredge. Project duration: approximately 6 months.	R-205 to R-212 (7,392 linear feet)	614,400 cy	New offshore borrow area.	Non-optimal
Ocean Ridge	Palm Beach	Hopper dredge. Project duration: approximately 6 months.	R-152 to R-159 (7,392 linear feet)	519,300 cy	North and south offshore borrow areas.	Optimal
Gulf Coast						
Gasparilla	Lee	Hopper dredge. Project duration: approximately 3.5 months.	R-11 to R-24 (13,200 linear feet)	79,250 cy	Boca Grande ebb shoal (Borrow Areas 1 and 2).	Optimal

[1] Piping plover habitat (non-optimal or optimal) designation based on the P^{3}BO (Service 2013).

United States Department of the Interior

U. S. FISH AND WILDLIFE SERVICE

7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
FWS Log No. 41910- 2013-F-0148

May 2, 2013

Mr. Eric Summa
Chief, Environmental Branch
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Summa:

The U.S. Fish and Wildlife Service (Service) received your letter dated April4, 2013, regarding sand placement activities under Public Law 84-99 for Flood Control and Coastal Emergencies (FCCE) to repair storm damage to the shoreline associated with storm events in 2012.

The Service issued a Statewide Programmatic Biological Opinion (SPBO) dated August 22, 2011, analyzing the impacts of sand placement projects on the loggerhead *(Caretta caretta),* green *(Chelonia mydas),* leatherback *(Dermochelys coriacea),* hawksbill *(Eretmochelys imbricata),* and Kemp's ridley *(Lepidochelys kempii)* sea turtles, and southeastern *(Peromyscus polionotus niveiventris),* Anastasia Island *(Peromyscus polionotus phasma),* Choctawhatchee *(Peromyscus polionotus allophrys),* St. Andrews *(Peromyscus polionotus peninsularis),* and Perdido Key *(Peromyscus polionotus trissyllepsis)* beach mice and designated critical habitat for the Perdido Key beach mouse, Choctawhatchee beach mouse, and St. Andrews beach mouse.

The Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) share Federal jurisdiction for sea turtles under the Endangered Species Act of 1973 (Act). The Service has responsibility for sea turtles on the nesting beach and NMFS has jurisdiction for sea turtles in the marine environment. Our analysis will only address activities that may impact nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. NMFS will assess and consult with the U.S. Army Corps of Engineers (Corps) concerning potential impacts to sea turtles in the marine environment.

The amount or extent of anticipated take for sea turtles in the SPBO is as follows:

The Service anticipates that no more than 27.7 miles of highly eroded shoreline along the Florida coastline (no more than 8.8 miles within the NGMRU and no more than 18.9 miles within the PFRU) would receive sand placement per year during nonemergency years with a maximum of 102 miles of shoreline (38 miles within the NGMRU and 64 miles of shoreline within the PFRU) receiving sand during or following an emergency event (declared disaster or Congressional Order) as a result of the Statewide Programmatic action. This represents two

percent of the entire shoreline per year during a nonemergency year and seven percent of the entire shoreline during an emergency year. Over the last 10 years, one Congressional Order occurred due to emergency events in the 2004-2005 period. The increased sand placement on 102 miles of shoreline is expected to occur once in a 10-year period due to emergency events.

The projects that are proposed under Public Law 84-99 for FCCE are considered an emergency and a Congressional Order was issued. The amount of take expected during an emergency events was expected to be no more than 38 miles within the loggerhead sea turtle's NGMRU (Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, Escambia Counties) and 64 miles of shoreline within the loggerhead sea turtle's PFRU (Nassau, Duval, St. Johns, Flagler, Volusia, Brevard, Indian River, St. Lucie, Martin, Palm Beach, Broward, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas Counties).

The Service and the Corps predicted these emergency events to occur once every 10 years as reflected in the SPBO. It follows that the previous emergency action occurred during the 2004-2005 period, about 7 years ago. Although the frequency of storm events is expected to increase as a result of climate change, it is difficult to predict how this will affect the amount of large scaled sand placement events that follow.

A large number of sand placement projects occurring within a short period of time have the potential to adversely affect nesting females, nests, and hatchlings on a much higher level by significantly reducing the amount of nesting habitat available for nesting females. The nesting beaches during construction are considered "temporarily lost" and degraded for over two nesting seasons following construction. The impact of these projects were outlined and assessed in the SPBO; however, given the large number of projects that will occur during a short period of time, the Service remains concerned about the following effects during the 2013 and 2014 nesting season:

1. Decreased nesting numbers over a larger stretch of nesting habitat during the 2013 and 2014 nesting season;
2. Decreased nesting success over a larger stretch of nesting habitat; and
3. Increased disorientations as a result of an increased effect of artificial lighting due to elevated beaches and work conducted at night.

The Corps' Commitments, Reasonable and Prudent Measures, and Terms and Conditions in the SPBO are applicable to the proposed projects and will minimize the impact to sea turtles. Given that this large scaled event is proposed sooner than the 10-year frequency, the Service continues to emphasize the importance of the sea turtle windows (May 1 through October 31) in the high density nesting beaches (Brevard through Broward). These windows represent the major part of the nesting season and do not represent the entire nesting and hatching season. The Service has determined that each project must coordinate with the Service's representative in that area to avoid as much of the early and late part of the nesting season as possible. Completing construction in a phased approach where all equipment can be removed from the beach would result in less nests being relocated as well as more nesting habitat available for females.

Decreased nesting success following sand placement projects is a concern on a widespread level. The Service has determined that a "sea turtle friendly profile" will minimize this impact. The Service is supportive of the 'sea turtle friendly profile" testing on a sand placement project in Martin County. Following the results of this study the Service would like to meet with a Corps representative to discuss next steps in implementing a "sea turtle friendly profile." This represents a practical application of Term and Condition A5 in the SPBO.

> *The Corps shall continue to work with the Florida Department of Environmental Protection (FDEP), the Florida Fish and Wildlife Conservation Commission (FWC) and the Service in conducting the second phase of testing on the sea turtle friendly profile during project construction. This includes exploring options to include a dune system in the project design for existing authorized projects and new non-Federal projects and how the existing sand placement template may be modified.*

Increased hatchling disorientations as a result of the elevated beaches can be minimized with upfront coordination. Term and Condition A11 in the SPBO minimizes this impact.

> *Two surveys shall be conducted of all lighting visible from the beach placement area by the Applicant or Corps, using standard techniques for such a survey (Appendix C), in the year following construction. The first survey shall be conducted between May 1 and May 15 and a brief summary provided to the Service. The second survey shall be conducted between July 15 and August 1. A summary report of the surveys, including any actions taken, shall be submitted to the Service by December 1 of the year in which surveys are conducted. After the annual report is completed, a meeting shall be set up with the Applicant, county or municipality, FWC, Corps, and the Service to discuss the survey report, as well as any documented sea turtle disorientations in or adjacent to the project area. If the project is completed during the nesting season and prior to May 1, the Corps may conduct the lighting surveys during the year of construction.*

Given the large number of projects, the Service has determined these lighting surveys must occur prior to the nesting season to enable early coordination and prevent high loss of hatchlings from the 2013 cohort.

In an effort to provide early coordination and specific details for each project as outlined in Term and Condition A8, the Corps shall also provide the Service with specific shoreline lengths and timing of the actual project that is going to proceed at the preconstruction meeting. To summarize, the following additional Terms and Conditions must be applied to the proposed projects under this emergency event to minimize the comprehensive impact over the shortened time period:

1. The Corps must conduct early coordination on each project with the Service's representative to avoid as much of the early and late part of the nesting season as possible. Completing construction in a phased approach where all equipment can be removed from the beach would lessen nest relocation as well as provide more nesting habitat for nesting females must be explored;

2. Following the "sea turtle friendly" profile testing in Martin County, the Corps must meet with the Service, the FDEP, and the FWC to discuss the results of the study and discuss next steps for implementing a "sea turtle friendly" profile for sand placement projects;

3. In addition to the Term and Condition A11, a lighting survey must be conducted prior to May 20 for each project proposed and the report submitted immediately to the Service's representative. After the first report is submitted, a meeting shall be set up with the Applicant, county or municipality, FWC, Corps, and the Service to discuss the survey report, as well as any documented sea turtle disorientations in or adjacent to the project area; and

4. The Corps shall also provide the Service with specific shoreline lengths and timing of the actual project that is going to proceed at the preconstruction meeting using the form on the following web link: hnp: ww' f, s go tnorthllondaJSeaTurtle Doc 'Corp° o20of%20Engineers°,o20Sea° o20 Turtle%20Permit%20Information.pdf). This form shall be emailed to the Service at seaturtle@fws. gov.

5. The Service would also like to clarify Term and Condition A14 would states the following:

   If available, staging areas for construction equipment shall be located off the beach during early (March 1 through April 30) and late (November 1 through November 30) nesting season for Brevard through Broward counties and peak nesting season (May 1 through October 31) for the remaining counties. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes placed on the beach shall be located as far landward as possible without compromising the integrity of the dune system. Pipes placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune if the width of the beach allows. Temporary storage of pipes shall be off the beach to the maximum extent possible. If the pipes are stored on the beach, they shall be placed in a manner that will minimize the impact to nesting habitat and shall not compromise the integrity of the dune systems.

   If the pipes that are placed parallel to the dune cannot be placed between 5 to 10 feet away from the toe of the dune during nesting and hatching season, the Corps must reinitiate consultation with the Service as this represents take that was not considered in the SPBO.

Provided the additional Terms and Conditions included in this letter are included in the proposed project, the Service has determined that the proposed projects under Public Law 84-99 for FCCE is appropriate to apply to the SPBO concerning sand placement activities along the coast of Florida for the Corps dated April19, 2011 (FWS Log No. 41910-2011-F-0170). The Service has modified the take for these emergency projects to occur once in 7 years.

The Incidental Take for Sea Turtles has been modified as follows:

Incidental take of nesting and hatchling sea turtles and sea turtle nests is anticipated to occur during project construction and during the life of the project. Take will occur on nesting habitat consisting of the length of the beach where the material will be placed or where jetty or groin maintenance is located, but is not expected to exceed 8.8 miles of shoreline per year within the northwest portion of Florida for the NGMRU and 18.9 miles of shoreline per year within the PFRU during a nonemergency year. Take will occur on nesting habitat consisting of the length of the beach where the material will be placed or where groin maintenance is located, but is not expected to exceed 102 miles of shoreline (38 miles of shoreline per year within the northwest portion of Florida for the NGMRU and 64 miles of shoreline per year within the PFRU) during an emergency (declared disasters or Congressional Orders) year. The increased sand placement of 102 miles of shoreline is expected to occur once in a 7-year period due to emergency events.

The incidental take for the beach mouse is not expected to exceed the amount provided in the SPBO.

Please submit a report for the proposed project as described in the SPBO Term and Condition A22 following completion of the proposed work.

Thank you for your cooperation in the effort to conserve fish and wildlife resources. Should you have any questions or require clarification regarding this letter, please contact Terri Calleson of this office at (904) 731-3286.

Sincerely,

Dawn Jenning
Acting Field Supervisor

cc:

DEP, Tallahassee, Florida (Lanie Edwards)
FWC, Imperiled Species Management Section, Tallahassee, Florida (Robbin Trindell)
NOAA Fisheries, St. Petersburg, Florida (Dennis Klemm)
Service, Atlanta, Georgia (Kenneth Graham)
Service, National Sea Turtle Coordinator (Sandy MacPherson

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
(727) 824-5317; FAX (727) 824-5300
http://sero.nmfs.noaa.gov/

March 30, 2011 F/SER4:JK/pw

(Sent via Electronic Mail)

Colonel Alfred Pantano
District Engineer, Jacksonville District
Department of the Army Corps of Engineers
Jacksonville Regulatory Office, South Permits Branch
PO Box 4970
Jacksonville, Florida 32232

Attention: Melody White

Dear Colonel Pantano:

NOAA's National Marine Fisheries Service (NMFS) reviewed public notice SAJ-1989-90053 (IP-MJW) dated February 28, 2011. The City of Delray Beach proposes to nourish approximately 1.9 miles of beach between Florida Department of Environmental Protection monuments R-179 to R-188A with 1,208,000 cubic yards of material obtained from two borrow areas that have been used for past nourishment events. The Jacksonville District's initial determination is that substantial adverse impacts to essential fish habitat (EFH) or federally managed fisheries are not expected from the project. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the following comments and recommendations are provided pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Essential Fish Habitat within the Project Area
The public notice indicates nearshore hardbottom habitat does not occur within the project area. The habitat in this area is characterized as marine sandy bottom, which is designated EFH for cobia (*Rachycentron canadum*), black seabass (*Centropristis striata*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*S. maculates*), spiny lobster (*Panulirus argus*), and pink shrimp (*Farfantepenaeus duorarum*). Tidal, sandy bottom habitats directly benefit fishery resources by providing foraging habitat. SAFMC provides detailed information on federally managed fisheries and their EFH in the 1998 comprehensive amendment to the fishery management plans for the South Atlantic region and in the *Fishery Ecosystem Plan of the South*

Atlantic Region (April 2009 and available on-line at *www.safmc.net*).

Impacts to Essential Fish Habitat

Hardbottom: Using data from the Florida Fish and Wildlife Conservation Commission and coordinates listed in the public notice, the closest coral reef or hardbottom habitat to the borrow areas are approximately 900 feet from the southeastern corner of Borrow Area 1; in contrast to the public notice which states that the nearest hardbottom habitat is approximately 1,200 feet seaward of the nearest borrow area. Regardless, a buffer of 900 feet should be sufficient to protect these coral reef and hardbottom habitats from the dredging activities.

Sandy Bottom: The Jacksonville District estimates that approximately 1,054 acres of sandy bottom would be impacted through this project, this total includes both the fill area as well as the borrow areas. NMFS is particularly concerned about the borrow areas. The project area was previously nourished during 1973, 1978, 1984, 1992, and 2002 with some additional sand placed in 2005 to repair areas damaged by storms. Cumulatively, ten borrow areas were used for these nourishment events (Hartog et al. 2008). None of these borrow areas have filled appreciably with sandy material even though the older borrow areas were last dredged over 30 years ago. As far as we know, only the oldest of the borrow areas has been monitored to determine if the species composition and abundance of the benthic communities had recovered from the disturbance (Bowen and Marsh 1988), and results from the study were equivocal (Wilber and Stern 1992). These former borrow areas cumulatively amount to over 100 acres of EFH that have never been shown to recover their fishery functions and no compensatory mitigation has been provided previously.

Compensatory Mitigation

The applicant does not propose compensatory mitigation for the project because no natural hardbottom communities would be impacted by the project. NMFS agrees that hardbottom habitat is not likely to be affected by the project provided the sand source is compatible with the fill beach. No information on compatibility is provided in the public notice.

Mitigating for the impacts to softbottom habitat is problematic. In many cases, NMFS does not require compensatory mitigation for impacts to this habitat because recovery by the benthic communities is anticipated to occur quickly because the physical habitat returns to ambient conditions quickly (i.e., borrow pits fill with material similar to what was dredged); this has not been the case for Delray Beach.

EFH Conservation Recommendation

NMFS finds the project would have substantial adverse impacts on EFH, Section 305(b)(4)(A) of the Magnuson-Stevens Act requires NMFS to provide EFH conservation recommendations when an activity is expected to adversely impact EFH. Based on this requirement, NMFS provides the following recommendations:

EFH Conservation Recommendation

1. Best management practices to minimize effects from sedimentation and turbidity shall be incorporated into the project design. This shall include providing NMFS with a compatibility analysis, with overfill ratios, of the proposed beach fill and native

sediments. Additional EFH conservation recommendations may be necessary pending results of the compatibility analysis.

2. Prior to permit issuance, a plan and permit condition aimed at assessing the status of the benthic communities within the former borrow pits and the borrow pits proposed for the upcoming work shall be provided to NMFS for review and approval. An acceptable plan will include statistically robust sampling designs with appropriate gear as well as pre- and post-construction sampling of the borrow sites used for the upcoming nourishment event.
3. EFH consultation with NMFS shall be reinitiated if the borrow areas are moved to be within 900 feet of hardbottom, coral, or coral reef habitats.

Section 305(b)(4)(B) of the Magnuson-Stevens Act and its implementing regulation at 50 CFR Section 600.920(k) require your office to provide a written response to this letter within 30 days of its receipt. If it is not possible to provide a substantive response within 30 days, in accordance with our "findings" with your Regulatory Functions Branch, an interim response should be provided to NMFS. A detailed response then must be provided prior to final approval of the action. Your detailed response must include a description of measures proposed by your agency to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH Conservation Recommendation, you must provide a substantive discussion justifying the reasons for not following the recommendation.

Thank you for the opportunity to provide comments. Related correspondence should be directed to the attention of Ms. Jocelyn Karazsia at our West Palm Beach office, which is co-located with the US Environmental Protection Agency at USEPA, 400 North Congress Avenue, Suite 120, West Palm Beach, Florida, 33401. She may be reached by telephone at (561) 616-8880, extension 207, or by e-mail at Jocelyn.Karazsia@noaa.gov.

Sincerely,

Pam Wilder

/ for

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc:

FWS, Jeffrey_Howe@fws.gov
FWCC, Lisa.Gregg@MyFWC.com
FWCC, Robbin.Trindell@MyFWC.com
FDEP, Steven.Macleod@dep.state.fl.us
EPA, Miedema.Ron@epa.gov
SAFMC, Roger.Pugliese@safmc.net
F/SER4, David.Dale@noaa.gov
F/SER47, Jocelyn.Karazsia@noaa.gov

Literature Cited

Bowen, PR and GA Marsh. 1988. Benthic faunal colonization of an offshore borrow pit in southeastern Florida. Dredging Operations and Technical Support Program Miscellaneous Paper D-88-5. US Army Engineer Waterways Experiment Station, Vicksburg, MS.

Hartog, WM, L Benedet, DR Walstra, M vanKoningsveld, MJF Stive, and CW Finkl. 2008. Mechanisms that influence the performance of beach nourishment: A case study in Delray Beach, Florida, U.SA. Journal of Coastal Research 24:1304-1319

Wilber, P and M Stern. 1992. A re-examination of infaunal studies that accompany beach nourishment projects. In: New Directions in Beach Management: Proceedings of the 5th Annual National Conference on Beach Preservation Technology, Florida Shore and Beach Preservation Association, Tallahassee, FL, pp. 242-257.

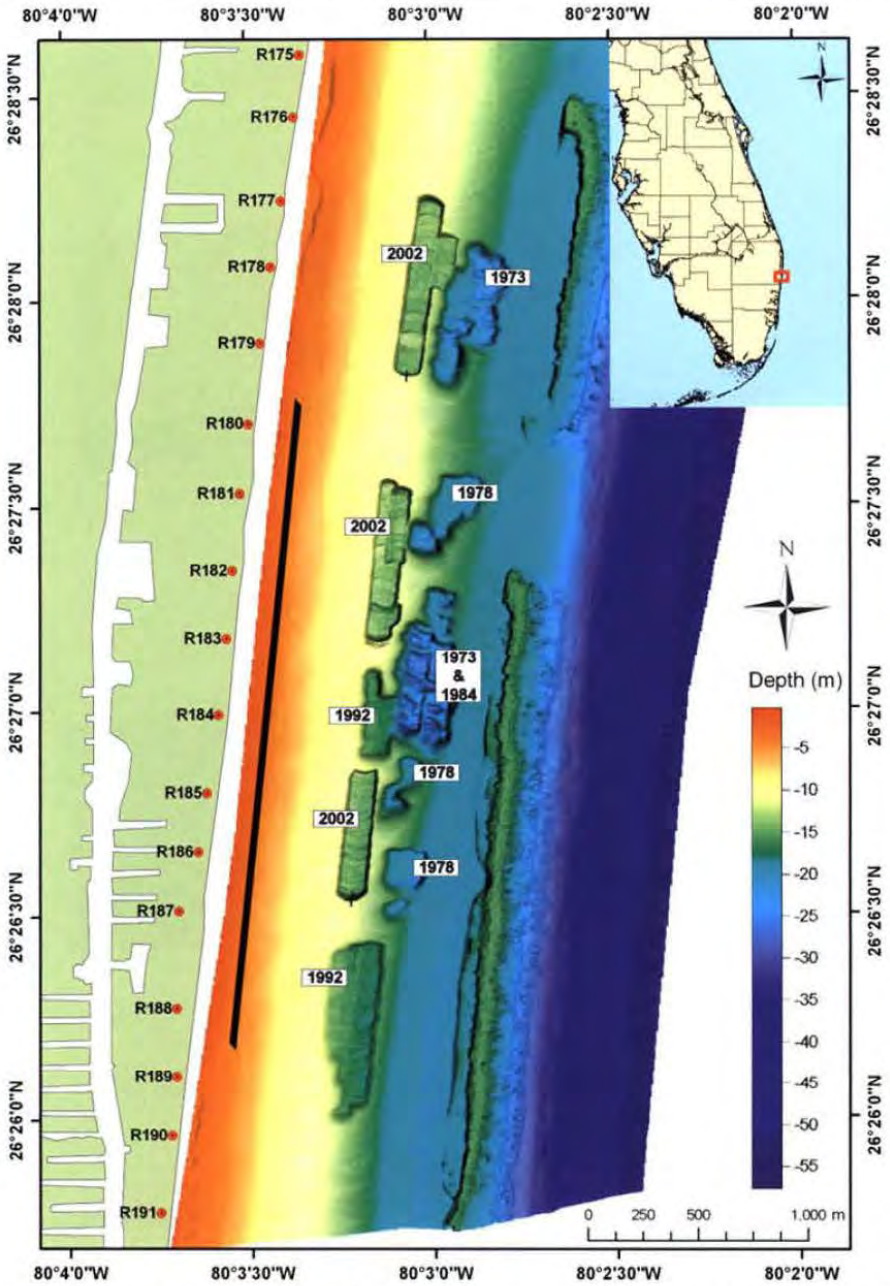

Figure 1 *from* **"Mechanisms that Influence the Performance of Beach Nourishment: A Case Study in Delray Beach, Florida, U.S.A." by Willem M. Hartog, Lindino Benedet, Dirk-Jan R. Walstra, M. van Koningsveld, Marcel J.F. Stive, and Charles W. Finkl, pp. 1304–1319.** Overview of the study area (R-175 to R-191). The modeling focused on the nourished segments of 1992 and 2002 (R-180 to R-188). Shown as a three-dimensional image is the bathymetry with the offshore parallel reef and the borrow pits. The years indicate the year in which the borrow pits were dredged.

Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
(727) 824-5317; FAX (727) 824-5300
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August 8, 2012

(Via Electronic email)

Colonel Alan M. Dodd
District Engineer, Jacksonville District
Regulatory Division, North Permits Branch
Department of the Army, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Colonel Dodd:

NOAA's National Marine Fisheries Service (NMFS) reviewed the projects described in the public notice(s) listed below.

Based on the information in the public notice(s), it appears the proposed project(s) would occur in the vicinity of essential fish habitat (EFH) designated by the South Atlantic Fishery Management Council or NMFS. Present staffing levels preclude further analysis of the proposed activities and no further action is planned. This position is neither supportive of nor in opposition to authorization of the proposed work.

NOTICE NO.	APPLICANT	NOTICE DATE	DUE DATE
2012-01244 (IP-AAZ)	Palm Beach County DERM	July 9, 2012	August 8, 2012
2004-07437 (LP-SLR)	Dennis Ratner	August 2, 2012	August 17, 2012
2007-06047 (LP-SLR)	Bernard Sykes	August 2, 2012	August 17, 2012
2012-01664 (LP-SLR)	Roger Thomas	August 2, 2012	August 17, 2012

Please note these comments do not satisfy your consultation responsibilities under section 7 of the Endangered Species Act of 1973, as amended. If the activity "may effect" listed species or critical habitat that are under the purview of NMFS, consultation should be initiated with our Protected Resources Division at the letterhead address.

Sincerely,

Pace Wilber (for)

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
4400 PGA BOULEVARD, SUITE 500
PALM BEACH GARDENS, FLORIDA 33410

SEP 23 2011

REPLY TO
ATTENTION OF

Regulatory Division
Palm Beach Gardens Section
SAJ-1989-90053(IP-MJW)

Mr. Miles Croom
Assistant Regional Administrator
Southeast Regional Office, Habitat Conservation
NOAA, National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, Florida 33701

Dear Mr. Croom:

We have received your preliminary Essential Fish Habitat (EFH) Recommendations provided by letter dated March 30, 2011, regarding Department of the Army (DA) permit application number SAJ-1989-90053 submitted by February 28, 2011.

In your letter, you provided three (3) EFH Recommendations:

1. Best management practices to minimize effects from sedimentation and turbidity shall be incorporated into the project design. This shall include providing NMFS with a compatibility analysis, with overfill ratios, of the proposed beach fill and native sediments. Additional EFH conservation recommendations may be necessary pending the results of the compatibility analysis.
2. Prior to permit issuance, a plan and permit condition aimed at assessing the status of the benthic communities within the former borrow pits and the borrow pits proposed for the upcoming work shall be provided to NMFS for review and approval. An acceptable plan will include statistically robust sampling designs with appropriate gear as well as pre- and post-construction sampling of the borrow sites used for the upcoming nourishment event.
3. EFH consultation with NMFS shall be reinitiated if the borrow areas are moved to be within 900 feet of hardbottom, coral, or coral reef habitats.

The U.S. Army Corps of Engineers (Corps) feels that the applicant has provided enough information to satisfy the EFH recommendations.

The Corps provided responses and additional information in response to your recommendations on May 25, 2011.

In regards to EFH Conservation Recommendation #1: *The applicant has provided the sediment compatibility analysis and overfills ratios on the attached CD. A sediment material characteristics comparison is summarized below:*

Material Source	Mean Grain Size (mm)	Mean Grain Size (phi)	Sorting (phi)	Silt (%)	Wet Color Munsell Value
Borrow Area I Composite	0.24	2.06	0.80	0.98	6
Borrow Area II Composite	0.23	2.11	0.76	0.89	6
Beach Composite	0.29	1.79	1.16	1.64	5

In regards to EFH Conservation Recommendation #2: *The applicant has provided the following response: Several studies have been conducted in the project area to assess infaunal changes as a result of dredging. A study conducted by Bowen and Marsh (1998) concluded that recovery of a new borrow area within Delray Beach project area occurred within 1 year of dredging, but this study has several design flaws including no pre-construction date for comparison. Wilbur and Stern (1992) conducted an analysis of multiple borrow areas in southeast Florida, including reanalysis of the Bowen and Marsh data, and concluded that full recovery can take 2-3 years or longer. Turbeville and Marsh (1982) sampled borrow area infaunal communities in Broward County five years post-dredging and found no long-term observable adverse quantitative effects; however, a qualitative change was observed compared to control samples but was determined not to be detrimental.*

In order to provide more robust monitoring plan for infaunal communities offshore of Delray Beach, the epifaunal and infaunal communities within the borrow areas and the fill area were analyzed once again during the Third Beach Renourishment of Delray Beach. This study employed spatial (control vs. compliance sites) and temporal (pre- vs. post construction) sampling techniques in order to monitor for dredge and fill project-related impacts on infaunal communities in the same area as the proposed project (CPE, 1997). Compliance samples were collected from within the borrow areas and fill areas and control samples were collected outside of the project area. Based on comparisons of community structure, species comparison, infauna densities, species diversities, and diversity indices between control and compliance monitoring stations, it appears that dredging of the borrow areas had little or no long-term effect on the associated infaunal communities or the mean grain size and silt/clay or organic content of the sediment.

These results support the more recent work of Posey and Alphin (2002) and Street et al. (2005), which concluded that interannual variability explains more of the observed differences in benthic infaunal communities than does sediment removal effects. Their data suggest that there is a relatively quick recovery from borrow activities with the effects related to timing of activities, small size of the area affected, and the opportunistic nature of many infaunal species. These various studies indicate that, while there is typically a significant impact to infauna immediately following dredging, borrow area faunal communities do eventually recover, likely between 1 and 4 years after dredging.

It is the position of the Corps that an environmental assessment within the boundaries of the borrow areas is unnecessary based on the recent and available literature as well as the fact that the study has already been conducted in the proposed borrow site. Copies of all papers listed above and a copy of the City of Delray Beach Fifth Periodic Beach Renourishment Project - Essential Fish Habitat Assessment is included on the enclosed CD.

In regards to EFH Conservation Recommendation #3: *The applicant acknowledges the setback. The Corps will reinitiate consultation if the borrow areas are moved closer than 900-feet to hardbottom. At this time, the proposed borrow site is located approximately 960-feet from the nearest hardbottom resources.*

Based on the above conditions, the Corps is satisfied that the consultation procedures outlined in 50 CFR Section 600.920 of the regulation to implement the EFH provisions of the Magnuson-Stevens Act have been met and intends to issue permit number SAJ-1989-90053 on or about 10 days after the date of this letter.

Sincerely,

Leah Oberlin
Section Chief

Enclosures on CD:

- Sediment Compatibility Analysis
- Bowen P.R. and A.G. Marsh. 1988. Benthic Faunal Colonization of an Offshore Borrow Pit in Southeastern Florida. Miscellaneous Paper D-88-5, US Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi
- CPE. 1997. City of Delray Beach, Third Periodic Beach Renourishment Project, 4-Year Post-Construction Phase, Hardbottom Environmental Monitoring with Borrow Area and Fill Site Infauna Assessment Report, Prepared by Coastal Planning & Engineering, Inc.

- Posey, M.H. and T.D. Alphin. 2002. Resilience and stability in an offshore benthic community: responses to sediment borrow activities and hurricane disturbance. *Journal of Coastal Research* 18: 685-697
- Street, M.W., A. Deaton, W.S. Chappell, and P.D. Mooreside, February 2005. *North Carolina Coastal Habitat Protection Plan*. Morehead City, North Carolina: North Carolina
- Wilber, P. and M. Stern. 1992. A re-examination of infaunal studies that accompany beach nourishment projects. *In*: S. Tait (ed.), Proceedings of the 1992 National Conference on Beach Preservation Technology, FL. Shore and Beach Preservation Association, Tallahassee, FL, pp. 242-257.
- City of Delray Beach Fifth Periodic Beach Renourishment Project - Essential Fish Habitat Assessment

Copies Furnished:

NMFS, Charleston

National Marine Fisheries Services, 400 North Congress Ave, Suite 120, West Palm Beach, Florida 33401

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
4400 PGA BOULEVARD, SUITE 500
PALM BEACH GARDENS, FLORIDA 33410

REPLY TO
ATTENTION OF

JUL 09 2012

Palm Beach Gardens Section
SAJ-2012-01244(IP-AAZ)

Mr. David Bernhart
Assistant Regional Administrator
Protected Resources Division
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701

Dear Mr. Bernhart:

This letter refers to a request on behalf of Palm Beach County for Department of the Army authorization for the Ocean Ridge Shore Protection project. Palm Beach County is proposing to place approximately 491,000 cubic yards of beach compatible material on approximately 1.1 miles (5,660 feet) of the beach south of South Lake Worth Inlet to renourish the beach between monument R-153 and R-159 in Palm Beach County. The applicant is also proposing to lower the shore-perpendicular stems of several existing T-head groins to improve their performance. The project is located within waters of the United States along the beaches of Palm Beach County at the South Lake Worth Inlet from 165 feet south of monument R-153 to monument R-159, adjacent and within the Atlantic Ocean, Section 22, Township 45 South, Range 43 East, Palm Beach County, Florida.

Approximately 491,000 cubic yards of beach compatible sand would be dredged from two borrow areas utilizing hydraulic cutter-head suction pipeline dredge equipment and transported on the beach via a pipeline. Containment and grading of the fill shall be conducted with typical beach construction equipment.

The U.S. Army Corps of Engineers (Corps) has completed an evaluation of the impacts the work may have on Johnson's seagrass, swimming sea turtles, the smalltooth sawfish, and the staghorn and elkhorn corals. The Corps has determined that the proposed project would cause the following effects on federally listed species:

No effect: Johnson's seagrass, swimming sea turtles, and the smalltooth sawfish

Johnson's seagrass *(Halophila johnsonii)*: The project would have *no effect* on Johnson's seagrass. The area was surveyed in June 2011 and does not contain Johnson's seagrass.

Swimming Sea Turtles - the endangered green sea turtle (*Chelonia mydas*), the endangered hawksbill sea turtle (*Eretmochelys imbricata*), the endangered leatherback sea turtle (*Dermochelys coriacea*), the endangered Kemp's ridley sea turtle (*Lepidochelys kempii*), and the threatened loggerhead sea turtle (*Caretta caretta*):

The work associated with the burial of 0.03 acres of nearshore hardbottom would have *no effect* on swimming sea turtles. The placement of material would have no impact on forging or resting habitat since the impacts to the hardbottom have already been offset. This determination is based on the area being nourished in 1998 under the Florida Department of Environmental Protection (FDEP) permits 50-2355609 and DBS-9A0330, followed by a renourishment event performed by the U.S. Army Corps of Engineers (Corps) in 2005 under JCP 0244200-001-JC. The initial nourishment in 1998 required construction of 5.24 acres of reefs as compensatory mitigation for hard bottom impacts. During the review of the renourishment in 2005, it was discovered that unauthorized burial of hardbottom occurred in the 1998 nourishment efforts. An additional 2.25 acres of reefs (60 pods of limestone boulders and 2 pre-fabricated reef modules) were required of Palm Beach County as additional compensatory mitigation. Because this project would result in the third nourishment for this area and the hardbottom impacts have already been mitigated, the placement of sand on the beach would have no effect on the swimming sea turtles habitat.

The use of the hydraulic cutter-head suction pipeline dredge equipment would also have *no effect* on swimming sea turtles. Consistent with the 1995 South Atlantic Regional Biological Opinion (SARBO), formal consultation conducted on dredging and beach nourishment operations from North Carolina through Cape Canaveral, Florida, in 1991 concluded that clamshell and pipeline dredges were not likely to adversely affect listed species. In addition, the 1991 SARBO concluded that pipeline dredges are unlikely to adversely affect sea turtles.

Smalltooth sawfish (*Pristis pectinata*): The project would have *no effect* on the federally endangered smalltooth sawfish nor

would it adversely modify the smallthooth sawfish designated critical habitat. The 2003 Gulf Hopper Dredge BO states that "After consultation with individuals with many years in the business of providing qualified observers to the hopper dredge industry to monitor incoming dredged material for endangered species remains and a review of the available scientific literature, NOAA Fisheries has determined that there has never been a reported take of a smalltooth sawfish by a hopper dredge, and such take is unlikely to occur because of smalltooth sawfishes' affinity for shallow, estuarine systems. Only hopper dredging of Key West channels would have the potential to impact smalltooth sawfish but those channels are not considered in this Opinion. Therefore, NOAA Fisheries believes that smalltooth sawfish are rare in the action area, the likelihood of their entrainment is very low, and that the chances of the proposed action affecting them are discountable." Because this project would use a hydraulic dredge, the Corps has determined that there is less risk to the species than the use of a hopper dredge. The Corps believes that the noise generated from the dredging equipment would deter the smalltooth sawfish from entering the area. The applicant has agreed to adhere to the NMFS and the Corps' Sea Turtle and Smalltooth Sawfish Construction Conditions dated March 23, 2006. All best management practices would be followed.

May affect not likely to adversely affect: The area was surveyed in June 2011 for the presence of Staghorn coral (*Acropora cervicornis*) and elkhorn coral (*Acropora palmata*). The survey indicated that the Acropora corals are not located within the project site. The nearest Acropora corals are offshore in water depths ranging from 53 to 69 feet located 5000 feet away. However, the site is located within designated critical habitat for the Staghorn coral. Because the site does not contain Acorpora corals and has been renourished in the past, the Corps has determined the proposal may affect, but is not likely to adversely affect the Acropora corals, and would not adversely modify their designated critical habitat.

Pursuant to Section 7 of the Endangered Species Act, the Corps requests your concurrence with the determinations for the Acorpora corals within 30 days. The enclosed checklist includes information provided in accordance with 50 CFR §402.12 and 14(c) to assist you in concurrence with our determination for the Acropora corals and/or preparation of a biological opinion.

Please advise if you agree with the above determinations or provide a date when formal consultation would commence. If you have any questions regarding this letter, please contact Alisa Zarbo at the letterhead address, by telephone at 561-472-3516, or by electronic mail at Alisa.A.Zarbo@usace.army.mil.

Sincerely,

Leah Oberlin
Chief, Palm Beach Gardens Section

Enclosure

Checklist of Information Needed to Complete Section 7 Consultations for U.S. Army Corps of Engineers Regulatory Division Applications

Project Specifications:

•Project or name of applicant, Action ID number

SAJ-2012-01244 Ocean Ridge Shore Protection project submitted by Palm Beach County

•Describe the location of the project site (address and latitude/longitude information). Location data **must** be given datum (e.g., NAD83) and lat/long format using decimal-degrees (**not** minutes and seconds): e.g., 27.71622N, 80.25174W.
On-line conversion: http://www.fcc.gov/mb/audio/bickel/DDDMMSS-decimal.html

The project is located within waters of the United States along the beaches of Palm Beach County at the South Lake Worth Inlet from 165 feet south of monument R-153 to monument R-159, adjacent and within the Atlantic Ocean, Section 22, Township 45 South, Range 43 East, Palm Beach County, Florida.

•In which body of water is the project located? If on a river or estuary, state the approximate navigable distance from the bay, ocean, or gulf).

Atlantic Ocean south of the South Lake Worth inlet

Site Description:

•Describe any existing structures and their use - for instance, acreage of overwater structures, if it's an existing marina, how many boat slips are present and what is their size.

Public beach with existing mitigation reefs and mitigation T-head groins. The initial 1998 nourishment included construction of 8 rubble mound T or L-shaped groins along the northern limits of the beach. As a result of the 2005 renourishment, 2.25 acres of mitigation reefs were constructed to include 60 pods of

•Is the project location within designated critical habitat?

The site is the northern extent of designated critical habitat for Staghorn corals, (Acorpora cervicornis).

•If project occurs in critical habitat, are PCEs present?

PCE is substrate of suitable quality and availability. The site contains sand with areas of nearshore hardbottom and worm rock reef. The borrow areas also contain a sandy bottom.

•What are the baseline conditions within the project area, including substrate type?

The site contains a sandy substrate bottom with areas of hard bottom. The system is an ephemeral system within temporarily buries and exposes different areas of hardbottom. The acreage of hardbottom has changed throughout the years of surveying. In 2004 preconstruction survey, the area contained 9.86

•Are seagrasses present in the project area? Include percent coverage estimates by species and the relative location of seagrass in relation to proposed structures. Was a seagrass or benthic habitat survey completed? If so, please submit. *

No seagrasses are present. The site contains a benthic community that quickly recruits to recently exposed substrate and are accustomed to a dynamic and high-energy environment. The community is dominated by turf algae and macroalgae, and is characterized by a low-density coral community. The

•Are mangroves present in or near the project area? Which species (red, black, white) and how much?

no

•Are corals present in or near the project area? Include density or percent coverage estimates by species and describe proximity of corals to proposed structures.

in the 2005 preconstruction survey, the only coral species documented were stony corals (Siderastrea radians and Solenastrea bournoni) while only Siderastrea siderea) was identified in post construction. The corals had a low average size of coral colonies (less than 2 cm) and low coral density, which is

•Was a benthic survey conducted within Johnson's seagrass growing season (April 1 - August 31)?

☐ Yes ☒ No

Construction Methods/ Project Description:

•Construction methods, including description of any demolition of existing structures or removal of debris. Will the work be done from a barge or uplands?

Sand would be dredged from the borrow areas utilizing hydraulic cutter-head suction pipeline dredge equipment and transported on the beach via a pipeline. Containment and grading of the fill shall be conducted with typical beach construction equipment.

The applicant is also proposing to lower the shore-perpendicular stems of several existing T-head groins to improve their performance. The southernmost five T-head groins would have the top layer of armor stone removed, which would lower the elevation of the groins by about two feet to an elevation of about 0.45 and 2.45 feet NGVD. The armor stone excavated from the stem structures would be removed from the beach.

- For docks, what type of decking will be used? If grated, provide manufacturer's name/ address/grating type, and percent light transmittance (%LT) of the grating design used? If wooden planks, what is the proposed spacing between the deckboards (½-inch, ¾-inch, 1-inch, other?). *Has the applicant been advised that COE-NMFS project review is significantly simplified and expedited for dock designs incorporating >43% LT grated decking, or 1-inch deckboard- and walkway-spacing, over Johnson's seagrass areas?* Proposed height of dock? Orientation of the dock (N, S, etc.)?

N/A

- Piling construction methodology. Are pile driving methods adequately described and are potential impacts to species adequately addressed? Will submerged aquatic vegetation (SAV) be impacted by pile installation? *If necessary, will the applicant's contractor adjust the spacing between piles to avoid driving piles onto Johnson's seagrass? Avoiding all piling impacts to JSG will significantly simplify and expedite the COE-NMFS project review process.*

N/A

- Number of new slips and size of slips, if applicable. If new construction includes High-and-Dry boat storage, what is the High-and-Dry vessel storage capacity?

N/A

- How big are the boats that are planned to be moored at the dock (either in the water or on a boatlift), if known?

N/A

- For all projects **not** involving docks or marinas (i.e., seawalls, jetties, etc.), please provide project description.

The applicant proposes to place approximately 491,000 cubic yards of beach compatible material on approximately 1.1 miles (5,660 feet) of the beach south of South Lake Worth Inlet to renourish the beach between monument R-153 and R-159 in Palm Beach County. The beach fill is expected to directly bury about 41.1 acres of sand substrate. All material would be derived from two offshore borrow areas. The

- Dredging? If yes, describe depth of cut, dredge type used, how many cubic yards, and what will be done with the spoil. Describe bottom sediments. Describe area hydrodynamics, i.e., average current speed and direction.

Approximately 491,000 cubic yards of sand would be removed from two borrow areas within the Atlantic Ocean and placed on the beach at Ocean Ridge. The material would be transported via pipeline to the beach for placement.

•Blasting? If yes, describe explosive weights, blasting plan, etc.

N/A

•What is the intended construction schedule (how many days, weeks, or months for in-water work)?

Work is tentatively scheduled to begin in the fall of 2013 during the 2013-2014 non-nesting season for marine sea turtles and is expected to last between 90 and 120 days.

Potential Effects on Species/Critical Habitat:

•Please explain any impacts/effects to the critical habitat's primary constituent elements - PCEs)? Please identify which critical habitat unit(s) is being affected (e.g., Gulf sturgeon have 14 units, seven under NMFS jurisdiction and seven under FWS jurisdiction).

PCE for Acropora is substrate of suitable quality and availability. The site contains sand with areas of nearshore hardbottom and worm rock reef. The borrow areas also contain a sandy bottom. The initial nourishment of this area occurred in 1998 under the Florida Department of Environmental Protection

•What will the effects be, if any, to each PCE?

The area currently experiences fluctuations in the acreage of exposed hardbottom due to the wave energy and climatic events. Therefore, there will be no adverse effects to the sandy and hardbottom that would be impacted due to the beach renourishment.

•Square footage to be affected by project?

The beach fill is expected to directly bury about 41.1 acres of sand substrate and approximately 4.2 hectares (or 10.3 acres) of exposed hardbottom. The impacts to hardbottom are expected to be temporary due to the wave energy. For the borrow areas, sand would be removed from 108.2 acres from

•Will mangroves be impacted? Explain and quantify impacts.

N/A

•How will the habitat be changed/altered as a result of the action? Could or will the alteration affect listed species? How?

This is expected to be temporary impacts as the sand shifts within the beach. The sand migrates south along the beach. The system is an ephemeral system which temporarily buries and exposes different areas of hardbottom. Subsequently, the benthic community inhabiting the area is comprised of taxa that quickly recruits to recently exposed substrate and are accustomed to a dynamic and high-energy environment. The community is dominated by turf algae and macroalgae, and is characterized by a low-density coral community. The coral community is predominately small colonies of Siderastrea siderea (less than 2 cm). This renourishment is required in order to maintain the shoreline south of the inlet throughout the next six year renourishment interval.

•Listed species within the project area:

☒ Sea turtles	☒ Smalltooth sawfish	☐ Shortnose sturgeon
☒ Elkhorn coral	☐ Johnson's seagrass	☐ North Atlantic right whales
☒ Staghorn coral	☐ Gulf sturgeon	☐ Other whales

•Explain potential effects to each species checked above:

Sea turtles: No effect as a result of the dredging efforts or the placement of material on the hardbottom. Sand would be dredged from the borrow areas utilizing hydraulic cutter-head suction pipeline dredge equipment and transported on the beach via a pipeline. The use of a hydraulic cutter-head suction dredge has not been know to cause injury to the species in the ocean waters.
Smalltooth sawfish: Similar to the sea turtles, the project would have no effect on the sawfish. The

•Shading impacts from construction.

N/A

•What is the estimated shadow effect of the boat (sq ft of shaded area beneath)?

N/A

•Discuss potential anchoring impacts to seagrass and corals. Discuss available water depth under the keel/propeller at Mean Low Water and the potential for prop dredging or blowouts. Discuss potential prop-scarring impacts to corals and seagrasses.

There would be no anchoring of vessels over seagrasses or corals. Two borrow areas will be utilized, which are approximately 2,100 feet offshore and consist of sandy substrate. The maximum dredge depths within the northern borrow area vary from -44.6 to -51.6 feet NGVD88. Maximum dredged depths within

•Describe increased boat traffic impacts, if any. Are there posted speed zones in the area?

N/A

•Describe Noise Impacts (this section not applicable to single-family, multi-family, and marina dock projects where piles driven are 12 inches or less in diameter).

The immediate project area may experience an increase in noise levels during the beach fill construction phase. Construction equipment would be properly maintained in order to minimize the effects of noise. The elevated noise levels would be localized and be short in duration because of the brief, temporary nature of the construction activity. The noise from the cutter head dredge equipment is not expected to be louder than 109 decibels.

•Source level of noise exceeds 120 dB re 1uPa RMS for continuous noise

Yes ☒ No

•Source level exceeds 160 dB re 1 uPa RMS for impulsive noise

Yes ☒ No

•Source level exceeds 180 dB re 1 uPa zero to peak

Yes ☒ No

Effects Determination:

•For executing the action (i.e., construction activities)

No Effect ☒ NLAA May Affect

•For the result of the action (i.e., new dock)

☒ No Effect NLAA May Affect

•If "No Effect" is determined for all species and critical habitat, please note your findings in a memorandum to your project file; no consultation/concurrence with/from NMFS is required.

☒ Memo made N/A

Mitigation/Protective Measures:

•Will the applicant follow the August 2001 Dock Construction Guidelines?

Yes ☒ No

•Will the applicant follow the October 2002 Johnson's Seagrass Key?

Yes ☒ No

•Will the Sea Turtle and Smalltooth Sawfish Construction Conditions, dated March 23, 2006, be followed?

☒ Yes No

•If not following any of the above, please explain:

The applicant is not constructing a dock, nor is Johnson's seagrass present.

•Turbidity controls? If yes, description of type used.

The applicant has proposed to avoid any damage to the offshore reefs by halting dredging operations if turbidity rises above acceptable levels (currently 29 NTUs above background) and also by maintaining an 800-foot exclusionary buffer zone around the reef into which anchoring and dredging is prohibited

•What are the proposed avoidance, minimization, and compensatory measures?

The applicant offered the following write-up for avoidance, minimization and compensatory measures:

The Federal Shore Protection Project at Ocean Ridge was designed in order to avoid and minimize negative impacts to the environment. Of particular concern is the presence of hardbottom communities and avoiding impacts related to their short- and long-term coverage by placed sand. Where impacts are unavoidable, the project design was optimized in order to minimize project-related effects. The proposed project represents the second renourishment of the Federal project subsequent to initial project

Each consultation letter should address the impacts listed in the checklist and their associated effects on listed species and their critical habitat. An explanation of how the impacts occur, their effects, and any mitigative measures that will be implemented to reduce the projects effects on listed species and their critical habitat should be included in the consultation letter.

* If Johnson's seagrass is present, please consult the following:

- *Dock Construction Guidelines in Florida for Docks or Other Minor Structures Constructed in or over Submerged Aquatic Vegetation, Marsh or Mangrove Habitat - U.S. Army Corps of Engineers/National Marine Fisheries Service*, dated August 2001

- *Key for Construction Conditions for Docks or Other Minor Structures Constructed in or Over Johnson's Seagrass (Halophila johnsonii)National Marine Fisheries Service/U.S. Army Corps of Engineers,* dated October 2002

Updated: August 2008

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
4400 PGA BOULEVARD, SUITE 500
PALM BEACH GARDENS, FLORIDA 33410

REPLY TO
ATTENTION OF

March 1, 2011

Palm Beach Gardens Section
SAJ-1989-90053(IP-MJW)

Mr. David Bernhart
Assistant Regional Administrator
Protected Resources Division
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701

Dear Mr. Bernhart:

This letter refers to a request on behalf of the City of Delray Beach for the dredging of Borrow Areas 1 and 2 and sand placement along the beach between DNR Reference monuments R-179 and R-188A. The project is located in and adjacent to the Atlantic Ocean from DNR Reference monuments R-179 to R-188-A, eastward of N. Ocean Boulevard, Delray Beach (Sections 16, 21, and 28, Township 46 South, Range 43 East) Palm Beach County, Florida. The U.S. Army Corps of Engineers (Corps) has completed an evaluation of the impacts the work may have on swimming seaturtles and the smalltooth sawfish. The Corps has made the following determinations:

May affect, not likely to adversely affect: the endangered and threatened swimming leatherback, loggerhead, green, hawksbill, and Kemp's Ridley seaturtles (*Chelonia mydas, Eretmochelys imbricate, Lepidochelys kempii, Dermochelys coriacea, Caretta caretta)* and the smalltooth sawfish *(Pristis pectinata)* due to construction activity and noise within the project area.

No effect on *Acropora sp.* The project will not impact hardbottom habitats where *Acropora sp.* is found; however, the project is located in *Acropora sp.* critical habitat and will not adversely modify habitat.

Pursuant to Section 7 of the Endangered Species Act we request your concurrence with this determination within 30 days. The enclosed checklist includes information provided in accordance with 50 CFR §402.12 and 14(c) to assist you in concurrence with our determination for the swimming seaturtle and sawfish.

Please advise if you agree with the above determination or provide a date when formal consultation would commence. If you have any questions regarding this letter, please contact Melody White at the letterhead address, by telephone at 561-472-3508, or by electronic mail at Melody.J.White@usace.army.mil.

Sincerely,

Leah Oberlin
Chief, Palm Beach Gardens Section

Enclosure

CC:

City of Delray Beach, Paul Dorling
dorling@mydelraybeach.com

Coastal Planning and Engineering, Inc., Richard Spadoni, Senior Vice President
rspadoni@coastalplanning.net

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
(727) 824-5312, FAX (727) 824-5309
http://sero.nmfs.noaa.gov

MAR 30 2007

F/SER31:MCB

Mr. John F. Studt
Jacksonville District, U.S. Army Corps of Engineers
4400 PGA Boulevard, Suite 500
Palm Beach Gardens, FL 33410

Re: SAJ-1986-479 (IP-LAO)

Dear Mr. Studt:

This responds to your February 12, 2007, letter to the National Marine Fisheries Service (NMFS) regarding the Corps of Engineers' request for Endangered Species Act (ESA) section 7 consultation for the proposed hydraulic dredging and beach renourishment project at Boca Raton. You determined the proposed action may affect, but is not likely to adversely affect, green, loggerhead, Kemp's ridley, hawksbill, and leatherback sea turtles, smalltooth sawfish, and elkhorn and staghorn coral, and requested our concurrence with your findings.

The project is located in the Atlantic Ocean along the northern shoreline of Boca Raton between Florida Department of Environmental Protection monuments R-205 and R-212 + 181', Sections 9 and 16, Township 47, Range 43 East, Palm Beach County, Florida. The proposed project includes the hydraulic dredging of approximately 920,000 cubic yards of material from a borrow area located approximately 2,500 feet directly offshore of the beach fill area. The dredged material will be transported to the fill area via a submerged pipeline.

We have analyzed the routes of potential effects on listed species from the proposed action. Potential effects are limited to the direct effects from dredging and pipeline placement and indirect effects from water quality impacts associated with the dredging (i.e., turbidity). We conclude that the project's effects on listed species are discountable or insignificant based on the following: The probability of sea turtles and smalltooth sawfish impacts associated with non-hopper type dredging is very low; sea turtles and smalltooth sawfish potentially present in the project area are highly mobile and can avoid the slow-moving dredge; foraging habitat for sea turtles and smalltooth sawfish will not be lost; turbidity effects on water quality will be temporary and minimal; and dredged material will be placed on the beach with suspended particles settling out within a short time frame without measurable effects on water quality (or on listed species directly). Potential effects on elkhorn and staghorn coral are discountable as no coral exists in the identified borrow area, or in the predominantly sandy substrate along the pipeline corridor.

In summary, we concur with your determination that the proposed action will not adversely affect listed species under our purview. 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 (PCTS) to allow you to track the status of ESA consultations. The COE's user identification and password for PCTS are "coepcts" and "coe22nmfs", respectively.

Thank you for your continued cooperation in the conservation of threatened and endangered species under NMFS' purview. If you have any questions on this consultation or PCTS use, please contact Michael Barnette at (727) 551-5794, or by e-mail at michael.barnette@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

File: 1514-22 F.1.FL
Ref: I/SER/2007/00718

Additional Considerations for ESA Section 7 Consultations (Revised 12-6-2005)

Marine Mammal Protection Act (MMPA) Recommendations: The Endangered Species Act (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.

Essential Fish Habitat (EFH) Recommendations: In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division (PRD) 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 Magnuson-Stevens Fishery Conservation and Management Act's (MSA) requirements for essential fish habitat (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.

Public Consultation Tracking System (PCTS) Guidance: PCTS is an online query system allowing federal agencies and U.S. Army Corps of Engineers' (COE) permit applicants to track the status of NMFS consultations under ESA section 7 and under MSA sections 305(b)2 and 305(b)(4): Essential Fish Habitat. Access PCTS via: www.nmfs.noaa.gov/pcts. Federal agencies are required to enter an agency-specific username and password to query the Federal Agency Site. The Corps Permit Site allows COE permit applicants the ability to check on the current status of Clean Water Act section 404 permit actions for which NMFS has conducted an ESA section 7 consultation with the COE since the beginning of the 2001 fiscal year (no password needed).

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 (e.g., SAJ-2005-123, SAJ-2005-1234, SAJ-2005-12345).

For inquiries regarding applications processed by Corps 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 (e.g., 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 April Wolstencroft at PCTSUsersupport@noaa.gov.

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

TRIBAL HISTORIC
PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA
AH-TAH-THI-KI MUSEUM

30290 JOSIE BILLIE HWY
PMB 1004
CLEWISTON, FL 33440

PHONE: (863) 983-6549
FAX: (863) 902-1117

August 1, 2013

Melody White
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232

THPO#: 0012166
PROJECT#: SAJ-1986-00479 &
SAJ-2002-00200

Subject: North and Central Boca Raton Beach Renourishment, Palm Beach County, Florida

Dear Ms. White,

The Seminole Tribe of Florida's Tribal Historic Preservation Office (STOF-THPO) received the Jacksonville District Corps of Engineers correspondence on July 1, 2013. The STOF-THPO has no objection to the proposed project at this time. However, the STOF-THPO would like to be informed if cultural resources that are potentially ancestral or historically relevant to the Seminole Tribe of Florida are inadvertently discovered at any time.

Thank you for the opportunity to review the information that has been sent to date regarding this project. Please reference ***THPO-0012166*** for any related issues.

Sincerely,

Geoffrey Wasson
Compliance Review Analyst
Seminole Tribe of Florida
30290 Josie Billie Hwy, PMB 1004
Clewiston, Florida 33440

APPENDIX D:
AGENCY AND PUBLIC INVOLVEMENT
Public Notices

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
4400 PGA BOULEVARD, SUITE 500
PALM BEACH GARDENS, FLORIDA 33410

REPLY TO
ATTENTION OF

July 1, 2013

Regulatory Division
South Permits Branch
Palm Beach Gardens Permits Section

PUBLIC NOTICE

Permit Application Number SAJ-1986-00479 (SP-MJW) and SAJ-2002-00200 (SP-MJW)

TO WHOM IT MAY CONCERN: The Jacksonville District of the U.S. Army Corps of Engineers (Corps) has received an application for a Department of the Army permit pursuant to Section 404 of the Clean Water Act (33 U.S.C. §1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §403) as described below:

APPLICANT: City of Boca Raton
25000 N.W. 1st Avenue
Boca Raton, Florida 33431

TITLE: North and Central Boca Raton Beach Renourishment Project

WATERWAY AND LOCATION: The project would affect waters of the United States associated with the Atlantic Ocean. The project site is located along the shoreline in north and central Boca Raton (Sections 9, 16, 21, and 28, Township 47 South, Range 43 East), Palm Beach County, Florida. The area is further broken up into project areas.

> North Boca: Segment 1 is located between the Sea Ranch Club of Boca Condominium south to the Brighton Condominium and between Florida Department of Environmental Protection (FDEP) Monuments R-205 to R-212+181'. The segment extends approximately 1.45 miles. The distance between North Boca and Central Boca segments is 0.76 miles.
>
> Central Boca: Segment 2 is located between 400 Ocean Boulevard and the Boca Beach Club and the northern Boca Inlet Jetty and between R-216 to H-222. The segment extends approximately 1.47 miles.

Directions to the site are as follows: 1) From I-95, take Exit 48 for FL-794 toward Yamato Road (east). 2) Turn left on Yamato Road. 3) Turn right onto FL-5 S/U.S. 1 South. 4) Turn left onto NW Spanish River Blvd. 5) Turn right onto N Ocean Blvd. Public beach access is located to the east of the intersection of N Ocean Blvd and E Palmetto Park Road. DEP Monument R-218 is located at this site. The project extends 2.69 miles north and 0.80 miles south of this marker.

LATITUDE & LONGITUDE:
North Boca Project Boundary:
Northern Limit: Latitude 26.389° North, Longitude 80.066° West

PROPOSED WORK: The applicant seeks authorization to renourish two segments of beach within the previous template excluding approximately 0.76 miles between segments. The project will place 1,200,000 cubic yards (cy) of sand along a total of 15,000 feet of Boca Raton's shorefront. This will include the placement of 600,000 cy of sand along 7,660 feet (78cy/ft) of the Segment 1 (North Boca) shoreline, extending from R-205 to R-212+181' and the placement of 677,000 cy of sand along 7,750 feet (87 cy/ft) of Segment 2 (Central Boca) shoreline extending from R-216 to R-H-222. These volumes include contributions from the beach design fill and tapers. The proposed slope from the dune to the berm is 100V:1H. The proposed berm height is 6.5 NAVD with a slope from berm to toe of fill to 15V to 1H. The proposed work is depicted on the attached 34 drawings.

Sand used for this beach fill project will be from the offshore borrow areas. The location of the borrow areas are depicted in the attached drawings. Borrow Area 1 (designated for Segment 1) consists of a newly proposed borrow site, as an extension of a previously utilized borrow site. Borrow Areas 2 (Segments 1 and 2) and 3 (Segment 2) have been previously dredged in nourishment projects. Based on 2004 geotechnical investigations, the mean grain size of material from Borrow Area 1 is 0.26mm, Borrow Area 2 is 0.27mm, and Borrow Area 3 is 0.25mm. The borrow site for the Central Boca 2010 project was located approximately 2,500 feet offshore of the project fill area between FDEP monuments R-2001 and R-2005.

The work will be completed within a single mobilization effort and complete sand placement within one winter season, between November 1st and April 30th. The applicant is requesting a 10-year permit, 2-event permit. The applicant is requests the ability to use either a hopper dredge or a pipeline/cutterhead dredge.

The North Boca Raton Beach was previously nourished in 1988, 1998, and 2010. The 1988 project included construction of six artificial reef modules as mitigation for impacts to nearshore hardbottom and a rock groin to protect the nearshore hardbottom habitat known as Red Reef Rock. The Central Boca Raton Beach was previously nourished in 1988, 1998, and 2004. Both previous projects have performed as anticipated with no new impacts to resources.

AVOIDANCE AND MINIMIZATION INFORMATION:
The applicant has provided the following information in support of efforts to avoid and/or minimize impacts to the aquatic environment:

For the Segment 1 portion, avoidance and minimization measure were applied in the 1985 general design. The selected alternative avoided and minimized beach impacts to resources while economically optimizing added beach width of the project.

The 2010 Segment I project maintained a buffer distance of approximately 1,000 feet from the eastern edge of the borrow site. Biological and sedimentation monitoring of the outer linear reef did not detect project related impacts during or immediately following project construction. Biweekly construction monitoring of the patch reef stations also did not detect project related sedimentation impacts during dredging at a distance of 600 to 700 feet from the borrow site. Based on these results, the proposed nourishment project maintains a buffer distance of over 950

Southern Limit: Latitude 26.368° North, Longitude 80.067° West

Central Boca Project Boundary:
Northern Limit: Latitude 26.357° North, Longitude 80.068° West
Southern Limit: Latitude 26.365° North, Longitude 80.067° West

PROJECT PURPOSE:

Basic: The project purpose is shoreline stabilization and storm protection.

Overall: The overall project purpose is shoreline stabilization and storm protection along the beaches of North and Central Boca Raton.

BACKGROUND: The proposed North Boca Raton Beach Preservation and Storm Damage Reduction Project combines the North Boca Raton and Central Boca Raton Nourishment Projects into a single nourishment project. The federally-authorized North Boca Raton Beach Renourishment Project is referred to as Segment 1 (R-205 to R-212+181 ft). Segment 2 (R-216 to H-222) is the previous Central Boca Raton Beach project shoreline. Segment 1 would be the third renourishment of the initial 1988 North Boca Raton Federal Shore Protection Project (fourth nourishment event) and would maintain the federally-authorized design width and advance fill. The Segment 2 portion would be the third fill placement event along the central Boca Raton shoreline between FDEP monuments R-216 and H-222.

EXISTING CONDITIONS: The coastline of Boca Raton in Palm Beach County is located entirely on a barrier island and consists of dune habitat, dry beach, inter-tidal beach, and sub-tidal beach. The upland vegetation consists of a large natural dune system that supports a variety of plants and animals. The beach area supports a variety of shore and wading birds and provides suitable habitat for nesting seaturtles. The sub and inter-tidal areas support various interfaunal interebrates, shorebirds, sea turtles and fish. The nearshore marine habitat within the project area consists of unconsolidated softbottom habitat and hard bottom habitat. Results of benthic surveys from the 2010 North Boca Raton and 2006 Central Boca Raton projects revealed the dominate components of the hardbottom communities to be turf and macroalgae, sponges, and octocorals. The most abundant scleractinian coral at the offshore reefs along the project area is *Siderastrea spp.* The existing area surrounding the project area consists of residential and commercial upland structures and public beaches with public facilities. Based on pre and post construction surveys from previous beach nourishments, the average erosion rate within the project area is approximately 29 feet per year in Segment I and 4.8 feet per year in Segment II.

Mitigation constructed in 1988 took into account future impacts to ephemeral hardbottom (within the footprint or design beach template) that may be exposed during future renourishment projects. This mitigation included compensation for all exposed nearshore rock between the Yamato Rock formation (near R-204) and the Red Reef Rock formation (near R-216). All exposed hardbottom is located between these formations and is assumed to have been mitigated for with the artificial reef constructed by the City of Boca Raton in April 1988.

PROPOSED WORK: The applicant seeks authorization to renourish two segments of beach within the previous template excluding approximately 0.76 miles between segments. The project will place 1,200,000 cubic yards (cy) of sand along a total of 15,000 feet of Boca Raton's shorefront. This will include the placement of 600,000 cy of sand along 7,660 feet (78cy/ft) of the Segment 1 (North Boca) shoreline, extending from R-205 to R-212+181' and the placement of 677,000 cy of sand along 7,750 feet (87 cy/ft) of Segment 2 (Central Boca) shoreline extending from R-216 to R-H-222. These volumes include contributions from the beach design fill and tapers. The proposed slope from the dune to the berm is 100V:1H. The proposed berm height is 6.5 NAVD with a slope from berm to toe of fill to 15V to 1H. The proposed work is depicted on the attached 34 drawings.

Sand used for this beach fill project will be from the offshore borrow areas. The location of the borrow areas are depicted in the attached drawings. Borrow Area 1 (designated for Segment 1) consists of a newly proposed borrow site, as an extension of a previously utilized borrow site. Borrow Areas 2 (Segments 1 and 2) and 3 (Segment 2) have been previously dredged in nourishment projects. Based on 2004 geotechnical investigations, the mean grain size of material from Borrow Area 1 is 0.26mm, Borrow Area 2 is 0.27mm, and Borrow Area 3 is 0.25mm. The borrow site for the Central Boca 2010 project was located approximately 2,500 feet offshore of the project fill area between FDEP monuments R-2001 and R-2005.

The work will be completed within a single mobilization effort and complete sand placement within one winter season, between November 1st and April 30th. The applicant is requesting a 10-year permit, 2-event permit. The applicant is requests the ability to use either a hopper dredge or a pipeline/cutterhead dredge.

The North Boca Raton Beach was previously nourished in 1988, 1998, and 2010. The 1988 project included construction of six artificial reef modules as mitigation for impacts to nearshore hardbottom and a rock groin to protect the nearshore hardbottom habitat known as Red Reef Rock. The Central Boca Raton Beach was previously nourished in 1988, 1998, and 2004. Both previous projects have performed as anticipated with no new impacts to resources.

AVOIDANCE AND MINIMIZATION INFORMATION:
The applicant has provided the following information in support of efforts to avoid and/or minimize impacts to the aquatic environment:

For the Segment 1 portion, avoidance and minimization measure were applied in the 1985 general design. The selected alternative avoided and minimized beach impacts to resources while economically optimizing added beach width of the project.

The 2010 Segment I project maintained a buffer distance of approximately 1,000 feet from the eastern edge of the borrow site. Biological and sedimentation monitoring of the outer linear reef did not detect project related impacts during or immediately following project construction. Biweekly construction monitoring of the patch reef stations also did not detect project related sedimentation impacts during dredging at a distance of 600 to 700 feet from the borrow site. Based on these results, the proposed nourishment project maintains a buffer distance of over 950

feet from the east edge of the borrow site to most of the offshore linear reefs. There are a few discrete areas adjacent to Borrow Site 3 where the buffer distance is approximately 800 feet. A buffer distance of 400 feet will be maintained to adjacent patch reef formations landward of the borrow sites and a biological monitoring program for potential sediment impacts during dredging will be implemented to ensure compliance.

The beach fill design of Segment II was developed to avoid impacts to natural nearshore hardbottom between R-214 and R-216 and the mitigation artificial reef at Red Reef Park; therefore, nearshore hardbottom mitigation should not be required.

The applicant does not proposed impacts to hardbottom near the borrow area so mitigation should not be required.

COMPENSATORY MITIGATION:
The applicant has provided the following explanation why compensatory mitigation should not be required:

For Segment I, the initial project was constructed in 1988 and compensatory mitigation reef was constructed as part of the 1988 project. The subsequent placement projects did not result in additional impacts to the resources, and the proposed project does not result in any additional impacts to the nearshore resources.

The beach fill design of Segment II was developed to avoid impacts to natural nearshore hardbottom between R-214 and R-216 and the mitigation artificial reef at Red Reef Park. The mitigation reef at Red Reef Park is performing as designed; therefore, additional nearshore hardbottom mitigation should not be required.

CULTURAL RESOURCES:
The Corps is aware of historic property/properties within or in close proximity of the permit area. A cultural resource survey is currently being conducted for North Boca (Segment 1). The Corps will initiate consultation with the State Historic Preservation Office and those federally recognized tribes with concerns in Florida and the Permit Area, and the Advisory Council on Historic Preservation as applicable pursuant to 33 CFR 325, Appendix C and Section 106 of the National Historic Preservation Act, by separate letter.

ENDANGERED SPECIES:
The Corps has determined the proposed project may affect, but is not likely to adversely affect the piping plover, (*Charadrius melodus*), the West Indian manatee (*Trichechus manatus*), and may affect but is not likely to adversely affect threatened/endangered nesting seaturtles (*Chelonia mydas, Eretmochelys inbricata, Lepidochelys kempii, Derochelys coriacea, Caretta caretta*). The project is not located in designated critical habitat and would not adversely modify critical habitat for any listed species under FWS preview. The Corps will request U.S. Fish and Wildlife Service concurrence with this determination pursuant to Section 7 of the Endangered Species Act.

The Corps has determined the proposed project may affect, but is not likely to adversely affect, endangered and threatened swimming Leatherback, Loggerhead, Green, Hawksbill, and Kemp's Ridley seaturtles (*Chelonia mydas, Eretmochelys imbricate, Lepidochelys kempii, Dermochelys coriacea, Caretta caretta),* the smalltooth sawfish (*Pristis pectinata).* The Corps is evaluating this project under the South Atlantic Regional Biological Opinion for the use of hopper dredging associated with the project. For non-hopper type dredging, National Marine Fisheries Service (NMFS) has previously concurred with the determination of may affect, but is not likely to adversely affect sea turtles and the smalltooth sawfish for non-hopper type dredging. The NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions will be made a condition of any issued permit.

The area was surveyed in March and April 2013 for the presence of Staghorn coral (*Acropora cervicornis*) and elkhorn coral (*Acropora palmata*). The survey indicated that Acorpora corals are not located within the project site. The site is within designated critical habitat for Staghorn coral on patch reefs and outer linear reefs adjacent to the proposed offshore borrow areas. The site does not contain Acropora corals and has been renourished in the past. The Corps has determined the project will have no effect on *Acroporid spp.* corals and will not adversely modify *Acropora spp.* critical habitat. The Corps will request National Marine Fisheries Service concurrence with this determination pursuant to Section 7 of the Endangered Species Act.

ESSENTIAL FISH HABITAT (EFH): This notice initiates consultation with the National Marine Fisheries Service on EFH as required by the Magnuson-Stevens Fishery Conservation and Management Act 1996. The proposal would impact approximately 365 acres of un-vegetated sandy bottom, tidal, and sub-tidal area utilized by various life stages of penaeid shrimp complex, reef fish, stone crab, spiny lobster, migratory/pelagic fish, and snapper/grouper complex. All impacts to hardbottom were previously offset. The project is within the template of the previously authorized project. Our initial determination is that the proposed action would not have a substantial adverse impact on EFH or Federally managed fisheries in the South Atlantic Region. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

NOTE: This public notice is being issued based on information furnished by the applicant. This information has not been verified or evaluated to ensure compliance with laws and regulation governing the regulatory program. The jurisdictional line has been verified by Corps personnel.

AUTHORIZATION FROM OTHER AGENCIES: Water Quality Certification may be required from the Florida Department of Environmental Protection and/or one of the state Water Management Districts.

COMMENTS regarding the potential authorization of the work proposed should be submitted in writing to the attention of the District Engineer through the Palm Beach Gardens Permits Section, 4400 PGA Boulevard, Suite 500, Palm Beach Gardens, Florida 33410 within 21 days from the date of this notice.

The decision whether to issue or deny this permit application will be based on the information received from this public notice and the evaluation of the probable impact to the associated

wetlands. This is based on an analysis of the applicant's avoidance and minimization efforts for the project, as well as the compensatory mitigation proposed.

QUESTIONS concerning this application should be directed to the project manager, Melody White, in writing at the Palm Beach Gardens Permits Section, 4400 PGA Boulevard, Suite 500, Palm Beach Gardens, Florida 33410, by electronic mail at Melody.J.White@usace.army.mil, by fax at (561)626-6971, or by telephone at (561)472-3508.

IMPACT ON NATURAL RESOURCES: Preliminary review of this application indicates that an Environmental Impact Statement will not be required. Coordination with U.S. Fish and Wildlife Service, Environmental Protection Agency (EPA), the National Marine Fisheries Services, and other Federal, State, and local agencies, environmental groups, and concerned citizens generally yields pertinent environmental information that is instrumental in determining the impact the proposed action will have on the natural resources of the area. By means of this notice, we are soliciting comments on the potential effects of the project on threatened or endangered species or their habitat

EVALUATION: The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including cumulative impacts thereof; among these are conservation, economics, esthetics, general environmental concerns, wetlands, historical properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food, and fiber production, mineral needs, considerations of property ownership, and in general, the needs and welfare of the people. Evaluation of the impact of the activity on the public interest will also include application of the guidelines promulgated by the Administrator, EPA, under authority of Section 404(b) of the Clean Water Act of the criteria established under authority of Section 102(a) of the Marine Protection Research and Sanctuaries Act of 1972. A permit will be granted unless its issuance is found to be contrary to the public interest.

The US Army Corps of Engineers (Corps) is soliciting comments from the public; Federal, State, and local agencies and officials; Indian Tribes; and other Interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

COASTAL ZONE MANAGEMENT CONSISTENCY: In Florida, the State approval constitutes compliance with the approved Coastal Zone Management Plan. In Puerto Rico, a Coastal Zone

Management Consistency Concurrence is required from the Puerto Rico Planning Board, in the Virgin Islands, the Department of Planning and Natural Resources permit constitutes compliance with the Coastal Zone Management Plan.

REQUEST FOR PUBLIC HEARING: Any person may request a public hearing. The request must be submitted in writing to the District Engineer within the designated comment period of the notice and must state the specific reasons for requesting the public hearing.

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
4400 PGA BOULEVARD, SUITE 500
PALM BEACH GARDENS, FLORIDA 33410

REPLY TO
ATTENTION OF

JUL 09 2012

Regulatory Division
Palm Beach Gardens Section

PUBLIC NOTICE

Permit Application No. SAJ-2012-01244(IP-AAZ)

TO WHOM IT MAY CONCERN: This district has received an application for a Department of the Army permit pursuant to Section 404 of the Clean Water Act (33 U.S.C. §1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §403) as described below:

APPLICANT: Palm Beach County
Environmental Resource Management
Attn: Mr. Daniel Bates
2300 North Jog Road, 4th Floor
West Palm Beach, Florida 33411

WATERWAY & LOCATION: The Ocean Ridge Shore Protection project is located within waters of the United States along the beaches of Palm Beach County at the South Lake Worth Inlet from 165 feet south of monument R-153 to monument R-159, adjacent and within the Atlantic Ocean, Section 22, Township 45 South, Range 43 East, Palm Beach County, Florida.

Directions to the site are as follows: From Interstate 95 in Palm Beach County, take exit 61 for Lantana Road. Travel east on Lantana Road for 1.1 miles, then turn right (south) onto U.S. highway 1. Travel 0.2 miles then take the second left (east) onto East Ocean Avenue. Travel 0.8 miles, then turn right (south) onto north State Road A1A South/South Ocean Boulevard. The site is the beach area south of the South Lake Worth Inlet.

LATITUDE & LONGITUDE:

Northern end: Latitude 26.544865° Longitude -80.042919°

Southern end: Latitude 26.524997° Longitude -80.047466°

PROJECT PURPOSE:

Basic: The basic project purpose is to stabilize the coastal shoreline.

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
4400 PGA BOULEVARD, SUITE 500
PALM BEACH GARDENS, FLORIDA 33410

REPLY TO
ATTENTION OF

February 28, 2011

Regulatory Division
Palm Beach Gardens Section

PUBLIC NOTICE

Permit Application No. SAJ-1989-90053(IP-MJW)

TO WHOM IT MAY CONCERN: This district has received an application for a Department of the Army permit pursuant to Section 404 of the Clean Water Act (33 U.S.C. §1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §403) as described below:

APPLICANT: City of Delray Beach
C/o Paul Dorling
100 NW First Avenue
Delray Beach, Florida 33444

WATERWAY & LOCATION: The project is located in and adjacent to the Atlantic Ocean from DNR Reference monuments R-179 to R-188-A, eastward of N. Ocean Boulevard, Delray Beach (Sections 16, 21, and 28, Township 46 South, Range 43 East) Palm Beach County, Florida.

Directions to the site are as follows: 1) Exit I-95 at Woolbright Road, Exit 56. 2) Continue east on Woolbright Road/ SW 15th Street. 3) Turn right at A1A N, South / Florida A1A S / N Ocean Boulevard. 4) Continue south on A1A approximately 3.5 miles. The northern limits of the construction area are located to the east at monument R-179.

LATITUDE & LONGITUDE: The proposed beach placement area extends from monument R-179 to R-184A.

R-179 Latitude 26.464° North
Longitude 80.057° West
R-184A Latitude 26.437° North
Longitude 80.061° West

The borrow area (BA) coordinates are listed below:
Borrow Area 1:

Corner	Latitude	Longitude
NW	26.460317	-80.051984

NE	26.460309	-80.050784
SW	26.431674	-80.055813
SE	26.431653	-80.052645

Borrow Area 2:

Corner	Latitude	Longitude
NW	26.475863	-80.049438
NE	26.472850	-80.047498
SW	26.463033	-80.051574
SE	26.436020	-80.049630

PROJECT PURPOSE:
Basic: The project proposes renourishment of a beach.

Overall: The project proposes reestablishment of the beach profile in order to provide storm protection between R-179A and R-188A.

PROPOSED WORK: The applicant proposes to place approximately 1,208,000 cubic yards of sand on Delray Beach to restore the federally authorized design section and placement of eight years of advanced nourishment. The volume is based on the amount of sand required to refill the 2002 construction template and erosion estimated to occur up to the time of construction. The beach fill will begin at R-179 and extend 1.9 miles south to R-188A. The project was designed with a berm elevation of +7.5 feet, NAVD with a slope of 1V:10H. The applicant requests a 10-year permit. The project is planned for commencement in November 2011 and completion by May 2012.

Borrow Area I and Borrow Area II were previously dredged for the 2002 nourishment project at Delray Beach. The two offshore borrow areas are located approximately 2,000 feet offshore. The borrow areas vary in width from 1,000 feet to 425 feet and have a combined length of 2.8-miles which extends parallel to the beach. The dredge plan indicates that Borrow Area I will be dredged first. The preliminary proposed acres to be dredged from Borrow Area 1 and Borrow Area II are 155.8 acres and 68.1 acres, respectively. It is possible that only a portion of Borrow Area 1 will be dredged.

The material will be dredged using a suction cutterhead dredge. The material will be transported from the offshore borrow site to the beach placement site through a series of submerged,

floating, and shore-supported pipelines. Once deposition of the material occurs at the fill site, the contractor will move the sand using heavy equipment to shape the beach to design cross-sections. Final design volume to be placed will be based on pending pre-construction surveys.

Avoidance and Minimization Information: The applicant has provided the following information in support of efforts to avoid and/or minimize impacts to the aquatic environment:

The project has been designed to avoid impacts to natural resources.

Compensatory Mitigation:
The applicant has provided the following explanation why compensatory mitigation should not be required:

No natural communities will be impacted by project construction of the project or the dredging of the borrow areas, therefore no mitigation should be required.

PROJECT HISTORY: Delray Beach was initially nourished in 1973 to provide storm protection and recreational benefits to the city. Subsequent renourishments took place in 1978, 1984, 1992, 2002. Beginning with the beach nourishment conducted in 1992, the design interval between beach nourishment was increased to eight years. Placement of sand for storm damage repair occurred in 2005. This project proposes the sixth periodic renourishment of Delray Beach to be constructed by the City of Delray Beach.

EXISTING CONDITIONS: The project area extends along the shorefront of the City of Delray Beach. The existing area surrounding the beach placement area consists of a dune system, S.R. A1A, and residential development to the east. The marine habitat within the project area is composed of unconsolidated softbottom habitat. No nearshore hardbottom is located within the renourishment project area. The nearest reef formation is a shore-parallel offshore reef tract, located in approximately 60-feet of water and approximately 1,200 feet seaward of the nearest borrow area.

ENDANGERED SPECIES:
The U.S. Army Corps of Engineers (Corps) has determined the proposed project may affect, but is not likely to adversely affect the endangered West Indian manatee (*Trichechus manatus*) and will not adversely impact its designated critical habitat. The applicant will adhere to the Standard Manatee Construction

Conditions. The Corps has determined that the proposed project may affect the endangered and threatened nesting leatherback, loggerhead, green, hawksbill, and Kemp's Ridley seaturtles (*Chelonia mydas, Eretmochelys imbricate, Lepidochelys kempii, Dermochelys coriacea, Caretta caretta)*. The Corps will request concurrence with the determination on the manatee and initiation of formal consultation for nesting seaturtles from the U.S. Fish and Wildlife pursuant to Section 7 of the Endangered Species Act by separate letter.

The Corps has determined that the proposed project may affect, but is not likely to adversely affect the endangered and threatened swimming leatherback, loggerhead, green, hawksbill, and Kemp's Ridley seaturtles and the smalltooth sawfish (*Pristis pectinata*). The work will not impact critical habitat of any listed species. The Corps will request concurrence with the determination for swimming seaturtles and smalltooth sawfish from the NOAA pursuant to Section 7 of the Endangered Species Act by separate letter.

The Corps has determined the project will have no effect on *Acropora sp.* The project will not impact hardbottom habitats. The project is not located in *Acropora sp.* critical habitat.

ESSENTIAL FISH HABITAT (EFH): This notice initiates consultation with the National Marine Fisheries Service on EFH as required by the Magnuson-Stevens Fishery Conservation and Management Act 1996. The proposal would impact approximately 1,054 acres of unconsolidated sediments. These habitats utilized by various life stages of penaeid shrimp complex, red drum, reef fish, stone crab, spiny lobster, migratory/pelagic fish, and snapper/grouper complex. Our initial determination is that the proposed action would not have a substantial adverse impact on EFH or Federally managed fisheries within the South Atlantic Region. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

IMPACT ON CULTURAL RESOURCES: A cultural resources survey was conducted in the vicinity of the borrow areas in December 2010. The report will be provided to the Corps when it is complete for further review and coordination with the State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO) as necessary.

A review of the Florida Master Site files did not document any known historical properties within the project area. The

proposed project will deposit 1,208,000-cubic yards of fill on Delray Beach between the R-179 to R-188-A HIGH/LOW water mark and UPLAND BOUNDARY. The permit area has been highly impacted by both natural erosion events and multiple beach re-nourishment projects, beginning in 1973. Due to the limited scope of the proposed work and the highly disturbed nature of the permit area, the Corps has determined there is no potential affect to any known or unknown cultural resources within the proposed area. The Corps will include a condition in the permit that requires work to cease and the Corps to be notified if archeological or cultural resources are unearthed.

NOTE: This public notice is being issued based on information furnished by the applicant. This information has not been verified or evaluated to ensure compliance with laws and regulation governing the regulatory program.

AUTHORIZATION FROM OTHER AGENCIES: Water Quality Certification will be required from the Florida Department of Environmental Protection.

Comments regarding the application should be submitted in writing to the District Engineer at the above address within 30 days from the date of this notice.

If you have any questions concerning this application, you may contact Melody White at the letterhead address, by electronic mail at Melody.J.White@usace.army.mil, by fax at 561-626-6971, or by telephone at 561-472-3508.

The decision whether to issue or deny this permit application will be based on the information received from this public notice and the evaluation of the probable impact to the associated wetlands. This is based on an analysis of the applicant's avoidance and minimization efforts for the project, as well as the compensatory mitigation proposed.

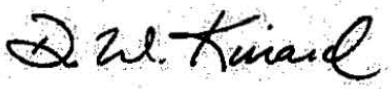
IMPACT ON NATURAL RESOURCES: Preliminary review of this application indicates an Environmental Impact Statement will not be required. Coordination with U.S. Fish and Wildlife Service, Environmental Protection Agency (EPA), the National Marine Fisheries Services, and other Federal, State, and local agencies, environmental groups, and concerned citizens generally yields pertinent environmental information that is instrumental in determining the impact the proposed action will have on the natural resources of the area.

IMPACT ON CULTURAL RESOURCES: Review of the latest published version of the National Register of Historic Places indicates that no registered properties or properties listed as eligible for inclusion therein are located at the site of the proposed work. Unknown archaeological, scientific, pre-historical, or historical data may be lost or destroyed by the work to be accomplished.

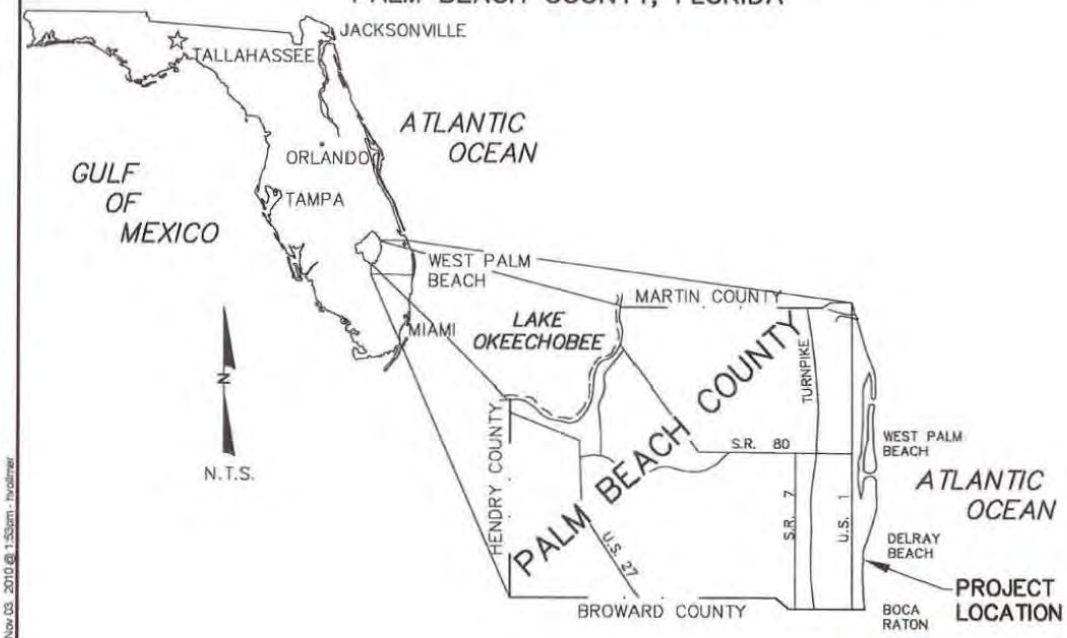
EVALUATION: The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including cumulative impacts thereof; among these are conservation, economics, esthetics, general environmental concerns, wetlands, historical properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food, and fiber production, mineral needs, considerations of property ownership, and in general, the needs and welfare of the people. Evaluation of the impact of the activity on the public interest will also include application of the guidelines promulgated by the Administrator, EPA, under authority of Section 404(b) of the Clean Water Act or of the criteria established under authority of Section 102(a) of the Marine Protection Research and Sanctuaries Act of 1972. A permit will be granted unless its issuance is found to be contrary to the public interest. The US Army Corps of Engineers (Corps) is soliciting comments from the public; Federal, State, and local agencies and officials, Indian Tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition, or deny a permit for this proposal. To make this determination, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

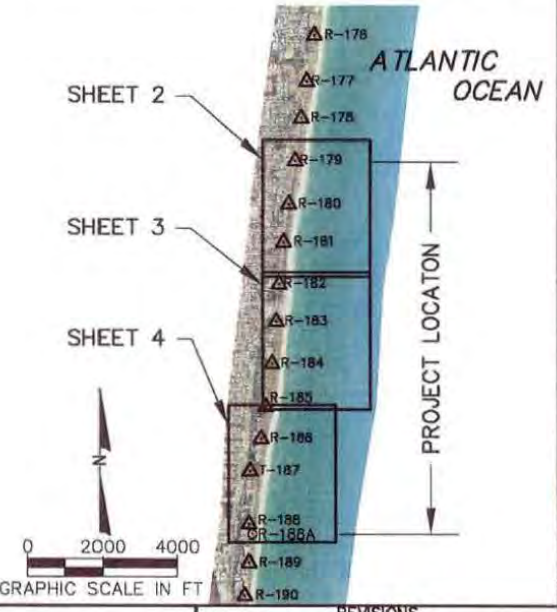
COASTAL ZONE MANAGEMENT CONSISTENCY: In Florida, the State approval constitutes compliance with the approved Coastal Zone Management Plan. In Puerto Rico, a Coastal Zone Management Consistency Concurrence is required from the Puerto Rico Planning Board. In the Virgin Islands, the Department of Planning and Natural Resources permit constitutes compliance with the Coastal Zone Management Plan.

REQUEST FOR PUBLIC HEARING: Any person may request a public hearing. The request must be submitted in writing to the District Engineer within the designated comment period of the notice and must state the specific reasons for requesting the public hearing.



CITY OF DELRAY BEACH
FIFTH BEACH RENOURISHMENT PROJECT
PALM BEACH COUNTY, FLORIDA





INDEX TO SHEETS

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/3/2010
DATE

REVISIONS

DATE	BY	DESCRIPTION

CITY OF DELRAY BEACH
FIFTH BEACH RENOURISHMENT PROJECT
COVER SHEET

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-8102
FAX (561) 391-9116
C.O.A. P.L. #2626
www.CoastalPlanning.com

DATE: 9/03/10
BY: JRC
COMM NO.: 1819.36

US Army Corps of Engineers.

February 28, 2011
File #: SAJ-1989-90053 (IP-MJW)
Public Notice Drawings: Page 1 of 13

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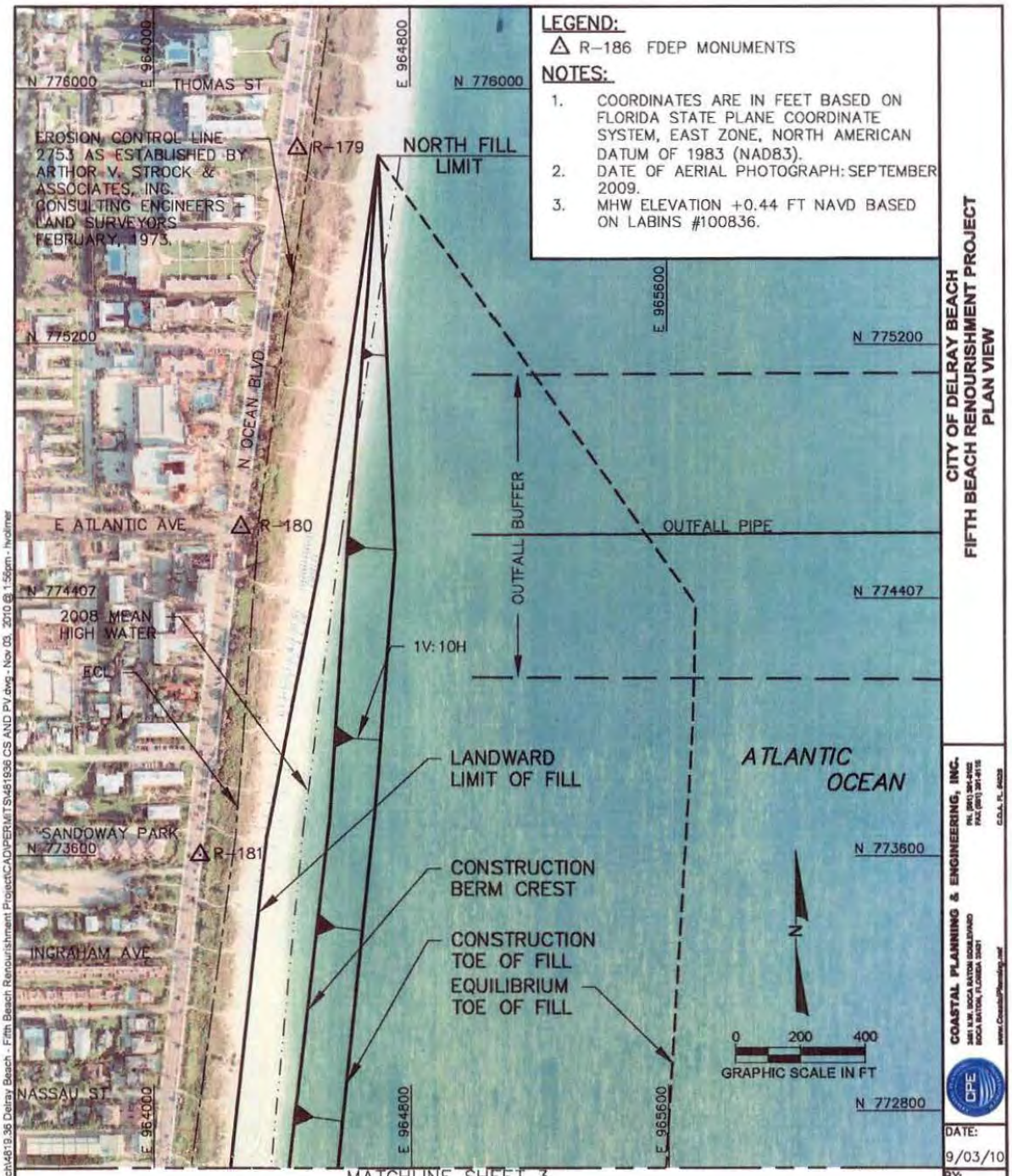

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/3/2010
DATE

US Army Corps of Engineers.

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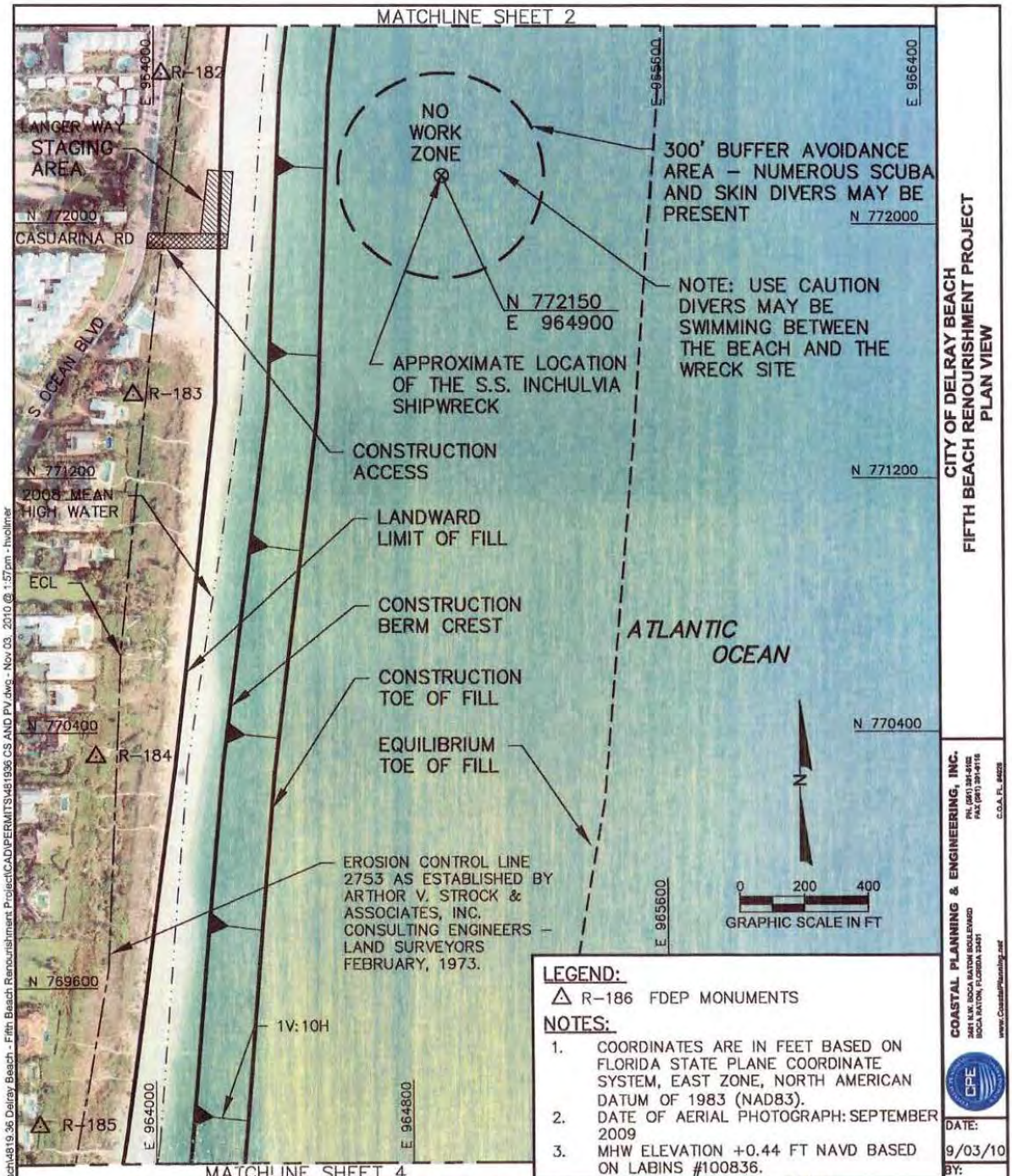

LEGEND:

△ R-186 FDEP MONUMENTS

NOTES:

1. COORDINATES ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
2. DATE OF AERIAL PHOTOGRAPH: SEPTEMBER 2009
3. MHW ELEVATION +0.44 FT NAVD BASED ON LABINS #100836.

CITY OF DELRAY BEACH
FIFTH BEACH RENOURISHMENT PROJECT
PLAN VIEW

COASTAL PLANNING & ENGINEERING, INC.
PH: (561) 391-8102
FAX: (561) 391-8106
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
C.O.A. P.L. #4625
www.CoastalPlanning.com

DATE: 9/03/10
BY: JRC
COMM NO.: 4819.36
SHEET: 3

REVISIONS

DATE	BY	DESCRIPTION

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/3/2010
DATE

US Army Corps of Engineers

February 28, 2011
File #: SAJ-1989-90053 (IP-MJW)
Public Notice Drawings: Page 3 of 13

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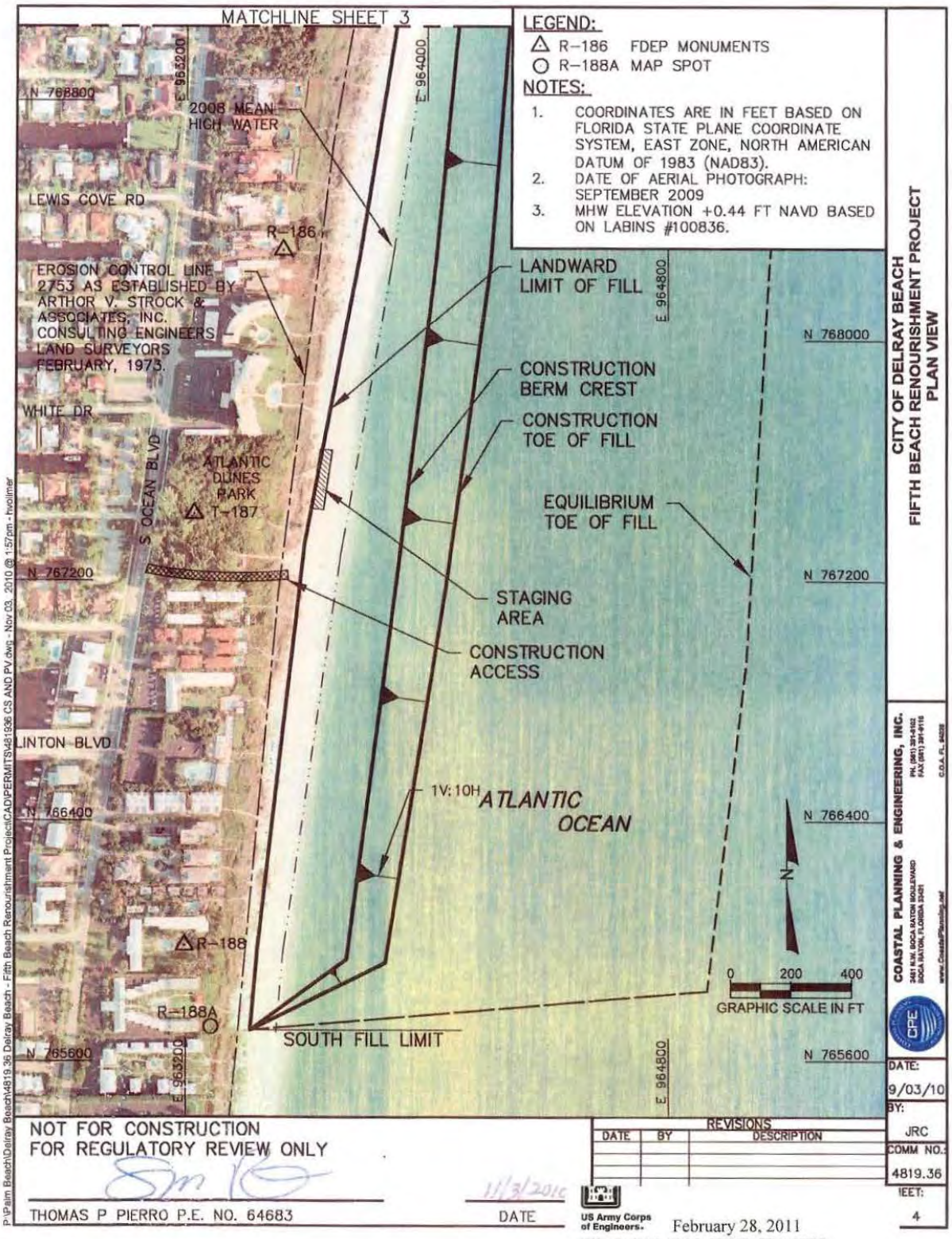

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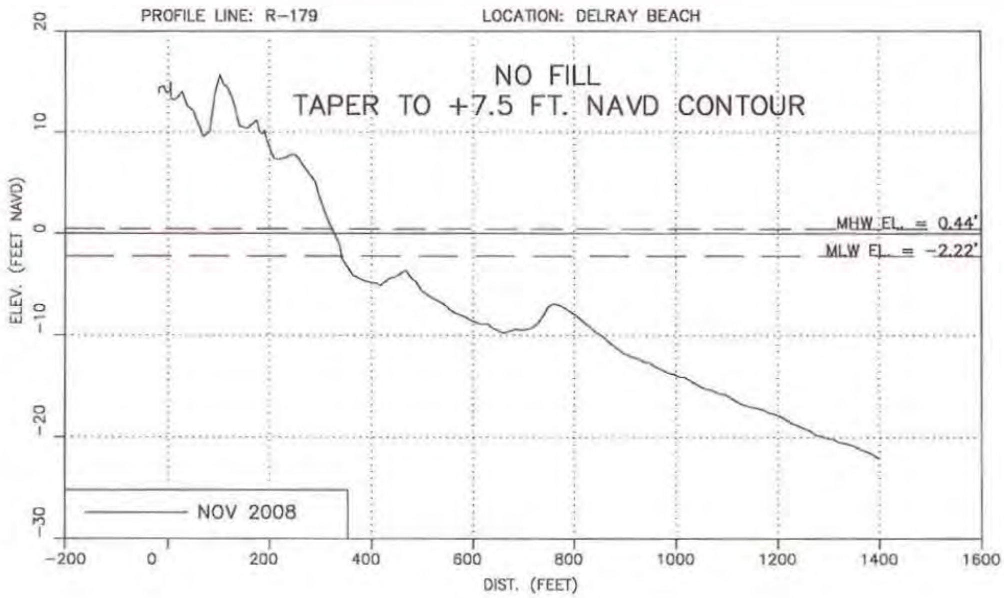

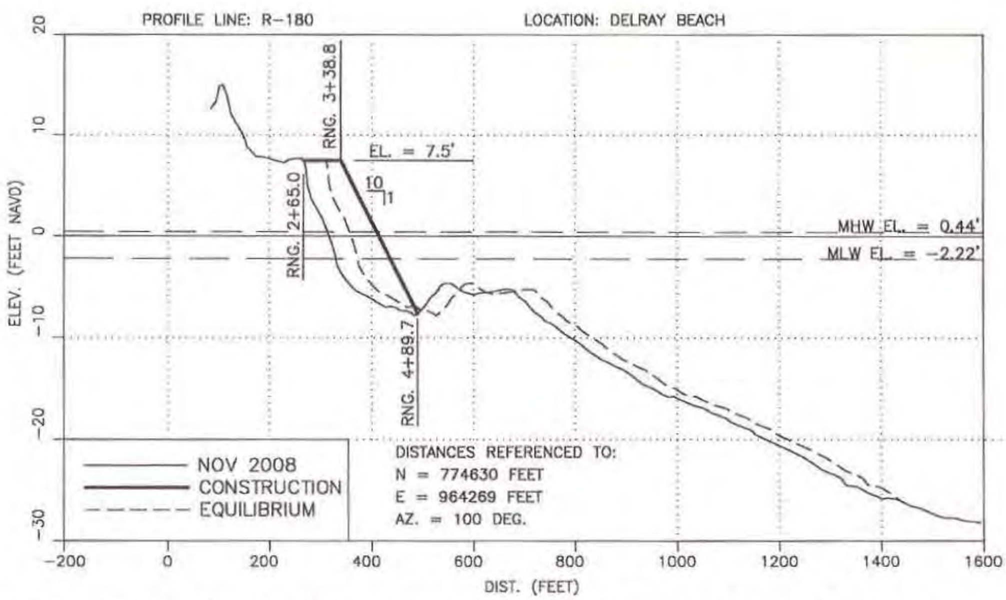

NOTE: MEAN HIGH WATER (MHW) AND MEAN LOW WATER (MLW) ELEVATIONS PUBLISHED IN NAVD 88, FROM LAND BOUNDARY INFORMATION SYSTEM (LABINS) BASED ON EPOCH 1983-2001 TIDE INTERPOLATION POINT IDENTIFICATION NUMBER 100836.

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P. PIERRO P.E. NO. 64683 — 11/3/2010 DATE

REVISIONS		
DATE	BY	DESCRIPTION

CITY OF DELRAY BEACH
FIFTH PERIODIC BEACH RENOURISHMENT PROJECT
FILL CROSS SECTIONS

COASTAL PLANNING & ENGINEERING, INC.

DATE: 3/22/10
BY: JRC
COMM NO.: 19.36
SHEET: 5

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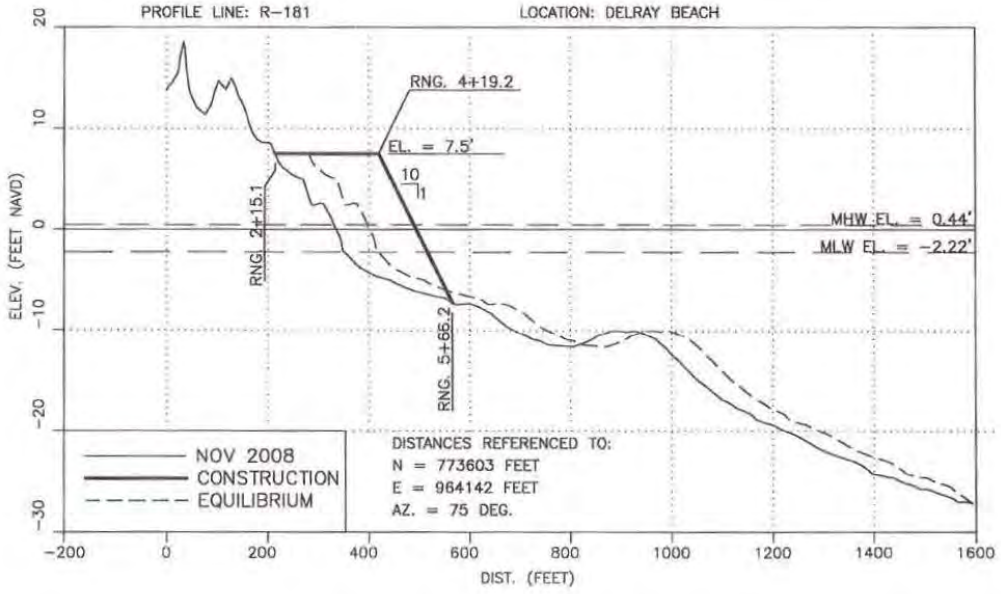
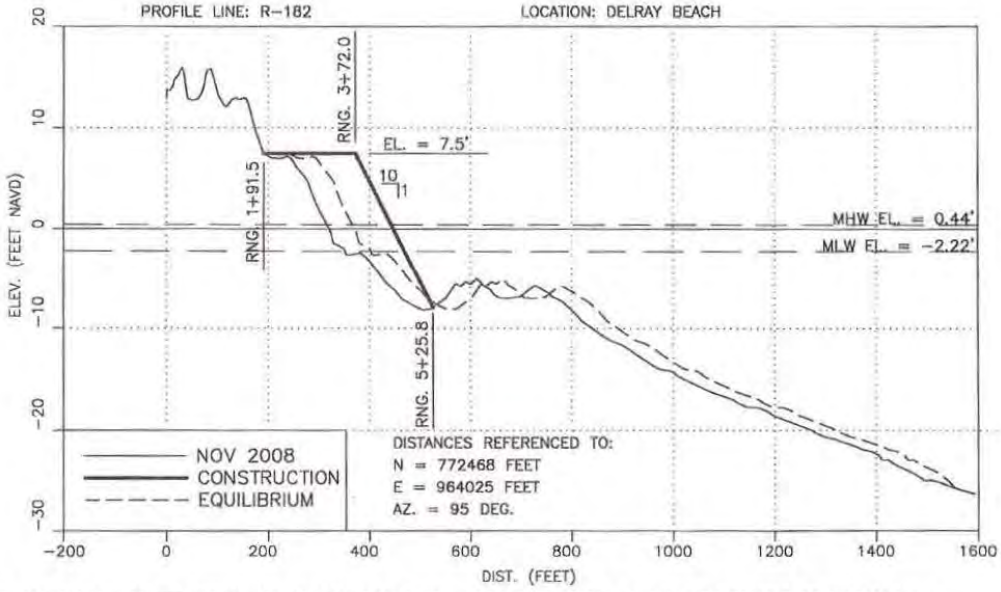
US Army Corps of Engineers.
February 28, 2011
File #: SAJ-1989-90053 (IP-MJW)





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NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P. PIERRO P.E. NO. 64683

11/3/2010
DATE

CITY OF DELRAY BEACH
FIFTH PERIODIC BEACH RENOURISHMENT PROJECT
FILL CROSS SECTIONS

COASTAL PLANNING & ENGINEERING, INC.
3481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-8102
FAX (561) 391-9116
C.O.A. FL. #4625
www.CoastalPlanning.net

DATE: 3/22/10
BY: JRC
COMM NO.: 9.36
T: 6

REVISIONS		
DATE	BY	DESCRIPTION

US Army Corps of Engineers.

February 28, 2011
File #: SAJ-1989-90053 (IP-MJW)
Public Notice Drawings: Page 6 of 13

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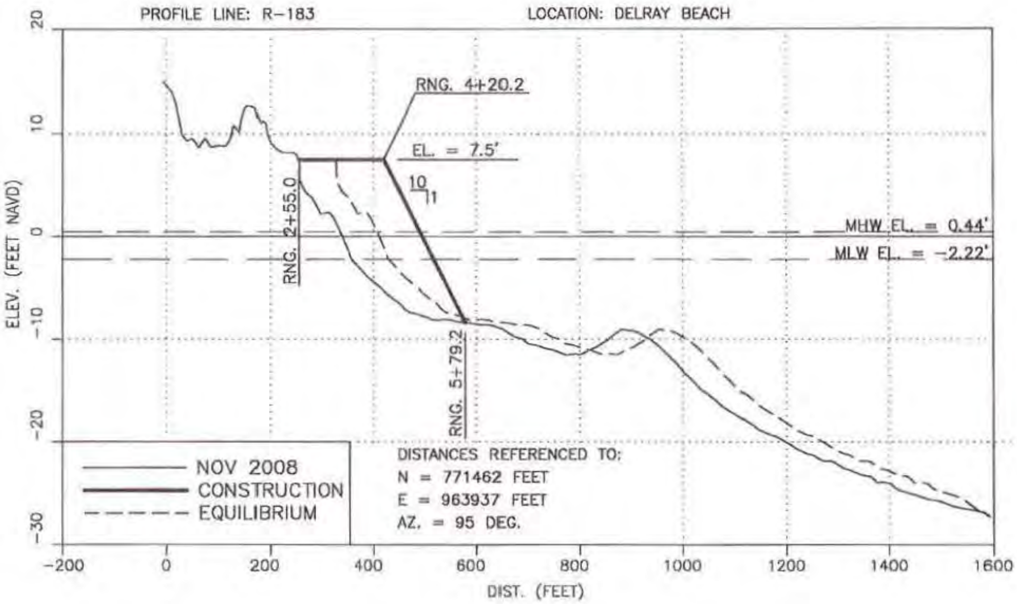

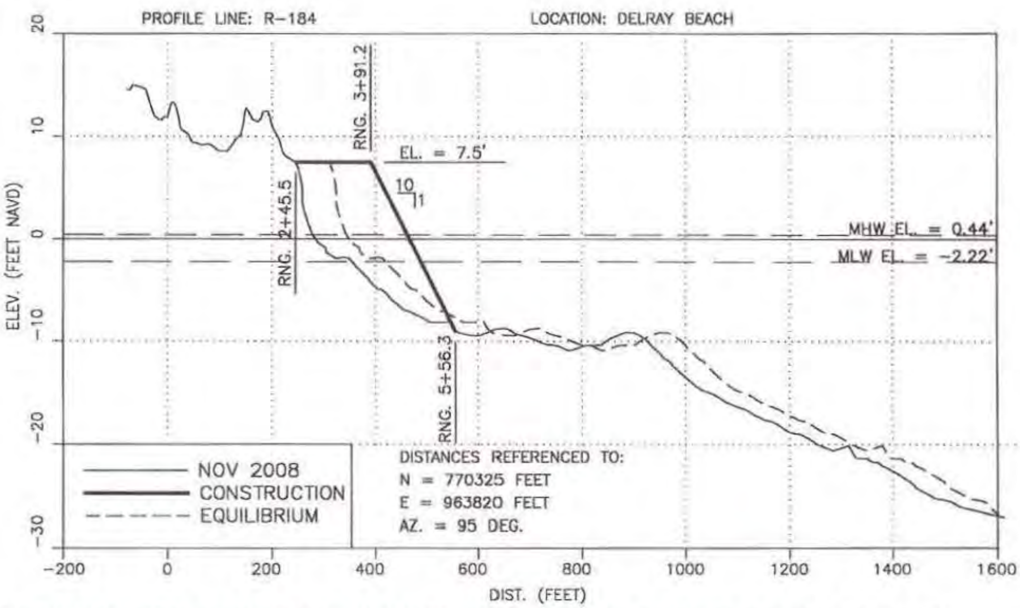

NOTE: MEAN HIGH WATER (MHW) AND MEAN LOW WATER (MLW) ELEVATIONS PUBLISHED IN NAVD 88, FROM LAND BOUNDARY INFORMATION SYSTEM (LABINS) BASED ON EPOCH 1983-2001 TIDE INTERPOLATION POINT IDENTIFICATION NUMBER 100836.

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P. PIERRO P.E. NO. 64683

11/3/2010
DATE

REVISIONS		
DATE	BY	DESCRIPTION

US Army Corps of Engineers

February 28, 2011
File #: SAJ-1989-90053 (IP-MJW)
Public Notice Drawings: Page 7 of 13

CITY OF DELRAY BEACH
FIFTH PERIODIC BEACH RENOURISHMENT PROJECT
FILL CROSS SECTIONS

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-8102
FAX (561) 391-9116
C.O.A. FL. 04622
www.CoastalPlanning.net

DATE: 3/22/10
BY: JRC
NO.: 9.36

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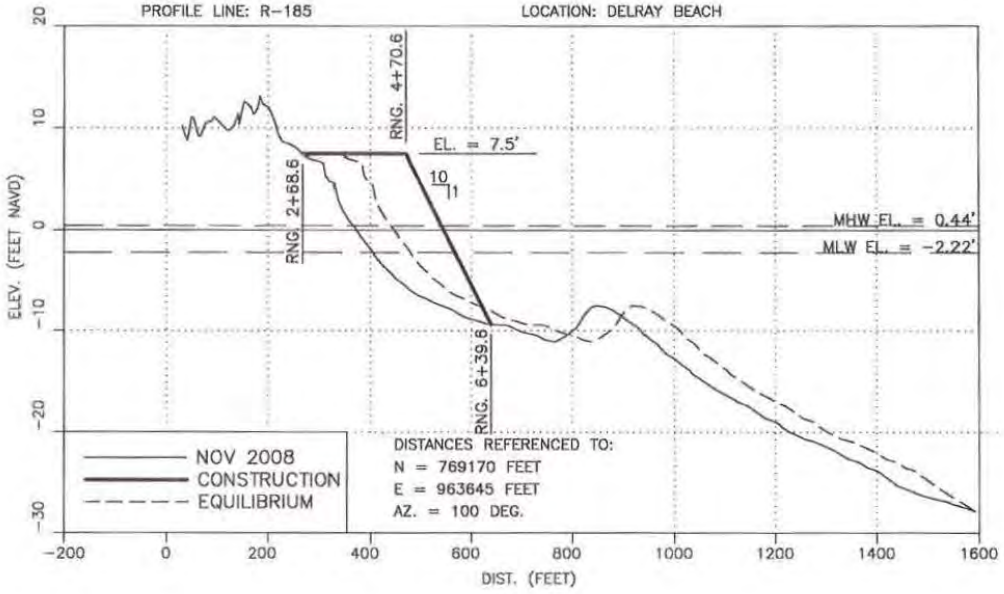

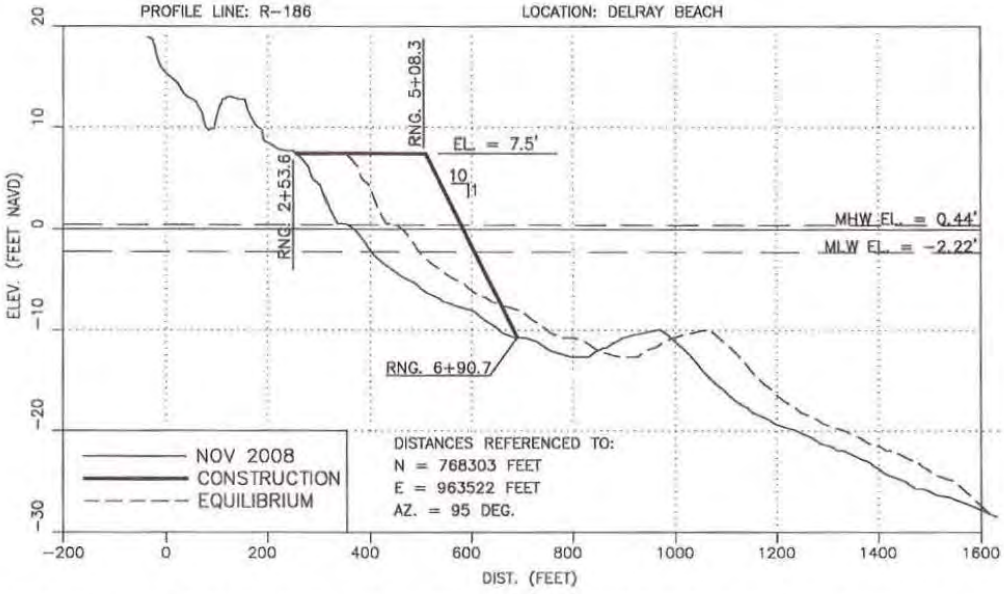

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FIFTH PERIODIC BEACH RENOURISHMENT PROJECT
FILL CROSS SECTIONS

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-8102
FAX (561) 391-8106
C.O.A. FL. #6028
www.CoastalPlanning.net

DATE: 3/22/10
BY: JRC
COMM NO.: 1.36

REVISIONS

DATE	BY	DESCRIPTION

US Army Corps of Engineers.

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File #: SAJ-1989-90053 (IP-MJW)
Public Notice Drawings: Page 8 of 13

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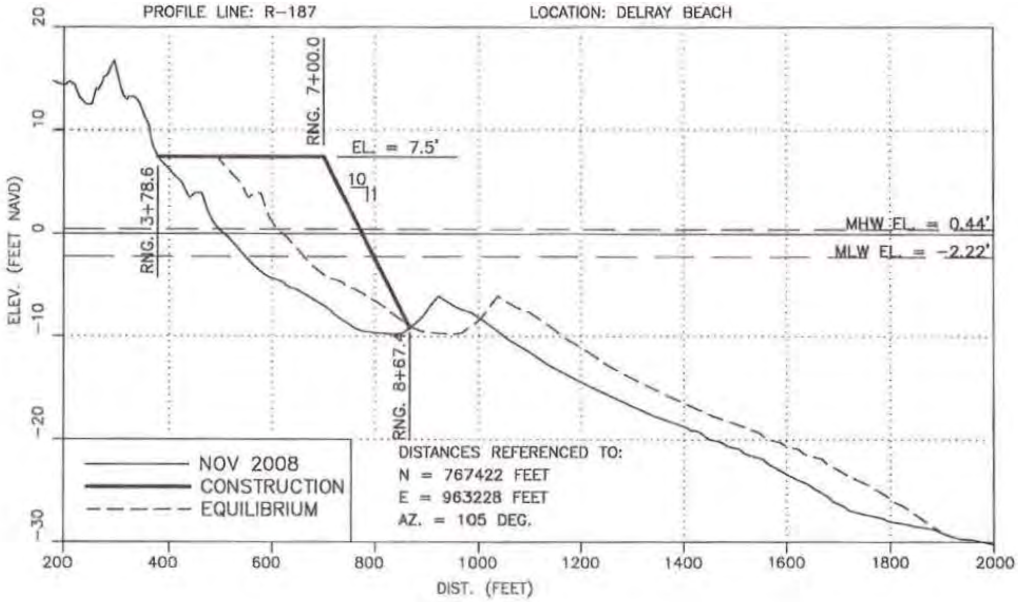

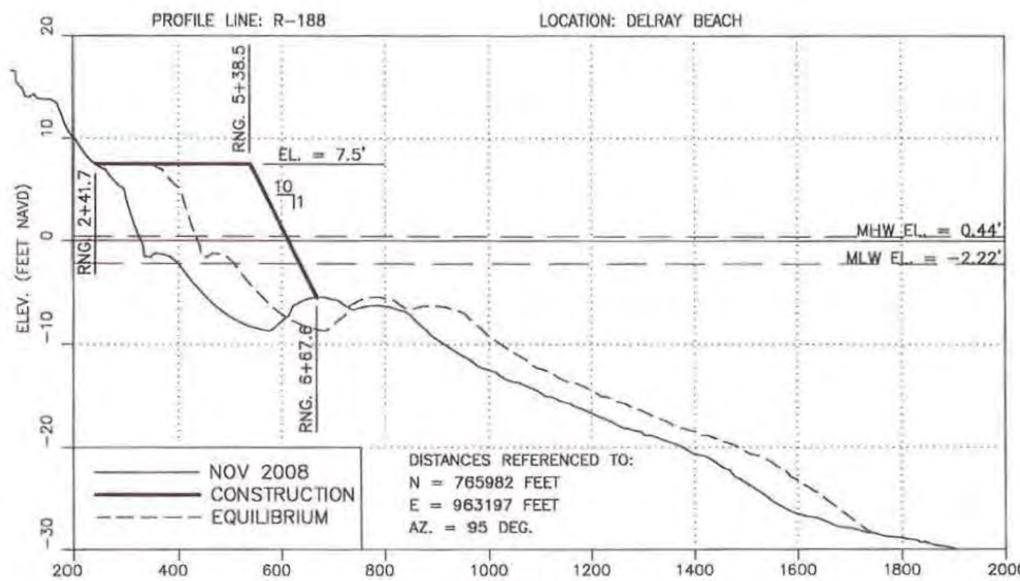

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THOMAS P. PIERRO P.E. NO. 64683 — 11/3/2010 DATE

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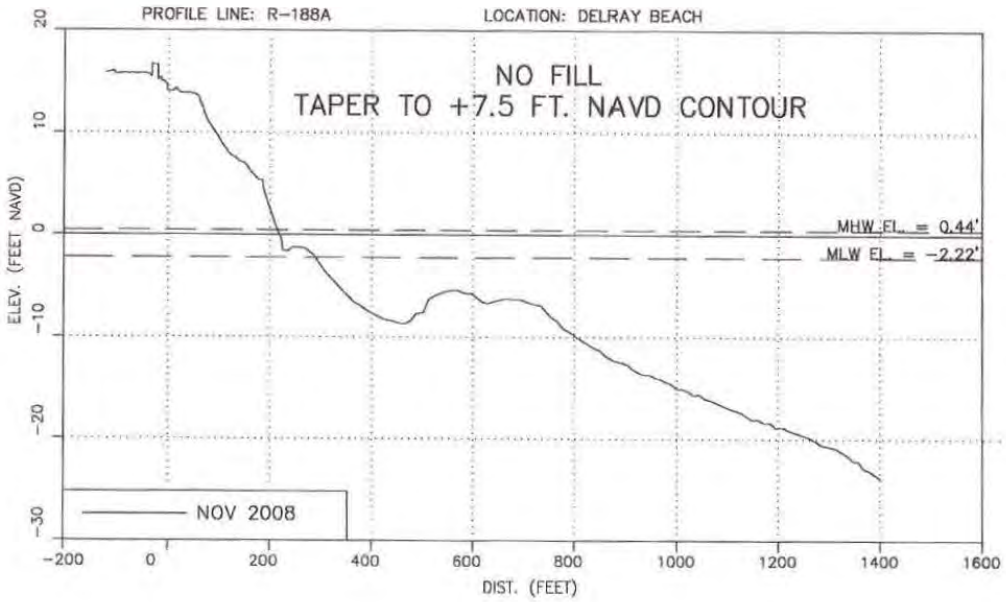
File #: SAJ-1989-90053 (IP-MJW)
Public Notice Drawings: Page 9 of 13

CITY OF DELRAY BEACH
FIFTH PERIODIC BEACH RENOURISHMENT PROJECT
FILL CROSS SECTIONS

COASTAL PLANNING & ENGINEERING, INC.

DATE: 3/22/10
BY: JRC
COMM NO.: 36



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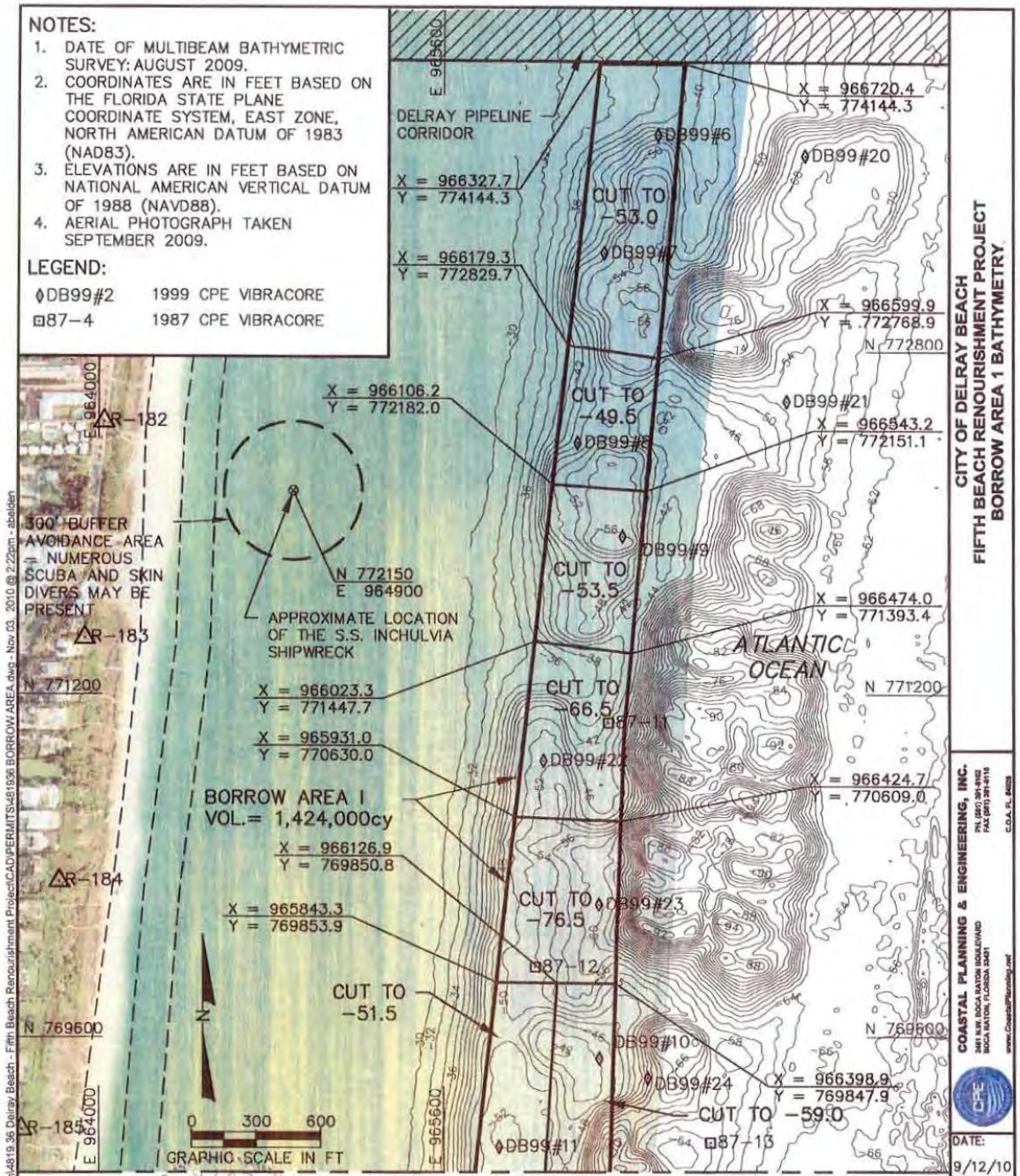
Public Notice Drawings: Page 10 of 13

CITY OF DELRAY BEACH
FIFTH PERIODIC BEACH RENOURISHMENT PROJECT
FILL CROSS SECTIONS

COASTAL PLANNING & ENGINEERING, INC.
PH. (561) 391-8102
FAX (561) 391-9116
C.O.A. FL. #6633
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
www.CoastalPlanning.com

DATE: 3/22/10
BY: JRC
NO.: 9.36
T: 0

P:\Palm Beach\Delray Beach\4819.36 Delray Beach - Fifth Beach Renourishment Project\CAD\PERMITS\481936 FILL XS.dwg - Nov 03, 2010 @ 2:04pm - hvollmer



CITY OF DELRAY BEACH
FIFTH BEACH RENOURISHMENT PROJECT
BORROW AREA 1 BATHYMETRY

COASTAL PLANNING & ENGINEERING, INC.
2481 NW BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH: (561) 391-8102
FAX: (561) 391-9116
C.O.A. FL. #4633
www.CoastalPlanning.net

DATE: 9/12/10
BY: AMB
COMM NO.: 1819.36
SHEET: 11

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

MELANY LARENAS P.E. NO. PE2397

11/3/10
DATE

REVISIONS

DATE	BY	DESCRIPTION

US Army Corps of Engineers.

February 28, 2011
File #: SAJ-1989-90053 (IP-MJW)
Public Notice Drawings: Page 11 of 13

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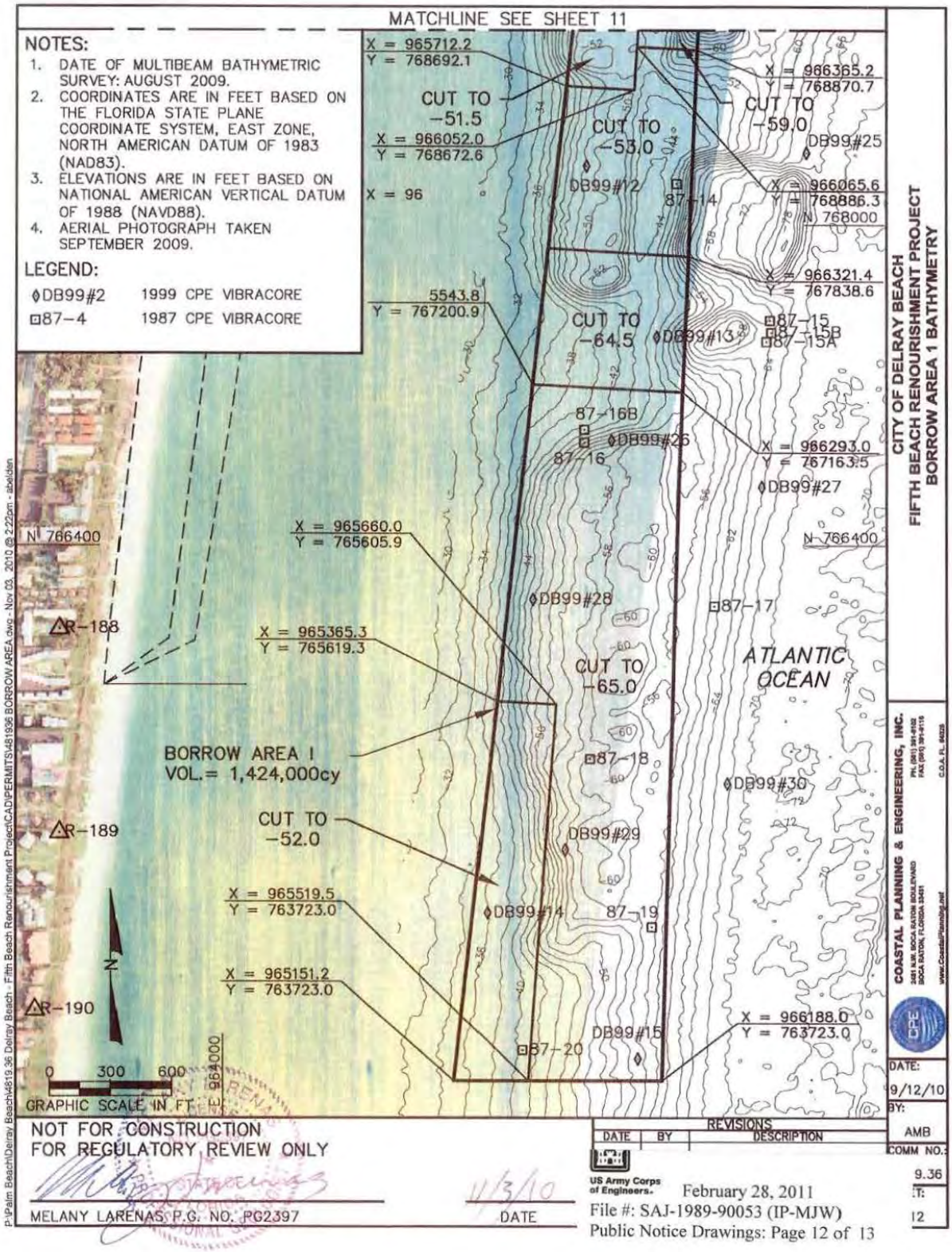
MATCHLINE SEE SHEET 11
NOTES:
1. DATE OF MULTIBEAM BATHYMETRIC SURVEY: AUGUST 2009.
2. COORDINATES ARE IN FEET BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
3. ELEVATIONS ARE IN FEET BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
4. AERIAL PHOTOGRAPH TAKEN SEPTEMBER 2009.
LEGEND:
◊DB99#2 1999 CPE VIBRACORE
□87-4 1987 CPE VIBRACORE
X = 965712.2
Y = 768692.1
CUT TO -51.5
X = 966052.0
Y = 768672.6
X = 96
CUT TO -53.0
DB99#12
87-14
X = 966365.2
Y = 768870.7
CUT TO -59.0
DB99#25
X = 966065.6
Y = 768886.3
N 768000
5543.8
Y = 767200.9
CUT TO -64.5
◊DB99#13
87-15
87-15B
87-15A
X = 966321.4
Y = 767838.6
87-16B
◊DB99#26
87-16
X = 966293.0
Y = 767163.5
◊DB99#27
N 766400
X = 965660.0
Y = 765605.9
◊DB99#28
87-17
R-188
X = 965365.3
Y = 765619.3
CUT TO -65.0
ATLANTIC OCEAN
BORROW AREA I
VOL.= 1,424,000cy
87-18
◊DB99#30
R-189
CUT TO -52.0
DB99#29
X = 965519.5
Y = 763723.0
◊DB99#14
87-19
X = 965151.2
Y = 763723.0
R-190
DB99#15
X = 966188.0
Y = 763723.0
87-20
964000
0 300 600
GRAPHIC SCALE IN FT
CITY OF DELRAY BEACH
FIFTH BEACH RENOURISHMENT PROJECT
BORROW AREA 1 BATHYMETRY
COASTAL PLANNING & ENGINEERING, INC.
DATE: 9/12/10
BY: AMB
COMM NO.: 9.36
T: 12
REVISIONS
DATE | BY | DESCRIPTION
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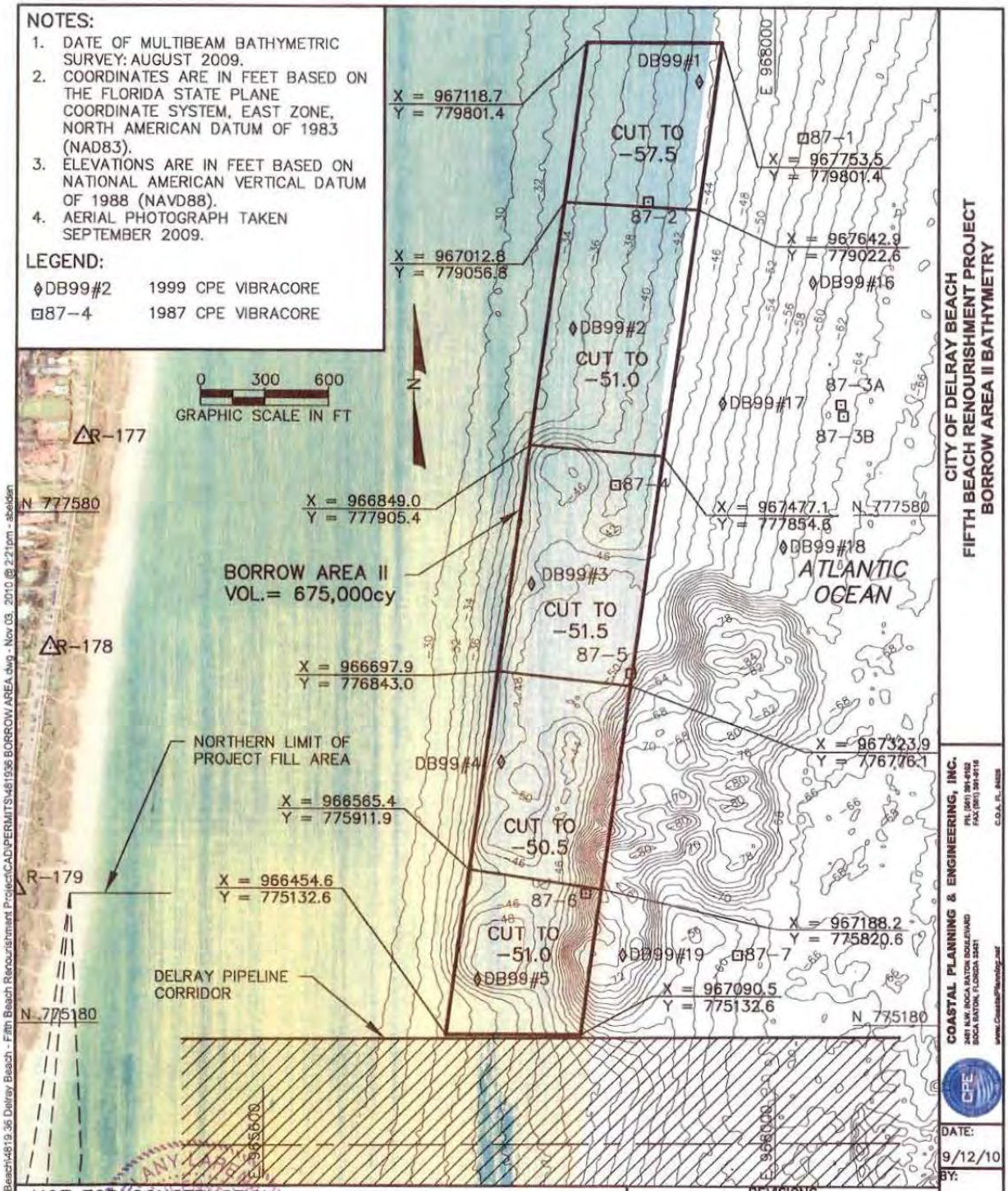
FOR REGULATORY REVIEW ONLY
MELANY LARENAS, P.G. NO. PG2397
11/3/10
DATE
US Army Corps of Engineers.
February 28, 2011
File #: SAJ-1989-90053 (IP-MJW)
Public Notice Drawings: Page 12 of 13
P:\Palm Beach\Delray Beach\4619.36 Delray Beach - Fifth Beach Renourishment Project\CAD\PERMITS\481906 BORROW AREA.dwg - Nov 03, 2010 @ 2:22pm - abelden


NOTES:
1. DATE OF MULTIBEAM BATHYMETRIC SURVEY: AUGUST 2009.
2. COORDINATES ARE IN FEET BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
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LEGEND:
◊DB99#2 1999 CPE VIBRACORE
⊡87-4 1987 CPE VIBRACORE
0 300 600
GRAPHIC SCALE IN FT
N
X = 967118.7
Y = 779801.4
DB99#1
CUT TO -57.5
⊡87-1
X = 967753.5
Y = 779801.4
E 968000
87-2
X = 967012.8
Y = 779056.8
X = 967642.9
Y = 779022.6
◊DB99#16
◊DB99#2
CUT TO -51.0
◊DB99#17
87-3A
87-3B
R-177
⊡87-4
N 777580
X = 966849.0
Y = 777905.4
X = 967477.1
Y = 777854.6
N 777580
◊DB99#18
ATLANTIC OCEAN
BORROW AREA II
VOL.= 675,000cy
◊DB99#3
CUT TO -51.5
87-5
R-178
X = 966697.9
Y = 776843.0
X = 967323.9
Y = 776776.1
NORTHERN LIMIT OF PROJECT FILL AREA
DB99#4
X = 966565.4
Y = 775911.9
CUT TO -50.5
R-179
X = 966454.6
Y = 775132.6
87-6
X = 967188.2
Y = 775820.6
CUT TO -51.0
◊DB99#19
⊡87-7
◊DB99#5
DELRAY PIPELINE CORRIDOR
X = 967090.5
Y = 775132.6
N 775180
N 775180
E 965600
E 966000
CITY OF DELRAY BEACH
FIFTH BEACH RENOURISHMENT PROJECT
BORROW AREA II BATHYMETRY
COASTAL PLANNING & ENGINEERING, INC.
DATE: 9/12/10
BY: AMB
COMM NO.: 119.36
SHEET: 13
REVISIONS
DATE BY DESCRIPTION
NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY
MELANY LARENAS P.E. NO. PG2397
4/3/10
DATE
US Army Corps of Engineers
February 28, 2011
File #: SAJ-1989-90053 (IP-MJW)
Public Notice Drawings: Page 13 of 13