FINDING OF NO SIGNIFICANT IMPACT

Use of Outer Continental Shelf Sand from the Southern Government Cut Extension Borrow Area in the Dade County (Florida) Beach Erosion Control and Hurricane Protection Project

Introduction

Pursuant to the National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500-1508), the U.S. Army Corps of Engineers (USACE) Jacksonville District, in coordination with the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), prepared an environmental assessment (EA) to determine whether authorizing use of Outer Continental Shelf (OCS) sand from the Southern Government Cut Extension (SGCE-1) borrow area in the Dade County (Florida) Beach Erosion Control and Hurricane Protection Project would have a significant effect on the human environment and whether an environmental impact statement (EIS) should be prepared. Pursuant to the Department of the Interior (DOI) regulations implementing NEPA (43 CFR 46), BOEMRE has independently reviewed the EA and determined that the document is suitable for adoption. Consistent with 43 CFR 46.320(2)(b), the Final EA (Attachment 1) has been augmented to incorporate supplemental information that clarifies responses to comments received on the Draft EA and addresses additional information that became available after the USACE finalized the EA. The supplemental information is attached to the EA (Attachment 2).

Proposed Action

The BOEMRE's proposed action is the issuance of a negotiated agreement to authorize use of the SGCE-1 borrow area so that the project proponents, the USACE and local sponsor, the Miami-Dade County, can obtain the necessary sand resources to nourish Priority Area 1, located along northern Miami Beach. The USACE's proposed action is the construction of the project, which includes nourishing Priority Areas 1 and 2. Priority Area 1, immediately south of Surfside will be nourished using up to 474,000 cubic yards of OCS sand from SGCE-1. Priority Area 2 will be nourished using sand from the accreting beach at Lummus Park, located along south Miami Beach.

The project is needed to reduce shoreline erosion, protect valuable property, and increase recreational beach width along the coastline in Dade County, Florida. The Dade County Beach Erosion Control and Hurricane Surge Protection Project was authorized by Section 301 of the rivers and Harbors Act of 1964, Public Law 89-298 (as amended by Section 156 of the Water Resources Development Act of 1976, Public Law 94-987 and Section 934 of the Water Resources Development Act of 1986, Public Law 99-662). The purpose of BOEMRE's proposed action is to respond to the project sponsors' request for use of OCS sand under the authority granted to the Department of the Interior by the Outer Continental Shelf Lands Act (OCSLA). Previous borrow areas used for the project have been depleted. The legal authority for the issuance of negotiated noncompetitive leases for OCS sand and gravel is provided by OCSLA (43 U.S.C. 1337(k)(2)).

Alternatives to the Proposed Action

In past NEPA analyses for the Dade County Beach Erosion Control and Hurricane Protection Project, a number of structural and non-structural alternatives have been considered and evaluated. The USACE has previously selected beach nourishment as the preferred alternative. The Miami-Dade Beach Erosion Control and Hurricane Surge Protection Project was initially constructed between 1975 and 1981 in a series of five construction cycles. The project area in Priority Areas 1 and 2 has had multiple maintenance nourishment projects to maintain the design profile between 1985 and 2008. Historically, offshore sand sources in state waters have been used for nourishment. The northern part of the SGC borrow area is in state waters and has been used in past maintenance cycles. The number of viable offshore borrow areas has substantially decreased over time due to sand resource depletion and environment conflicts. The Assistant Secretary of the Army for Civil Works directed the Jacksonville District to use remaining sand in the SCG-1 borrow area, while developing a longer-term strategy for beach nourishment activities including use of non-domestic sand. The USACE requested BOEMRE authorize use of SGCE-1 as part of this project consistent with this directive. The only practical alternative to BOEMRE's proposed action is to not issue the negotiated agreement. The potential impacts resulting from BOEMRE's no action actually depend on the course of action subsequently pursued by the project sponsors, which could include use of several offshore and/or upland sand sources or conduct a smaller project. The latter would not be consistent with the purpose and need. In the case of the no project option, coastal erosion would continue, sea turtle and shorebird nesting habitat would deteriorate, and the likelihood and frequency of property and storm damage would increase.

Environmental Effects

In 1975, the USACE evaluated the potential environmental effects resulting from beach nourishment and alternatives in its *Final Environmental Impact Statement* (EIS) – *Beach Erosion Control and Hurricane Surge Project Dade County, Florida*. The USACE has prepared several supplemental NEPA documents that evaluate the potential effects of the beach nourishment project, all of which have been incorporated by reference into the 2011 EA:

- Coast of Florida Erosion and Storm Effects Study, Region III, Feasibility Report with Final Environmental Impact Statement. U.S. Army Corps of Engineers, Jacksonville District, October 1996.
- Final Environmental Assessment, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Second Periodic Nourishment, Surfside and South Miami Beach Segments. U.S. Army Corps of Engineers, Jacksonville District, April 1997.
- Final Environmental Impact Statement, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Modifications at Sunny Isles, U.S. Army Corps of Engineers, Jacksonville District, July 1998.
- Final Environmental Assessment, Renourishment at Miami Beach in the vicinity of 63rd Street. Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. U.S. Army Corps of Engineers, Jacksonville District, November 2000.
- Final Environmental Assessment, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. Proposed Test Fill from a Domestic Upland Sand Source. U.S. Army Corps of Engineers, Jacksonville District, August 2002.

The EA analyzes all phases of operations: dredging, conveyance, and placement. The connected actions of conveyance and placement of sand are addressed in the above documents that are incorporated by reference. Based on the effects analysis presented in the attached EA (Attachment 1), no significant impacts were identified. The EA identifies all mitigation and monitoring that is necessary to avoid, minimize, and/or reduce and track any foreseeable adverse impacts that may result from all phases of construction. A subset of mitigation, monitoring, and reporting requirements, specific to activities under BOEMRE jurisdiction, will be incorporated into the negotiated agreement to avoid, minimize, and/or reduce and monitor any adverse impacts. These requirements are highlighted in Appendix A of the FONSI.

Significance Review

Pursuant to 40 CFR 1508.27, the BOEMRE evaluated the significance of potential environmental effects considering both CEQ context and intensity factors. The potential significance of environmental effects has been analyzed in both spatial and temporal context. Potential effects are generally considered reversible because they will be minor to moderate, localized, and short-lived. No long-term significant or cumulatively adverse effects were identified. The ten intensity factors were considered in preparing the EA and are specifically addressed below:

1. *Impacts that may be both beneficial and adverse. A beneficial effect of the proposed action will be an increase in knowledge of the geologic structure of the project area.*

Potential adverse effects to the physical environment, biological resources, cultural resources, and socioeconomic resources have been considered. Temporary reduction of water quality is expected due to turbidity during dredging and placement operations. Small, localized, temporary increases in concentrations of air pollutant emissions are expected, but the short-term impact by emissions from the dredge or the tugs would not affect the overall air quality of the area. A temporary increase in noise level and a temporary reduction in the aesthetic value during construction would occur. Adverse effects to benthic habitat and communities in the borrow area and nearshore are expected to be reversible. Short-term adverse effects on fish habitat and fishes are also expected within the dredged area due to removal of benthic habitat and in the fill placement area due to burial of existing benthic habitat. No significant adverse impacts to hard bottom communities are anticipated due to a 400-ft dredging buffer around the resources and pipeline collaring in established pipeline corridor. Temporary displacement of birds may occur near the shoal site or beach placement. Impacts would be short-term, localized and temporary and should have no lasting effects on bird populations in the area. No archaeological resources were identified in the borrow area or pipeline corridor. A dredge with GPS-positioning equipment would be used to ensure the dredge is operating in the authorized location. An unexpected finds clause would be implemented in the case an archaeological resource is discovered during operations. Potential effects to sea turtles, migratory birds, marine mammals, and cultural resources in the vicinity of operations have been reduced through tested mitigation. Effects to sea turtles, marine mammals, nesting and courting shorebirds, nearshore and offshore hard bottom and reef communities, and water quality will also be monitored following a detailed Physical and Biological Monitoring Program (Appendix E of the EA). If hard bottom and reef communities are adversely affected in the vicinity of nearshore pipeline operations, a Contingent Mitigation Policy will be implemented in close coordination with stakeholders (Appendix E of the EA).

2. *The degree to which the proposed action affects public health or safety.*
The proposed activities are not expected to significantly affect public health. Construction noise will temporarily increase ambient noise levels and equipment emissions decrease air quality in the immediate vicinity of placement activities. The public is typically prevented from entering the segment of beach under construction, so recreational activities will not be occurring in close proximity to operations.

3. *Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.*
No prime or unique farmland, designated Wild and Scenic reaches, or wetlands would be impacted by implementation of this project. Critical habitat for the staghorn and elkhorn corals may be located within the project area, although no elkhorn coral was directly observed during pre-construction surveys. Hard bottom and other reef habitat in the vicinity of dredging, pump-out and pipeline operations have been designated as Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). All hard bottom and reef communities must be avoided be 400 feet during all operations, except in the designated pipeline corridor. Potential impacts to nearshore hard bottom and benthic communities will be further minimized by using collared pipelines in established pipeline corridors. Mature staghorn coral colonies will be relocated prior to the temporary pipeline emplacement. The USACE and local sponsor have previously constructed offshore artificial reefs to compensate for potential deleterious effects on these important resources. Both the pipeline corridors and borrow area will be monitored for effects during pump-out, placement, and beach shaping operations. A Contingency Mitigation Plan for corals and hard bottom habitat will be implemented if monitoring within the pipeline corridor indicates that project impacts are more severe than anticipated (Appendix E of EA). Benthic re-colonization in the borrow area should occur within a few years given recruitment from adjacent undisturbed communities. Demersal and pelagic fishes may temporarily avoid the dredged area because of locally reduced prey availability, but are expected to return following benthic re-colonization. No cultural resources are known to exist in the project area.

4. *The degree to which the effects on the quality of the human environment are likely to be highly controversial.*
No effects are expected that are scientifically controversial. Effects from beach nourishment projects, including similar construction cycles in the same project area, are well studied. The effects analyses in the EA has relied on the best available scientific information, including information collected from previous dredging and nourishment activities in and adjacent to the project area. Numerous studies and monitoring efforts have been undertaken along northeast Florida evaluating the effects of dredging and beach nourishment on shoreline change, benthic, hard bottom, and reef communities, nesting and swimming sea turtles, and shorebirds.

5. *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.*
Beach nourishment is a long practiced solution to coastal erosion along Miami Beach and the southeast Florida coast. No significant and persistent adverse effects have been documented during or as a result of past operations. The project design and plan is typical of beach

nourishment activities. Mitigation and monitoring efforts are similar to that undertaken for past projects and have been demonstrated to be effective. The effects of the proposed action are not expected to be highly uncertain, and the proposed activities do not involve any unique or unknown risks.

6. *The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.*
No precedent for future action or decision in principle for future consideration is being made in BOEMRE's decision to authorize use of the borrow area. The BOEMRE considers each use of a borrow area on the OCS as a new Federal action, despite the fact that Congress has authorized the USACE to design, construct, and maintain the beach nourishment project at necessary intervals over 50 years. The Bureau's authorization of the use of the borrow area does not dictate the outcome of future leasing decisions. Future actions will also be subject to the requirements of NEPA and other applicable environmental laws.

7. *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.*
Significance may exist if it is reasonable to anticipate cumulatively significant impacts that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. The EA and supplement identifies those actions and summarizes potential impacts related to underlying activities. The EA and previous NEPA documents conclude that the activities related to the proposed action are not reasonably anticipated to incrementally add to the effects of other activities to the extent of producing significant effects. Because the seafloor is expected to equilibrate and moving sand will slowly accumulate in SGCE-1, the proposed project provides an incremental, but localized effect on the reduction of offshore sand resources. Although there will be a short-term and local decline in benthic habitat and populations (including reef communities), both are expected to recover within a few years. An adverse effect will be compensated for with the creation of additional artificial reef. No significant, long-term cumulative impacts to benthic habitat are expected from the use of the borrow site.

8. *The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.*
The proposed action is not expected to adversely affect historic resources. Seafloor-disturbing activities (e.g., dredging, anchoring, pipeline emplacement and relocation) may occur during proposed construction activities. The greatest risk to cultural resources exists in the borrow area where dredging will occur; however, geophysical and diver surveys have not identified any cultural resources within the borrow area. No bottom-disturbing activities will occur on the OCS outside of the surveyed borrow area. Archival research did not identify any other historic resources are in the project area, including the pipeline corridor which has been surveyed as well. The USACE, acting as the lead agency for complying with the National Historic Preservation Act, has coordinated with the Florida State Historic Preservation Office (SHPO). The Florida SHPO concurred with the Corps' no effects determination. The BOEMRE will require implementation of a chance-finds procedure which calls for immediate cessation of operations and notification in the event of an unanticipated discovery of a cultural resource.

9. *The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.* Nesting and swimming sea turtles, manatees, staghorn and elkhorn corals, smalltooth sawfish, as well as right whales may be present in the project area during and after construction operations and may be adversely affected. There is critical habitat in the project area for staghorn and elkorn corals. The USACE and BOEMRE have formally consulted with the NMFS and U.S. Fish and Wildlife Service (FWS) pursuant to the Endangered Species Act (ESA). Both resources agencies have issued Biological Opinions addressing the effects of the proposed activities. NMFS and FWS authorized incidental take of protected sea turtles and their nesting habitat without jeopardizing the species' continued existence. Although the risk of entrainment, strike, and degradation of nesting habitat cannot be entirely eliminated, the risk of lethal and sub-lethal take will be greatly diminished through adoption and effective implementation of the mitigation required by NMFS and FWS. NMFS authorized incidental take of protected corals without jeopardizing the species' continued existence and supports the USACE's plan to a re-locate and transplant larger corals. Although the proposed action may adversely affect endangered or threatened species or designated critical habitat, the nature of potential impacts is not significant given the implementation of effective mitigation.

10. *Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.*
As a Federal agency, the USACE must comply with all applicable Federal, State, and local laws and requirements. The USACE and BOEMRE have consulted with NMFS and U.S. FWS pursuant to the ESA and MSA. A Joint Coastal Permit (JCP) and consistency concurrence from the Florida Department of Environmental Protection (FDEP) has been obtained for the proposed action. The JCP Final Order has been issued and is available at ttp://www.dep.state.fl.us/beaches/permitting/. The JCP includes substantive mitigation and monitoring requirements, including measures to ensure state water quality standards are not violated. The USACE will also implement their Migratory Bird Protection Policy to avoid and monitor for potential effects on migratory birds. The proposed action is in compliance with the Marine Mammal Protection Act. Marine mammals are not likely to be adversely affected by the project and incorporation of safeguards to protect threatened and endangered species during project construction would also protect marine mammals in the area.

Consultations and Public Involvement

The Draft EA was made available to the public on December 28, 2009 for a 60-day comment period. All comments that BOEMRE provided on the Draft EA have been adequately addressed. The USACE, serving as the lead Federal agency, and the BOEMRE, in a consulting role, coordinated with the U.S. FWS, NMFS, Florida Clearinghouse and Florida DEP, and the Florida SHPO in support of this decision. Application for the Joint Coastal Permit was also noticed to the public. Pertinent correspondence with Federal and state agencies are provided in Appendix F of the EA. After signature of this Finding of No Significant Impact (FONSI), a Notice of Availability of the FONSI and EA will be prepared and published by the BOEMRE in the Federal Register or by other appropriate means. The EA and FONSI will be posted to the BOEMRE web site [http://www.boemre.gov/sandandgravel/MarineMineralProjects.htm].

Conclusion
The BOEMRE has considered the consequences of issuing a negotiated agreement to authorize use of OCS sand from the SGCE-1 Borrow Area. The BOEMRE jointly prepared and independently reviewed the EA and finds that it (with the supplemental information provided) complies with the relevant provisions of the CEQ regulations implementing NEPA, DOI regulations implementing NEPA, and other Marine Mineral Program requirements. Based on the NEPA and consultation process coordinated cooperatively by the USACE and BOEMRE, appropriate terms and conditions enforceable by the BOEMRE will be incorporated into the negotiated agreement to avoid, minimize, and/or mitigate any foreseeable adverse impacts.

Based on the evaluation of potential impacts and mitigating measures discussed in the EA, the BOEMRE finds that entering into a negotiated agreement, with the implementation of the mitigating measures, does not constitute a major Federal action significantly affecting the quality of the human environment, in the sense of NEPA Section 102(2)(C), and will not require preparation of an EIS.

July 15, 2011

James F. Bennett
Acting Chief, Environmental Division

Date

Appendix A
Mitigation, Monitoring, and Reporting Requirements

The following mitigation measures, monitoring requirements, and reporting requirements are proposed by the BOEMRE to avoid, reduce, or eliminate environmental impacts associated with the Proposed Action (herein referred to as the "Project"). Mitigation measures, monitoring requirements, and reporting requirements in the form of terms and conditions are added to the negotiated agreement and are considered enforceable as part of the agreement.

Plans and Performance Requirements

The USACE will provide the Bureau with a copy of the Project's "Construction Solicitation and Specifications Plan," including final project drawings, prior to construction (herein referred to as the "Plan"). No activity or operation authorized by this MOA at SGC-Ext Borrow Area shall be carried out until the Bureau has had an opportunity to review the Plan. The USACE will ensure that all operations at SGC-Ext Borrow Area are conducted in accordance with the final approved Plan and all terms and conditions in this MOA, as well as all applicable regulations, orders, guidelines, and directives specified or referenced herein.

The dredging method from the SGC-Ext. Borrow Area will be consistent with NEPA and authorizing documents as well as the project permits. The USACE will allow the Bureau to review and comment on modifications to the Plan that may affect the project area, including the use of submerged or floated pipelines to directly convey sediment from the borrow area to the placement site. Said comments shall be delivered in a timely fashion in order to not delay the USACE's construction contract or schedule. If dredging and/or conveyance methods are not wholly consistent with that evaluated in relevant NEPA documents and environmental and cultural resource consultations (described in Title IV. C. 2) and authorized by the JCP Final Order, additional environmental review may be necessary. If the additional NEPA consultations or permit modifications would impact or otherwise supplement the provisions of this MOA, an amendment may be required.

Environmental Responsibilities and Environmental Compliance

The USACE is the lead agency on behalf of the Federal Government to ensure the Project complies with applicable environmental laws, including but not limited to the ESA, MSFMCA, MBTA, MMPA, NHPA, and CZMA.

The USACE will serve as the lead Federal agency for ESA Section 7 consultation concerning protected species under the purview of U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). The USACE will instruct its contractor(s) to implement the mitigation and monitoring terms, conditions, and measures required by USFWS, NMFS, Florida Department of Environmental Protection (FDEP), and the Bureau pursuant to applicable Federal and state laws and regulations. The required mitigation terms, conditions, and measures are reflected in the attached Biological Opinions, Conservation Recommendations (and related correspondence), and JCP Final Order No.: 0295427-001-JC.

The USACE is responsible for compliance with the specific conditions of the JCP, including implementation of turbidity monitoring and the Sediment Quality Assurance/Quality Control Plan. Miami-Dade Department of Environmental Resources Management (DERM) is responsible for compliance with certain monitoring and contingency mitigation requirements for the Project, including implementation of the requirements of the Final Physical and Biological Monitoring Plan and Contingency Mitigation Plan. Prior to the commencement of the Project, the USACE and DERM will invite the Bureau to participate in any conference with FDEP to review specific conditions and monitoring requirements. Construction shall not commence until the pre-construction requirements of the Final Physical and Biological Monitoring Plan have been completed.

Copies of all relevant correspondence, monitoring reports, and other technical reports shall be provided to the Bureau at dredgeinfo@boemre.gov within 30 days of its completion. If physical and/or biological monitoring confirms that unexpected adverse impacts are occurring in the vicinity of the SGC-Ext Borrow Area, the USACE and DERM will invite the Bureau to participate in any effort to further study the impacts and/or undertake corrective, remedial, and/or compensatory action.

Notification of Activity in or near the Borrow Area

The USACE will notify the Bureau at dredgeinfo@boemre.gov of the commencement and termination of operations at SGC-Ext Borrow Area within 24 hours after the USACE receives such notification from its contractor(s) for the Project. The Bureau will notify the USACE in a timely manner of any OCS activity within the jurisdiction of the DOI that may adversely affect the USACE ability to use OCS sand resources for the Project.

Dredge Positioning

During all phases of the Project, the USACE will ensure that the dredge and any bottom disturbing equipment is outfitted with an onboard global positioning system (GPS) capable of maintaining and recording location within an accuracy range of no more than plus or minus 3 meters. The GPS must be installed as close to the cutterhead or draghead as practicable. An exclusionary buffer of 400 feet has been established around documented hardbottom and reef features adjacent to the proposed borrow area. The borrow area design reflects the required buffer. During dredging operations, the USACE will immediately notify the Bureau at dredgeinfo@boemre.gov if dredging occurs outside of the approved borrow area. Anchoring, spudding, or other bottom disturbing activity is to be avoided outside the authorized borrow area on the OCS.

The USACE will provide the Bureau all Dredging Quality Management (DQM) data acquired during the project using procedures jointly developed by the USACE's 's National Dredging Quality Management Data Program Support Center and the Bureau. The USACE will submit the DQM data, including draghead status and depth, to dredgeinfo@boemre.gov biweekly. A complete DQM dataset will be submitted within 45 days of completion of the Project.

Local Notice to Mariners

The USACE shall require its contractor(s) for the Project to place a notice in the U.S. Coast Guard Local Notice to Mariners regarding the timeframe and location of dredging and construction operations in advance of commencement of dredging.

Marine Pollution Control and Contingency Plan

The USACE will require its contractor(s) and subcontractor(s) to prepare for and take all necessary precautions to prevent discharges of oil and releases of waste and hazardous materials that are unpermitted. In the event of an occurrence, notification and response will be in accordance with applicable requirements of 40 C.F.R. Part 300. All dredging and support operations shall be compliant with U.S. Coast Guard regulations and the Environmental Protection Agency's Vessel General Permit, as applicable. The USACE will notify the Bureau of any occurrences and remedial actions and provide copies of reports of the incident and resultant actions at dredgeinfo@boemre.gov.

Encounter of Ordinance

If any ordinance is encountered while conducting dredging activities at SGC-Ext Borrow Area, the USACE will report the discovery within 24 hours to Chief, BOEMRE Leasing Division, at (703) 787-1215 and dredgeinfo@boemre.gov.

Archeological Resources

Onshore Prehistoric or Historic Resources

If the USACE discovers any previously unknown historic or archeological remains while accomplishing activity on Miami-Dade Beaches, the USACE will notify the Bureau of any finding. The USACE will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

Offshore Prehistoric or Historic Resources

The final borrow area design includes the required buffer. In the event that the dredge operators discover any archaeological resource while conducting dredging operations in SGC-Ext Borrow Area, the USACE shall require that dredge and/or pump-out operations be halted immediately and avoid the resource per the requirements of the USACE specifications for unanticipated finds. The USACE shall then immediately report the discovery to Chief, BOEMRE Leasing Division, at (703) 787-1215. If investigations determine that the resource is significant, the parties shall together determine how best to protect it.

Bathymetric Surveys

The USACE will provide the Bureau with pre- and post-dredging bathymetric surveys of SGC-Ext Borrow Area. The pre-dredging survey will be conducted within 90 days prior to dredging. The post-dredging survey will be conducted within 60 days after the completion of dredging.

The USACE will also provide the Bureau a bathymetric survey performed between 1 year and 3 years following the completion of dredging. Hydrographic surveys will be performed in accordance with the USACE Hydrographic Surveying Manual EM 1110-2-1003 unless specified otherwise. One hundred percent coverage using interferometric swath or multibeam bathymetry data is preferred over single-beam data. All bathymetric data shall be roll, pitch, heave, and tide corrected. Survey lines of the specific dredge area, within Unnamed Shoal A, will be established at no greater than 50 meters intervals perpendicular to a baseline. Three equidistant cross-tie lines will be established parallel to the same baseline. Survey lines will extend at least 50 meters beyond the edge of the dredge areas. All data shall be collected in such a manner that post-dredging bathymetry surveys are compatible with the pre-dredging bathymetric survey data to enable the latter to be subtracted from the former to calculate the volume of OCS sand resources removed the shape of the excavation, and the nature of post-dredging bathymetric change.

Copies of pre-dredging and post-dredging hydrographic data will be submitted to the Bureau via dredgeinfo@boemre.gov within 30 days after each survey is completed. The delivery format for data submission is an ASCII file containing x,y,z data. The horizontal data will be provided in the North American Datum of 1983 (NAD ’83) Florida State Plane, U.S. survey feet. Vertical data will be provided in the North American Vertical Datum of 1988 (NAVD ’88), U.S. survey feet. An 8.5x11” plan view plot of the pre- and post-construction data will be provided showing the individual survey points, as well as contour lines at appropriate elevation intervals. These plots will be provided in PDF format.

Submittal of Production and Volume Information

The USACE, in cooperation with the dredge operator, shall submit to the Bureau on a biweekly basis a summary of the dredge track lines, outlining any deviations from the original Plan. A color-coded plot of the cutterhead or drag arms will be submitted, showing any horizontal or vertical dredge violations. The dredge track lines shall show dredge status: hotelling, dredging, transiting, or unloading. This map will be provided in PDF format.

The USACE will provide at least a biweekly update of the construction progress including estimated volumetric production rates to the Bureau. The biweekly deliverables will be provided electronically to dredgeinfo@boemre.gov.

The project completion report, as described below, will also include production and volume information, including Daily Operational Reports.

Prior to the commencement of construction, the USCAE shall provide a summary of the construction schedule. The USACE, at the reasonable request of the Bureau, shall allow access, at the site of any operation subject to safety regulations, to any authorized Federal inspector and shall provide the Bureau any documents and records that are pertinent to occupational or public health, safety, or environmental protection as may be requested.

Project Completion Report

A project completion report will be submitted by the USACE to the Bureau within 120 days following completion of the activities authorized under this MOA. This report and supporting materials should be sent to Chief, BOEMRE Leasing Division, 381 Elden Street, MS 4010, Herndon, Virginia 20170 and dredgeinfo@boemre.gov. The report shall contain, at a minimum, the following information:

- the names and titles of the project managers overseeing the effort (for the USACE, the engineering firm (if applicable), and the contractor), including contact information (phone numbers, mailing addresses, and email addresses);
- the location and description of the project, including the final total volume of material extracted from the borrow area and the volume of material actually placed on the beach or shoreline (including a description of the volume calculation method used to determine these volumes);
- ASCII files containing the x,y,z and time stamp of the cutterhead or drag arm locations;
- a narrative describing the final, as-built features, boundaries, and acreage, including the restored beach width and length;
- a table, an example of which is illustrated below, showing the various key project cost elements;

	Cost Incurred as of Construction Completion ($)
Construction	
Engineering and Design	
Inspections/Contract Administration	
Total	

- a table, an example of which is illustrated below, showing the various items of work construction, final quantities, and monetary amounts;

Item No.	Item	Estimated Quantity	Final Quantity
1	Mobilization and Demobilization		
2	Beach Fill		
3	Any beach or offshore hard structure placed or removed		

- a listing of construction and construction oversight information, including the prime and subcontractor(s), contract costs, etc.;
- a list of all major equipment used to construct the project;
- a narrative discussing the construction sequences and activities, and, if applicable, any problems encountered and solutions;
- a list and description of any construction change orders issued, if applicable;

- a list and description of any safety-related issues or accidents reported during the life of the project;
- a narrative and any appropriate tables describing any environmental surveys or efforts associated with the project and costs associated with these surveys or efforts;
- a table listing significant construction dates beginning with bid opening and ending with final acceptance of the project by the USACE;
- digital appendices containing the as-built drawings, beach-fill cross-sections, and survey data; and
- any additional pertinent comments.

ATTACHMENT 1

FEBRUARY 2011

BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT
DADE COUNTY, FLORIDA

CONTRACT E BEACH RENOURISHMENT PROJECT

FINAL ENVIRONMENTAL ASSESSMENT

U.S. ARMY CORPS
OF ENGINEERS
Jacksonville District

U.S. DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE

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ON
BEACH RENOURISHMENT OF MIAMI-DADE COUNTY
MIAMI BEACH, FLORIDA
MIAMI BEACH, MIAMI-DADE COUNTY, FLORIDA

1 PROJECT PURPOSE AND NEED

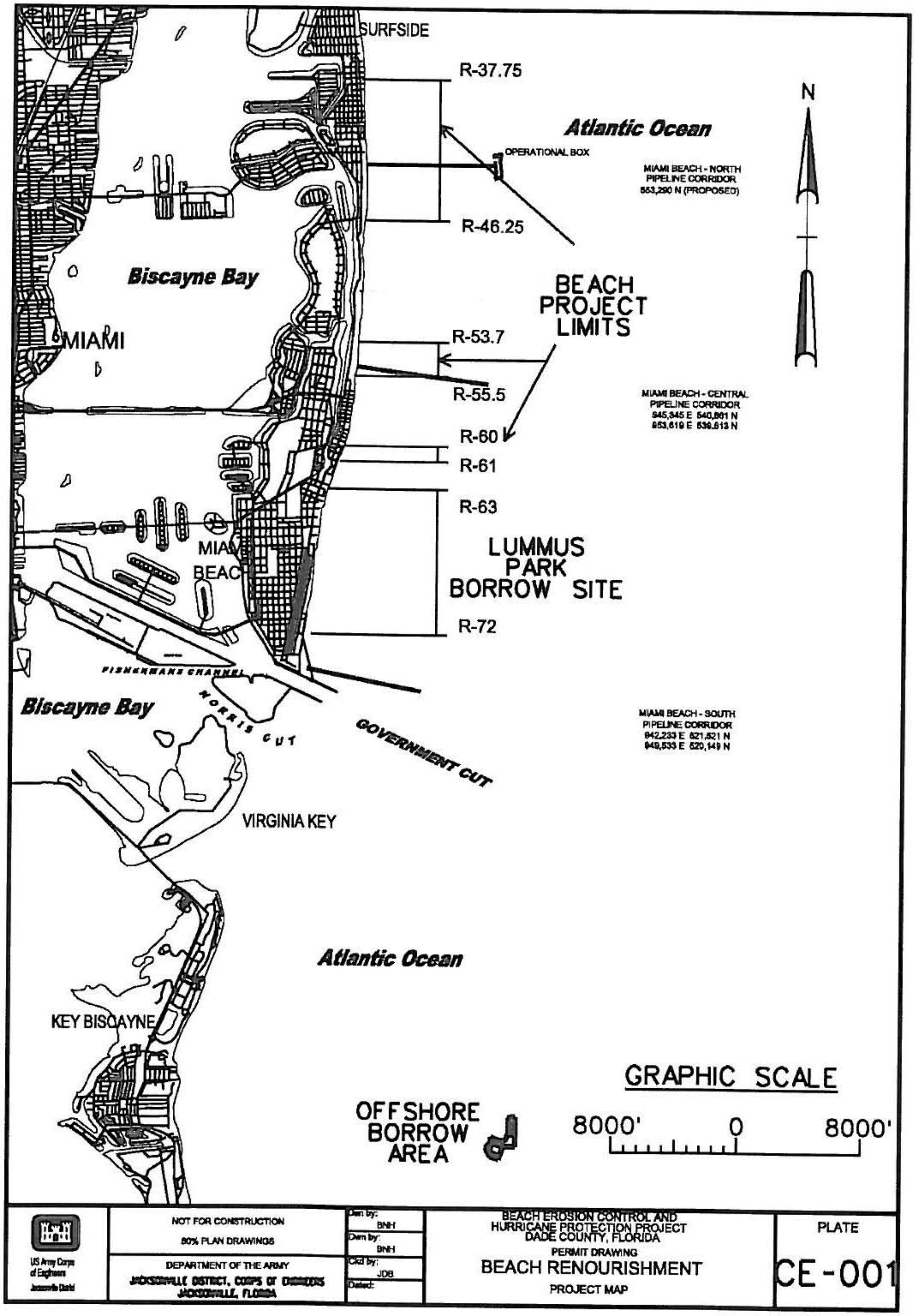
1.1 PROJECT LOCATION.

Miami-Dade County is located along the southeast coast of Florida, and contains the City of Miami. Broward County (Ft Lauderdale) lies to the north, and Monroe County (Florida Keys) lies to the south of Miami-Dade County. The Miami-Dade County shoreline extends along two long peninsular barrier island segments and three smaller islands, each of which is separated from the mainland by Biscayne Bay. The City of Miami is located on the mainland, and a number of coastal communities are located along the barrier islands. These barrier islands vary in width from about 0.2 to 1.5 miles, with an average width of 0.5 miles. Elevations along the entire coastal region (and much of the mainland) are low, generally less than 10 feet. Along the coastal region elevations are generally the highest along the coastline, sloping gradually downward toward the bay (Figure 1).

1.2 PROJECT AUTHORITY.

The Beach Erosion Control and Hurricane Protection (BEC) Project for Dade County, Florida was authorized by the Flood Control Act of 1968. Bureau of Ocean Energy Management Regulation and Enforcement (BOEM), Department of the Interior (DOI) will serve as a cooperating agency under NEPA, with the Corps of Engineers as the lead agency due to the use of an offshore borrow area located in federal waters (greater than three miles offshore) referred to as "South of Government Cut – Extension" (SGC1-Extension). The BOEM is authorized under Public Law 103-426 to negotiate on a non-competetive basis the rights to Outer Continental Shelf (OCS) sand resources for shore protection projects. The BOEM' action is required because Miami-Dade County and the Corps submitted a request to BOEM for authorization of use.

Figure 1: Vicinity Map And Plan View



1.3 PROJECT NEED OR OPPORTUNITY.

Inlet construction and maintenance along Florida's coasts has resulted in the instability of beach sands as well as changes in sediment transport and deposition patterns along beaches. Natural events such as winter storms and hurricanes also affect sediment deposition along beaches. As a result of these two effects, beaches along the east coast are continually eroding and require active management. The management of beaches has been a collaborative effort between county, state and federal partners.

There are four areas along the Miami-Dade County BEC that are designated as erosional hot spots in need of immediate nourishment to protect coastal structures. Due to the scarcity of beach quality sand in Miami-Dade County – the County is working with the Corps on longer term plans to completely renourish the entire project in the future, however until that can be completed – these hot spots must be addressed. This Environmental Assessment (EA) addresses the two highest priority areas for renourishment (Figure 1).

Priority Area #1 has undergone four nourishment events starting with the original project nourishment in 1974 with subsequent renourishment events listed in the table below. USFWS has also previously reviewed activities proposed for this priority area under Department of the Army Permit #SAJ-1999-3761 issued on 08/04/2006 and modified on 09/06/2007 as well as Florida Department of Environmental Protection Permit #0233882-004-JC issued on 09/22/2006 and expires on 09/22/2011.

Date	Cubic Yardage Placed	R-Monument Boundaries
1975-1982	Original nourishment	
1985	110,000	R42-R46
1998	18,000	R44-R45
2001	192,000	

* Source: Dade County Beach Erosion Control Master Plan

Renourishment of Priority Area #2 was the subject of an Environmental Assessment completed by the Corps in 2002. In addition to review of the EA for the Test Beach, USFWS has also previously reviewed activities proposed for this priority area under well as Florida Department of Environmental Protection Permit #0126527-JC issued on 11/20/2000. This permit expired on August 30, 2010. This area has undergone numerous nourishment events starting with the original project nourishment in 1974 with subsequent renourishment events listed below.

Date	Cubic Yardage Placed	R-Monument Boundaries
1975-1982	Original Nourishment	
1985	50,000	R57-R60
1994	122,096	R55-R56
1994	30,000	R54-R59
1996	8,000	R54-R60
1997	30,000	R57-R59
1997	478,938	R53-R58
2001	125,000	
2005	35,000	
2006	35,000	R48.7-R61
2008	70,000	R60-R70

* Source: Dade County Beach Erosion Control Master Plan

Miami-Dade County has effectively depleted known sand supplies in traditional offshore borrow areas resulting in a need for approximately 11,800,000 cubic yards of material over the next 24 years (36 years for the 2.4-mile Sunny Isles segment) for renourishment of the Dade County Beach Erosion Control (BEC) and Hurricane Protection (HP) Project for the remaining period of Federal participation nor for the foreseeable future need of Miami-Dade County. The periods of federal participation and need of 11.8 million cubic yards (MCY) were calculated based on projections from the year 2001. Since 2001, no significant renourishment has been completed in the project area due to a lack of sand. Therefore the need still applies and has likely increased. Non-domestic sand represents a potentially viable source to fulfill the project's deficit. Two Congressional directives currently restrict investigation of non-domestic sources for use on the Miami-Dade County project:

Section 935 of WRDA '86: "*Notwithstanding any other provision of law, in any case in which the use of fill material for beach erosion and beach nourishment is authorized as a purpose of an authorized water resource project, the Secretary is authorized to acquire by purchase, exchange, or otherwise from non-domestic sources and utilize such material for such purposes if such materials are not available from domestic sources for environmental or economic reasons*."

Conferee Report on the FY 99 Energy and Water Appropriations Bill (H8842): "*The conferees direct that none of the funds provided for the Dade County, Florida project be used for acquisition of foreign source materials for the project unless the Secretary of the Army provides written certification to the Committees on Appropriations that domestic sources of material are not available*."

As a result of the depleted sand source options to address the 11.8 MCY need, in a letter dated 10 December 2007, the Assistant Secretary of the Army for Civil Works (ASA-CW) directed the Corps to assess remaining sand needs at Miami-Dade County through a three-tiered approach to resolve the County's immediate need for sand and to propose a longer-term plan for future sand replenishment needs. First, the remaining sand in the SCG-1 borrow area would be utilized for placement at the Contract E project to begin to restore the project profile. Additional nearby material from smaller borrow sources would also be utilized. Secondly, a study should be initiated to examine the viability of non-domestic sand sources for intermediate and longer-term renourishment needs. This examination would include all necessary NEPA coordination and completion of an appropriate NEPA document. Finally, in addition to non-domestic sand sources, the remaining Florida domestic sand sources should be evaluated through a comprehensive regional management plan address the longer term renourishment needs along the Atlantic coast of Florida.

1.4 AGENCY GOAL OR OBJECTIVE.

The agency goals are to restore two eroded hotspot priority areas along Miami-Dade beaches (see Figure 1). Figure 2 shows a typical cross-section of beach under current conditions and with sand placement. The priority renourishment areas are as follows:

Priority Area #1 is located in northern Miami Beach, from 90th street to 63rd street, (State R-Monuments 37.75 through 46.25), consisting of approximately 8,500 feet of beach.

Priority Area #2 is located from approximately 57th street to 45th street, R53.7 to R55.5, consisting of approximately 1,800 feet and from approximately 29th street to 26th street, R60 to R61, approximately 1,000 feet.

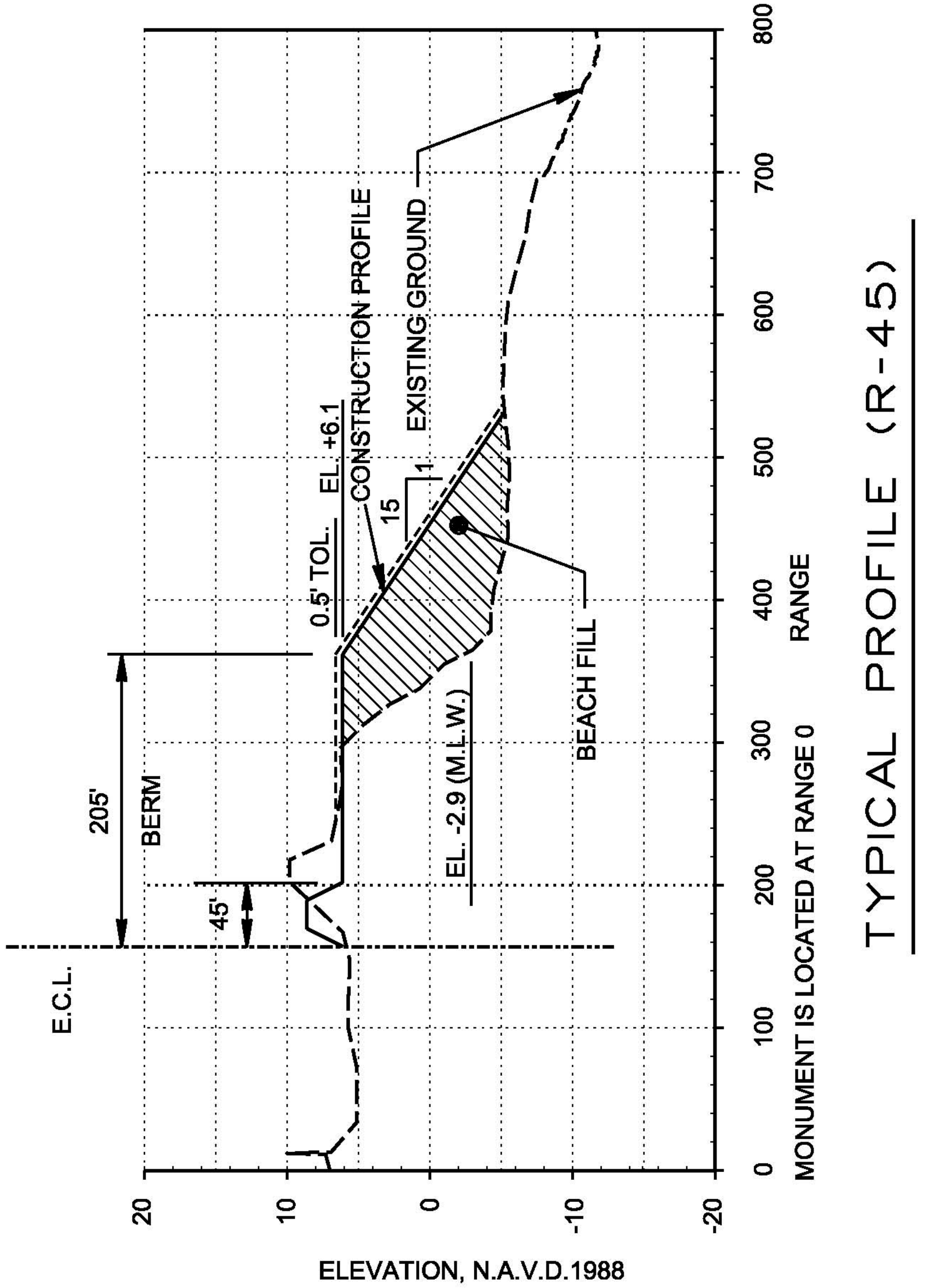
1.5 RELATED ENVIRONMENTAL DOCUMENTS.

The following is a list of related environmental documents which are incorporated by reference:

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

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

Figure 2: Beach Fill Typical Cross Section



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

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

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

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

g. Final Environmental Impact Statement, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Modifications at Sunny Isles, July 1998.

h. Final Environmental Assessment, Renourishment at Miami Beach in the Vicinity of 63rd Street, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida, November 2000.

i. Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. Proposed Test Fill from a Domestic Upland Sand Source. Environmental Assessment. U.S. Army Corps of Engineers, Jacksonville District, August 2002.

j. Proposed Modifications to 5 Groins Between Beach Monuments R-27 and R-31.5 Bal Harbour Beach Erosion Control Project Bal Harbour, Dade County Florida. Environmental Assessment. U.S. Army Corps of Engineers, Jacksonville District, 2005.

1.6 DECISIONS TO BE MADE.

The Corps' decision in this EA is whether to renourish critically eroded hotspots, priority areas #1 and #2, along Miami-Dade beaches and, if so, evaluate alternatives to accomplish that goal within the limitations of the ACA-CW's 2007 memorandum directing the Corps to utilize the remaining offshore domestic sand sources. Borrow areas SGC1-Extension and the Lummus Park/South Miami Beach are the proposed sand sources for renourishment of areas #1 and #2. The BOEM, as a cooperating federal agency, must decide whether or not to issue a negotiated agreement with the Corps authorizing the use of the SGC-1 Extension borrow area as sand source for the renourishment project.

1.7 SCOPING AND ISSUES.

1.7.1 ISSUES EVALUATED IN DETAIL.

The following issues were identified to be relevant to the proposed action and appropriate for detailed evaluation:

a. Function and value of nearshore and borrow area benthic habitat resources.
b. Potential impact of pipelines on hardground.
c. Potential impacts to staghorn coral at pipeline and borrow area locations.
d. Proposed impact of the project on Essential Fish Habitat.
e. Impacts and benefits of the project on sea turtle nesting and foraging habitat.
f. Impact of current conditions on future public recreational use.

1.7.2 IMPACT MEASUREMENT.

The following provides the means and rationale for measurement and comparison of impacts of the proposed action and alternatives.

1.7.2.1 Hardground and Reef Impacts.

Based on extensive experience with beach renourishment in Miami-Dade County and other Florida beaches, impacts to hardground and reefs can be predicted based on proximity, currents, nature of borrow material, buffer zones and other factors. Our desire in selecting an alternative is to keep impacts to these resources to the minimum practicable in consideration of other project requirements. The only impacts to hardground and reef resources will be from placement of the pipeline to transport material to the beach fill area. Pipeline corridors that have been previously identified and utilized will be used to minimize impacts to these resources.

1.7.2.2 Elkhorn and Staghorn Coral

On 9 May 2006, staghorn and elkhorn (Acroporid) corals were listed as "threatened" under the Endangered Species Act of 1973 (ESA). On November 26, 2008, NMFS published a final rule in the Federal Register to designate critical habitat for elkhorn and staghorn corals. Designated critical habitat includes one specific area of the Atlantic Ocean offshore of Palm Beach, Broward, Miami-Dade, and Monroe counties, Florida that includes certain parameters for acroporid corals to be present within the habitat.

Recent surveys conducted by Miami-Dade County DERM (2008) determined that colonies of staghorn corals occur in the hardground and reef areas in the nearshore areas of the project footprint. Although the dredging and pipeline corridors have been sited to avoid these colonies, the National Marine Fisheries Service (NMFS) determined that the proposed action may adversely affect staghorn corals due to pipeline deployment and retrieval. NMFS required in their Biological Opinion (BO) dated 21 October 2009, that staghorn colonies within the pipeline corridors be relocated to nearby suitable reef sites. More details on this consultation can be found in section 4.4.1.3 and 4.32.2 of this EA.

1.7.2.3 Sea Turtles.

Sea Turtle nesting is closely monitored along Miami-Dade County's public beaches. Detected nests are relocated to a designated relocation site. Impacts of compaction and scarps on sea turtle nesting are fairly well documented in literature. In addition, continued beach erosion would reduce available nesting habitat. Corrective and mitigative protocols have been established and will be followed for this renourishment event. It is our goal to minimize impacts to sea turtles and to comply with the requirements of the ESA.

1.7.2.4 Other Impacts.

Bases for impact measurement and comparison are stated more specifically in section 4.0 on ENVIRONMENTAL EFFECTS and other sections of this document and its appendices.

1.7.3 ISSUES ELIMINATED FROM DETAIL ANALYSIS.

No issues were specifically identified for elimination.

1.8 PERMITS, LICENSES, AND ENTITLEMENTS.

The proposed beach renourishment is subject to the Coastal Zone Management Act (CZMA). Consultation with the State Historic Preservation Officer (SHPO) is also required. Since there would be a discharge of dredged or fill material into waters of the United States, the proposed Action is subject to Section 404 of the Clean Water Act (CWA). In addition the proposed action is subject to Section 401 of the CWA for certification of water quality by the state. The U.S. Army Corps of Engineers, Jacksonville District, has submitted an application for a Section 401 Water Quality Certificate (WQC) from Florida Department of Environmental Protection (FDEP).

If conducted during the sea turtle nesting and hatching season, the proposed action will require daily sea turtle nest surveys and nest relocations to be conducted by the Miami-Dade County Department of Parks and Recreation, who already posses the appropriate permit from Florida Fish and Wildlife Conservation Commission (FWC).

The project sponsor, Miami-Dade County Department of Environmental Resources Management (DERM), is responsible for obtaining any real estate easements and rights of way required for this project. Section 4.32 provides a detailed list of environmental compliance regulations, policies, and permits applicable to this project.

2 ALTERNATIVES

2.1 DESCRIPTION OF ALTERNATIVES

Shore protection projects lend themselves to a large array of alternatives to prevent damage to structures adjacent to the coast. These options include hard and soft stabilization projects. Hard options include jetties, breakwaters, groins and seawalls. Soft options include beach nourishment or renourishment with their own array of sand source alternatives. Typically, soft options are preferred over hard alternatives and native sand options are preferred to upland sources. It is also common for NEPA analysis to include a review of all of these types of alternatives for a project. However, due to the limitations placed on the Corps by the ASA-CW letter, the only alternatives that will be analyzed in this EA will be the use of sand from the SGC-1 Extension borrow area Alternative and the No Action Alternative.

2.1.1 NO ACTION ALTERNATIVE

The No Action Alternative would result in no alteration to the current beach conditions. Under the No Action Alternative, the Corps would not place any material on the beach to offset the shoreline erosion that has occurred in the area and BOEM would not issue a negotiated agreement for use of sand from the offshore borrow area. The shoreline would continue to erode, threatening habitable structures, shoreline vegetation, and nesting habitat for sea turtles.

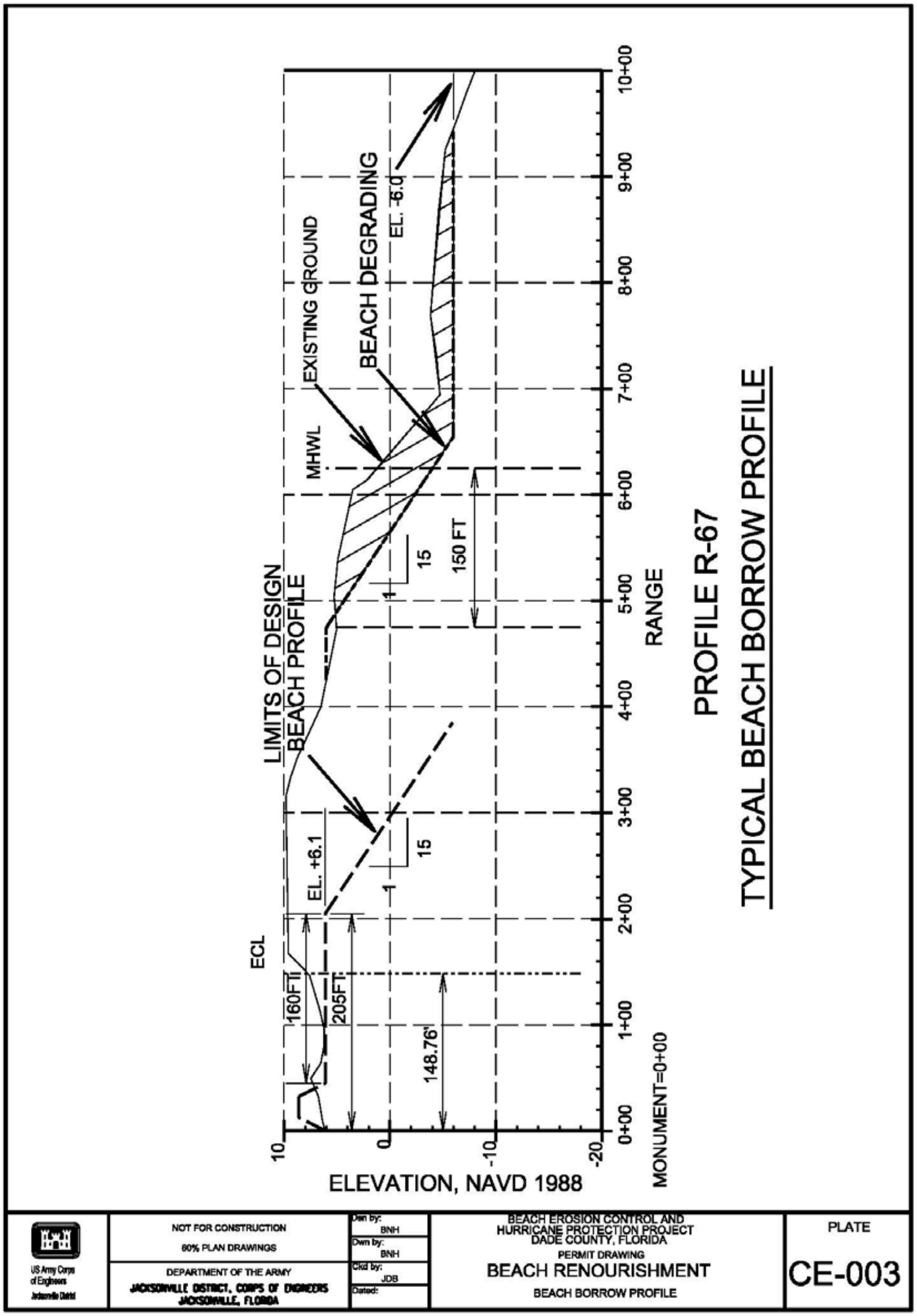
2.1.2 PREFERRED ALTERNATIVE PRIORITY AREAS 1 AND 2

The Preferred Alternative would renourish Miami-Dade beaches in priority areas 1 and 2 using a total of 850,000 cubic yards of sand material from SGC1-Extension and the Lummus Park/South Miami Beach borrow areas (Figure 3).

Priority area 1, between R37.75 and R46.25, would receive 474,000 cubic yards of material, along approximately 8,500 feet of beach. It is anticipated that this stretch of beach will be nourished using SGC1-Extension borrow area. Priority area 2, between R53.7 and R55.5 (approximately 1,800 feet) and from R60 to R61 (approximately 1,000 feet) would receive 218,000 cubic yards of material remainder from the Lummus Park/South Miami Beach borrow area. Figure 4 shows a typical cross-section of the Lummus Park borrow area under current and post-excavation conditions.

Figure 3: SGC1-Extension and Lummus Park Borrow Areas

Figure 4: Lummus Park Borrow Area Typical Cross Section



2.1.2.1 Construction Methodologies

To renourish Priority Area 2, the Corps proposes to use an upland-placed cutterhead suction dredge to obtain approximately 376,000 cy of sand from an onshore borrow site located in the uplands at Lummus Park. A 3,000-foot long by 150-foot wide by six-foot deep area would be excavated at Lummus Park beach. The material would be hydraulically transferred to the south end (approximately R-64) of a long dike through approximately 3,700 feet of 10 to 14 inch pipe. The purpose of the dike is to allow 90 to 95 percent of the fill material to fall out of suspension prior to ocean re-entry. Using backhoes and bulldozers, the fill material would be collected, transferred, and sloped accordingly within the proposed project site. The excavation area and dredge would be enclosed by a temporary chain link fence with privacy screening. The pipe would be buried just below grade and positioned approximately five feet seaward of the existing dune. With a production rate of 1,600 cy per day, completion of this portion of the project is expected to take 135 to 180 days. This work was previously performed at this site without resulting in any adverse impacts on the down drift beach. Figures 5 and 6 show the previous work being conducted.

Figure 5: Dredge on the Beach at Lummus Park

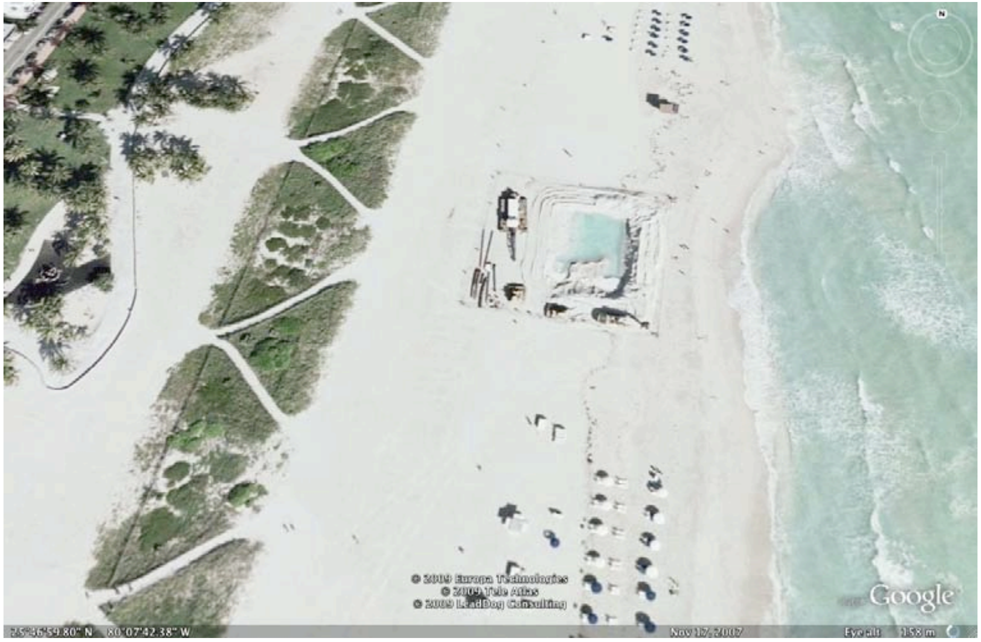


Figure 6: Dredging on the Beach at Lummus Park

Approximately 474,000 cy of sand from an offshore borrow site will be used to Priority Area 1, covering approximately 8,500 linear ft. The 762,000-sq-ft "SGC1-Extension" borrow site, is located approximately 11 miles SSE from the placement area in federal waters at a depth of 33 ft. Due to the distance of the borrow site from shore, a hopper dredge is the most likely type of equipment to be used for offshore sand mining and sediment placement at the renourishment site.

Hopper dredges are self-propelled seagoing ships of from 180 to 550 ft in length. The materials excavated by hopper dredges cover a wide range of types, but hopper dredges are most efficient in excavating loose, unconsolidated materials (e.g., sand). Dredged material is raised by suction pipes (drag arms) hinged on each side of the vessel with the intake (draghead) extending downward toward the stern of the vessel. During dredging operations, hopper dredges travel at a ground speed of from 2 to 3 mph and can dredge in depths from about 10 to over 80 ft. The dredged material is sucked up the drag arm and deposited and stored in the hoppers of the vessel. Once fully loaded, hopper dredges move to the disposal site to unload before resuming dredging. The Silent Inspector system, a geospatial referencing technology, will be used during dredging activities to ensure the dredge does not stray outside of the proposed borrow area.

Unloading sediment from a hopper dredge is accomplished either by opening doors in the bottoms of the hoppers and allowing the dredged material to sink to the open-water disposal site or by pumping the dredged material to upland disposal sites. For the proposed action, mined sediments will be offloaded from the dredge using a temporary discharge pipeline. Approximately 8,300 ft of temporary pipeline will be laid in the previously identified pipeline corridor. Pipeline diameters range from 24-36 inches, with an average of 30 inches. The proposed pipeline corridor is approximately 415,000 sq ft. The pipeline is assembled in sections on board vessel and then floated into place over the identified pipeline corridor. For safety reasons, the pipeline cannot be set in place by divers; instead, it must be sunk. The pipeline is retrieved by welding the ends shut and filling it with compressed air until the entire length of the pipeline floats straight to the surface. The pipeline is then towed off site for placement. The offshore end of the pipeline is hooked to a buoy, allowing it to be connected to the dredge as it pulls alongside. A properly assembled and operating pipeline releases very little sediment, if any, meaning sedimentation of the habitat surrounding the pipeline is likely to be undetectable above the natural background level.

Much of the sand placement on the renourishment areas will take place above the water level. The bottom areas below mean high water that will be covered by the initial placement and later equilibration consist of sediments similar to those on the beach, with no hardground habitat, corals, or seagrasses. No seagrasses or worm-rock reef habitats were identified in the nearshore portion of the action area (i.e., landward of the first reef tract). Only bare rubble and rubble with some algae were identified in the nearshore portion of the project (Miami-Dade 2009). The habitat near the proposed offshore borrow site consists of reef habitat of variable relief. The contract for this project will be awarded in June 2010, construction is anticipated to commence within 30 to 45 days of award, and should take approximately six months to complete.

2.1.2.2 Sand Characteristics

Soil borings were obtained from the SGC1-Extension borrow site in July 1996 and again in June 2008. Analyses of the borings were similar from the two studies. The material was confirmed as sand to silty sand, with approximately 90% of the material Greater than 0.75 um (being retained by a #200 sieve). Sediment color was typically described as light brown or pale yellow and is appropriate for beach placement. Appendix C contains results of the two studies.

2.2 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

No other alternatives were evaluated, due to the limitations placed on the Corps by the ASA-CW letter, the only alternatives that will be analyzed in this EA will be the use of sand from the SGC-1 Extension borrow area Alternative and the No Action Alternative.

2.3 COMPARISON OF ALTERNATIVES

Table 1 lists alternatives considered and summarizes the major features and consequences of the proposed action and alternatives. See section 4.0 Environmental Effects for a more detailed discussion of impacts of alternatives.

Table 1: Summary Of Direct And Indirect Impacts

Environmental Resource	No Action Alternative	Preferred Alternative
Coastal Environment	The shoreline and coastal environment would continue to erode into design width	No adverse impact. Beneficial impact from protection of the shoreline, dunes, and beachfront structures.
Sediments	No impact, however sediment would continue to erode.	No adverse impacts anticipated with compatible sand material placement of the beach.
Vegetation/Dune Communities	No direct impact. Potential adverse impact over time due to loss of beach habitat from erosion without regular renourishment.	No adverse impact anticipated. Benefits would occur from protection of dunes and vegetation with regular renourishment.
Sea Turtles	No direct impact. However, lack of regular renourishment would result in loss of nesting beach habitat.	Potential minor adverse impact on turtle nesting from beach placement. Long-term benefits due to increased nesting habitat. Potential lethal and sub-lethal effects from vessel strikes or dredge entrainment.
Elkhorn and staghorn corals	No impact.	Staghorn corals may be adversely impacted due to pipeline deployment\retrieval. An estimated 43 colonies are likely to be relocated (lethal and non-lethal take) as a reasonable and prudent measure to reduce the effect of the anticipated take. Up to 15 colonies too small to be seen with the eye may be lethally taken by pipeline placement. Collection of small coral fragments will also be required to help achieve recovery goals.
Least Tern	No direct impact. However, lack of regular renourishment would result in loss of foraging beach habitat.	No adverse impact anticipated
Hardground	No impact	Temporary impacts from pipeline deployment/retrieval. No long-term adverse impact anticipated.
West Indian Manatee	No impact.	No adverse impact anticipated with standard protection measures during dredging.

Environmental Resource	No Action Alternative	Preferred Alternative
Wildlife other than T&E Species	No impact.	Temporary impact to infaunal communities on the existing beach as well as within borrow area. Bird species that rely on infauna associated with the existing beach will also be temporarily impacted. Following construction these communities are expected to stabilize within 6-12 months. Potential lethal and sub-lethal effects to fish from vessel strikes or dredge entrainment.
Benthic Habitat	No impact.	Potential impact to 189,000 sq. ft. (approximately 4.3 acres) of hardground along the pipeline corridors. These impacts will be minimized to the maximum extent practicable. Potential lethal and sub-lethal effects from vessel strikes or dredge entrainment.
Essential Fish Habitat	No impact.	Minor, temporary adverse impacts to water column during dredging and beach placement. Minor, temporary impacts to benthic species due to displacement during dredging. Temporary impacts to hardground from pipeline deployment/retrieval. No long-term adverse impact anticipated.
Coastal Barrier Resources	No impact.	No impact.
HTRW	No impact.	No adverse impact anticipated.
Air Quality	No impact.	No adverse impact anticipated.
Noise	No impact.	Minor, temporary impacts on the beach during dredging and beach placement. Additional minor underwater noise impacts from dredging and equipment movement.
Socioeconomics	No impact.	No impact.
Environmental Justice	No impact.	No impact.
Aesthetics	No impact.	Minor, temporary adverse impacts during beach placement of sand.
Recreation and Safety	Long-term adverse impact through loss of recreational beach property and shoaling within the navigational channel.	Minor, temporary adverse impact during beach placement of sand. Temporary impact to recreation at Lummus Park during excavation activities.

Environmental Resource	No Action Alternative	Preferred Alternative
Cultural Resources	No impact.	No impact, per SHPO letter

2.4 MITIGATION

Adverse impacts to hardground habitat from dredging pipeline placement may require mitigation. NMFS estimated in their BO that approximately 189,000 square feet (4.3 acres) of the proposed pipeline corridor occurs within hardground. Actual adverse impacts are difficult to determine, so post-construction surveys would be required to determine the actual level effect. A mitigation plan for impacts to hardground was prepared by Miami-Dade County Department of Resource Management (DERM) (Appendix E). In addition, a physical and biological monitoring plan will be implemented to insure that the full extent of effects of the project is determined. This document is also included in Appendix E. Based on the NMFS BO for the project and the findings of Fisher et al, 2008, the Corps does not believe that any adverse impacts associated with mining sand from the borrow area are likely to occur, and thus no mitigation is planned associated with sand mining activities.

Mitigation for impacts associated with this project will have two components: (A) salvage (collection and re-stabilization) of dislodged and or fractured hard corals, and (B) "In-kind" mitigation by creation of benthic habitat through the placement of limestone boulders, and/or designed artificial reef modules. Relocated corals will be re-stabilized using proven techniques and adhesives and will be relocated as close as possible to the area from which they were removed. The methods established and utilized by NOAA National Marine Sanctuary Restoration and Assessment Program will be followed. The "In-kind" creation of benthic habitat will occur at one of the 11 current artificial reef sites in Miami-Dade County. The closest and preferred reef site, with depths comparable to those found in and around the first reef areas, is the "Anchorage Site" (center point - 25°48'43.5"; 80°05'35.5"; depth range 30 to 55 ft.), located approximately 3 miles south of the proposed pipeline corridor. The next best location is the "Port of Miami Mitigation Site – A", which is approximately 2 miles further south, with a water depth of 25 feet. These sites have current permits and are available for use on this project.

The Florida Department of Environmental Protection (FLDEP) determined that the mitigation previously constructed for impacts associated with the 2001 use of the Contract E pipeline corridor will be sufficient for the Contract E project in their December 10, 2010, "Consolidated Notice of Intent to Issue a Joint Coastal Permit and Authorization to Use Sovereign Submerged Lands", stating:

> The project is expected to impact approximately 126 square meters (0.031 acre) of coral and hardbottom resources along the pipeline corridor. Mitigation for this quantity of impacts within this pipeline corridor was previously constructed under Permit No 0126527-002-JC.

Based on this determination by the FLDEP, the Corps does not intend to mitigate for impacts associated with the use of the Contract E pipeline corridor by construction of reef modules unless the impact exceeds 126 square meters (0.031 acres) of coral and hardbottom resources.

The amount of impact within the corridor will be controlled by a number of factors: (i.e., need of repair or re-positioning of the pipeline which requires lifting and replacement; impact by accessory equipment [i.e., marker buoys]; the ability of the pipeline 'collars' to hold the portions of the pipeline off the reef; irregularities of the bottom assisting in holding the pipeline off the reef; and utilization of floating lines or cable motion dampeners on needed marking or lifting buoys to minimize impacts to areas adjacent to pipeline). The varied factors that can affect the amount of area impacted, and past assessments of pipeline impacts indicate actual impact will be less than estimated in the pre-project assessments. Therefore the area of impact, and subsequently, the area of mitigation will be determined by post-pipeline removal assessments.

Impact Assessment Methodology The impact will be assessed by DERM biologists with experience in identification and evaluation of benthic impacts. Biologists will visually inspect the entire pipeline path to identify and quantify the area and amount (degree) of impact to benthic communities. Such methods will include measurement of all areas of scarification, denudation, crushing or other modified bottom characteristics attributable to the pipeline and or accessory equipment. The degree of impact will be estimated on a scale of 0-25%, 25-50%, 50-75%, 75-100% and 100%. The actual area of impact will be the product of the measured area and the decimal equivalent of the 'mid-point' of the level of impact. The area requiring mitigation will be the sum of those products, plus the overall area of hard corals impacted (i.e., crushed, fractured, scraped or dislodged).

Mitigation Ratio Considerations In previous coordination, it was determined that a 1:1 mitigation ratio for this project. This ratio is reasonable given the following:

1. The project is being conducted in the interest of public health and safety (protection of property and life from storms, hurricanes and coastal flooding)
2. Physical alterations to the hardground will be minimal. Past pipeline placements indicate disturbance to the bottom from the pipeline will be significantly less than estimated in the pre-project assessment.
3. The region the pipeline traverses is dominated by sponges, algae and moderate sized soft corals, which have a relatively short recovery time (2-8 years).

Estimated Mitigation Requirement

For the 2001 project which used this corridor, it was estimated based on pre-project assessments that approximately 306m^2 of hardbottom would be impacted, however following the post-project impact assessment, the actual impact was 126m^2. Based on these results, and results from other Miami-Dade projects where pipelines have been used, it has been documented that the actual impact is typically from 20% to 60% less than the pre-project estimate. Given that this corridor has been previously used, and that recently completed biological surveys of the corridor shows little change in the habitat characteristics present in the corridor from 2001 surveys, we anticipate a similar or lesser level of measured impact to occur in the pending project. As such, it is proposed that for the purposes of this mitigation plan, that the pre-project estimate of impact be established at 130 m^{2,} or 1399 square feet. To mitigate this level of impact using limestone boulders, approximately 90, 4′ diameter boulders equaling approximately 270 tons will be required. If modules are used, assuming a 54 ft^2 base as has been used in other projects, 26 modules will be required. If a combination of the two materials, or an alternative module design is utilized, a revised plan will be submitted the appropriate federal and state resource agencies prior to construction for review and comment. If post project impact assessments indicate a greater or lesser level of impact, the construction plan would be adjusted accordingly.

Construction Schedule

A final mitigation plan based on the documented level of impact and the specific materials to be used will be submitted to the Department within 90 days of completion of the post project impact assessment will be submitted to the Department for approval. Construction of the required mitigation will be completed within one year of the completion of the project.

In addition to the mitigation for hardground and acropora impacts, the Corps will comply with other environmental commitments to insure protection of other physical and natural resources. A summary of these measures are included in Section 4.31, Environmental Commitments.

3 AFFECTED ENVIRONMENT

3.1 GENERAL ENVIRONMENTAL SETTING

Ocean conditions in the summer time are generally calm, with low swell waves predominantly from the south, and light winds predominantly from the east to southeast. However, the area is subject to tropical storms and hurricanes during the summer and fall months. These storms generally approach from the south, southeast, or southwest and generate storm waves.

Prevailing winds in the wintertime are from the northeast and the area is subject to periodic frontal activity. Occasionally, strong extra-tropical storms generate large, short period waves, generally approaching from the northeast direction. These storms tend to be very destructive as they are large, slow moving storms that subject the area to severe conditions for extended periods of time.

The beaches of Miami-Dade County between Government Cut and Haulover Inlet are used as recreational beaches. These beaches have been actively managed since the 1970s. Condominiums, hotels, and residential homes line the coast. As a result of urban development, natural areas no longer exist along this portion of the coast. Dunes are planted and landscaping is common place along Miami-Dade County beaches. The marine environment supports typical sub-tropical fauna and flora, including sand and hardground habitat.

3.2 COASTAL PROCESSES

Beach erosion is attributable to wave induced transport of beach sediments either across the beach to the offshore region (cross-shore) or along the shoreline (long-shore) to adjacent beaches. During storms, a beach is shaped by cross-shore wave-induced transport towards a condition in equilibrium with the waves and water level. Waves that approach the shoreline at an angle will induce long-shore transport proportional to the square of the wave height (USACE 1984). For any segment of beach, if more sand is transported out of the segment than into the segment, the beach will erode. Comparably, if more sand is transported into the segment, the beach will accrete.

Within the project area, erosion by storm waves and tides is exacerbated by the seaward encroachment of the upland development relative to the adjacent shore. In 1985, between DNR-41 and DNR-46 (71st and 63rd streets), 110,000 cubic yards of sand were placed as part of an authorized renourishment of the Miami-Dade County BEC&HP (USACE 2010). The beach was then surveyed again in 1996 and showed net shoreline erosion with an average erosion rate of 10.25 ft/year. Between DNR-43 and DNR-47 the average volume change between adjacent monuments was 2,665cy/yr. In order to improve the longevity of the beach fill and maintain the design beach width of the project, three shore-attached breakwaters were constructed at 32nd Street (R59-R60) during May-July 2002 (FDEP 2008). Concurrently, transfer of 50,000 cubic yards of beach sand to an adjacent erosional area (R53.5-R56) was conducted. A survey program is being conducted to monitor the performance of the project and verify the predicted effects of the breakwaters.

In 2005 and 2006, approximately 40,000 and 30,000 cubic yards of sand via truck haul, respectively, was placed downdrift of the structures (R60-R61) in order to mitigate for downdrift impacts as specified in the approved State monitoring and mitigation plan. Additionally, the performance of the beach fill along the segment of shore located near 55th Street, Miami Beach and 44th Street, Miami Beach has not maintained the design beach width. Erosion by storm waves and tides is exacerbated by the seaward encroachment of the upland development relative to the adjacent shore. During 2006, the County truck hauled and placed approximately 30,000 cubic yards of sand at the 55th Street segment (R48.7-R50.7) and placed approximately 50,000 cubic yards of sand at the 44th Street segment (R53.7-R55.5) (FDEP 2008).

3.3 VEGETATION

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

3.4 MARINE MAMMALS AND THREATENED AND ENDANGERED SPECIES

3.4.1 SEA TURTLES

Five species of sea turtles occur within the waters of Miami-Dade County. These species are the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*) and hawksbill (*Eretmochelys imbricata*). Under the ESA the loggerhead is listed as threatened and the green, Kemp’s ridley, hawksbill and leatherback turtles are listed as endangered. Their life history is well documented and has been included in numerous Biological Opinions issued to the Corps on past renourishment projects (FWS 2009; NMFS 2009).

The waters offshore of Miami-Dade County and those of Biscayne Bay are also used for foraging and shelter for the three species listed above, the hawksbill sea turtle and the possibly Kemp's ridley sea turtle, and Olive ridley sea turtle (*Lepidochelys oliveacea*) (DC&A 2001; Foley, et al 2003). During the summer months, adult turtles tend to congregate just offshore during mating and nesting activities and between nesting events. During the fall northward migration along the Keys and South Florida, there may be a greater tendency for individuals to wander into harbors and inland waterways in search of food, foraging for a day or two and then moving on.

3.4.1.1 Nesting Habitat

Due to large scale urbanization, Miami-Dade County hosts fewer sea turtle nests than many counties to the north. Three species of sea turtles have been documented as nesting on the beaches of Miami-Dade County: loggerhead, green and leatherback turtles. Loggerhead turtles establish the most nests, while green and leatherbacks nest on Miami-Dade beaches to a lesser extent (Table 2). The Kemp's ridley and hawksbill are infrequent nesters along the east coast of Florida and have not been recorded as nesting on County beaches.

Table 2: Documented Sea Turtle Nests Surveyed Along Miami-Dade County Beaches From 2004-2009 (FWRI 2010)

Year	Loggerhead (*C. caretta*)	Leatherback (*D. coriacea*)	Green (*C. myadas*)
2004	289	1	2
2005	301	9	15
2006	302	3	0
2007	295	8	20
2008	323	10	0
2009	358	5	12
Total	1510	31	37

From 2004-2009 within Miami-Dade County over 95% of nests were identified as loggerhead turtle nests (Table 2). Green and leatherback turtles constitute the remainder of turtle nests documented from 2004-2009. In 2006 and 2008 no green turtle nests were documented on County beaches.

Florida Fish and Wildlife Research Institute (FWRI) reported false crawl data for Miami-Dade County in 2009, with 561 loggerhead false crawls, zero leatherback false crawls, and one (1) false crawls documented for green turtles. Although the cause of false crawls is not fully understood, causes cited include, obstructions, previously staked sea turtle nests, sea walls, sand castles, public benches, and trash cans. No identifying obstacles or reasons for the documented false crawls were reported.

3.4.1.2 Offshore Habitat

Sea turtles use the habitats offshore of Miami-Dade County to different degrees during different stages of their life cycle. During the summer months hatchlings utilize this habitat as a corridor to deeper waters farther off the coast. Juvenile and sub-adult turtles use the offshore habitats as foraging grounds, while adult turtles are present year round with seasonally high abundances during the breeding season.

Loggerhead hatchlings emerge primarily at night and swim offshore in a “frenzy” until they arrive at offshore weed and debris lines (Carr 1986) (Wyneken and Salmon 1992). Post hatchling turtles from the Florida coast enter currents of the North Atlantic Gyre, eventually returning to the western Atlantic coastal waters (Bowen et al. 1993). When loggerheads reach a carapace length of approximately 40-60 cm, they leave the pelagic environment and move into various nearshore habitats (Carr 1986). These juvenile and sub-adult loggerhead turtles are found throughout the year along the southeast coast of Florida, including Miami-Dade County. Abundances of adult loggerhead turtles in Florida waters increase during the nesting season (Magnuson et al. 1990).

Green turtles show a similar life history pattern as loggerheads, but they leave the pelagic phase and enter benthic foraging habitats at a considerably smaller size, about 20-25 cm carapace length (Magnuson et al. 1990). Typical foraging habitats are shallow, protected waters where seagrasses are prevalent (Carr et al. 1978), but green turtles are commonly found in reef habitats where algae is present (Ehrhart et al. 1996; Coyne 1994). Green turtles nesting in Florida have a minimum size of 83.2 cm carapace length, but they appear to leave Florida foraging habitats by about 60-65 cm carapace length (Witherington and Ehrhart 1989), perhaps migrating to the southeastern Caribbean. Juvenile green turtles feed primarily on seagrasses and algae. As adults, offshore habitat utilization would be greatest during the nesting period.

Leatherback turtles occur worldwide in pelagic waters from the tropics to near the Arctic and Antarctic Circles. Nesting is primarily on the Pacific coast of Mexico and the Caribbean coast of South America, with some continental U.S. nesting in Florida. The majority of Florida leatherback nesting activity is located within St. Lucie, Martin and Palm Beach counties (Meylan et al. 1995). Leatherbacks are known to be a mostly pelagic species, moving into nearshore environments during the nesting season.

3.4.2 WEST INDIAN MANATEE

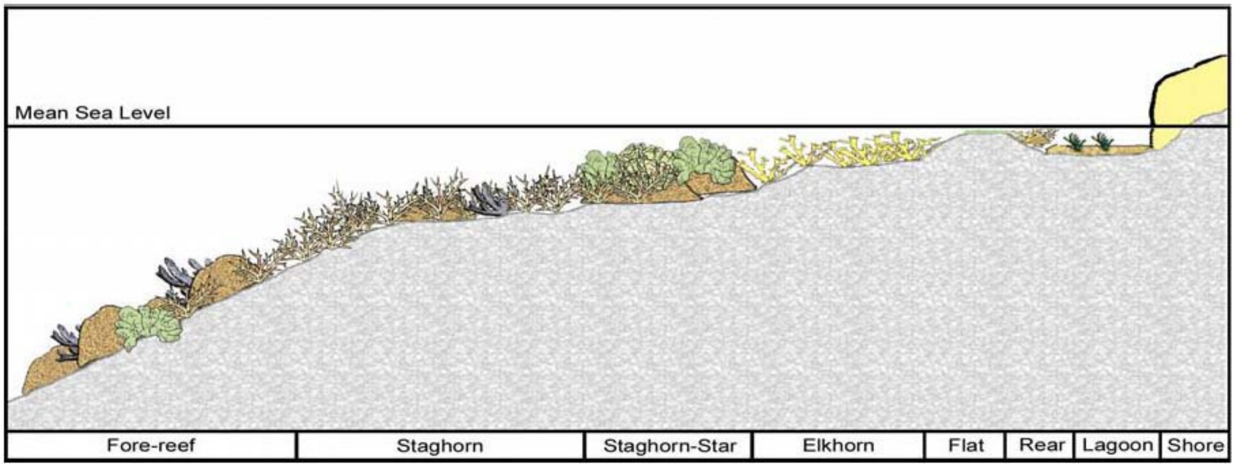
The West Indian manatee (*Trichechus manatus*) is protected under Federal laws (the ESA and the Marine Mammal Protection Act), and is also listed as protected under Florida state law. The manatee is generally restricted in range to the Georgia coast southward around the Florida peninsula. Manatees frequently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

Within Miami-Dade County, manatees are frequently found in Biscayne Bay, canals, the Miami River and the intra-coastal waterway. They are less often seen in the Atlantic Ocean. Mortality data for the West Indian manatee in Florida is available from 1974-2009, through FWRI (FWRI 2009). Mortality data within one-mile of the project area reported the occurrence and cause of 2 manatee deaths between 1974 and 2009. No deaths were reported within the project footprint (FWRI 2009). In order to minimize and avoid potential impacts to manatees, the dredge contractor will be required to monitor for manatees under Florida law.

3.4.3 STAGHORN AND ELKHORN CORAL

On 9 May 2006, staghorn and elkhorn corals were listed as “threatened” under the ESA. On November 26, 2008, NMFS published a final rule in the Federal Register to designate critical habitat for elkhorn and staghorn corals. Designated critical habitat includes one specific area of the Atlantic-Ocean offshore of Palm Beach, Broward, Miami-Dade, and Monroe counties, Florida with defined parameters that must be present for the designated footprint to be considered critical habitat for the species. Elkhorn (*Acropora palmata*) and staghorn (*Acropora cervicornis*) corals are two of the major reef-building corals in the wider Caribbean. Staghorn coral is characterized by staghorn-antler-like colonies, with cylindrical, straight, or slightly curved branches. Elkhorn colonies are flattened to near-round, with frond-like branches that typically radiate outward from a central trunk that is firmly attached to the sea floor. Historically, both acroporid species formed dense thickets at shallow (<5 m) and intermediate (10 to 15 m) depths in many reef systems, including some locations in the Florida Keys, western Caribbean (e.g., Jamaica, Cayman Islands, Caribbean Mexico, Belize), and eastern Caribbean. Early descriptions of Florida Keys reefs referred to reef zones, of which the staghorn zone was described for many shallow-water reefs (Figure 7) (Jaap 1984, Dustan 1985, Dustan and Halas 1987). As summarized in Bruckner (2002), however, the structural and ecological roles of Atlantic Acropora spp. in the wider Caribbean are unique and cannot be filled by other reef-building corals in terms of accretion rates and the formation of structurally complex reefs.

Figure 7: Reef Zonation Schematic Example Modified From Several Reef Zonation Descriptive Studies



Historically, staghorn coral was reported from depths ranging from <1 to 60 m (Goreau and Goreau 1973). It is suspected that 60 m is an extreme situation and that the coral is relatively rare below 20 m depth. The common depth range is currently observed at 5 to 15 m. In southeastern Florida, this species historically occurred on the outer reef platform (16 to 20 m) (Goldberg, 1973), on spur and groove bank reefs and transitional reefs (Jaap 1984; Wheaton and Jaap, 1988), and on octocoral-dominated hardground (Davis 1982). Colonies have been common in back- and patch-reef habitats (Gilmore and Hall 1976; Cairns 1982). Although staghorn coral colonies are sometimes found interspersed among colonies of elkhorn coral, they are generally in deeper water or seaward of the elkhorn zone and, hence, more protected from waves. Historically, staghorn coral was also the primary constructor of mid-depth (10 to 15 m) reef terraces in the western Caribbean, including Jamaica, the Cayman Islands, Belize, and some reefs along the eastern Yucatan peninsula (Adey, 1978).

3.4.3.1 Staghorn and Elkhorn Survey within the Project Area

Within the project area, staghorn and elkhorn surveys were conducted along the proposed north pipeline corridor as well as on hardground areas within and surrounding the SGC1-Extension borrow area (Miami-Dade County 2008). The "Recommended Survey Protocol for *Acropora* spp. In Support of Section 7 Consultation (Revised October 2007)" was used to survey both areas. No elkhorn coral was found in either location, while staghorn was documented at both the areas surveyed.

Along the north pipeline corridor, on the first reef, forty-four colonies of staghorn coral were found along 2 out of 4 transects. Staghorn colony density ranged from 0.095 colonies/m2 to 0.125 colonies/m2 where staghorn colonies occurred. Additional colonies were observed outside of transect in hardground areas between 20-25 feet (Miami-Dade County 2008).

At the SGC1-Extension borrow area staghorn coral was documented along the eastern edge of the second reef, between 20 and 30 feet depth (Figure 8). Thirty one colonies of staghorn coral were documented along 2 out of 3 transects surveyed, and colony density ranged from 0.040 colonies/m^2 to 0.115 colonies/m^2 (Miami-Dade County 2008). Figure 9 shows acroporid resources within the Miami Beach-North pipeline corridor.

3.4.4 LEAST TERN

Least terns (*Sterna antillarum*) are protected under Florida state and federal laws and are listed as "threatened". They nest on beaches and on gravel rooftops, where nearby waters supply foraging grounds for small fish. Terns also occupy recently dredged or deposited sandy substrates in active phosphate mines and in limerock quarries in south Florida. Least terns usually return to the same nesting site each year, unless the colony has consistently failed to fledge young. Nesting begins in May and young are fledged through August or early September. Least terns migrate away from South Florida in August through September (FFWCC 2003, accessed 7/15/09).

Figure 8: Acroporid Resources Adjacent to the SGC1-Extension Borrow Area

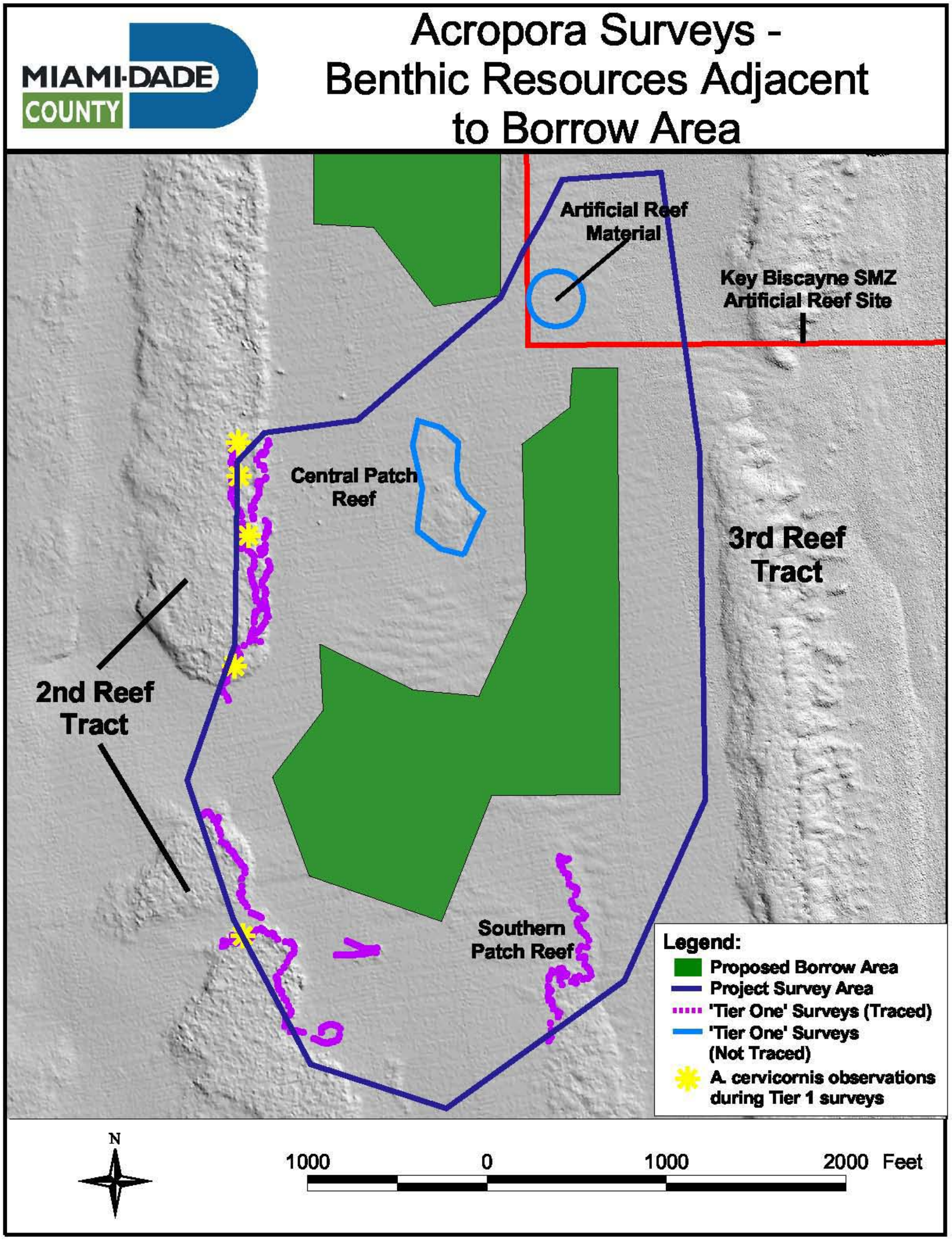
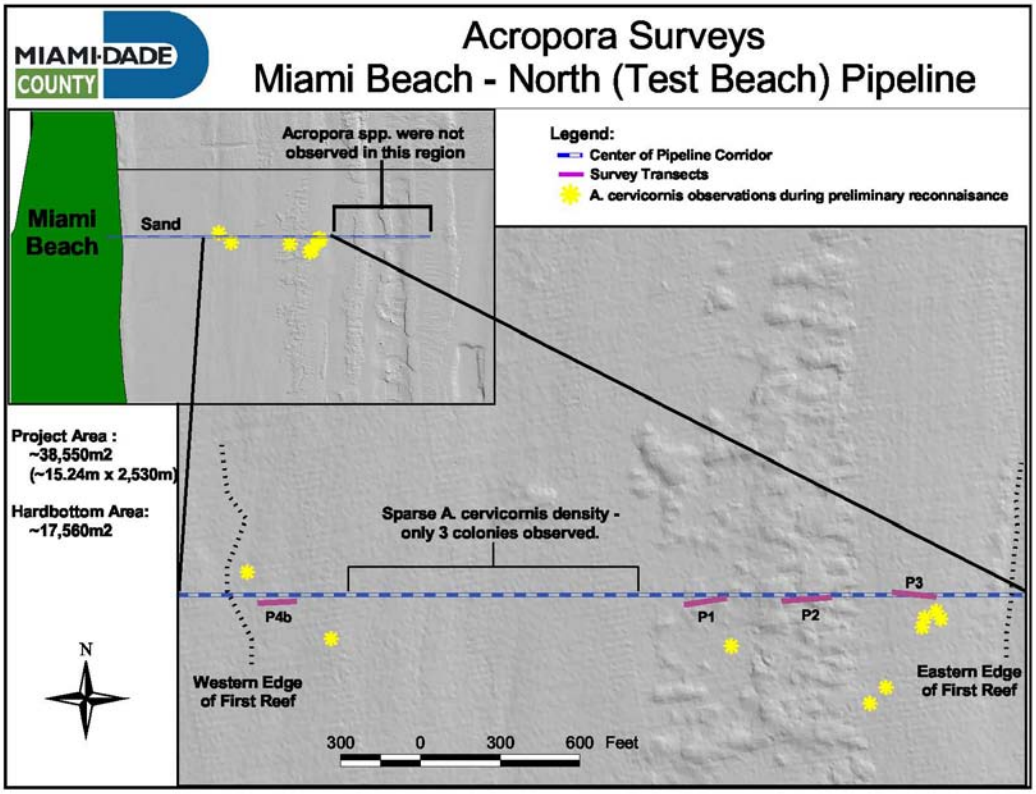


Figure 9: Acroporid Resources Within the Pipeline Corridor



Least terns are considered a threatened species based on previous population declines and threats to their coastal habitat (Wood 1991). Except for areas with extensive salt marsh or mangrove habitat, Least terns nest along nearly all of Florida's Gulf coast, while occasionally nesting along the Atlantic coast. Because of their use of gravel-covered roofs, Least terns are found even along intensively developed portions of the coast, and populations are believed to be stable or increasing. Although least tern ground colonies are known to occur in Miami-Dade County, few have been documented since 1998, and no ground colonies have been reported since 2005 (FWC 2009).

3.4.5 SMALLTOOTH SAWFISH

Smalltooth sawfish, *Pristis pectinata* were once common in Florida as detailed by the final Smallthooth sawfish recovery plan (NMFS 2009) and are very rarely reported in southeast Florida. The logic set forth about hopper dredges in the 2003 (as amended in 2005 and 2007) Gulf Regional Biological opinion (GRBO) for sawfish and hopper dredges in the Gulf of Mexico, where sawfish are known to be much more prolific, it should hold true in Dade county where sawfish are believed to be much rarer. As stated in the GRBO, "Smalltooth sawfish (*Pristis pectinata*) are tropical marine and estuarine fish that have the northwestern terminus of their

Atlantic range in the waters of the eastern U.S. Currently, their distribution has contracted to peninsular Florida and, within that area, they can only be found with any regularity off the extreme southern portion of the state. The current distribution is centered in the Everglades National Park, including Florida Bay. They have been historically caught as bycatch in commercial and recreational fisheries throughout their historic range; however, such bycatch is now rare due to population declines and population extirpations. Between 1990 and 1999, only four documented takes of smalltooth sawfish occurred in shrimp trawls in Florida (Simpendorfer 2000).

3.4.6 BOTTLENOSE DOLPHIN

The USACE expects to find bottlenose dolphins (*Tursiops truncatus*) in the activity area. The National Marine Fisheries Service - Southeast Fisheries Science Center-Miami Laboratory has been conducting a photo-identification survey of the dolphins in Biscayne Bay since 1990. The study area encompasses an area of approximately 200 square miles. The study area ranged from Haulover Inlet south to the Card Sound Bridge behind Key Largo.

The study has identified 159 individual animals residing in Biscayne Bay, 146 of which have been resighted on at least one additional time. Many of these animals have been sighted within or transiting through the Port of Miami.

There is not currently a stock assessment available from NMFS concerning the status of bottlenose dolphins in the inshore and nearshore waters off of south Florida (Emily Menashes, pers.com 2002). Additionally, no status reviews or published reports of status of the Biscayne Bay dolphins have been published (although NMFS-SEFSC is currently working on one - Contillo, in press). The stocks of bottlenose dolphins that reside closest to the project area, that have a completed stock assessment report available for review is the western North Atlantic coastal stock and offshore stock of bottlenose dolphins. The assessment for these groups was completed in November 2001 and September 2000, respectively.

3.4.7 NORTH ATLANTIC RIGHT WHALE

The North Atlantic right whale (*Eubalaena glacialis*) is a Federally listed endangered species and is also listed as a depleted stock under the MMPA. The minimum estimated population within the north Atlantic Region is 291 animals (NMFS 2001). North Atlantic right whales are highly migratory, summering in feeding and nursery grounds in New England waters and northward to the Bay of Fundy and the Scotian Shelf. (NMFS 2001). They migrate southward in winter to the northeastern coast of Florida. The breeding and calving grounds for the right whale occur off of the coast of southern Georgia and north Florida and have been designated as critical habitat under the ESA in 1994 (59 FR 28793). During these winter months, right whales are routinely seen close to shore. While North Atlantic right whales have been historically reported in south Florida and the Gulf of Mexico, these sightings are extremely rare (Dan O'Dell, Hubbs-Sea World Research Institute, 2002, personal communication; North American Right Whale Consortium database, University of Rhode Island, accessed September 2003).

3.5 HARDGROUND

Duane and Meisburger (1969) first described the reef distribution pattern for southeast Florida reefs north of Key Biscayne. These reefs are oriented parallel to shore and consist of an inner reef in approximately 15 to 25 feet of water, a middle patch reef zone in approximately 30 to 50 feet of water, and an outer reef in approximately 60 to 100 feet of water. This general description was first published by Duane and Meisburger (1969) and has been the basis for most descriptions of hardground areas north of Government Cut since that time (Goldberg, 1973; Courtenay et al., 1974; Lighty et al.,1978; Jaap, 1984; Banks et al. 2007). Development of these three reef terraces into their present form is thought to be related to fluctuations in sea level stands associated with the Holocene sea level transgression that began about 10,000 years ago.

Lighty et al. (1978) showed that active barrier reef development took place as far north as the Fort Lauderdale area as late as 8,000 years ago. It is possible that the reefs and hardground areas seen from Delray Beach southward are the result of active coral reef growth in the relatively recent past, whereas the hard bottom features seen north of Palm Beach Inlet may represent the outcropping of older, weathered portions on the Anastasia Formation. The reefs north of Palm Beach Inlet (Lake Worth Inlet) do not show the same orientation to shore as those to the south and the classical "three reef” hardground description begins to differ north of that inlet (Continental Shelf Associates, Inc., 1993).

The composition of hardground biological assemblages along Florida's east coast has been detailed by Goldberg (1970, 1973), Marszalek and Taylor (1977), Raymond and Antonius (1977), Marszalek (1978), Continental Shelf Associates, Inc. (1984; 1985; 1987; 1993), Blair and Flynn (1989), Moyer et al. (2003), Gilliam (2008). Although there are a large variety of hard coral species growing on the reefs north of Government Cut, these corals are no longer actively producing the reef features seen there. The reef features seen north of Government Cut have been termed "gorgonian reefs" (Goldberg, 1970; Raymond and Antonius, 1977) because they support such an extensive and healthy assemblage of octocorals. Goldberg (1973) identified 39 species of octocorals from Palm Beach County waters. The U.S. Environmental Protection Agency (1992) lists 46 species of shallow water gorgonians as occurring along southeast Florida. Surveys by

Continental Shelf Associates, Inc. (1984; 1985) identified 33 sponge, 21 octocoral, and 5 hard coral species on offshore reefs off Ocean Ridge and 40 sponge, 18 octocoral, and 14 hard coral species on the offshore reefs off Boca Raton.

Blair and Flynn (1989) described the reefs and hard bottom communities off Miami-Dade County and compared them to the offshore reef communities from Broward and Palm Beach counties. They and others, Gilliam (2008), documented a decrease in the hard coral species density moving northward from Miami-Dade County to Palm Beach County. Despite this gradual decrease in the density of hard coral species present, the overall hardground assemblage of hard corals, soft corals, and sponges seen along southeast Florida's offshore reefs remains remarkably consistent throughout the counties of Miami-Dade, Broward, and Palm Beach. Commercially, the most important invertebrate species directly associated with these hardground areas is the Florida lobster, *Panulirus argus*. A recent survey conducted by Walker (2009) provided an updated map of hardground and seagrass communities in the nearshore area of Miami Beach (Figure 10).

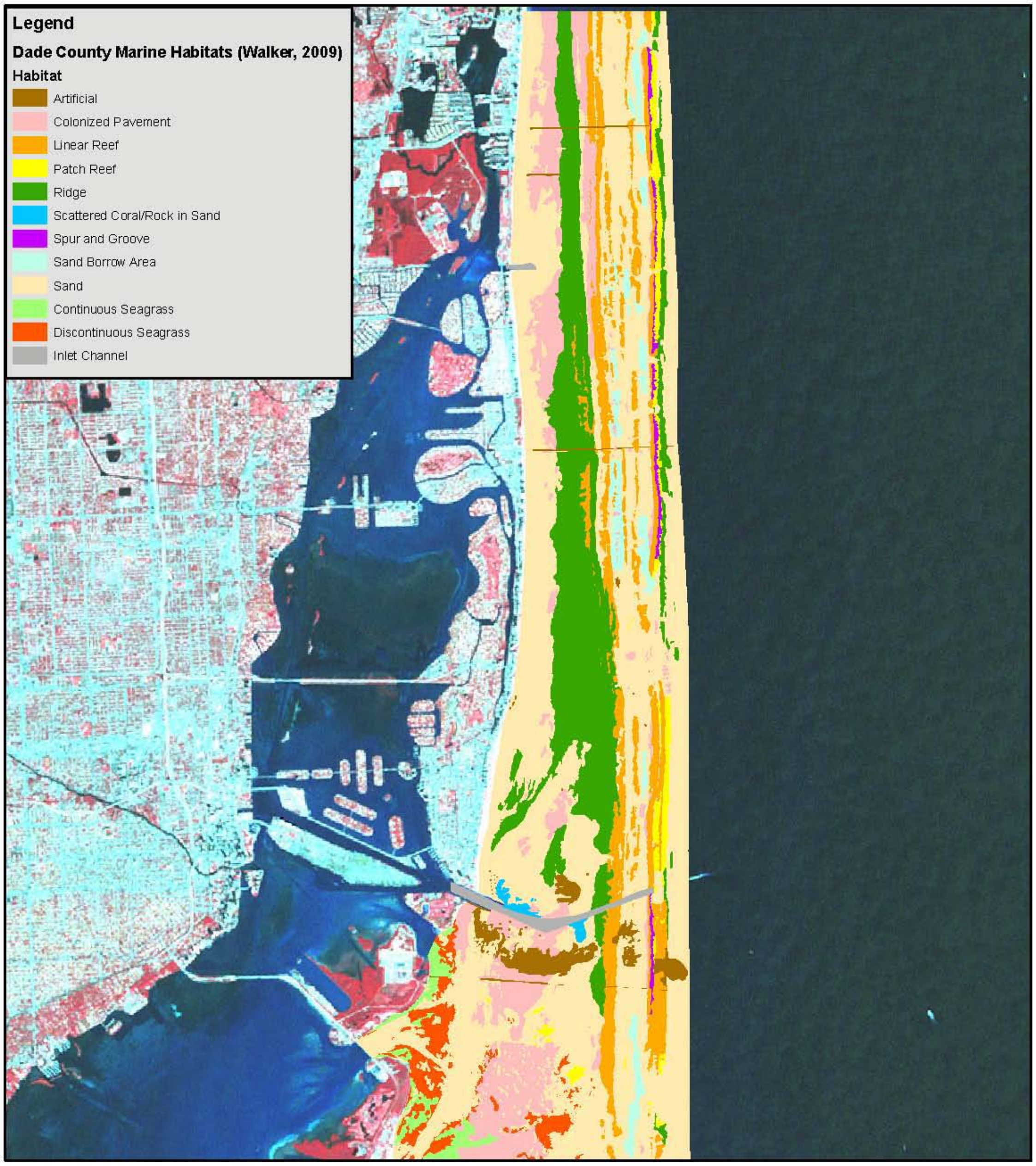
Common fish species identified with the reef/hardground communities include grunts (Haemulidae), angelfish (Pomacanthidae), butterflyfish (Chaetodontidae), damselfish (Pomacentridae), wrasses (Labridae), drum (Sciaenidae), sea basses (Serranidae) snapper (Lutjanidae) and parrotfish (Scaridae). Important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

Herrema (1974) reported over 300 fish species as occurring off southeast Florida. Approximately 20 percent of these species were designated as "secondary" reef fish. Secondary reef fish are fish species that, although occurring on or near reefs, are equally likely to occur over open sand bottoms. Many of these species, such as the sharks, jacks, mullet, bluefish, sailfish, and marlin, are pelagic or open water species and are transient through all areas of their range. Fleur et al. (2005) reported 208 fishes over a four-year sampling period in Broward County waters. Species richness and biomass of fishes increased from inshore to offshore over the sampling period. Many commercially important species such as groupers and snappers were smaller than the legal limit for fishing, suggesting pressure on these fish populations.

3.5.1 HARDGROUND IN THE PROJECT AREA

No hardground was identified within the SGC1-Extension borrow area. However, the site is located between two reef tracts to the east and west, while patch reefs are know north and south of the site (Figure 8). Miami-Dade County DERM recently completed surveys to characterize the benthic habitat of the reef communities adjacent to the SGC1-Extension borrow area (DERM 2010a).

The pipeline corridor crosses several habitat types from the operational box to the shoreline (DERM 2010b). The corridor crosses alternating linear reef systems and shallow sand ridges. Miami-Dade County DERM conducted a habitat characterization study of the pipeline corridor from May 10 to June 18, 2010 consisting of 11 transects. Scleractian species were the most common species identified along the reef transects. One *Acropora cervicornis* colony was documents in the study.



MARINE COMMUNITIES

Miami-Dade County BEC & HP
Priority Placement Areas Contract "E"

Scale: 1 inch = 2 miles	Drawn By: MDR
Date: November 2009	Approved By: MLR
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J09-1116
	Figure 6

Figure 10: Marine Resources

3.6 FISH AND WILDLIFE RESOURCES

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

Shallow subtidal soft bottom habitats (0 to 1 meters [0 to 3 feet] depth) show an increasing species richness and are dominated by a relatively even mix of polychaetes (primarily spionids), gastropods (*Oliva sp*., *Terebra sp*.), portunid crabs (*Arenaeus sp., Callinectes sp., Ovalipes sp*.), and burrowing shrimp (*Callianassa sp*.). In slightly deeper water (1 to 3 meters [3 to 10 feet] depth) the fauna is dominated by polychaetes, haustoid and other amphipod groups, bivalves such as *Donax sp*. and *Tellina sp*. (Marsh et al., 1980; Goldberg et al., 1985; Gorzelany and Nelson, 1987; Nelson, 1985; Dodge et al., 1991). Offshore soft bottom communities are less subject to wave-related stress than are nearshore soft bottom communities.

They exhibit a greater numerical dominance by polychaetes as well as an overall greater species richness than their nearshore counterparts.

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

3.7 ESSENTIAL FISH HABITAT

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

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

3.7.1 ESSENTIAL FISH HABITAT WITHIN THE PROJECT AREA

The South Atlantic Fishery Management Council (SAFMC) designated corals, coral reefs, hardbottom, and unconsolidated sediments as EFH. Hardbottoms are EFH for coral, red grouper (*Epinephelus morio*), gag grouper (*Mycteroperca microlepis*), gray snapper (*Lutjanus griseus*), mutton snapper (*L. analis*), white grunt (*Haemulon plumieri*), and spiny lobster (*Panulirus argus*). Sand habitats are EFH for cobia (*Rachycentron canadum*), black seabass (*Centropristis striata*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*S. maculates*), spiny lobster, and pink shrimp (*Farfantepenaeus duorarum*). All demersal fish species under SAFMC management that associate with coral habitats are contained within the fishery management plan for snapper-grouper species and include some of the more commercially and recreationally valuable fish of the region. All of these species show an association with coral or hardbottom habitat during their life history. In groupers, the demersal life history of almost all *Epinephelus* species, several *Mycteroperca* species, and all *Centropristis* species, takes place in association with coral habitat (SAFMC 2009). Coral, coral reef, and hardbottom habitats benefit fishery resources by providing food or shelter (SAFMC 1983). SAFMC also designated corals, coral reefs, and hardbottoms as a Habitat Area of Particular Concern (HAPC), which is a subset of EFH that is either rare, particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally stressed area. In light of their designation as EFH-HAPC’s and Executive Order 13089, NMFS applies greater scrutiny to projects affecting corals, coral reefs, and hardbottoms to ensure practicable measures to avoid and minimize adverse effects to these habitats are fully explored.

3.8 COASTAL BARRIER RESOURCES

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

3.9 WATER QUALITY

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

Turbidity values are generally lowest in the summer months and highest in the winter months, corresponding with winter storm events and the rainy season, and are higher closer to shore (Gilliam et al. 2008; Dompe and Haynes, 1993; Coastal Planning & Engineering [CPE], 1989). Moreover, higher turbidity levels can generally be expected around inlet areas, and especially in estuarine areas, where nutrient and entrained sediment levels are higher. Although some colloidal material will remain suspended in the water column upon disturbance, high turbidity episodes usually return to background conditions within several days to several weeks, depending on the duration of the perturbation (storm event or other) and on the amount of suspended fines.

3.10 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

The coastline within the project area is located adjacent to predominantly residential, commercial and recreational areas. The areas within the project are high energy littoral zones and the material used for nourishment are composed of particles with large grain sizes that do not normally have contaminants adsorbing to them. The nature of the work involved with the renourishment of beaches is such that contamination by hazardous and toxic wastes is very unlikely. No contamination due to hazardous and toxic waste spills is known to be in the study area.

3.11 AIR QUALITY

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

3.12 NOISE

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

3.12.1 NOISE ASSOCIATED WITH DREDGING OPERATIONS

Noise generated by dredges is low frequency in nature. This low frequency noise tends to carry long distances in the water, but is attenuated the further away you are from the source. Underwater noise as it relates to marine mammals is discussed in Sections 3.6 and 4.6. Sound exposure levels measured for equipment similar to clamshell equipment used in the past range between 75 and 88 dBA at 50 foot distance from the dredging equipment (NMFS 2007).

3.13 AESTHETIC RESOURCES

The project area consists of light beige sandy beaches that contrast strikingly with the deep hues of the panoramic Atlantic Ocean. Dunes, dune vegetation and tropical landscaping separates the beach from condominium and hotels along the shore. Landscaping vegetation consists of trees such as coconut, sabal, and date palms, as well as a shrub canopy including seagrape, cocoa plum, which transitions into sea oats, dune sunflower, morning glory vines. These and many other tropical beach plantings provide an aesthetic transition between the dunes and the beach. The project segments consist of good to excellent aesthetic values throughout the project.

3.14 RECREATION RESOURCES AND SAFETY

Miami-Dade County is a heavily populated county on Florida's Atlantic Coast, which receives a tremendous volume of tourists, particularly during the winter months. Those beaches that can be accessed by the general public are heavily used year round. In the recent past, new developments have been required to build public beach accesses to allow the general public access to beaches which are in front of private condominiums. Additionally, a borderwalk has been built along the Miami-Dade beaches allowing visitors greater access to all the beaches along the county.

Miami Beach has public access and receives heavy use by swimmers and sunbathers. Adjacent to these beaches are many condominiums and hotels used by long term and short-term visitors and residents of the area. Other water related activities within the project area include on-shore and offshore fishing, snorkeling, SCUBA diving, windsurfing and recreational boating. Most of the boating activity in the area originates from either Bakers Haulover Inlet or Government Cut. Both offshore fishing and diving utilize the natural and artificial reefs located within and adjacent to the project area. Commercial enterprises along the beach rent beach chairs, cushions, umbrellas, and jet skis. Food vendors can also be found along the beach areas. The revenue generated by beachgoers supports a strong Miami Beach business district in the project vicinity.

3.15 HISTORIC PROPERTIES

The offshore borrow area was originally surveyed in 1996 and identified three magnetic/side scan sonar anomalies well north of the SGC1-Extension borrow area (USACE letter to the Florida SHPO dated July 25, 2009). The upland sand source for this area was previously surveyed and is currently approved as a sand source under FDEP permit #0126527-JC and USACE permit #SAJ-1999-3761 (IP-PLC) and was determined not to hold any cultural resources. The pipeline corridors was previously surveyed and determined not to contain any historic resources (USACE 2005).

4 ENVIRONMENTAL EFFECTS

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

4.1 GENERAL ENVIRONMENTAL EFFECTS

The placement of sand on the beach and within the transition fill area would restore some of the beach's ability to provide protection against storms and flooding. It would also enhance the appearance and suitability for recreation along the beach and would provide additional habitat for threatened and endangered species of sea turtles. Dredging activities and placement of the discharge pipeline would directly impact 4.3 acres of the associated reef community including soft and hard corals. Indirect impacts due to turbidity or sedimentation would be insignificant (NMFS 2009). If no action is taken, the project beach would continue to erode and shoreline recession would continue.

4.2 COASTAL PROCESSES

4.2.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

Potential impacts resulting from dredging the borrow area include effects on near-field and far-field hydrodynamic and sediment transport processes, as well as local sediment conditions. Increasing borrow area depth generally results in decreased current velocities, sediment convergence, and pit infilling. While local current velocities immediately downstream of dredged areas may temporarily increase (in the direction of strong along-shelf flows), the magnitude and footprint of change are expected to be relatively small.

Alterations of near-bed currents may result in local and short-lived changes in sediment transport pathways and grain size in the immediate vicinity of the borrow area. Although the project area is sediment starved, transport pathways are expected to return to pre-dredging conditions following any infilling or seafloor equilibration in the vicinity of the dredged area. Some borrow areas in adjacent state waters have not filled given the relative dearth of available sediment and persist as pits on the seafloor. As waves move landward from deeper water and propagate over bathymetric anomalies, the height, direction, and other characteristics of the waves change. Wave shoaling, refraction, reflection, and diffraction, coupled to current veering, can increase or decrease the transport of sand at the borrow area.

Margin erosion, infilling, and migration of the SGC1-Extension borrow area is expected to reflect natural variations including storm characteristics and source material. Borings show that the materials within the proposed dredging depth generally consist of sand, poorly graded, mostly fine-grained sand-size quartz and shell fragments, with less than 5% of silt.

Offshore wave transformation can also affect gradients in long-shore sediment transport, resulting in localized changes in erosion and accretion along the shoreline. Modeling has been performed to show that long-shore sediment transport from Bakers Haulover Inlet to south Miami Beach (R-30 to R-60) generally increases resulting in relatively high rates of erosion (Coastal Systems International 2004). The reach from Lummus Park south to Government's Cut is accretional, owing to a change in shoreline orientation and decreasing rates of long-shore sediment transport. The performance of hypothetical beach fill scenarios have also been modeled, including a simulation of back passing sand from Lummus Park area (70,000 cy/yr). However, no site-specific modeling has been completed to predict the possible changes in physical processes that could result from offshore dredging. Because of the relatively shallow dredge cut depths proposed (5-10 feet) and SGC-Extension 1's geomorphic location and relative distance offshore (at least 3.5 miles), no significant impacts in the vicinity of the borrow area or to shoreline processes in the project area are expected. As water depths in SGC-Extension 1 (located within an inter-swale region between reef tracts) increase, waves would be expected to focus on the margins of the dredged area and decrease at its center. However, topographically-higher reefs landward and seaward are anticipated to be the primary control on wave transformation.

Since the reef morphology will not be directly affected by dredging activities given a 400 foot buffer, only minor impacts to incident waves are expected. Changes in the incident wave field will dissipate rapidly with wave propagation towards the shoreline. Localized wave focusing may occur over adjacent reefs, resulting in locally enhanced bottom stress. The bottom effects should generally not exceed natural variability associated with storm conditions. The margins of the borrow area may locally erode and relatively deeper depressions form and migrate until equilibrium is reached. With the implementation of the required 400 foot buffer, no substantial persistent adverse effects to adjacent reefs and hard-bottom should occur.

A suite of monitoring activities are proposed to ensure the proposed action does not result in any unanticipated impacts. Under a Sediment Quality Control (QC) and Quality Assurance (QA) Plan, the dredge contractor must provide daily observation reports to verify the location and depth of dredging. Pre- and post-construction bathymetric surveys will be performed at the borrow area to determine the depth and footprint of excavation and provide a baseline for measuring recovery. The

BOEM will also require an additional bathymetric survey between one and three years after construction. As specified in the Biological and Physical Monitoring Plan (Appendix E), Miami-Dade's DERM will monitor sedimentation on adjacent reef and hardbottom habitat, which includes diver observations during dredging activities. Shoreline change and beach fill performance, as well as nearshore impacts to hardbottom and reef habitat, will also be monitored using depth-of-closure beach profiles and aerial photography.

4.2.2 NO ACTION ALTERNATIVE (STATUS QUO)

Under the No Action Alternative, the current erosive condition would continue at its present rate, or may increase due to increased storm frequency or magnitude. The No Action Alternative does not provide the benefits needed to protect the coast from the effects of erosion and storm damage over the long-term, nor the means for sustainable use of available sand sources.

4.3 VEGETATION

4.3.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

There are no sea grasses or algal communities present in the footprint of the beach fill or the adjacent nearshore areas. No work would be performed on vegetated upland or dune areas. Potential indirect impacts to upland vegetation at the upland borrow site proposed by the contractor may occur. These impacts will not be discussed in this evaluation since upland sand sources will be identified by the contractor. No adverse impacts to either marine or terrestrial vegetation are expected.

4.3.2 NO ACTION ALTERNATIVE (STATUS QUO)

This alternative would have no effect on marine vegetation. However, continued erosion could eventually result in the loss upland vegetation adjacent to the beach.

4.4 MARINE MAMMALS AND THREATENED AND ENDANGERED SPECIES

4.4.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

4.4.1.1 Sea Turtles

Beach nourishment and associated activities have the potential to impact sea turtles and may have the following effects.

a. Scarp development leading to hindrance or blockage of accessibility to nesting habitat.

b. Adverse alteration of moisture levels or temperature in beach due to modified nesting material.

c. Compaction and cementation of beach sediments that cause reduced nesting success and aberrant nest cavity construction resulting in reduced nesting and/or hatching success.

d. If carried out during the nesting season, there is a potential for the destruction of nests that are not identified during the daily nest survey and relocation program.

e. Disruption of nesting activities that could lead to poor nest site selection and energetic cost diminishing egg production.

f. Disorientation or mis-orientation of hatchlings from adjacent beaches by artificial lights on dredge equipment or construction equipment on the beach.

Important physical and chemical characteristics of beaches may include but are not limited to; sand grain size, grain shape, silt-clay content, sand color, beach hardness, moisture content, mineral content, substrate water potential, and porosity/gas diffusion. By using proper management techniques such as nest relocation, tilling of compacted beaches, use of compatible sand, and smoothing of scarp formations, most of the negative effects can be avoided or corrected (Nelson and Dickerson 1989a).

Placement of upland or nearshore dredged material is not expected to have any long-term effects on sea turtle nesting in the project area because the material is sand from the downdrift beach being pumped back north to renourish the eroded areas. The sand on Lummus Park was previously found on the eroded areas before it moved south and settled at Lummus Park. Studies by Nelson, et. al (1999) and Blair et al. (2000) have shown no differences in nest success parameters between sand types.

Artificial lighting along the beach is known to effect the orientation of hatchlings (Dickerson and Nelson, 1989; Witherington 1991) and to effect the emergence of nesting females onto the beach (Witherington 1992). Since beach nourishment may occur during the sea turtle nesting season, lighting associated with construction activities on the beach may effect hatchlings and nesting females. Research has shown that low pressure sodium (LPS) lights that emit only yellow wavelengths do not attract hatchlings (Dickerson and Nelson 1988 and 1989; Nelson and Dickerson, 1989b). Witherington (1992) demonstrated that LPS lights on the beach did not significantly effect the nesting behavior of green or loggerhead sea turtles. The use of LPS lighting at the beach nourishment site and on the dredge can reduce the potential for lighting effects on sea turtles. However, the Corps is concerned about the appropriateness of using LPS lights in a marine environment for safety reasons. In a letter dated January 29, 1998, the USFWS revised their requirement for using LPS lights to a recommendation. Sea turtle protection measures will be incorporated into plans and specifications and are included in section 2.4, Mitigation. And section 4.31, Environmental Commitments.

Hopper dredging activities have the potential to adversely effects swimming sea turtles. Hopper dredges are also known to impact sea turtles resting on the bottom of entrance channels and in sand borrow areas. The National Marine Fisheries Service, the November 2003 GRBO for the use of hopper dredges in the Gulf of Mexico makes the following statement:

"The construction and maintenance of Federal navigation channels have been identified as a source of turtle mortality since turtle takes were first documented during hopper dredging operations in Canaveral Channel, Florida, in 1980… Hopper dredges, which are frequently used in ocean bar channels and sometimes in harbor channels and offshore sand mining areas, move relatively rapidly and can entrain and kill sea turtles, presumably as the drag arm of the moving dredge overtakes the slower moving turtle."

As a result of these findings, the South Atlantic Division of the Corps (which includes the Jacksonville District) completed a regional consultation for the use of hopper dredges throughout the southeast Atlantic from the Virginia-North Carolina state line to Key West, Florida. This consultation resulted in a regional biological opinion (referred to as the "SARBO") for the use of hopper dredges in Corps maintained entrance channels and borrow areas and provided for protective measures the Corps was required to take to reduce the likelihood of turtle entrainment, such as draghead deflectors.

4.4.1.2 West Indian Manatee

The proposed action has the potential to adversely affect the West Indian manatee. However, the standard manatee protection measures would be incorporated into plans and specifications for this project. To insure the contractor and his personnel are aware of the potential presence of the manatee in the project area, their endangered status, and the need for precautionary measures, the contract specifications will include the standard manatee protection clauses. All small vessels associated with the project will be required to operate at "no wake" speeds at all times while in shallow water, or channels, where the draft of the vessel provides less than three feet clearance from the bottom. Boats used to transport personnel shall be shallow draft vessels, preferably of the light-displacement category, where navigational safety permits. Workboats shall follow routes of deep water when possible. The contractor shall be held responsible for any manatee harmed, harassed, or killed as a result of construction activities. If a manatee is sighted within a hundred yards of the dredging area, appropriate safeguards will be taken, including suspension of dredging, if necessary, to avoid injury to manatees.

4.4.1.3 Staghorn and Elkhorn Corals

Miami-Dade County (2008) surveyed the hardground areas occurring in and around the SGC1-Extension borrow site and the proposed pipeline corridor for *Acropora* using the NMFS-approved survey protocols for *Acropora* (NMFS 2007). No elkhorn coral (*Acropora palmata)* was identified during the surveys. Therefore, NMFS determined that elkhorn coral would not likely be impacted by the proposed action.

As determined by NMFS in their BO, potential adverse effects to *Acropora* critical habitat from sedimentation are discountable (NMFS 2009). No nearshore hardground areas containing the primary constituent element (PCE) exist near the proposed beach renourishment sites (USACE 2009; DERM 2009), thus adverse sedimentation effects during renourishment are not likely to occur. Hardground areas with the PCE may exist adjacent to the offshore borrow site. However, Gilliam et al. (2006) documented increased sedimentation rates with dredging and beach placement in adjacent areas were no higher than background levels. Additionally, the requirement to maintain a 400-ft buffer zone will further reduce the risks of sedimentation. Therefore, no measurable sedimentation impacts are not expected to occur to *Acropora* critical habitat, thus any adverse effect from sedimentation will be insignificant.

NMFS believes that the proposed project may adversely affect staghorn coral (*Acropora cervicornis)*, which is listed as a threatened species under the ESA. The portion of the proposed action that may affect *A. cervicornis* essentially comprises two elements: (1) sand mining from the SGC1-Extension borrow area and (2) placement of mined sand on the renourishment areas, including deployment and retrieval of a temporary pipeline. In section 2 of the BO, NMFS determined only the deployment/retrieval of a temporary pipeline for pumping sand may adversely affect *A. cervicornis*.

NMFS estimated up to 58 colonies could be lethally taken during deployment/retrieval of the pipeline if not relocated (Figure 9). NMFS believes coral transplantation will be highly successful and relocating these corals outside the pipeline corridor is appropriate to minimize the impact of this take. Since colonies less than 10 cm in size cannot be transplanted, 15 colonies located in the proposed pipeline corridor will likely be too small for relocation and will likely suffer mortality.

Given their size, these colonies are not likely to be sexually mature. The remaining 43 colonies are of suitable size for relocation. Similar habitat, influenced by the same environmental conditions currently affecting these colonies, exists nearby the proposed pipeline corridor.

NMFS estimated the proposed relocation may cause up to 36 non-lethal takes. The non-lethal take of up to 36 *A. cervicornis* colonies is not expected to have any measurable impact on the reproduction, numbers, or distribution of the species. Those colonies are expected to fully recover such that no reductions in reproduction or numbers of this species are anticipated. Since relocated colonies will remain in the same area, no change in species distribution is anticipated. Protection measures for Acropora species are included in Section 4.31, Environmental Commitments.

4.4.1.4 Least Tern and other Migratory Birds

Least tern ground colonies are known to occur in Miami-Dade County, few have been documented since 1998, and no ground colonies have been reported since 2005 (FWC 2009). Therefore, the proposed action is not likely to affect the least tern. The FWS expressed no concerns in the BO (FWS 2009).

During dredging and placement activities, bird habitat may be adversely or beneficially affected; similar, short-term and local disturbances may affect individual bird behavior (Grippo *et al.*, 2009; Cook and Burton, 2010). Bird species may forage for fish in the hopper as it is being filled during dredging since dredging entrains possible prey items. Dredging also results in temporary increases in turbidity and sedimentation, removal and burial of benthic species, and displacement of fishes that could adversely impact foraging local opportunities, however those effects are minimal given the short-duration of activities and widespread availability of equivalent habitat. Temporary displacement and noise related to use of heavy construction equipment could disturb nesting and foraging birds. Birds may forage in the immediate area of equipment operation where heavy equipment is used to shape dewatering sediment discharged from the pipeline. Temporary adverse effects may also occur from a reduction in available food sources following burial. Beach fill alongshore generally occurs at an alongshore rate of 300-500 feet of beach per day; benthic invertebrates can immediately recolonize the newly created habitat (Burlas *et al.*, 2001). Any tilling and scarp removal that must be done to shape the beach to accommodate nesting sea turtles should be done outside the shorebird nesting season. Following construction, the newly created beach will create suitable shorebird nesting habitat. Detailed borrow area and beach compatibility analysis, as required by state law, has been performed to ensure the beach fill matches the native or existing beach (Appendix D).

The USACE, in conjunction with the U.S. FWS, State of Florida Freshwater Game and Fish Commission, and Audubon Society has developed a statewide policy to avoid and monitor potential impacts birds (http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DOCS/MigratoryBirdProtection_DistrictPolicy.pdf). The Corps has developed a suite of contractual specifications for dredge contractors to implement during construction http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DOCS/MigratoryBirdProtection_ContractsSpecs.pdf). The Contractor shall keep all dredging and construction activities under surveillance, management, and control to prevent impacts to migratory birds and their nests. The Contractor may be held responsible for harming or harassing the birds, their eggs or their nests as a result of their activities. The FLDEP JCP permit and Corps' protection policy jointly require monitoring of shore birds and operation restrictions during the nesting season between April and September, when nesting and courting behavior is most prevalent.

- Within the project area, a 200 ft-wide buffer zone will be established around any location where shorebirds have been engaged in courtship or nesting behavior, or around areas where protected birds occur or winter migrants congregate in significant numbers. Any and all construction activities, including movement of vehicles, should be prohibited in the buffer zone.

- If shorebird nesting occurs within the project area, a bulletin board will be placed and maintained in the construction area with the location map of the construction site showing the bird nesting areas and a warning, clearly visible, stating that "BIRD NESTING AREAS ARE PROTECTED BY THE FLORIDA THREATENEDAND ENDANGERED SPECIES ACT AND THE FEDERAL MIGRATORYBIRD ACT".

- If it will be necessary to extend construction pipes past a known nesting site or over-wintering area, then whenever possible those pipes should be placed landward of the site before birds are active in that area. No sand shall be placed seaward of a known nesting site during the nesting season.

4.4.1.5 Smalltooth Sawfish

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 (C. Slay, Coastwise Consulting, pers. comm. August 18, 2003) 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 within the area of influence of this project. 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." The Corps completely agrees with this determination and incorporates it into our effects determination.

4.4.1.6 Bottlenose Dolphin

Although bottlenose dolphins are common in the nearshore waters of southeast Florida, USACE has never documented a direct effect on bottlenose dolphins from dredging activities during its numerous dredging projects throughout Florida and the United States. Although bottlenose dolphins are common in the nearshore waters of south Florida, USACE has never documented a direct effect on bottlenose dolphins from dredging activities during its numerous dredging projects throughout Miami-Dade County, Florida, and the United States. In the April 25, 2005 notice in the Federal Register for the issuance of an IHA for blasting at the Port of Miami, NMFS states:

"According to the Corps, bottlenose dolphins and other marine mammals have not been documented as being directly affected by dredging activities and, therefore, the Corps does not anticipate any incidental harassment of bottlenose dolphins. NMFS concurs." (NMFS 2005b)"

4.4.1.7 North Atlantic Right Whale

The proposed action would have no adverse effect on the North Atlantic right whale.

4.4.2 NO ACTION ALTERNATIVE (STATUS QUO)

4.4.2.1 Sea Turtles

If no action is taken, the beach would continue to erode. If left to erode, this could ultimately result in the loss of sea turtle nesting habitat and/or poor nest site selection.

4.4.2.2 West Indian Manatee

The No Action Alternative would not have any effect on the West Indian manatee.

4.4.2.3 Staghorn and Elkhorn Corals

The No Action Alternative would not have any effect on staghorn or elkhorn corals.

4.4.2.4 Least Tern

The No Action Alternative would not have any direct effect on the least tern. However, adverse impacts would be expected on least terns foraging along the eroded beach.

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4.4.2.5 Smalltooth Sawfish

The No Action Alternative would not have any effect on the smalltooth sawfish.

4.4.2.6 Bottlenose Dolphin

The No Action Alternative would not have any effect on the bottlenose dolphin.

4.4.2.7 North Atlantic Right Whale

The No Action Alternative would not have any effect on the north Atlantic right whale.

4.5 HARDGROUNDS

4.5.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2.

Minimal impacts to nearshore hardground communities are expected by sand placement (i.e., disposal) on the beach due to the distance of the reefs to the shore. In conjunction with the Coast of Florida Erosion and Storm Effects Study, the hardground areas offshore of Miami-Dade County were mapped using side scan sonar. Subsequent aerial photography flown in July 1997 and April 2000 has also been used to map the nearshore hardground The closest hardground community in the vicinity of the proposed beach fill in Miami Beach is in excess of 1,800 feet offshore.

The communities found offshore of Miami-Dade County out to one-half mile from shore are described in Dodge et al. (1987). Dodge characterizes four community types within this area. (1) non-vegetated sand flats occurring; (2) soft coral communities in sand deposits of 3" to 6" or greater depth; (3) soft coral and attached algae on sand bottom; (4) hard coral community hardground "reefs". Of these community types, only the last one is characteristic of hardground reef areas (i.e., continuous rocky substrate with epibiotic growth). The other community types noted by Dodge et al. (1987) have developed and grown in these highly dynamic areas of sand movement, characterized by sporadic, episodic sand inundation and removal. The organisms that colonize these areas are more tolerant of the dynamic conditions that exist in these areas, and comprise a stable community adapted to sand movement of the nearshore system. The community types (2) and (3) above correlate to the hardground areas located closest to shore as interpreted by side scan sonar. The hardground areas ((4) above) noted by Dodge et al. (1987) were reported as being "never closer than 1500 feet and generally greater than 1800 feet from shore", and that "the hard coral coverage and diversity is greatest on the seaward portions of the transects" (greater than 3000 feet from shore). Because the communities nearest the shore (within 1500 feet) are adapted for periodic sand movement within the zone it is not expected that these communities will be effected by the placement of sand on the beach or the subsequent periodic offshore-onshore movement of that sand. The shoreward edge of the hard coral community described above is at least 1000 seaward of the anticipated equilibrium toe of the beach fill and would not be directly impacted by the sand.

A potential method of placing the sand onto the beach would be to pump it from barges or dredges offshore. It may therefore be necessary to place a discharge pipeline across the reef from an offshore pump-out platform to the beach fill site. The placement of the pipeline across the reef would have an impact on the benthic community. Potential impacts included: physical crushing, abrasion and shading of benthos (algae, sponges, soft coral and hard coral). It is expected that the major impact would occur to sponges, algae and soft corals, with some loss to hard corals. The actual extent of impact would be determined through post-construction surveys.

The substrate located within the footprint of the pipeline will be temporarily impacted by the placement of the pipeline. However, when the pipeline is removed the area will be re-exposed and new benthic populations will begin to quickly establish. Past observations during previous renourishments (Miami Beach 1994; Sunny Isles and Miami Beach 1997; Surfside and South Miami Beach 1999; Sunny Isles and Miami Beach 2001/2002) have shown the pipeline made only occasional contact with the bottom, minimizing the impact by reducing the amount of substrate and number of benthic organisms contacting the pipeline. Post-placement inspection of the pipe found it to be in contact with the reef only sporadically. Irregularities of the reef and the connector collars (or rings) used to connect the pipe segments, held the pipeline off the reef surface for considerable distances. In general, impacts to the bottom were much less than expected. The most severe impacts noted were to large hard coral heads having a colony diameter up to 2.0 m. The most common impact was to erect, dendroid soft corals that bordered the pipeline. These corals were abraded by the constant wave surge moving their branches against the pipeline. The actual impact was considerably less than the pre-project estimated impact. This was the result of several factors. The pre-project evaluation of the reef area over which the pipeline was to be placed provided a 'minimal impact" path for the corridor. In addition, the connector rings for the pipeline segments raised substantial lengths of the pipe off the bottom (between 50 and 100 feet, dependent on localized relief). Finally, the irregularities of the reef itself served as point supports for the pipe, allowing substantial lengths of the pipeline (up to 150 to 200 feet) to remain off the bottom.

4.5.2 NO ACTION ALTERNATIVE (STATUS QUO).

The No Action Alternative would have no impact on hardgrounds within the project area.

4.6 FISH AND WILDLIFE RESOURCES

4.6.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

During the placement of sand on the beach there may be some interruption of foraging and resting activities for shorebirds that utilize the project area. This impact would be short-term and limited to the immediate area of disposal and time of construction. There would be sufficient beach area north and south of the renourishment sites that can be used by displaced birds while construction takes place. Increased foraging opportunities for some species, such as sea gulls, can also occur as a result of the discharge activity. Elevated turbidity levels within the immediate vicinity of the discharge site may interfere with foraging by sight feeders such as the brown pelican (*Pelecanus occidentalis*). However, increased turbidity levels would be limited to a small portion of the shoreline and should not result in significant impacts to foraging activities.

Nelson (1989c) reviewed the literature on the effects of beach renourishment projects on sand beach fauna and concluded that minimal biological effects resulted from beach nourishment. In addition, some mortality of organisms may occur where grain size is a poor match to existing sediments; however, recovery of the beach system appears to be rapid. Nelson reviewed several studies on the most common beach invertebrates of the southeastern U.S., including the mole crab, *Emerita talpoida*, the surf clam, *Donax sp.*, and the ghost crab *Ocypode quadrata*. None of the studies cited by Nelson showed significant or lasting impacts to any of the above species resulting from beach nourishment. Hackney et al. (1996) provide a more recent review of the effects of beach restoration projects on beach infauna in the southeastern U.S. They also reviewed studies on the above species and agree with the conclusions set forth by Nelson (1989c), with the suggestion that construction should take place in winter months to minimize impacts, and that the sand used should be a close match to native beach sand. In review of past studies, there was a considerable short-term reduction in the abundances of mole crabs, surf clams, and ghost crabs attributable to direct burial. Recruitment and immigration were generally sufficient to re-establish populations within one year of construction. No long-term adverse effects are anticipated to the intertidal macroinfaunal community due to nourishment activities (Deis, et al. 1992, Nelson 1985, Gorzelany & Nelson 1987, USFWS 1997).

4.6.2 NO ACTION ALTERNATIVE (STATUS QUO)

The No Action Alternative would have no impact on fish and wildlife resources within the project area. Continued erosion of the County's beaches could result in continued loss of habitat and eventual loss of vegetated dune habitat. Also, the armoring measures that may be taken by residents along the beaches in these areas would result in impact to the plant and animal communities within these areas by impacting the natural dune system, as well as potentially impacting nesting sea turtles.

4.7 ESSENTIAL FISH HABITAT ASSESSMENT

Section 3.7 describes the "existing conditions" of the Essential Fish Habitat (EFH), Federally managed fisheries, and associate species such as major prey species, including affected life history stages. The following subsections describe the individual and cumulative impacts of the proposed action(s) and alternatives on EFH, Federally managed fisheries, and associate species such as major prey species, including affected life history stages.

4.7.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

Implementation of the preferred alternative would not significantly impact EFH resources within the project area. Placement of material on the beach would temporarily impact fishes within the nearshore habitats. Increased turbidity and disturbance during construction may hinder feeding and migration of fishes within these habitats. Due to the relatively small habitat being impacted at one time during the project, and the available adjacent habitats, fishes should be able to utilize these adjacent habitats. Impacts associated with the beach fill for this project will not result in any long-term significant adverse impacts to EFH within the area.

Acropora and hardground resources have the potential to be directly impacted during placement of the pipeline as has been described in Section 4.5.1. The Corps will relocate 43 colonies of *A. cerviconis* and monitor additional colonies along the pipeline corridor and adjacent to the SGC-1 Extension borrow according to the NMFS BO and mitigation plan.

4.7.2 NO ACTION ALTERNATIVE (STATUS QUO)

The No Action Alternative would have no impact on EFH within the project area.

4.8 COASTAL BARRIER RESOURCES

4.8.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

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

4.8.2 NO ACTION ALTERNATIVE (STATUS QUO)

The No Action Alternative would have no impact on Coastal Barrier resources within the project area.

4.9 WATER QUALITY

4.9.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

The proposed action would cause temporary increases in turbidity along and adjacent to the beach disposal site. The State of Florida water quality regulations require that water quality standards not be violated during dredging operations. The standards state that turbidity outside the mixing zone to be determined by the permit shall not exceed 29 NTU's above background. Results from turbidity monitoring at previous beach nourishment projects have shown that the turbidity did not exceed the standard. Various protective measures and monitoring programs would be conducted during construction to ensure compliance with state water quality criteria. Should turbidity exceed State water quality standards as determined by monitoring, the contractor would be required to cease work until conditions returned to normal. The proposed action has been evaluated in accordance with Section 404 of the Clean Water Act and a 404(b) evaluation report has been included as Appendix A to this EA.

As specified in the Corps' Master Guide Specification, Section 01 57 20 Environmental Protection, a spill prevention plan must be prepared to insure that measures are taken to insure prevention and remediation of spills or any other accidental release of petroleum or other products.

4.9.2 NO ACTION ALTERNATIVE (STATUS QUO)

The No Action Alternative would have no impact on water quality within the project area.

4.10 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

4.10.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

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

With the use of construction equipment in the in the areas around the borrow and beach fill sites, there is the potential for hydrocarbon spills or other effluent releases. However, the likelihood of significant accidents and releases of this sort is very remote. The contract specifications will require the contractor to develop accident and spill prevention plans. The no-action alternative should not allow conditions to develop that would increase accidents or releases of this sort.

4.10.2 NO ACTION ALTERNATIVE (STATUS QUO)

The No Action Alternative would have no impact on hazardous, toxic, and radioactive waste within the project area.

4.11 AIR QUALITY

4.11.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

Direct emissions from the proposed action involving dredging of the offshore borrow site and renourishment of priority area 1 would be confined to exhaust emissions of labor transport equipment (land and water vehicles), and construction equipment (dredge, barges, tugs, etc.). Criteria air pollutant emissions were estimated for the preferred action using estimates of power requirements, duration of operations, and emission factors for the various equipment types. Multiplying horsepower rating, activity rating factor (percent of total power), and operating time yields the energy used. The energy used multiplied by an engine-specific emission factor yields the emission estimate. Operational data from the 2005 Duval County nourishment cycle was used to estimate power requirements and duration for each phase of the proposed hopper dredging activity. The horsepower rating of the dredge plant was assumed for each activity as follows: propulsion (3,500 hp), dredging (2,000 hp), pumping (2000 hp), and auxiliary (1,165 hp).

Different rating or loading factors were used for dredging, propulsion, and pumping. The estimated duration of dredging was approximately 81 days. The estimated time to each complete dredge cycle, including idle time, was approximately 8.89 hours per load. It was assumed that about 3,983 cy of material would be moved in each cycle, requiring about 217 loads to excavate enough material to place 474,000 cy of sand on the beach. The placement and relocation of the nearshore mooring buoys used during pump-out may involve up to two tender tugboats, a derrick barge, two work barges, and pipeline hauler / crane. It was assumed that the buoy would need to be moved at most five times during the project, with each move taking approximately 12 hours. It was assumed that a crew/supply vessel would operate daily for four hours as well.

All dredging was assumed to occur on the OCS, whereas 55% of hopper transport and crew/supply vessel activities were assumed to occur over state waters or at the placement site. The beach fill related estimates assumed the use of up to four bulldozers/pipeline movers and two trucks, each operating eighty percent of the time for the duration of the project.

Emission factors for the diesel engines on the hopper dredge, barge, tugboats were obtained from EPA's *Compilation of Air Pollutant Emissions Factors, AP-42, Volume 1* (2002). Emission factors for tiered equipment used in beach construction were derived from NONROAD model (5a) estimates. Total project emissions of nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter (PM) are presented in Table 3.

Table 3: Estimated Emissions For The Proposed Action (Tons Per Year)

Activity	Emissions (tons)					
	NOx	**SO2**	**CO**	**VOC**	**$PM_{2.5}$**	**PM_{10}**
Dredge Plant (Hopper)						
Dredging/Operation	14.9	0.3	3.4	0.4	0.2	0.2
Turning/Sail	29.6	0.5	6.8	0.8	0.5	0.5
Pump-out	13.6	0.2	3.1	0.4	0.2	0.2
Idle / Connect-Disconnect	3.0	0.0	0.7	0.1	0.0	0.0
Supporting Offshore Activities	10.8	0.2	2.5	0.2	0.2	0.2
Beach Fill	6.2	1.1	2.9	0.4	0.5	0.5
Total Emissions	**78.1**	**2.3**	**19.4**	**2.2**	**1.7**	**1.7**
Total Emissions within State	28.9	1.8	12.8	1.5	1.2	1.2
Total Emissions within OCS	49.2	0.7	6.6	0.8	0.5	0.5
2002 Countywide Emissions Nonpoint + Mobile (Point and Nonpoint + Mobile)	73,395 (86,064)	24,492 (34,067)	630,493 (635,181)	121,113 (122,724)	6,275 (7,424)	22,555 (24,023)

Miami-Dade County 2002 emissions from EPA National Emission Inventory
http://www.epa.gov/air/data/

The proposed action may result in small, localized, temporary increases in concentrations of nitrogen dioxide (NO_2), SO_2, CO, VOC, and PM. Since the project is located in an attainment area, there is no requirement to prepare a conformity determination. Nonetheless, estimates were tallied to determine the portion of total emissions that would occur within state limits. Since the Federal OCS waters attainment status is unclassified, there is no provision for any classification in the Clean Air Act for waters outside of the boundaries of state waters. Calculating the increase in emissions that may occur within the state limits was done by subtracting out the dredging-related and 45% of transport emissions, since those activities would take place entirely over Federal waters.

Emissions associated with the dredge plant would be the largest contribution to the inventory. However, the total increases are relatively minor in context of the existing point and nonpoint and mobile source emissions in Miami-Dade County (Table 3). Projected emissions from the proposed action would not adversely impact air quality given the relatively low level of emissions and the likelihood for prevailing offshore winds. With the proposed action, the criteria pollutant levels would be well within the national ambient air quality standards.

Direct emissions from the excavation at Lummus Park and renourishment of priority area 2 would be confined to exhaust emissions of labor transport equipment (land and water vehicles), and construction equipment (dredge, barges, tugs, etc.). These emissions would likely be well under the *de minimus* levels for ozone non-attainment areas as cited in 40 CFR 91.853; that is, projects implemented cannot produce total emissions greater or equal to 100 tons per year of Volatile Organic Compounds (VOCs).

4.11.2 NO ACTION ALTERNATIVE (STATUS QUO)

The No Action Alternative would have no impact on air quality within the project area.

4.12 NOISE

4.12.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

With the implementation of the proposed action there would be a temporary increase in the noise level during construction. The principle noise would stem from the vicinity of the discharge point on the beach. Construction equipment would be properly maintained to minimize the effects of noise. Increases from the current noise levels as a result of the proposed action would be localized and minor, and limited to the time of construction. The principle noise-related effect in the underwater marine environment would be generated by dredges and is low frequency in nature. This low frequency noise tends to carry long distances in the water, but is attenuated the further away you are from the source. Noise and its effect on marine mammals would be limited to the bottlenose dolphins that may transit by the project area (NMFS 2005).

4.13 AESTHETICS

4.13.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

There would be a temporary increase in the noise level during construction, as mentioned above. Engine exhaust fumes would be rapidly carried away by breezes. Any temporary decrease in air quality caused by this work would be corrected once work is completed. Hundreds of feet of dredge pipe lying on the beach or just offshore would have a negative visual impact on the aesthetics of the area. This impact would only be temporary and would be removed along with the pipe at the completion of the work. The negative visual impacts of the equipment and pipe would be offset to an extent by the natural curiosity of some individuals to see what is going on and how work is progressing. There would also be a temporary increase in turbidity during construction adjacent to the point of discharge. Turbidity would return to normal levels once construction activities cease. Once completed the proposed project would result in an overall improved aesthetic quality. The placement of sand on the beach would restore the natural appearance of the shore. With the no-action alternative, the shoreline would continue to erode. This would result in the loss of existing shoreline, which would reduce the visual aesthetics of the area.

The excavation of a portion of the beach at Lummus Park would have a temporary adverse effect on the aesthetic characteristics. However, this effect would only be temporary during excavation activities.

4.13.2 NO ACTION ALTERNATIVE (STATUS QUO)

The No Action Alternative would have no impact on aesthetic resources within the project area.

4.14 RECREATION AND SAFETY

4.14.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

During nourishment activities, the use of the beach in the vicinity of construction would drop or be restricted temporarily. Use of the beach in the immediate area of the discharge pipe and equipment would be restricted for public safety. Noise from the heavy equipment needed to spread and smooth the sand would disturb some users as well. Many visitors would seek quieter areas for sunbathing or swimming. As portions of the renourished beaches come available, use by the general public would increase once more. After nourishment of the beach, use by the general public would return to pre-erosion activity levels. The general public would be more inclined to use these beaches rather than by-passing them for others with more sand above the high tide line. There would be a temporary adverse effect on recreational fishing in the immediate area of beach fill operations due to construction activities and turbidity. Fishing would not be affected outside the area of immediate construction. Nearshore snorkeling, and SCUBA diving activities may also be impacted by increased turbidity during construction activities and shortly thereafter. Long-term adverse impacts to these water activities are not anticipated. Boat operations may be detoured during construction activities; however, the extent of these detours and time frame of operations render these impacts insignificant. With the no-action alternative, the shoreline would continue to erode. This would eventually reduce the amount of beach available for recreation and would result in the degradation or loss of shorefront property thus, adversely impacting beach recreational opportunities within the area. There would be no construction related impacts to fishing, snorkeling and SCUBA diving.

The excavation of a portion of the beach at Lummus Park will result in a temporary disruption of recreational activities along the beach. In addition to the temporary loss of beach use in the direct footprint of the borrow area, it is likely that the vicinity of the borrow area would be avoided by many residents and tourists. The pipeline running along the beach to the placement area would have sand ramps built up at access points, providing safe access for residents and tourists over the pipeline.

4.14.2 NO ACTION ALTERNATIVE (STATUS QUO)

The No Action Alternative would have no impact on recreation within the project area.

4.15 HISTORIC PROPERTIES

4.15.1 PROPOSED ACTION, PRIORITY AREAS 1 AND 2

SHPO concurred with the Corps findings that no historic properties would be affected by the use of the SGC1-Extension borrow site or beach placement of the materials in priority areas 1 or 2 (Appendix F). The SHPO previously determined that fill from an upland sand source should not result in any impact to historic properties under the current active permits.

As specified in the Corps' Master Guide Specification, Section 01 57 20 Environmental Protection, if, during construction activities, the Contractor observes items that may have historic or archeological value, such observations shall be reported immediately to the Contracting Officer so that the appropriate Corps staff may be notified and a determination for what, if any, additional action is needed. Examples of historic, archeological and cultural resources are bones, remains, artifacts, shell, midden, charcoal or other deposits, rocks or coral, evidences of agricultural or other human activity, alignments, and constructed features. The Contractor shall cease all activities that may result in the destruction of these resources and shall prevent his employees from further removing, or otherwise damaging, such resources. The possibility of encountering submerged cultural resources is inherent in dredging and snagging operations. Such findings could include shipwrecks, shipwreck debris fields (such as steam engine parts), prehistoric watercraft (such as log "dugouts"), and other structural features intact or displaced. The materials may be deeply buried in sediment, resting in shallow sediments or above them, or protruding into water. Suspected cultural materials inadvertently gathered from a water-saturated context should be kept moist by re-immersion, spraying, or some other expedient means of wetting until the appropriate Corps staff provide further directives. No interviews or other contact with media shall occur without clear authorization from the Contracting Officer or the appropriate Corps representative.

4.15.2 NO ACTION ALTERNATIVE (STATUS QUO)

The No Action Alternative would have no impact on historic properties within the project area.

4.16 ENERGY REQUIREMENTS AND CONSERVATION

The energy requirements for this construction activity would be confined to fuel for the dredge, labor transportation, and other construction equipment. The no-action alternative would allow conditions to develop that may endanger coastal property from storm surges and wave erosion during future storm events. On-site preventive measures and post clean up under the no-action alternative would likely demand greater energy than that required of the proposed action.

4.17 NATURAL OR DEPLETABLE RESOURCES

In this case, the beach quality sand used to construct the project is considered a depletable resource. The gasoline and diesel fuel used by the construction equipment is also considered a depletable resource.

4.18 SCIENTIFIC RESOURCES

The proposed action would not have any impact on scientific resources, although continued monitoring during and after dredging and beach placement would add to scientific knowledge regarding the effects of dredging on nearshore resources.

4.19 NATIVE AMERICANS

The proposed action would have no impact on Native American resources.

4.20 REUSE AND CONSERVATION POTENTIAL

The proposed action would not directly present any reuse or conservation potential other than the using nearshore or accreted sand to protect upland natural resources and property.

4.21 DRINKING WATER

The proposed action would have no effect on primary and secondary drinking water standards or sole source aquifer.

4.22 CUMLATIVE IMPACTS

Cumulative impact is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Repeated placement of pipeline for periodic nourishment would have a cumulative impact on nearshore hardground habitat. However, using the same corridors for each renourishment to the extent practicable minimizes such cumulative impact. The proposed action would result in long-term benefits, which should outweigh any short-term environmental losses. The cumulative impact of shore protection projects along the Florida coast has been to restore and maintain many beaches which otherwise would have experienced severe erosion or would have totally disappeared. In addition, these activities have reduced property damage and helped maintain property value. Cumulative impacts to EFH for this project would be minimal. The re-utilization of pipeline corridors will minimize hardground impacts. Turbidity and distrurbance associated with beach placement will be temporary and no long term impacts to EFH are anticipated.

4.23 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.23.1 IRREVERSIBLE

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. One example of an irreversible commitment might be the mining of a mineral resource. Any impacts to larger hard coral could be irreversible for practical purposes given the long amount of time needed to regrow older and larger specimens. Measures would be taken to try to avoid such impacts and the plan (Appendix E) calls for efforts to move, reattach, or otherwise salvage as much hard coral that might be damaged as possible.

An additional irreversible commitment is the removal of beach fill material from the upland sand source. The removal of this material would constitute an irreversible act. The energy and fuel used during construction would also be an irreversible commitment of resources.

4.23.2 IRRETRIEVABLE

An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. An example of an irretrievable loss might be where a type of vegetation is lost due to road construction. Impacts from the placement of the pipeline which are temporary (benthic invertebrates, etc.), would be an irretrievable loss of that resource for the period of time it takes to recover.

4.24 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Those species that are not able to escape the construction area are expected to recolonize after project completion. There would be an unavoidable reduction in water clarity and increased turbidity and sedimentation directly offshore of the fill areas. This would be limited to the immediate areas of the beach fill operation. This impact will be temporary and should disappear shortly after construction activities cease. There would also be unavoidable impacts to hardground benthic organisms due to placement of pipelines across the nearshore reef. Measures will be implemented to minimize these impacts.

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

We recognize that protection of the shoreline is a continual effort. No acceptable and permanent one-time fix has currently been identified. Using periodic renourishment is an ongoing effort with the support of local, state and federal partners. Renourishment efforts have a temporary and short-term impact on the biological resources on and near the shore. This project will result in depletion of offshore borrow area resources since the borrow areas do not recover quickly enough to satisfy the needs for beach quality sand material in the County.

4.26 INDIRECT EFFECTS

Indirect effects in the form of increased turbidity and sedimentation on nearby hardground and reef communities could occur with dredging of the SGC1-Extension borrow area. These effects have been addressed in this EA as well as during ESA consultation and Section 401 permit coordination with the state and federal agencies.

4.27 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

The proposed action would be consistent with the state's Coastal Zone Management plan (see Appendix B on consistency determination). We expect the preferred alternative to be consistent with Federal, State and local plans and objectives.

4.28 CONFLICTS AND CONTROVERSY

In recent years, resource agencies, scientists and some environmental organizations have expressed concern about the impact of beach restoration and maintenance activities on nearshore resources. The controversy tends to involve issues relating to the duration or permanency of the impact and the capacity of the resource to recover from perturbations caused by beach restoration activities; and the cumulative effect of multiple but unrelated projects in a region of the coast.

In response to this controversy, the Corps has subjected the regulatory compliance determination for the Miami-Dade Beach Renourishment Project, to full review under the National Environmental Policy Act (NEPA). While public concern for impacts to nearshore habitats cannot be fully alleviated simply by analysis in an EA, the issues of concern will be more closely examined and the sufficiency of measures to avoid, minimize, and mitigate for impacts to resources can be better examined.

The limited availability of potential traditional nearshore borrow areas within the confines of Miami-Dade County requires that other sources of beach quality sand be utilized to protect both the environmental, private, and commercial resources located within the study area. With careful screening of potential borrow material before placement on the beach and monitoring of effects post placement, success for renourishment can be judged.

4.29 UNCERTAIN, UNIQUE, OR UNKNOWN RISKS

Restoration of eroding sandy shorelines through periodic placement of sand from offshore borrow areas is a long established practice in Florida and in the region of the Miami-Dade BEC, additionally, the project's local sponsor, DERM, has extensive experience with upland borrow sites for renourishment activities on the county's beaches. Consequently, with respect to the means and methods for constructing the project, general performance of the beach nourishment, and expected range of impacts, there are few if any risks that are uncertain, unique, or unknown. Burial of features along the shoreline within the fill template is a clear unavoidable impact if the beach is to be restored. What is not fully certain is the extent to which burial of these features, which have only been exposed by shoreline retreat in the last 50 years, will have long-term impact on the environment.

4.30 PRECEDENT AND PRINCIPLE FOR FUTURE ACTIONS

The proposed action would not set any precedent or principle for future actions.

4.31 ENVIRONMENTAL COMMITMENTS

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

Protection of Manatees

The Corps will incorporate the standard manatee protection construction conditions into our plans and specifications for this project. These standard conditions are:

1. The contractor instructs all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel are responsible for observing water-related activities for the presence of manatee(s), and shall implement appropriate precautions to ensure protection of the manatee(s).

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

3. Prior to commencement of construction, the prime contractor involved in the construction activities shall construct and display at least two temporary signs (placard) concerning manatees. For all vessels, a temporary sign (at least 8 1/2" x 11") reading "Manatee Habitat/Idle Speed In Construction Area" will be placed in a prominent location visible to employees operating the vessels. A second temporary sign (at least 8 1/2" x 11") reading "Warning, Manatee Habitat: Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment. Any collision with and/or injury to a manatee shall be reported immediately to the Florida Marine Patrol at 1-800-DIAL-FMP" will be located prominently adjacent to the displayed issued construction permit. Temporary notices are to be removed by the permittee upon completion of construction.

4. All vessels associated with the project operate at "idle speed/no wake" at all times while in the construction area and while in waters where the draft of the vessel provides less than a four foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

5. If manatees are seen within 100 yards of the active daily construction/dredging operation, all appropriate precautions shall be implemented to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet of a manatee. Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment.

6. Any collision with and/or injury to a manatee shall be reported immediately to the Florida Marine Patrol (1-800-DIALFMP) and to the Florida Department of Protection, Office of Protected Species Management at (904)922-4330.

7. The contractor maintains a log detailing sightings, collisions, or injuries to manatees should they occur during the contract period. A report summarizing incidents and sightings shall be submitted to the Florida Department of Protection, Office of Protected Species Management, Mail Station 245, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399 and to the U.S. Fish and Wildlife Service, 3100 University Boulevard, Jacksonville, FL 32216. This report must be submitted annually or following the completion of the project if the contract period is less than a year.

Protection of Sea Turtles

1. In accordance with the 2001 rule change under subsection 62B-41.007, Florida Administrative Code, all fill material placed on the beach must be analogous to that which naturally occurs within the project location or vicinity in quartz to carbonate ratio, color, median grain size, and median sorting. Specifically, such material shall be predominately of carbonate, quartz, or similar material with a particle size distribution ranging between 0.062 mm and 4.76 mm (classified as sand by either the Unified Soil Classification System or the Wentworth classification). The material shall be similar in color, grain size distribution (sand grain frequency, mean and median grain size, and sorting coefficient) to the material in the existing coastal system at the nourishment site and shall not contain:

   1a.Greater than 5 percent, by weight, silt, clay, or colloids passing the #230 sieve.
   1b. Greater than 5 percent, by weight, fine gravel retained on the #4 sieve.
   1c.Coarse gravel, cobbles, or other material retained on the 0.75-inch sieve in a percentage size greater than found on the native beach.

1d. Construction debris, toxic material or other foreign matter; and not result in contamination or cementation of the beach.

These standards must not be exceeded in any 10,000 square foot section, extending through the depth of the nourished beach. If the natural beach exceeds any of the limiting parameters listed, then the fill material must not exceed the naturally occurring level for that parameter.

2. Daily early morning surveys for sea turtles will be required if any portion of the sand placement construction occurs during the nesting season (March 1 through November 30). Nesting surveys must be initiated 65 days prior to construction activities, or by March 1, whichever is later. Nesting surveys must continue through the end of the project or through September 30, whichever is earlier. If nests are constructed in areas where they may be affected by sand placement activities, eggs must be relocated per the following requirements:

2a.Nesting surveys and egg relocations will only be conducted by personnel with prior experience and training in nesting survey and egg relocation procedures. Surveyors must have a valid FWC Permit. Nesting surveys must be conducted daily between sunrise and 9 a.m. The contractor must not initiate work until daily notice has been received from the sea turtle permit holder that the morning survey has been completed. Surveys must be performed in such a manner so as to ensure that sand placement activities do not occur in any location prior to completion of the necessary sea turtle protection measures.

2b. Only those nests that may be affected by sand placement activities will be relocated. Nests requiring relocation must 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. Nest relocations in association with sand placement activities must cease when these activities no longer threaten nests.

2c. Nests deposited within areas where construction activities have ceased or will not occur for 65 days must be marked and left in *in situ* unless other factors threaten the success of the nest. The sea turtle permit holder must install an on-beach marker at the nest site and a secondary marker at a point landward as possible to assure the future location of the nest will be possible should the on-beach marker be lost. A series of stakes and highly visible survey ribbon or string must be installed to establish a 10-foot radius around the nest. No activity will occur within this area nor will any activity occur which could result in impacts to the nest. Nest sites must be inspected daily to assure nest markers remain in place and that the nest has not been disturbed by the sand placement activity.

3. Immediately after completion of sand placement and prior to March 1 for 3 consecutive years, sand compaction must be monitored in the area of sand placement. The requirement for compaction monitoring can be eliminated if the decision is made to till regardless of post construction compaction levels. In addition, out-year compaction monitoring and remediation are not required if the Corps can demonstrate that placed sand no longer remains above MHW. If required, the area must be tilled to a depth of 36 inches, and all tilling activity must be completed prior to March 1. Each pass of the tilling equipment must be overlapped to allow more thorough and even tilling. Compaction monitoring should at a minimum include:

   3a. Compaction sampling stations must be located at 500-foot intervals along the project area. One station must be at the dune toe (when material is placed in this area), and one station must be midway between the dune toe and the high water line (normal wrack line). At each station, the cone penetrometer will be pushed to a depth of 6, 12, and 18 inches three times (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 will be located as close to each other as possible, without interacting with the previous hole or disturbed sediments. The three replicate compaction values for each depth will be averaged to produce final values for each depth at each station. Reports will include all 18 values for each transect line, and the final six averaged compaction values.

   3b. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area must be tilled prior to March 1. 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 consultation with the Service will be required 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.

4. Visual surveys for escarpments along the project area must be made immediately after completion of the project and prior to March 1 for three consecutive years. All escarpments shall be leveled, or the beach profile shall be reconfigured, to minimize escarpment formation. In addition, weekly

surveys of the project area shall be conducted during the three consecutive nesting seasons following completion of sand placement as follows:

4a. The number of escarpments and their location relative to DEP reference R-monuments shall be recorded during each weekly survey and reported relative to the length of the beach survey (*e.g.,* 50 percent escarpments). Notations on the height of these escarpments shall be included (0 to 2 feet, 2 to 4, and 4 feet or higher) as well as the maximum height of all escarpment; and

4b.Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet must be leveled to the natural beach contour by March 1. An escarpment removal shall be reported relative to DEP reference R-monument locations. The Service and FWC must be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs and persist for more than one week during the peak nesting and hatching season (May 1 to October 31) to determine the appropriate action to be taken. If it is determined escarpment leveling is required during the nesting season, the Service and FWC will provide written authorization that describes methods to be used to reduce the likelihood of impacting existing nests.

5. The Corps must arrange a meeting between representatives of the contractor, the Service, the FWC, and the sea turtle permit holder responsible for egg relocation at least 30 days prior to the commencement of work on this project. At least 10 days advance notice must be provided prior to conducting this meeting. This will provide an opportunity for explanation or clarification of the sea turtle protection measures.

6. From March 1 through November 30, staging areas for construction equipment must be located off the beach to the maximum extent possible. Nighttime storage of construction equipment not in use must be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes placed on the beach must be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system. Temporary storage of pipes must be off the beach to the maximum extent possible. Temporary storage of pipes on the beach must be in such a manner so as to impact the least amount of nesting habitat and must likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline is recommended as the method of storage).

7. A preconstruction lighting survey shall be conducted followed by a lighting survey 30 days post construction to ensure no lights or light sources are visible from the project area. Additional lighting surveys shall be conducted annually prior to March 1 in perpetuity.

8. In the event a sea turtle nest is excavated during construction activities, the sea turtle permit holder responsible for egg relocation for the project must be notified so the eggs can be moved to a designated relocation site.

9. A report describing the actions taken to implement the terms and conditions of this incidental take statement must be submitted to the FWC, Imperiled Species Management Section, Tallahassee office and the Service's South Florida Ecological Services Office, Vero Beach, Florida within 60 days post construction. This report will include the dates of actual construction activities, names and qualifications of personnel involved in nest surveys and relocation activities, descriptions and locations of self-release beach sites, nest survey and relocation results, hatching success of nests, preconstruction lighting survey results, post construction escarpment and sand compaction survey results, tilling activity, and both the pre-construction and 30-day post construction lighting survey results.

   Additionally, a monitoring report will be submitted for three consecutive nesting seasons post construction by December 31, that will include sand compaction survey or tilling activities, and escarpment survey results. Also, a report summarizing all lights visible, using standard survey techniques for such surveys, shall be submitted by March 1 documenting compliance with the Miami-Dade County beach lighting ordinance and enforcement action. All reports will be submitted electronically to the Corps, FWC, and the Service on standard electronic media (*e.g.,* CD).

   Upon locating a dead, injured, or sick endangered or threatened sea turtle specimen, initial notification must be made to the Service's Office of Law Enforcement (10426 NW 31st Terrace, Miami, Florida 33172; 305-526-2610). Additional notification must be made to FWC at 1-888-404-3922 and the Service's South Florida Ecological Services Office (1339 20th Street, Vero Beach, Florida 32960-3559; 772-562-3909). Care should be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure evidence intrinsic to the specimen is not unnecessarily disturbed.

Protection of Acropora and Hardground Communities

The Corps will comply with all components of the NMFS BO and FDEP permit conditions to insure protection and compensation for project impacts to acroporid and hardground resources.

NMFS BO Conditions

1. The Corps must ensure that *A. cervicornis* colonies, 10 cm or larger, occurring in the proposed pipeline corridor are transplanted. Qualified individuals following the protocols in Appendix A must conduct transplantation. The Corps must ensure that all transplanted colonies are re-located to suitable habitat near their original location, but no closer than 400 ft from the pipeline corridor boundary and no further away than 2,500 ft. Best management practices recommend a minimum 400-ft buffer between dredges and hardground resources (PBS&J 2008); transplanting colonies no more than 2,500 ft from the pipeline corridor boundary is desirable to minimize any potential genetic impacts from relocation. For the purposes of this opinion, suitable habitat is considered: similar depth as origin (+/- 5ft), uncolonized hard substrate, appropriate water quality (based on water quality data and local knowledge), and minimal chances of other disturbances (boat groundings, damage caused by curious divers/fisherman).

2. The Corps must ensure a 3-cm fragment is collected from each parent colony. The fragment must be collected from the axial tip of healthy branches (i.e., apparently free of disease, algae, or boring sponge infestation) using hand tools (e.g., clipper). Should colonies to be transplanted fragment during handling, all fragments smaller that 10 cm shall be collected in lieu of collecting an axial tip. Any fragments larger than 10 cm should be relocated according to transplantation protocols. All fragments must remain in seawater until transfer to the custody of the *Acropora* nursery within the sub-region. The Corps will coordinate with PRD to determine the appropriate nursery to receive the fragments.

3. The Corps must record the original location of each transplanted colony, as well as the location of each colony after transplantation. These data must be submitted to the central acroporid geodatabase maintained by the Florida Fish and Wildlife Conservation Commission (FFWCC). COE must contact David Palandro, Ph.D. of FFWCC at (727) 896-8626, ext. 3056, prior to transplantation to discuss data collection and reporting requirements.

4. The Corps must submit any changes to transplantation protocols and the qualifications of any persons conducting transplantation are submitted to NMFS, Protected Resources Division, Southeast Regional Office, Protected Resources Division, 263 13th Avenue South, St. Petersburg, Florida 33701.

5. The Corps must ensure that only persons with an appropriate background conduct sedimentation and *Acropora cervicornis* colonial health monitoring.

6. The Corps must ensure the sedimentation and coral health monitoring programs included as Appendix B of the BO are followed. Any changes to these protocols must be reviewed and approved by NMFS-PRD before they can be implemented. Copies of these documents can be found in Appendix F of this EA.

FDEP Permit Conditions
A Mitigation Plan was submitted and approved for adverse impacts to Acropora and hardground communities as part of FDEP Permit No.: 0295427-001-JC-Miami-Dade (including 008082-001-JC and subsequent modification). Mitigation for impacts associated with this project would have two components: (A) salvage (collection and re-stabilization) of dislodged and or fractured hard corals, and (B) "In-kind" mitigation by creation of benthic habitat through the placement of limestone boulders, and/or designed artificial reef modules.

A physical and biological monitoring plan was also submitted to FDEP to insure accurate documentation of project impacts and is included in Appendix E of this document. The Corps will comply with conditions and protocols in both the mitigation plan and monitoring plan.

Protection of Migratory Birds
The Corps will incorporate the standard migratory bird protection protocols into the project plans and specifications and will require the contractor to abide by those requirements.

4.32 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.32.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Environmental information on the project has been compiled and a Draft Environmental Assessment, has been prepared and will be circulated for public review and comment. The project is in compliance with the National Environmental Policy Act.

4.32.2 ENDANGERED SPECIES ACT OF 1973

Consultation was initiated with NMFS on March 9, 2009, and completed on October 21, 2009 (see Section 4.4). Consultation was initiated with USFWS on May 1, 2009, and completed when the FWS BO received by the Corps on December 17, 2009. (see Section 4.4). In addition, the proposed action will comply with all aspects under the NMFS Regional BO-hopper dredging-South Atlantic coast

(1997). This project was fully coordinated under the ESA and is therefore, in full compliance with the Act.

4.32.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

This project has been coordinated with the USFWS through the NEPA process with this EA. This project is in full compliance with the Act.

4.32.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (INTER ALIA)

(PL 89-665, the Archeology and Historic Preservation Act (PL 93-291), and executive order 11593), and (executive order 11593) Archival research, field investigations, and consultation with the Florida State Historic Preservation Officer (SHPO), have been conducted in accordance with the National Historic Preservation Act, as amended; the Archeological and Historic Preservation Act, as amended and Executive Order 11593. The project will not affect historic properties included in or eligible for inclusion in the National Register of Historic places. The project is in compliance with each of these Federal laws.

4.32.5 CLEAN WATER ACT OF 1972

The project is in compliance with this Act. Application for a Section 401 water quality certification has been submitted to the FLDEP. All State water quality standards would be met. A Section 404(b) evaluation is included in this report as Appendix A.

4.32.6 CLEAN AIR ACT OF 1972

No air quality permits would be required for this project. This project is in compliance with Section 309 of the Act. (See Section 4.10) The draft EA will be forwarded to EPA for their review.

4.32.7 COASTAL ZONE MANAGEMENT ACT OF 1972

A federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix B. State consistency review was conducted during the coordination of the draft EA.

4.32.8 FARMLAND PROTECTION POLICY ACT OF 1981

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

4.32.9 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.

4.32.10 MARINE MAMMAL PROTECTION ACT OF 1972

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

4.32.11 ESTUARY PROTECTION ACT OF 1968

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

4.32.12 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)).

4.32.13 SUBMERGED LANDS ACT OF 1953

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

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

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

4.32.15 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 the public notice, public hearing, and other evaluations normally conducted for activities subject to the act. The project is in full compliance.

4.32.16 ANADROMOUS FISH CONSERVATION ACT

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

4.32.17 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

No migratory birds would be affected by project activities. Measures would be taken to avoid destruction of migratory bird eggs, chicks and adults. The project is in compliance with these acts.

4.32.18 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

The term "dumping" as defined in the Act (3[33 U.S.C. 1402](f)) does not apply to the 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.

4.32.19 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

This act requires the preparation of an EFH Assessment and coordination with NMFS. The EFH Assessment has been integrated within the draft EA and has been coordinated with NMFS during the normal NEPA coordination.

4.32.20 E.O. 11990, PROTECTION OF WETLANDS

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

4.32.21 E.O. 11988, FLOOD PLAIN MANAGEMENT

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

4.32.22 E.O. 12898, ENVIRONMENTAL JUSTICE

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

4.32.23 E.O. 13089, CORAL REEF PROTECTION

The proposed action may affect U.S. coral reef ecosystems as defined in the Executive Order (E.O.). Precautions will be implemented during construction to minimize impacts. Any potential reef impacts due to sedimentation and elevated turbidity levels have been determined to be insignificant. Up to 4.3 acres of hardground would be directly impacted by deployment/retrieval of the pipeline. NMFS estimated up to 58 colonies of *A. cervicornis* could be lethally taken during this process if not relocated. NMFS also estimated the proposed relocation may cause up to 36 non-lethal takes, but it is not expected to have any measurable impact on the reproduction, numbers, or distribution of the species. The Corps will comply with the reasonable and prudent measures outlined in the NMFS BO for the project. Through coordination with NMFS, the proposed project is in compliance with the E.O. 13089.

4.32.24 E.O. 13112, INVASIVE SPECIES

The proposed action would not affect the status of any invasive species in the project area. The proposed project is in compliance.

4.32.25 E.O. 13186, MIGRATORY BIRDS.

This Executive Order requires, among other things, a Memorandum of Understanding (MOU) between the Federal Agency and the U.S. Fish and Wildlife Service concerning migratory birds. Neither the Department of Defense MOU nor the Corps' Draft MOU clearly address migratory birds on lands not owned or controlled by the Corps. For many Corps civil works projects, the real estate interests are provided by the non-Federal sponsor. Control and ownership of the project lands remain with a non-Federal interest. Measures to avoid the destruction of migratory birds and their eggs or hatchlings are described in a section above on the Migratory Bird Treaty Act. The Corps will include our standard migratory bird protection requirements in the project plans and specifications and will require the contractor to abide by those requirements.

The BOEMRE (then the MMS) entered into a MOU with the U.S. Fish and Wildlife Service on June 4, 2009. This document includes the measures taken by BOEMRE to ensure the protection of migratory birds pursuant to this Executive Order.

5 LIST OF PREPARERS

5.1 PREPARERS

This Environmental Assessment was prepared by the following personnel:

Preparer	Organization	Discipline	Role
Lee Swain	**Dial Cordy and Associates Inc.**	**Water Resource Planner**	**Principal Writer**
Martha Robbart	**Dial Cordy and Associates Inc.**	**Marine Biology**	**Associate Writer**

5.2 REVIEWERS

This Environmental Assessment was reviewed by the following personnel:

Reviewer	Organization	Discipline	Role
Patrick Griffin	**Environmental Branch, Planning Division, Jacksonville District, U.S. Army Corps of Engineers**	**Biology**	**Document Review**
Terri Jordan-Sellers	**Environmental Branch, Planning Division, Jacksonville District, U.S. Army Corps of Engineers**	**Marine Biology**	**EA Project Manager, Document Review**
Geoff Wikel	**Bureau of Ocean Energy Management, Regulation and Enforcement**		**Cooperating Agency Representative, Document Review**

6 PUBLIC INVOLVEMENT

6.1 SCOPING AND DRAFT EA

Informal scoping was conducted with resource agencies and local stakeholders. The Notice of Availability (NOA) of the draft EA was issued on December 28, 2009 and made available to the public on the Corps website. The comment period remained open until February 28, 2010.

6.2 AGENCY COORDINATION

The proposed project has been coordinated with the following agencies: Bureau of Ocean Energy Management, Regulation and Enforcement (formerly Minerals Management Service), U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, Florida State Clearinghouse, Florida State Historic Preservation Officer, Florida Fish and Wildlife Conservation Commission, and the Florida Department of Environmental Protection, and any other interested parties.

6.3 LIST OF RECIPIENTS

Copies of the draft EA were mailed to the various stakeholders and resource agencies, and posted on the Corps Environmental Documents website found at http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine.htm. A complete mailing list is in Appendix G.

6.4 COMMENTS ON THE DRAFT EA

Comments received on the draft EA are included in Appendix H and have been incorporated in this final EA.

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APPENDIX A - SECTION 404(B) EVALUATION

SECTION 404(b) EVALUATION

CONTRACT E BEACH RENOURISHMENT PROJECT
MIAMI BEACH
MIAMI-DADE COUNTY, FLORIDA

I. Project Description

a. Location: The project is located on the southeast Florida coast within Miami-Dade County. Priority Area #1 is located in northern Miami Beach, from 90th street to 63rd street, (State R-Monuments 37.75 through 46.25), consisting of approximately 8,500 feet of beach. Priority Area #2 is located from approximately 57th street to 45th street, R53.7 to R55.5, consisting of approximately 1,800 feet and from approximately 29th street to 26th street, R60 to R61, approximately 1,000 feet.

b. General Description: The proposed action consists of placing fill material on eroded shorelines of Miami Beach. Priority area 1, between R37.75 and R46.25, would receive 474,000 cubic yards of material, along approximately 8,500 feet of beach. It is anticipated that this stretch of beach will be nourished using SGC1-Extension borrow area. Priority area 2, between R53.7 and R55.5 (approximately 1,800 feet) and from R60 to R61 (approximately 1,000 feet) would receive 218,000 cubic yards of material from the Lummus Park/South Miami Beach borrow area

c. Authority and Purpose: Initial authorization came from the Flood Control Act of 1968 authorization of the Beach Erosion Control and Hurricane Protection (BEC) Project for Dade County, Florida (see Figure 1, Location Map).

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

d. General Description of Dredged or Fill Material

(1) General Characteristics of Material: Material suitable for beach placement must meet the following specifications:

- Composed of quartz and/or carbonate with no more than 20 percent other constituents.

- Average mean grain size greater than or equal to 0.30 mm and less than 0.55 mm.
- Silt content (passing #200 sieve (.074mm)) of less than 5 percent.
- 99 percent of the material must pass 3/8 inch sieve and sand shall contain no material larger than the 3/4 inch sieve.
- Phi Standard Deviation values from 0.50 phi to 2.00 phi.
- Free of debris, sharp rocks and pebbles, concrete rubble, clay and organic material.
- Sand color will be similar to the existing beach. Based on the Munsell Soil Color Chart, color must be within the following range: HUE of 2.5 YR, 5 YR, 7.5 YR, 10 YR, 2.5 Y, 5 Y with a CHROMA of 1, 2, or 3 and a VALUE of 6, 7, or 8. This color specification eliminates strongly colored or dark sand.

(2) Quantity of Material: The proposed action would result in 692,000 cy of beach fill, with 474,000 cy to be placed in priority area 1 and 218,000 cy to be placed in priority area 2.

(3) Source of Material: Priority area 1 will be nourished using SGC1-Extension borrow area. Priority area 2, between R53.7 and R55.5 (approximately 1,800 feet) and from R60 to R61 (approximately 1,000 feet) would receive 218,000 cubic yards of material from the Lummus Park/South Miami Beach borrow area

e. Description of the Proposed Discharge Site(s)

(1) Location : The proposed discharge sites are located on the southeast Florida coast within Miami-Dade County (see EA Figure 1). Priority Area #1 is located in northern Miami Beach, from 90th street to 63rd street, (State R-Monuments 37.75 through 46.25), consisting of approximately 8,500 feet of beach. Priority Area #2 is located from approximately 57th street to 45th street, R53.7 to R55.5, consisting of approximately 1,800 feet and from approximately 29th street to 26th street, R60 to R61, approximately 1,000 feet.

(2) Size: Priority area 1 consists of a 8,500 foot length of shoreline and priority area 2 consists of two stretches of beach, 1,800 and 1,000 feet long.

(3) Type of Site: The site for disposal of the sand material is a segment of eroded, sandy, recreational beach and inshore seabed.

(4) Type(s) of Habitat: The site for disposal of the sand material is a segment of eroded, sandy, recreational beach and inshore seabed.

(5) Timing and Duration of Discharge: The exact timing of nourishment is not known. It is anticipated that construction will occur during 2010.

f. Description of Disposal Method : . It is anticipated that the material would be transported by ocean going hydraulic dredge, pumped onto the beach and graded using construction equipment to achieve the desired construction profile. A "dredge on land" technique will be used for the Lummus Park borrow site.

II. Factual Determinations

a. Physical Substrate Determinations:

(1) Substrate Elevation and Slope: The beach fill would be constructed with a berm elevation of +0.5 feet mean low water and a width of 205 feet from the ECL. The construction slope of the beach fill would be 1 vertical on 15 horizontal.

(2) Sediment Type: The material to be used as beach fill will be a quartz and/or carbonate sand from an upland sand source that meets the requirements of the sand specification.

(3) Dredged/Fill Material Movement: The fill material will be subject to erosion by waves with the net movement of fill material to the south.

(4) Physical Effects on Benthos: Some benthic organisms that are not mobile may be may be covered by the beach fill. 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: None.

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

b. Water Circulation. Fluctuation and Salinity Determinations

(1) Water column: During beach fill operations turbidity will increase temporarily in the water column adjacent to the project shoreline. The increased turbidity will be short-term; therefore fill 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

(2) 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.

(3) 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.

(4) Salinity Gradients: Salinity is that of oceanic water. Fill placement will not affect normal tide fluctuations or salinity.

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

e. Suspended Particulate/Turbidity Determinations

(1) 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 beach fill 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.

(2) 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 and inshore seabed. 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

(a) Light Penetration: Some decrease in light penetration may occur in the immediate vicinity of the beach fill 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 reaeriation 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.

(f) Others as Appropriate: None.

(3) Effects on Biota

(a) 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 beach fill.

(b) 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.

(c) 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.

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

d. Contaminant Determinations: The sand that will be used as beach fill material will not introduce, relocate, or increase contaminants at the fill area. The material would be clean sand meeting the sand specification and compatible with the existing beach

e. Aquatic Ecosystem and Organism Determinations: The upland sand 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.

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

(2) Effects on Benthos: The beach fill will bury some benthic organisms. Benthic organisms found in the intertidal areas along the project beach are adapted for existence in an area with considerable substrate movement, thus most will be able to burrow up through the fill material. 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. Placement of the discharge pipeline across the nearshore hardground will impact a portion of the benthic community. Any impact to the hardground community as a result of placing the pipeline will be mitigated as discussed in the EA.

(3) Effects on Nekton: No adverse impacts to nektonic species are anticipated

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

(5) Effects on Special Aquatic Sites: There are no hardground or coral reef communities located in the immediate nearshore area that would be impacted by beach fill activities. A discharge pipeline used to pump the sand to the beach will be placed across the nearshore hardground habitat. Section 4 of the EA offers a more detailed discussion on hardground impacts and mitigation

(6) Threatened and Endangered Species: Staghorn corals may be affected by deployment and retrieval of the discharge pipeline. Appropriate measures to avoid, minimize, and mitigate for impacts to this species have been fully coordinated with NMFS and are described in section 4 of the EA.

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

(8) Actions to Minimize Impacts: Measures to avoid and/or relocate staghorn coral colonies will be incorporated into the project and are described in section 4 of the EA.

f. Proposed Disposal Site Determinations

(1) 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.

(2) Determination of Compliance with Applicable Water Quality Standards : Because of the inert nature of the material to be to be used as beach fill, Class III water quality standards will not be violated

(3) Potential Effects on Human Use Characteristic

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

(b) 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

(c) 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.

(d) 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

(e) 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 fill 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 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. The no action alternative would allow the present condition of the shoreline to continue and would not provide the benefits needed for storm damage protection.

c. Compliance with Applicable State Water Quality Standards: After consideration of disposal site dilution and dispersion, the discharge of fill 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 fill material for beach renourishment 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 fill material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

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 fill 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 B - COASTAL ZONE MANAGEMENT CONSISTENCY

FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURES

CONTRACT E BEACH RENOURISHMENT PROJECT
MIAMI BEACH
MIAMI-DADE COUNTY, FLORIDA

1. Chapter 161, Beach and Shore Preservation.

Coastal areas are among the state's most valuable natural, aesthetic, and economic resources; and they provide habitat for a variety of plant and animal life. The state is required to protect coastal areas from imprudent activities that could jeopardize the stability of the beach-dune system, accelerate erosion, provide inadequate protection to upland structures, endanger adjacent properties, or interfere with public beach access. Coastal areas used, or likely to be used, by sea turtles are designated for nesting, and the removal of vegetative cover that binds sand is prohibited. This statute provides policy for the regulation of construction, reconstruction, and other physical activities related to the beaches and shores of the state. Additionally, this statute requires the restoration and maintenance of critically eroding beaches.

Response: The proposed plans and information will be submitted to the state in compliance with this chapter.

2. Chapters 163(part II), 186, and 187, County, Municipal, State and Regional Planning.

The purpose of this statute is to provide for the implementation of comprehensive planning programs to guide and control future development in the state. The comprehensive planning process encourages units of local government to preserve, promote, protect, and improve the public health, safety, comfort, good order, appearance, convenience, law enforcement and fire prevention, and general welfare; prevent the overcrowding of land and avoid undue concentration of population; facilitate the adequate and efficient provision of public facilities and services; and conserve, develop, utilize, and protect natural resources within their jurisdictions.

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 State Comprehensive Plan through preservation and protection of the shorefront development and infrastructure.

3. Chapter 186, F.S., State and Regional Planning

The state comprehensive plan provides basic policy direction to all levels of government regarding the orderly social, economic, and physical growth of the state. The goals, objectives, and policies of the state comprehensive plan are statewide in scope and are consistent and compatible with each other. The statute provides direction for the delivery of governmental services, a means for defining and achieving the specific goals of the state, and a method for evaluating the accomplishment of those goals.

Response: The proposed action does not involve social, economic or physical growth of Dade County or the state. Therefore this Chapter is not applicable to this project.

4. Chapter 252, F.S., Emergency Management

The state of Florida is vulnerable to a wide range of emergencies, including natural, technological, and manmade disasters and this vulnerability is exacerbated by the tremendous growth in the state's population, especially the growth in the number of persons residing in coastal areas, in the elderly population, in the number of seasonal vacationers, and in the number of persons with special needs. This statute directs the state to reduce the vulnerability of its people and property to natural and manmade disasters; prepare for, respond to and reduce the impacts of disasters; and decrease the time and resources needed to recover from disasters. Disaster mitigation is necessary to ensure the common defense of Floridians' lives and to protect the public peace, health, and safety. The policies provide the means to assist in the prevention or mitigation of emergencies that may be caused or aggravated by the inadequate planning or regulation of facilities and land uses. State agencies are directed to keep land uses and facility construction under continuing study and identify areas that are particularly susceptible to natural or manmade catastrophic occurrences.

Response: The proposed action involves placing beach compatible material from an upland sand source onto an eroding beach as a protective means for residents, development and infrastructure located along the Atlantic shoreline within the community of Miami Beach in Miami-Dade County. Therefore, this project would be consistent with the efforts of Division of Emergency Management.

5. Chapter 253, F.S., State Lands

The Board of Trustees of the Internal Improvement Trust Fund (Trustees) is vested and charged with the acquisition, administration, management, control, supervision, conservation, protection, and disposition of all lands owned by the state. Lands acquired for preservation, conservation and recreation serve the public interest by contributing to the public health, welfare and economy. In carrying out the requirements of this statute, the Trustees are directed to take necessary action to fully: conserve and protect state lands; maintain natural conditions; protect and enhance natural areas and ecosystems; prevent damage and depredation; and preserve archaeological and historical resources. All submerged lands are considered single-use lands to be maintained in natural condition for the propagation of fish and wildlife and public recreation. Where multiple-uses are permitted, ecosystem integrity, recreational benefits and wildlife values are conserved and protected.

Response: The proposed beach renourishment would create increased recreational beach and potential sea turtle nesting habitat. No seagrass beds or hardgrounds are located within the area proposed to receive fill. The proposed project would comply with the intent of this chapter.

6. Chapter 258, F.S., State Parks and Preserves

The statute addresses the state's administration of state parks, aquatic preserves, and recreation areas, which are acquired to emblemize the state's natural values and to ensure that these values are conserved for all time. Parks and preserves are managed for the non-depleting use, enjoyment, and benefit of Floridians and visitors and to contribute to the state's tourist appeal. Aquatic Preserves are recognized as having exceptional biological, aesthetic, and scientific value and are set aside for the benefit of future generations. Disruptive physical activities and polluting discharges are highly restricted in aquatic preserves. State managed wild and scenic rivers possess exceptionally remarkable and unique ecological, fish and wildlife, and recreational values and are designated for permanent preservation and enhancement for both the present and future.

Response: The proposed project area does not contain any state parks or aquatic preserves. The project is consistent with this chapter.

7. Chapters 259, F.S., Land Acquisition for Conservation or Recreation

The statute addresses public ownership of natural areas for purposes of maintaining the state's unique natural resources; protecting air, land, and water quality; promoting water resource development to meet the needs of natural systems and citizens of this state; promoting restoration activities on public lands; and providing lands for natural resource based recreation. Lands are managed to protect or restore their natural resource values, and provide the greatest benefit, including public access, to the citizens of this state.

Response: Since the affected property already is in public ownership, this chapter does not apply.

8. Chapters 260, F.S., Florida Greenways and Trails Act

A statewide system of greenways and trails is established in order to conserve, develop, and use the natural resources of Florida for healthful and recreational purposes. These greenways and trails provide open space benefiting environmentally sensitive lands and wildlife and provide people with access to healthful outdoor activities. The greenways and trails serve to implement the concepts of ecosystem management while providing, where appropriate, recreational opportunities such as horseback riding, hiking, bicycling, canoeing, jogging, and historical and archaeological interpretation.

Response: The proposed project area does not contain any state greenways or trails. The project is consistent with this chapter.

9. Chapter 267, F.S., Historical Resources

The management and preservation of the state's archaeological and historical resources are addressed by this statute. This statute recognizes the state's rich and unique heritage of historic resources and directs the state to locate, acquire, protect, preserve, operate and interpret historic and archeological resources for the benefit of current and future generations of Floridians. Objects or artifacts with intrinsic historic or archeological value located on, or abandoned on, state-owned lands or state-owned submerged lands belong to the citizens of the state. The state historic preservation program operates in conjunction with the National Historic Preservation Act of 1966 to require state and federal agencies to consider the effect of their direct or indirect actions on [significant] historic and archeological resources. These resources cannot be destroyed or altered unless no prudent alternative exists. Unavoidable impacts must be mitigated.

Response: This project has been coordinated with the State Historic Preservation Officer (SHPO). Historic Property investigations were conducted in the project area. No known historic properties are located on the segment of beach to be renourished. The SHPO concurred with the Corps determination that the proposed project will not adversely affect any significant cultural or historic resources. The project will be consistent with the goals of this chapter.

10. Chapter 288, Chapter 288, F.S., Commercial Development and Capital Improvements

The framework to promote and develop general business, trade, and tourism components of the state economy are established in this statute. The statute includes requirements to protect and promote the natural, coastal, historical, and cultural tourism assets of the state; foster the development of nature-based tourism and recreation; and upgrade the image of Florida as a quality destination. Natural resource-based tourism and recreational activities are critical sectors of Florida's economy. The needs of the environment must be balanced with the need for growth and economic development.

Response: The proposed beach nourishment would protect the beach. The larger beach, as a result of this project, will attract tourists by providing additional space for recreation and more protection to recreational facilities along the beach. This would be compatible with tourism for this area and therefore, is consistent with the goals of this chapter.

11. Chapter 334, F.S., Transportation Administration

The statute addresses the state's policy concerning transportation administration. It establishes the responsibilities of the state, the counties, and the municipalities in the planning and development of the transportation systems serving the people of the state and to assure the development of an integrated, balanced statewide transportation system. This is necessary for the protection of public safety and general welfare and for the preservation of all transportation facilities in the state.

Response: No public transportation systems would be impacted by this project.

12. Chapter 339, F.S., Transportation Finance and Planning

The statute addresses the finance and planning needs of the state's transportation system.

Response: No financing or planning needs associated with public transportation systems is required for this project.

13. Chapter 373, F.S., 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.

Response: This project does not involve water management, conservation of surface or ground water as described in this chapter. The project will have no effect on freshwater aquatic life or wild animal life. Short-term increases in turbidity may be encountered during construction, but the project will comply with the water quality monitoring and compliance requirements that will be included in the State's Water Quality Certification that will be issued for the permit. Based on the overall impacts of the project, the project is consistent with the goals of this chapter.

14. Chapter 375, F.S., Outdoor Recreation and Conservation Lands

The statute addresses the development of a comprehensive multipurpose outdoor recreation plan. The purpose of the plan is to document recreational supply and demand, describe current recreational opportunities, estimate the need for additional recreational opportunities, and propose the means to meet the identified needs.

Response: The project will support the continued use of Miami-Dade County beaches as a recreational resource for the citizens of Florida by maintaining the beach footprint over time. Based on the overall design of the project, the project is consistent with the goals of this chapter.

15. Chapter 376, F.S., Pollutant Discharge Prevention and Removal

Regulating the transfer, storage, and transportation of pollutants, and the cleanup of pollutant discharges is essential for maintaining the coastal waters, estuaries, tidal flats, beaches, and public lands adjoining the seacoast in as close to a pristine condition as possible. The preservation of the seacoast as a source of public and private recreation and the preservation of water and certain lands are matters of the highest urgency and priority. This statute provides a framework for the protection of the state's coastline from spills, discharges, and releases of pollutants as a result of the transfer, storage, and transportation of such products. The discharge of pollutants into or upon any coastal waters, estuaries, tidal flats, beaches, and lands adjoining the seacoast of the state is prohibited. The statute provides for hazards and threats of danger and damages resulting from any pollutant discharge to be evaluated; requires the prompt containment and removal of pollution; provides penalties for violations; and ensures the prompt payment of reasonable damages from a discharge. Portions of Chapter 376, F.S., serve as a complement to the national contingency plan portions of the federal Water Pollution Control Act.

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.

16. Chapter 377, F.S., Energy Resources

The statute addresses the regulation, planning, and development of the energy resources of the state. The statute provides policy to conserve and control the oil and gas resources in the state, including products made therefrom and to safeguard the health, property and welfare of Floridians. The Department of Environmental Protection (DEP) is authorized to regulate all phases of exploration, drilling, and production of oil, gas, and other petroleum products in the state. The statute describes the permitting requirements and criteria necessary to drill and develop for oil and gas. DEP rules ensure that all precautions are taken to prevent the spillage of oil or any other pollutant in all phases of extraction and transportation. The state explicitly prohibits pollution resulting from drilling and production activities. No person drilling for or producing oil, gas, or other petroleum products may pollute land or water; damage aquatic or marine life, wildlife, birds, or public or private property; or allow any extraneous matter to enter or damage any mineral or freshwater-bearing formation. Penalties for violations of any provisions of this chapter are detailed.

Response: This project does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore, this chapter does not apply. Sections 377.06, .24(9), and .242(1)(a)5 are not approved by NOAA as enforceable policy as they deal with regulation of oil and gas resources.

17. Chapter 379, F.S., Fish and Wildlife Conservation

The framework for the management and protection of the state of Florida's wide diversity of fish and wildlife resources are established in this statute. It is the policy of the state to conserve and wisely manage these resources. Particular attention is given to those species defined as being endangered or threatened. This includes the acquisition or management of lands important to the conservation of fish and wildlife. This statute contains specific provisions for the conservation and management of marine fisheries resources. These conservation and management measures permit reasonable means and quantities of annual harvest, consistent with maximum practicable sustainable stock abundance, as well as ensure the proper quality control of marine resources that enter commerce.

Additionally, this statute supports and promotes hunting, fishing and the taking of game opportunities in the State. Hunting, fishing, and the taking of game are considered an important part in the state's economy and in the conservation, preservation, and management of the state's natural areas and resources.

Response: The proposed beach fill may cause a temporary short-term impact to infaunal invertebrates from increased turbidity and/or direct burial of these organisms in the marine environment. However, these organisms are highly adapted to the periodic burial by sand in the intertidal zone. These organisms are highly fecund and are expected to return to pre-construction levels within 6 months to one year after construction. No adverse impacts to marine fishery resources are expected. It is not expected that sea turtles would be significantly impacted by this project. Sections 379.2551 and .362 not approved by NOAA as enforceable policy. Based on the overall impacts of the project, the project is consistent with the goals of this chapter.

18. Chapter 380, F.S., Land and Water Management

Land and water management policies are established to protect natural resources and the environment; and to guide and coordinate local decisions relating to growth and development. The statute provides that state land and water management policies, to the maximum possible extent, be implemented by local governments through existing processes for the guidance of growth and development and that all the existing rights of private property be preserved in accord with constitutions of this state and of the United States. The chapter establishes the Areas of Critical State Concern designation, the Florida Communities Trust as well as the Florida Coastal Management Act. The Florida Coastal Management Act provides the basis for the Florida Coastal Management Program which seeks to protect the natural, commercial, recreational, ecological, industrial, and aesthetic resources of Florida’s coast.

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. Section 380.23(3)(d) is not approved by NOAA as enforceable policy.

19. Chapter 381, F.S., Public Health: General Provisions

The statute establishes public policy concerning the state's public health system, which is designated to promote, protect, and improve the health of all people in the state.

Response: The proposed renourishment project will not have any effect on the state's public health system. Therefore, the project is consistent with the goals of this chapter. NOAA has only approved Sections 381.001, .0011, .0012, .006, ,0061, .0065, .0066, and .0067 as enforceable policy.

20. Chapter 388, F.S., Mosquito Control

Mosquito control efforts of the state are to achieve and maintain such levels of arthropod control as will protect human health and safety and foster the quality of life of the people, promote the economic development of the state, and facilitate the enjoyment of its natural attractions by reducing the number of pestiferous and disease-carrying arthropods. It is the policy of the state to conduct arthropod control in a manner consistent with protection of the environmental and ecological integrity of all lands and waters throughout the state.

Response: The project will not further the propagation of mosquitoes or other pest arthropods. Therefore, the project is consistent with the goals of this chapter.

21. Chapter 403, F.S., Environmental Control

Environmental control policies conserve state waters; protect and improve water quality for consumption and for the propagation of fish and wildlife; and maintain air quality to protect human health and plant and animal life. This statute provides wide-ranging authority to address various environmental control concerns, including air and water pollution; electrical power plant and transmission line siting; the Interstate Environmental Control Compact; resource recovery and management; solid and hazardous waste management; drinking water protection; pollution prevention; ecosystem management; and natural gas transmission pipeline siting.

Response: A Draft Environmental Assessment addressing project impacts has been prepared and coordinated with the appropriate resource agencies including the Florida Department of Environmental Protection. Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources will occur. Water Quality Certification will be sought from the State prior to construction. The project complies with the intent of this chapter. Section 403.7125(2) and (3) has not been approved by NOAA as an enforceable policy.

22. Chapter 553, F.S., Building and Construction Standards

The statute addresses building construction standards and provides for a unified Florida Building Code.

Response: The proposed renourishment project will not result in the construction of any building. Therefore, the project is consistent with the goals of this chapter. Only Sections 553.73 and .79 are approved by NOAA as enforceable policy.

23. Chapter 582, F.S., Soil and Water Conservation

It is the state's policy to preserve natural resources; control and prevent soil erosion, prevent floodwater and sediment damages and to further the conservation, development and use of soil and water resources, and the disposal of water. Farm, forest, and grazing lands are among the basic assets of the state; and the preservation of these lands is necessary to protect and promote the health, safety, and general welfare of its people. These measures help to preserve state and private lands, control floods, maintain water quality, prevent impairment of dams and reservoirs, assist in maintaining the navigability of rivers and harbors, preserve wildlife and protect wildlife habitat, protect the tax base, protect public lands, and protect and promote the health, safety, and general welfare of the people of this state.

Response: The proposed project is not located near or on agricultural lands; therefore, this chapter does not apply.

24. Chapter 597, F.S., Aquaculture

The statute establishes public policy concerning the cultivation of aquatic organisms in the state. The intent is to enhance the growth of aquaculture, while protecting Florida's environment. This includes a requirement for a state aquaculture plan which provides for the coordination and prioritization of state aquaculture efforts, the conservation and enhancement of aquatic resources and which provides mechanisms for increasing aquaculture production for the creation of new industries, job opportunities, income for aquaculturists, and other benefits to the state.

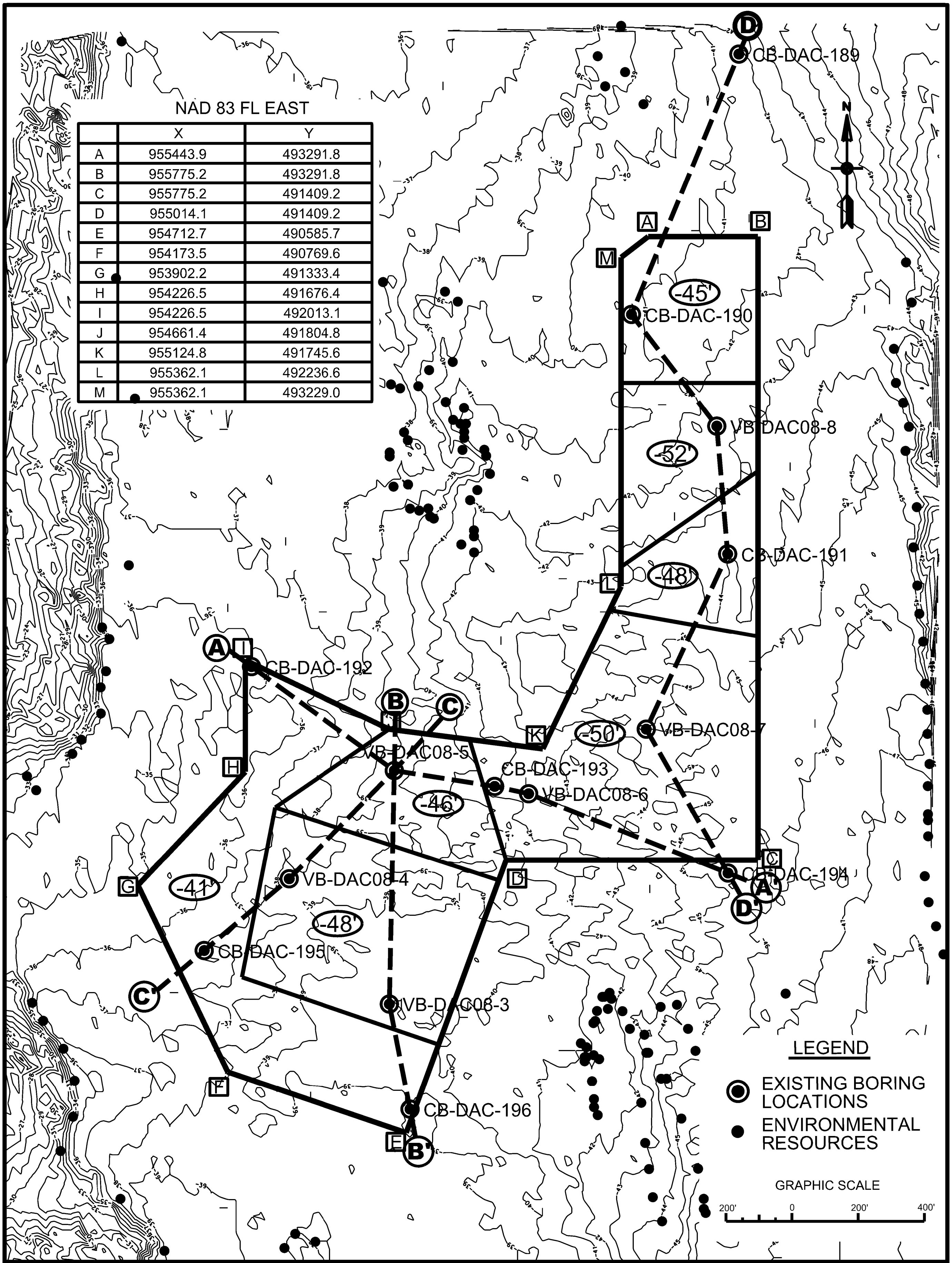
Response: The proposed project is not include aquaculture, therefore, this chapter does not apply.

APPENDIX C – SEDIMENT CHARACTERISTICS

Due to the size of the 2009 Dade County Sediment Report and Core Boring logs (263 Pages), the Corps will provide these documents via our Environmental Documents website or upon request.

http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine_DadeCo_BchErCtrl.htm

2009 Boring Locations



NAD 83 FL EAST

	X	Y
A	955443.9	493291.8
B	955775.2	493291.8
C	955775.2	491409.2
D	955014.1	491409.2
E	954712.7	490585.7
F	954173.5	490769.6
G	953902.2	491333.4
H	954226.5	491676.4
I	954226.5	492013.1
J	954661.4	491804.8
K	955124.8	491745.6
L	955362.1	492236.6
M	955362.1	493229.0

US Army Corps
of Engineers
Jacksonville District

NOT FOR CONSTRUCTION
60% PLAN DRAWINGS

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

Dsn by: T.A.M.
Dwn by: C.J.B.
Ckd by: T.A.M.
Dated: OCT. 2009

DADE COUNTY, FLORIDA

SGC-1 SOUTH EXTENTION

CROSS SECTION DETAIL
PERMIT DRAWING

PLATE
B-1

1996 Sediment Boring Logs

Hole No.CB-DAC-189

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District
		SHEET 1 OF 1

1. PROJECT DADE COUNTY SPP	10. SIZE AND TYPE OF BIT 3 1/2" Drive Shoe
2. LOCATION *(Coordinates or Station)* X=79948,0.4 Y=49332,2.7	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* MLW
3. DRILLING AGENCY ALPINE OCEAN SURVEY, INC.	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRACORE
4. HOLE NO. *(As shown on drawing title and file number)* CB-DAC-189	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 0 undisturbed: 0
5. NAME OF DRILLER NICK PRICE	14. TOTAL NUMBER OF CORE BOXES 2
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED	15. ELEVATION GROUND WATER Tide = +2.6
	16. DATE HOLE STARTED 7/4/96 COMPLETED 1330
7. THICKNESS OF BURDEN 0 Ft.	17. ELEVATION TOP OF HOLE −38.5 Ft.
8. DEPTH DRILLED INTO ROCK 0 Ft.	18. TOTAL CORE RECOVERY FOR BORING 94 %
9. TOTAL DEPTH OF HOLE 19.5 Ft.	19. SIGNATURE OF GEOLOGIST ROCKLAND BURR

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS
-38.5	0.0					*-38.5*
			Sand, fine grained, light brown, trace of shell fragments (SP)			Lat-Lon 25 41 17.0N 80 05 26.3W Laboratory Data Depth USCS SpG. 3.5 SP 8.5 SP 11.5 SP 18.0 SP-SM
-46.7	8.2					
			Sand, fine to coarse grained, light brown, mostly shell fragments (SP)			
-56.5	18.0					
			Sand, fine to medium, light brown, mostly shell fragments (SP-SM)			
-58.0	19.5					
			End of Boring Soils are field visually classified in accordance with the Unified Soils Classification System.			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT	HOLE NUMBER
DADE COUNTY SPP	CB-DAC-189

Hole No.CB-DAC-190

DRILLING LOG

DIVISION
South Atlantic

INSTALLATION
Jacksonville District

SHEET 1 OF 1

1. PROJECT
DADE COUNTY SPP

2. LOCATION *(Coordinates or Station)*
X=79915,6.0 Y=49289,6.5

3. DRILLING AGENCY
ALPINE OCEAN SURVEY, INC.

4. HOLE NO. *(As shown on drawing title and file number)* CB-DAC-190

5. NAME OF DRILLER
NICK PRICE

6. DIRECTION OF HOLE
☒ VERTICAL ☐ INCLINED

7. THICKNESS OF BURDEN 0 Ft.

8. DEPTH DRILLED INTO ROCK 0 Ft.

9. TOTAL DEPTH OF HOLE 19.7 Ft.

10. SIZE AND TYPE OF BIT 3 1/2" Drive Shoe

11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*
MLW

12. MANUFACTURER'S DESIGNATION OF DRILL
VIBRACORE

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN
disturbed: 0 undisturbed: 0

14. TOTAL NUMBER OF CORE BOXES 2

15. ELEVATION GROUND WATER Tide = +3.8

16. DATE HOLE STARTED 7/4/96 COMPLETED 1216

17. ELEVATION TOP OF HOLE -37.6 Ft.

18. TOTAL CORE RECOVERY FOR BORING 91 %

19. SIGNATURE OF GEOLOGIST
ROCKLAND BURR

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS
-37.6	0.0					*-37.6*
			Sand, fine grained, light brown, trace of shell fragments (SP)			Lat-Lon 25 41 12.8N 80 05 29.8W Laboratory Data Depth USCS SpG. 1.5 SP 6.5 SP-SM 9.7 SP-SM 11.5 SP 18.0 SP
-44.1	6.5					
			Sand, fine to medium, light brown, trace of shell fragments (SP-SM)			
-49.1	11.5					
			Sand, fine to medium grained, light brown, mostly shell fragments, pieces of coral (SP)			
-57.3	19.7					
			End of Boring Soils are field visually classified in accordance with the Unified Soils Classification System.			

0
2.5
5
7.5
10
12.5
15
17.5
20
22.5

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.
MAR 71

PROJECT
DADE COUNTY SPP

HOLE NUMBER
CB-DAC-190

Hole No.CB-DAC-191

DRILLING LOG

DIVISION South Atlantic

INSTALLATION Jacksonville District

SHEET 1 OF 1

1. PROJECT DADE COUNTY SPP

2. LOCATION *(Coordinates or Station)* X=79944,6.5 Y=49217,3.9

3. DRILLING AGENCY ALPINE OCEAN SURVEY, INC.

4. HOLE NO. *(As shown on drawing title and file number)* CB-DAC-191

5. NAME OF DRILLER NICK PRICE

6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED

7. THICKNESS OF BURDEN 0 Ft.

8. DEPTH DRILLED INTO ROCK 0 Ft.

9. TOTAL DEPTH OF HOLE 19.9 Ft.

10. SIZE AND TYPE OF BIT 3 1/2" Drive Shoe

11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* MLW

12. MANUFACTURER'S DESIGNATION OF DRILL VIBRACORE

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 0 undisturbed: 0

14. TOTAL NUMBER OF CORE BOXES 2

15. ELEVATION GROUND WATER Tide = +2.6

16. DATE HOLE **STARTED** 7/5/96 **COMPLETED** 1348

17. ELEVATION TOP OF HOLE -39.7 Ft.

18. TOTAL CORE RECOVERY FOR BORING 80 %

19. SIGNATURE OFGEOLOGIST ROCKLAND BURR

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS
-39.7	0.0					-39.7
			Sand, fine to medium grained, light brown, pieces of coral (SP)			
-44.7	5.0					
			Sand, fine to medium grained, light brown (SP-SM)			
-47.7	8.0					
			Silty sand, fine grained, light brown (SM)			
-49.7	10.0					
			Silty sand, fine grained, light brown, trace of shell fragments (SM)			
-59.6	19.9					
			End of Boring Soils are field visually classified in accordance with the Unified Soils Classification System.			

Lat-Lon

25	41	05.6N
80	05	26.8W

Laboratory Data

Depth	USCS	SpG.
2.5	SP	
6.0	SP-SM	
8.0	SP-SM	
12.5	SM	

0 2.5 5 7.5 10 12.5 15 17.5 20 22.5

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.
MAR 71

PROJECT DADE COUNTY SPP

HOLE NUMBER CB-DAC-191

Hole No.CB-DAC-192

DRILLING LOG

DIVISION
South Atlantic

INSTALLATION
Jacksonville District

SHEET 1
OF 1

1. PROJECT
DADE COUNTY SPP

2. LOCATION *(Coordinates or Station)*
X=79800,8.0 Y=49183,3.3

3. DRILLING AGENCY
ALPINE OCEAN SURVEY, INC.

4. HOLE NO. *(As shown on drawing title and file number)* CB-DAC-192

5. NAME OF DRILLER
NICK PRICE

6. DIRECTION OF HOLE
☒ VERTICAL ☐ INCLINED

7. THICKNESS OF BURDEN 0 Ft.

8. DEPTH DRILLED INTO ROCK 0 Ft.

9. TOTAL DEPTH OF HOLE 19.9 Ft.

10. SIZE AND TYPE OF BIT 3 1/2" Drive Shoe

11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*
MLW

12. MANUFACTURER'S DESIGNATION OF DRILL
VIBRACORE

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN
disturbed: 0 undisturbed: 0

14. TOTAL NUMBER OF CORE BOXES 2

15. ELEVATION GROUND WATER Tide = +4.1

16. DATE HOLE STARTED COMPLETED
7/5/96 1302

17. ELEVATION TOP OF HOLE -31.9 Ft.

18. TOTAL CORE RECOVERY FOR BORING 94 %

19. SIGNATURE OF GEOLOGIST
ROCKLAND BURR

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS
-31.9	0.0					*-31.9*
			Sand, fine to medium grained, light brown, trace of shell fragments (SP)			<u>Lat-Lon</u> 25 41 02.3N 80 05 42.5W <u>Laboratory Data</u> Depth USCS SpG. 3.0 SP 8.0 SP-SM 13.0 SP-SM 17.0 SP-SM
-36.4	4.5					
			Sand, fine to medium grained, light brown (SP-SM)			
-51.8	19.9					
			End of Boring Soils are field visually classified in accordance with the Unified Soils Classification System.			

0 2.5 5 7.5 10 12.5 15 17.5 20 22.5

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.
MAR 71

PROJECT
DADE COUNTY SPP

HOLE NUMBER
CB-DAC-192

Hole No.CB-DAC-193

DRILLING LOG

DIVISION
South Atlantic

INSTALLATION
Jacksonville District

SHEET 1
OF 1

1. PROJECT
DADE COUNTY SPP

2. LOCATION *(Coordinates or Station)*
X=79874,2.1 Y=49147,2.3

3. DRILLING AGENCY
ALPINE OCEAN SURVEY, INC.

4. HOLE NO. *(As shown on drawing title and file number)* CB-DAC-193

5. NAME OF DRILLER
NICK PRICE

6. DIRECTION OF HOLE
☒ VERTICAL ☐ INCLINED

7. THICKNESS OF BURDEN 0 Ft.

8. DEPTH DRILLED INTO ROCK 0 Ft.

9. TOTAL DEPTH OF HOLE 19.9 Ft.

10. SIZE AND TYPE OF BIT 3 1/2" Drive Shoe

11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*
MLW

12. MANUFACTURER'S DESIGNATION OF DRILL
VIBRACORE

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN
disturbed: 0 undisturbed: 0

14. TOTAL NUMBER OF CORE BOXES 2

15. ELEVATION GROUND WATER Tide = +3.7

16. DATE HOLE STARTED 7/5/96 COMPLETED 1212

17. ELEVATION TOP OF HOLE -37.8 Ft.

18. TOTAL CORE RECOVERY FOR BORING 89 %

19. SIGNATURE OF GEOLOGIST
ROCKLAND BURR

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS
-37.8	0.0					-37.8
			Sand, fine to medium grained, light brown, a few shell fragments (SP)			Lat-Lon 25 40 58.7N 80 05 34.5W
-43.1	5.3					
			Sand, fine grained, light brown, trace of shell fragments (SP)			
-46.3	8.5					
			Silty sand, fine grained, light brown, trace of shell fragments (SM)			
-57.7	19.9					
			End of Boring			
			Soils are field visually classified in accordance with the Unified Soils Classification System.			

Laboratory Data

Depth	USCS	SpG.
2.0	SP	
6.5	SP	
11.0	SM	
16.5	SM	

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.
MAR 71

PROJECT
DADE COUNTY SPP

HOLE NUMBER
CB-DAC-193

Hole No.CB-DAC-194

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District *SHEET 1 OF 1*

1. PROJECT DADE COUNTY SPP	10. SIZE AND TYPE OF BIT 3 1/2" Drive Shoe
2. LOCATION *(Coordinates or Station)* X=79944,7.7 Y=49121,0.0	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* MLW
3. DRILLING AGENCY ALPINE OCEAN SURVEY, INC.	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRACORE
4. HOLE NO. *(As shown on drawing title and file number)* CB-DAC-194	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 0 undisturbed: 0
5. NAME OF DRILLER NICK PRICE	14. TOTAL NUMBER OF CORE BOXES 2
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED	15. ELEVATION GROUND WATER Tide = +3.1
	16. DATE HOLE STARTED 7/5/96 COMPLETED 1100
7. THICKNESS OF BURDEN 0 Ft.	17. ELEVATION TOP OF HOLE -41.0 Ft.
8. DEPTH DRILLED INTO ROCK 0 Ft.	18. TOTAL CORE RECOVERY FOR BORING 81.3 %
9. TOTAL DEPTH OF HOLE 19.9 Ft.	19. SIGNATURE OFGEOLOGIST ROCKLAND BURR

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS
-41.0	0.0					*-41.0*
			Sand, fine grained, light brown, a little shell, pieces of coral (SP)			Lat-Lon 25 40 51.6N 80 05 26.8W Laboratory Data Depth USCS SpG. 2.5 SP 7.0 SP-SM 11.5 SP-SM 15.5 SP-SM
-46.9	5.9					
			Sand, fine grained, light brown, trace of shell (SP-SM)			
-60.9	19.9					
			End of Boring Soils are field visually classified in accordance with the Unified Soils Classification System.			

0
2.5
5
7.5
10
12.5
15
17.5
20
22.5

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.
MAR 71

PROJECT	HOLE NUMBER
DADE COUNTY SPP	CB-DAC-194

Hole No.CB-DAC-195

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Jacksonville District

SHEET 1 OF 1

1. PROJECT: DADE COUNTY SPP
2. LOCATION *(Coordinates or Station)*: X=79786,5.1 Y=49097,6.2
3. DRILLING AGENCY: ALPINE OCEAN SURVEY, INC.
4. HOLE NO. *(As shown on drawing title and file number)*: CB-DAC-195
5. NAME OF DRILLER: NICK PRICE
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED
7. THICKNESS OF BURDEN: 0 Ft.
8. DEPTH DRILLED INTO ROCK: 0 Ft.
9. TOTAL DEPTH OF HOLE: 19.9 Ft.
10. SIZE AND TYPE OF BIT: 3 1/2" Drive Shoe
11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)*: MLW
12. MANUFACTURER'S DESIGNATION OF DRILL: VIBRACORE
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: disturbed: 0 undisturbed: 0
14. TOTAL NUMBER OF CORE BOXES: 2
15. ELEVATION GROUND WATER: Tide = +2.9
16. DATE HOLE: STARTED 7/5/96 COMPLETED 1032
17. ELEVATION TOP OF HOLE: -33.7 Ft.
18. TOTAL CORE RECOVERY FOR BORING: 89 %
19. SIGNATURE OF GEOLOGIST: ROCKLAND BURR

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS
-33.7	0.0					-33.7
			Sand, fine grained, light brown, trace of shell fragments (SP)			Lat-Lon 25 40 53.9N 80 05 44.1W Laboratory Data Depth USCS SpG. 4.0 SP 6.5 SP-SM 13.0 SP-SM 15.0 SP-SM
-40.2	6.5					
			Sand, fine to medium grained, light brown, a few shell fragments (SP-SM)			
-48.7	15.0					
			Silty sand, fine to medium grained, light brown, some shell fragments (SM)			
-53.6	19.9					
			End of Boring Soils are field visually classified in accordance with the Unified Soils Classification System.			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: DADE COUNTY SPP

HOLE NUMBER: CB-DAC-195

Hole No.CB-DAC-196

DRILLING LOG | **DIVISION** South Atlantic | **INSTALLATION** Jacksonville District | *SHEET 1 OF 1*

1. PROJECT DADE COUNTY SPP

2. LOCATION *(Coordinates or Station)* X=79848,7.1 Y=49049,7.1

3. DRILLING AGENCY ALPINE OCEAN SURVEY, INC.

4. HOLE NO. *(As shown on drawing title and file number)* CB-DAC-196

5. NAME OF DRILLER NICK PRICE

6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED

7. THICKNESS OF BURDEN 0 Ft.

8. DEPTH DRILLED INTO ROCK 0 Ft.

9. TOTAL DEPTH OF HOLE 19.9 Ft.

10. SIZE AND TYPE OF BIT 3 1/2" Drive Shoe

11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* MLW

12. MANUFACTURER'S DESIGNATION OF DRILL VIBRACORE

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 0 undisturbed: 0

14. TOTAL NUMBER OF CORE BOXES 2

15. ELEVATION GROUND WATER Tide = +2.8

16. DATE HOLE **STARTED** 7/5/96 **COMPLETED** 0944

17. ELEVATION TOP OF HOLE -34.4 Ft.

18. TOTAL CORE RECOVERY FOR BORING 89 %

19. SIGNATURE OF GEOLOGIST ROCKLAND BURR

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS	
-34.4	0.0					*-34.4*	
			Sand, fine to medium grained, light brown, mostly shell fragments (SP)			Lat-Lon 25 40 49.1N 80 05 37.3W Laboratory Data Depth USCS SpG. 4.5 SP 8.0 SP-SM 9.8 SM 11.0 SM	
-41.2	6.8						
			Sand, fine grained, light brown, trace of shell fragments (SP-SM)				
-43.9	9.5						
			Silty sand, fine grained, light brown, trace of shell fragments (SM)				
-54.3	19.9						
			End of Boring Soils are field visually classified in accordance with the Unified Soils Classification System.				

0 2.5 5 7.5 10 12.5 15 17.5 20 22.5

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.
MAR 71

PROJECT DADE COUNTY SPP **HOLE NUMBER** CB-DAC-196

Hole No.CB-MH01-02

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District SHEET 1 OF 1

1. PROJECT Miami Harbor Deepening and Widening
2. LOCATION *(Coordinates or Station)* X=954,633 Y=520,416
3. DRILLING AGENCY Corps of Engineers
4. HOLE NO. *(As shown on drawing title and file number)* CB-MH01-02
5. NAME OF DRILLER Pickett
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED
7. THICKNESS OF BURDEN 4.5 Ft.
8. DEPTH DRILLED INTO ROCK 0.0 Ft.
9. TOTAL DEPTH OF HOLE 4.5 Ft.
10. SIZE AND TYPE OF BIT See Remarks
11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* MLW, Horizontal Datum: NAD83, FLE
12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN disturbed: 2 undisturbed: 0
14. TOTAL NUMBER OF CORE BOXES 1 of 1
16. ELEVATION GROUND WATER
16. DATE HOLE STARTED 03/01/01 COMPLETED 03/01/01
17. ELEVATION TOP OF HOLE -48.4 Ft.
18. TOTAL CORE RECOVERY FOR BORING 20 %
19. SIGNATURE OF INSPECTOR J. Arthur, PG

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit & Barrel	BLOWS/ .5'
-48.4	0.0					*-48.4*	
		░	SAND, fine to medium, poorly graded, calcareous, light gray. (SP)	33	1	SPT *-49.9*	18 16 17
		░		27	2	SPT *-51.4*	8 8 9
-52.9	4.5	░		0		SPT *-52.9*	12 11 10
			Notes: 1. Soils are field visually classified in accordance with the Unified Soils Clasification System.			140# hammer w/30" drop used with 2.0' split spoon (1 3/8" I.D. X 2" O.D.).	

0 2.5 5 7.5 10 12.5 15 17.5 20 22.5

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.
MAR 71

PROJECT	HOLE NUMBER
Miami Harbor Deepening and Widening	CB-MH01-02

1996 Sediment Boring Data

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

Project: Dade County SSP File No: 96-026

Client: ARMY CORPS OF ENGINEERS

Date: 8/16/96

Test Location	DEPTH (FT)	Specific Gravity	UNFIED CLASS.	% passing by Weight												
				4	7	10	14	18	25	35	45	60	80	120	170	230
CB-DAC-182	11.0	N/A	SM	99.9	99.7	98.6	95.1	91.8	88.6	82.5	75.2	67.5	60.5	49.7	36.6	19.0
CB-DAC-182	15.5	N/A	SM	98.6	98.1	96.8	91.7	87.7	84.7	79.8	73.1	65.2	57.4	45.9	35.8	22.6
CB-DAC-183	2.5	N/A	SP	99.0	96.8	93.9	86.8	74.8	60.3	33.4	15.9	9.6	6.9	4.0	2.6	2.0
CB-DAC-183	4.0	N/A	SP-SM	98.5	95.8	88.3	70.3	61.1	55.8	49.5	44.5	38.9	31.3	18.1	12.0	10.1
CB-DAC-183	8.0	N/A	SM	99.9	99.4	98.2	94.4	89.8	86.1	81.2	77.3	72.7	66.3	50.2	27.6	12.6
CB-DAC-183	16.0	N/A	SM	99.5	98.6	97.4	95.3	93.2	91.3	88.1	84.2	79.2	72.9	59.8	43.8	25.8
CB-DAC-184	4.0	N/A	SP	95.7	93.1	89.3	79.1	68.5	60.1	46.4	33.3	21.9	14.2	7.6	5.2	4.3
CB-DAC-184	7.5	N/A	SM	99.1	98.1	96.5	91.9	87.8	84.9	81.2	77.7	72.9	65.4	47.7	26.7	14.2
CB-DAC-185	2.0	N/A	SP	99.6	97.3	92.8	83.2	71.8	62.1	45.7	30.3	19.5	12.7	6.2	3.8	3.0
CB-DAC-185	7.5	N/A	SM	97.4	96.6	95.1	90.7	86.4	83.1	79.0	75.3	70.5	63.2	46.4	26.7	14.4
CB-DAC-185	13.0	N/A	SM	100.0	99.7	99.1	97.5	95.6	93.8	91.2	88.6	85.1	79.7	66.7	45.2	20.0
CB-DAC-186	2.0	N/A	SP	99.8	98.9	97.3	92.8	85.4	77.6	62.9	45.5	28.0	15.0	4.0	1.7	1.3
CB-DAC-186	4.0	N/A	SP-SM	98.8	96.8	94.6	89.7	82.2	74.5	60.9	46.9	33.2	22.0	9.6	5.6	4.6
CB-DAC-186	11.0	N/A	SP-SM	98.9	97.9	94.9	87.1	80.2	74.3	64.2	53.1	41.5	31.7	21.1	13.1	8.1
CB-DAC-186	12.5	N/A	SM	99.6	98.5	96.3	91.4	86.8	82.6	75.9	68.7	60.2	50.5	36.9	24.5	15.1
CB-DAC-186	17.5	N/A	SM	99.8	98.3	95.7	89.9	84.9	80.7	74.1	68.3	62.1	56.0	46.8	36.9	24.0
CB-DAC-187	4.0	N/A	SP	96.3	94.3	91.6	85.1	75.8	66.4	48.8	29.5	13.9	5.9	2.2	1.6	1.4
CB-DAC-187	7.5	N/A	SP	100.0	98.5	94.6	75.6	57.2	46.5	33.0	21.8	13.5	8.2	5.0	4.0	3.5
CB-DAC-187	14.0	N/A	SM	99.8	99.1	97.0	89.2	81.7	76.8	71.0	66.4	61.5	54.9	39.6	22.6	12.4
CB-DAC-187	16.0	N/A	SP-SM	99.3	97.1	91.1	73.5	61.3	54.3	45.6	38.8	33.1	27.4	18.5	11.8	8.5
CB-DAC-188	2.0	N/A	SP	99.6	98.7	97.3	93.7	88.2	81.9	67.5	46.5	25.0	11.6	3.5	2.1	1.8
CB-DAC-188	8.0	N/A	SP-SM	97.6	96.7	95.0	88.0	79.1	71.0	55.4	36.2	22.1	15.9	11.4	9.6	8.6
CB-DAC-189	3.5	N/A	SP	99.7	98.9	97.5	94.6	89.6	83.7	69.1	47.1	25.3	11.8	2.8	1.5	1.3
CB-DAC-189	8.5	N/A	SP	97.8	95.1	90.8	76.8	60.8	49.9	35.2	23.6	15.3	9.4	4.1	2.8	2.5

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

Project: Dade County SSP File No: 96-026

Client: ARMY CORPS OF ENGINEERS

Date: 8/16/96

Test Location	DEPTH (FT)	% passing by Weight														
		Specific Gravity	UNFIED CLASS.	4	7	10	14	18	25	35	45	60	80	120	170	230
CB-DAC-189	11.5	N/A	SP	99.2	97.2	92.6	75.8	58.5	47.1	30.7	17.3	9.4	5.5	2.9	2.2	1.9
CB-DAC-189	18.0	N/A	SP-SM	97.3	93.8	87.1	68.1	52.2	43.1	32.0	22.5	14.9	10.4	7.6	6.5	5.8
CB-DAC-190	1.5	N/A	SP	99.6	97.8	95.3	88.6	78.5	68.7	50.2	31.2	16.6	7.9	1.9	0.9	0.8
CB-DAC-190	6.5	N/A	SP-SM	99.1	97.8	95.7	91.7	87.6	84.2	77.4	67.8	55.3	39.9	17.4	10.7	9.2
CB-DAC-190	9.7	N/A	SP-SM	98.2	96.4	94.1	86.8	77.7	70.3	58.6	48.1	39.1	29.9	15.3	7.8	5.4
CB-DAC-190	11.5	N/A	SP	99.6	96.6	93.0	78.4	63.5	52.9	35.9	21.7	13.9	10.1	6.6	4.9	4.1
CB-DAC-190	18.0	N/A	SP	98.8	95.6	90.4	74.5	59.9	50.4	36.5	23.5	12.9	7.9	5.6	4.5	4.0
CB-DAC-191	2.5	N/A	SP	97.4	96.1	94.5	90.9	85.9	80.2	66.7	47.8	29.5	16.3	4.7	1.9	1.8
CB-DAC-191	6.0	N/A	SP-SM	98.8	97.7	96.2	92.0	86.8	81.5	70.3	55.6	41.5	27.7	11.4	7.3	5.9
CB-DAC-191	8.0	N/A	SP-SM	100.0	99.6	98.8	97.1	95.0	93.0	88.3	81.3	71.8	57.4	29.5	15.6	10.3
CB-DAC-191	12.5	N/A	SM	99.5	99.0	97.7	94.7	92.1	90.0	86.1	80.4	72.1	60.1	36.7	20.8	12.8
CB-DAC-192	3.0	N/A	SP	99.0	95.4	90.6	82.3	73.6	66.4	56.3	45.4	33.1	19.9	6.3	3.0	2.4
CB-DAC-192	8.0	N/A	SP-SM	100.0	99.3	98.3	95.0	90.0	84.9	76.2	64.5	47.0	25.4	9.5	5.8	5.1
CB-DAC-192	13.0	N/A	SP-SM	96.2	94.6	93.1	90.4	88.1	86.1	82.4	76.2	63.0	43.1	23.7	13.7	8.9
CB-DAC-192	17.0	N/A	SP-SM	99.8	99.4	99.0	97.9	96.4	94.8	91.5	85.2	68.7	43.6	21.0	12.3	9.1
CB-DAC-193	2.0	N/A	SP	99.7	98.7	97.5	93.6	87.2	80.4	66.8	52.1	38.5	25.5	9.2	4.3	3.2
CB-DAC-193	6.5	N/A	SP	100.0	99.4	98.6	95.6	90.5	84.9	73.2	60.8	48.0	32.6	11.6	4.9	3.5
CB-DAC-193	11.0	N/A	SM	99.4	98.6	97.5	93.9	90.4	87.8	83.1	76.6	67.8	55.6	33.6	20.4	14.2
CB-DAC-193	16.5	N/A	SM	99.9	99.7	99.1	96.9	94.6	92.7	89.3	85.5	79.7	72.9	61.6	44.8	21.8
CB-DAC-194	2.5	N/A	SP	94.4	92.6	91.2	88.7	85.0	80.8	71.2	56.1	38.9	23.3	6.6	3.0	2.4
CB-DAC-194	7.0	N/A	SP-SM	100.0	99.9	99.5	98.0	95.7	93.1	87.2	78.1	66.7	51.0	19.3	7.9	5.3
CB-DAC-194	11.5	N/A	SP-SM	99.0	97.9	96.5	95.4	95.2	94.4	92.2	87.5	76.1	57.2	30.2	17.1	12.0
CB-DAC-194	15.5	N/A	SP-SM	98.4	98.2	97.5	96.1	95.1	94.1	92.0	86.9	75.7	57.6	31.8	17.9	12.1
CB-DAC-195	4.0	N/A	SP	99.0	96.7	93.0	87.2	81.6	77.2	71.3	64.3	55.1	41.0	14.5	4.4	2.8

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

Project: Dade County SSP File No: 96-026

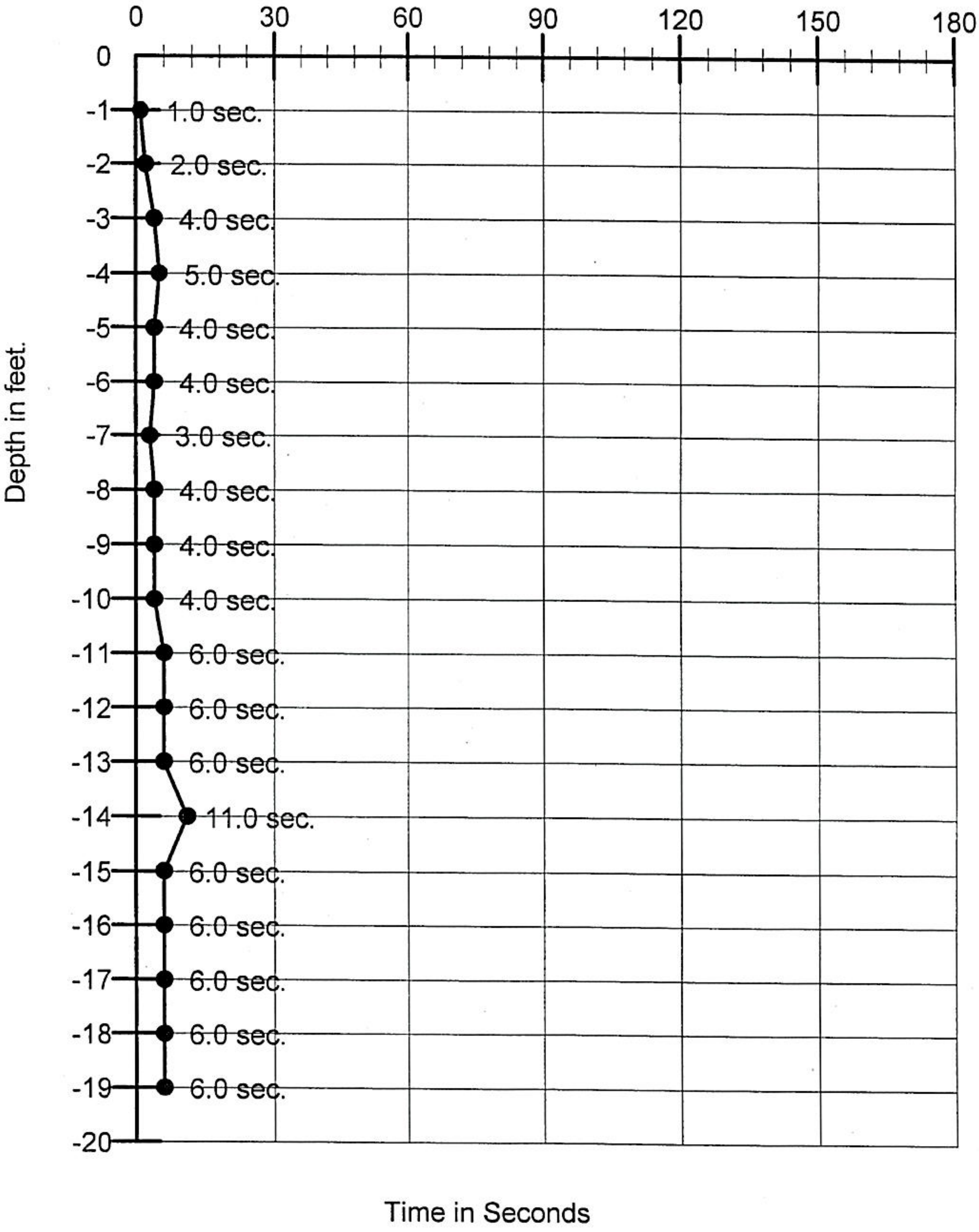
Client: ARMY CORPS OF ENGINEERS

Date: 8/16/96

Test Location	DEPTH (FT)			% passing by Weight												
		Specific Gravity	UNFIED CLASS.	4	7	10	14	18	25	35	45	60	80	120	170	230
CB-DAC-195	6.5	N/A	SP-SM	96.9	91.9	84.7	73.0	63.6	57.4	50.5	44.4	37.8	28.7	14.7	8.9	7.0
CB-DAC-195	13.0	N/A	SP-SM	96.7	93.9	90.4	81.2	68.0	58.2	47.6	40.0	34.0	27.3	20.1	15.5	12.3
CB-DAC-195	15.0	N/A	SP-SM	96.4	93.7	90.8	81.4	67.8	57.7	45.9	37.6	31.4	25.3	18.7	15.4	12.8
CB-DAC-196	4.5	N/A	SP	95.7	93.4	90.4	82.7	71.3	59.3	38.1	22.0	13.9	8.6	3.9	2.6	2.2
CB-DAC-196	8.0	N/A	SP-SM	99.8	98.8	97.1	91.4	85.3	80.8	73.8	67.0	59.1	48.1	28.7	14.1	8.6
CB-DAC-196	9.8	N/A	SM	99.5	99.1	98.4	96.0	93.5	91.4	88.0	84.7	80.7	74.6	58.7	35.3	17.9
CB-DAC-196	11.0	N/A	SM	100.0	99.5	98.7	96.4	94.6	93.3	91.3	88.9	85.4	79.4	63.2	37.7	17.5

PENETRATION GRAPH

Core No: CBDAC 189 *Run#:* 1 *Location: East:* 95577.7 ft. *North:* 493482.9 ft.
Date: 7/4/96 *Start Time:* 1:30 PM *Stop Time:* 1:33 PM *Jet to:*
W.D. Raw: 41.1 ft. *W.D.Corrected:* *Total Penetration:* 19.5 ft. *Total Recovery:* 18.8 ft.

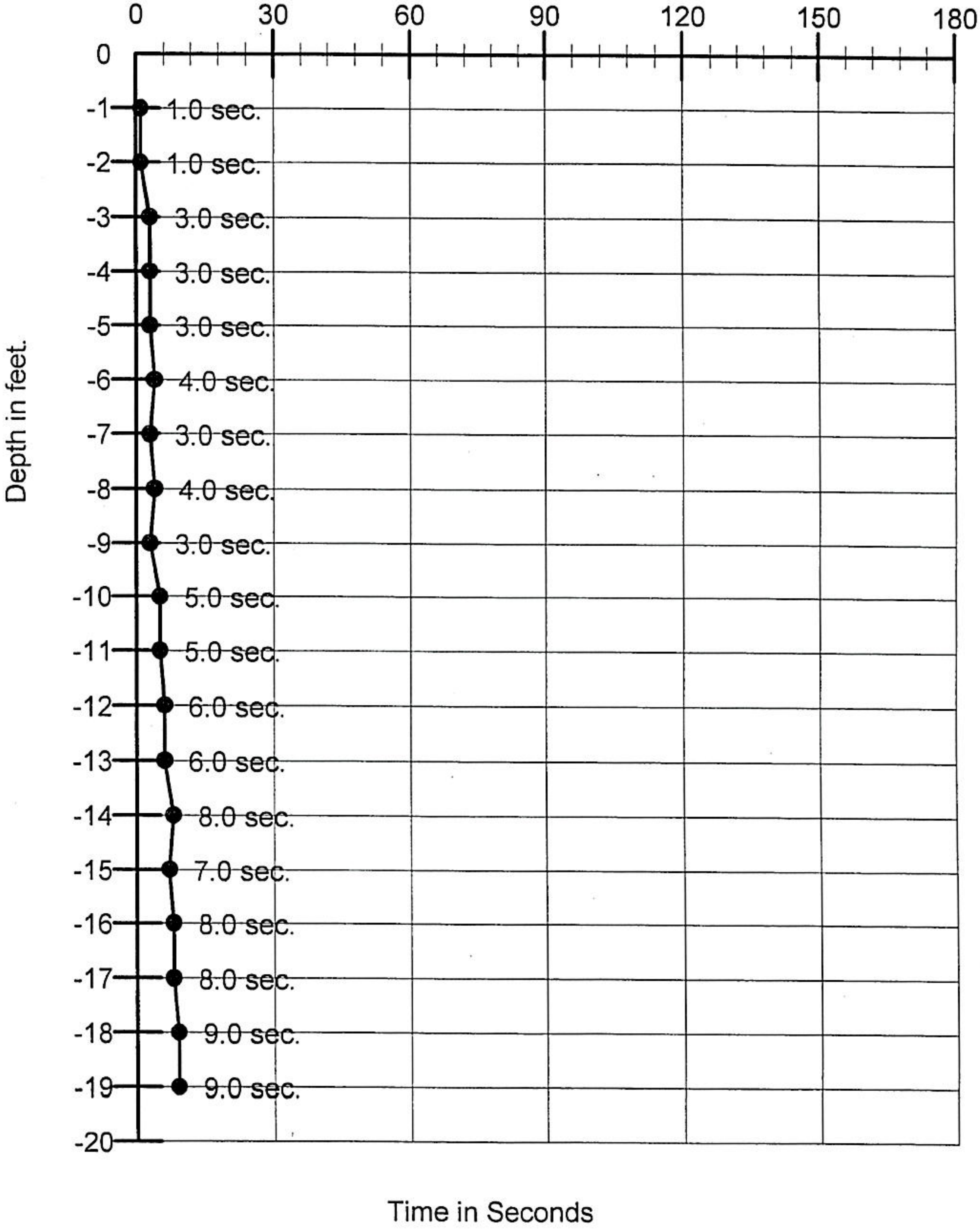


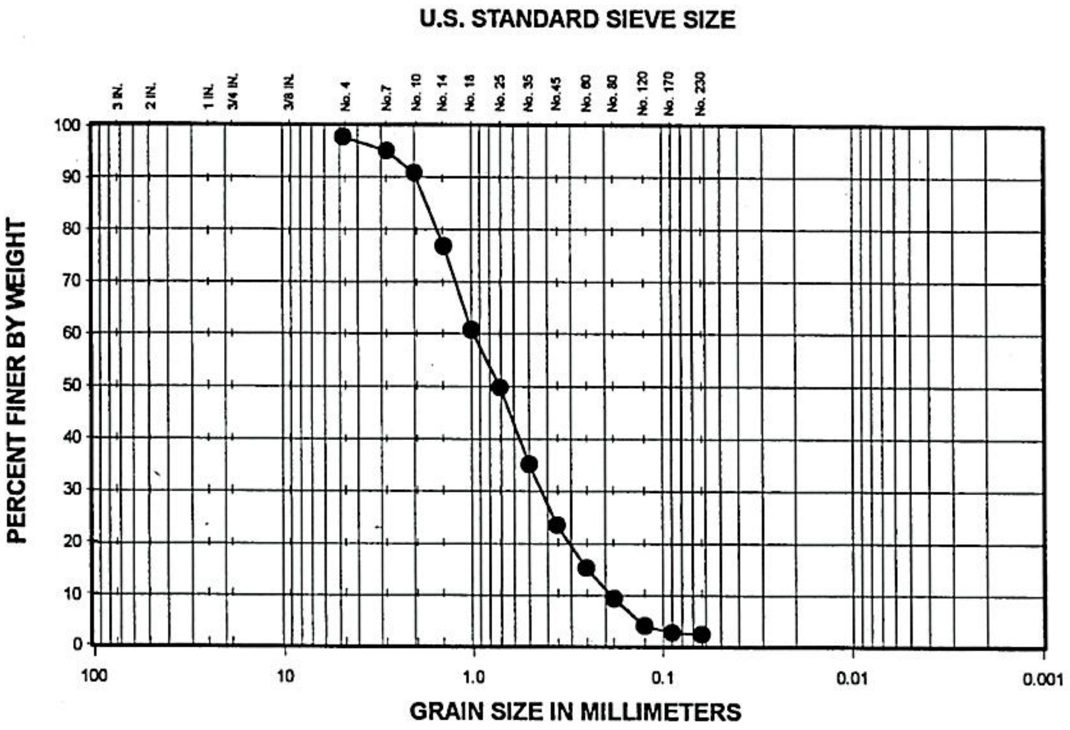
PENETRATION GRAPH

Core No: CBDAC 190 *Run#:* 1 *Location: East:* 955393.3 ft. *North:* 493056.7 ft.

Date: 7/4/96 *Start Time:* 12:17 P *Stop Time:* 12:19 P *Jet to:*

W.D. Raw: 41.0 ft. *W.D.Corrected:* *Total Penetration:* 19.7 ft. *Total Recovery:* 17.5 ft.





GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-189	8.5	●	SP

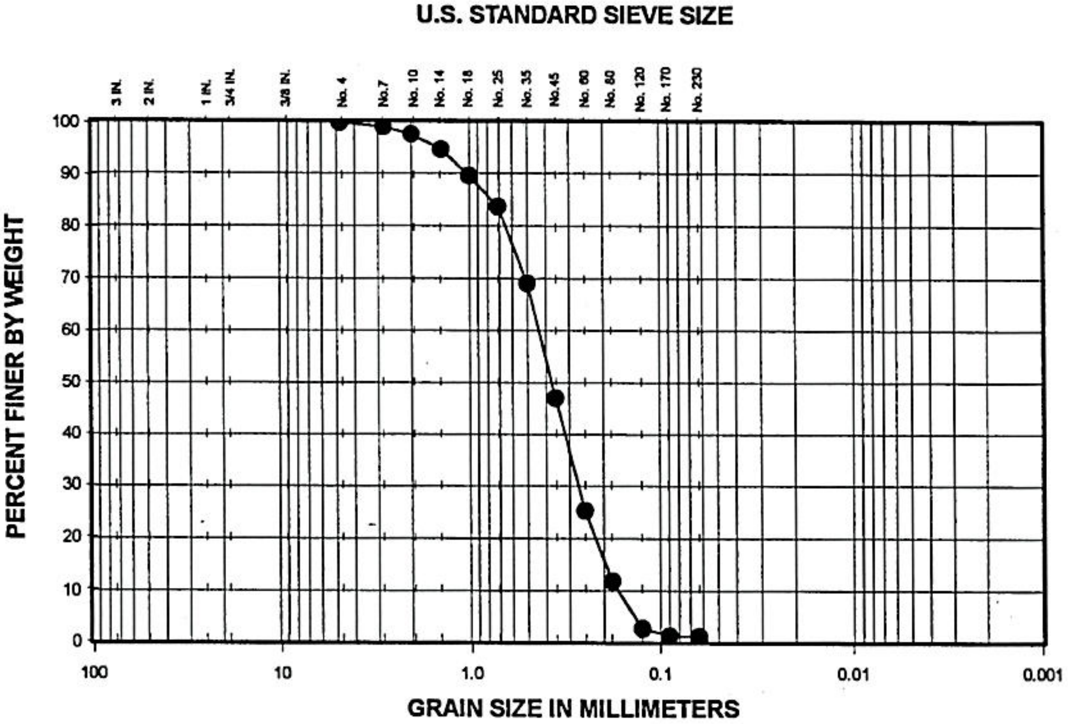
GRAIN-SIZE DISTRIBUTION

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

Dade County SSP

DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-189	3.5	●	SP

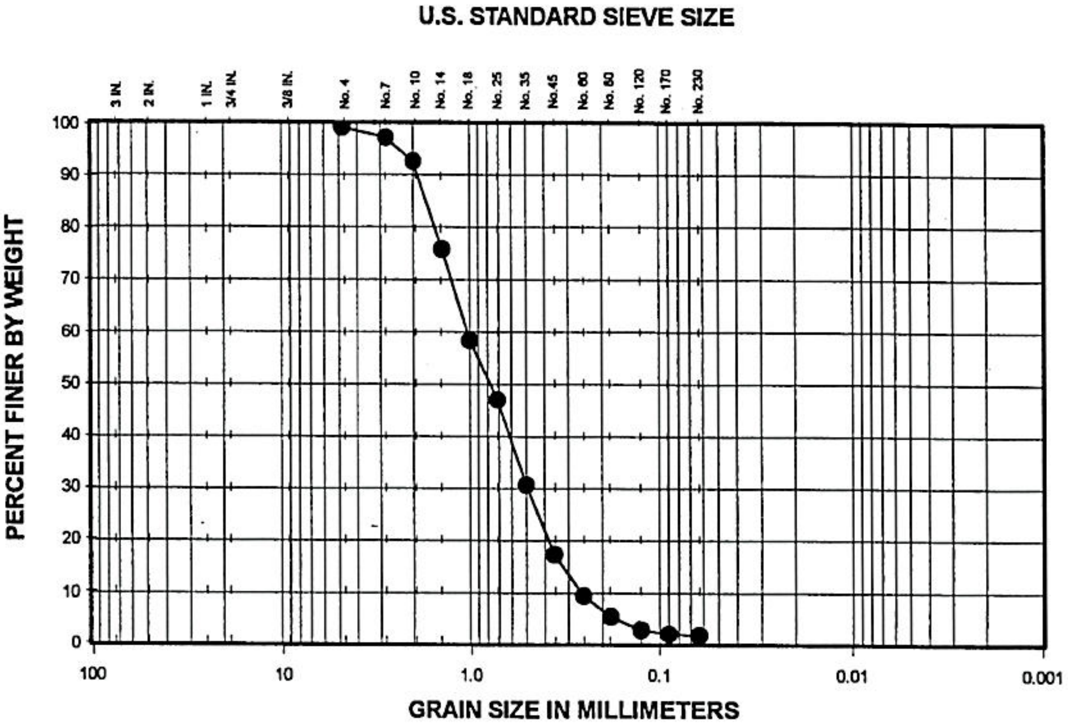
GRAIN-SIZE DISTRIBUTION

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

Dade County SSP

DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-189	11.5	●	SP

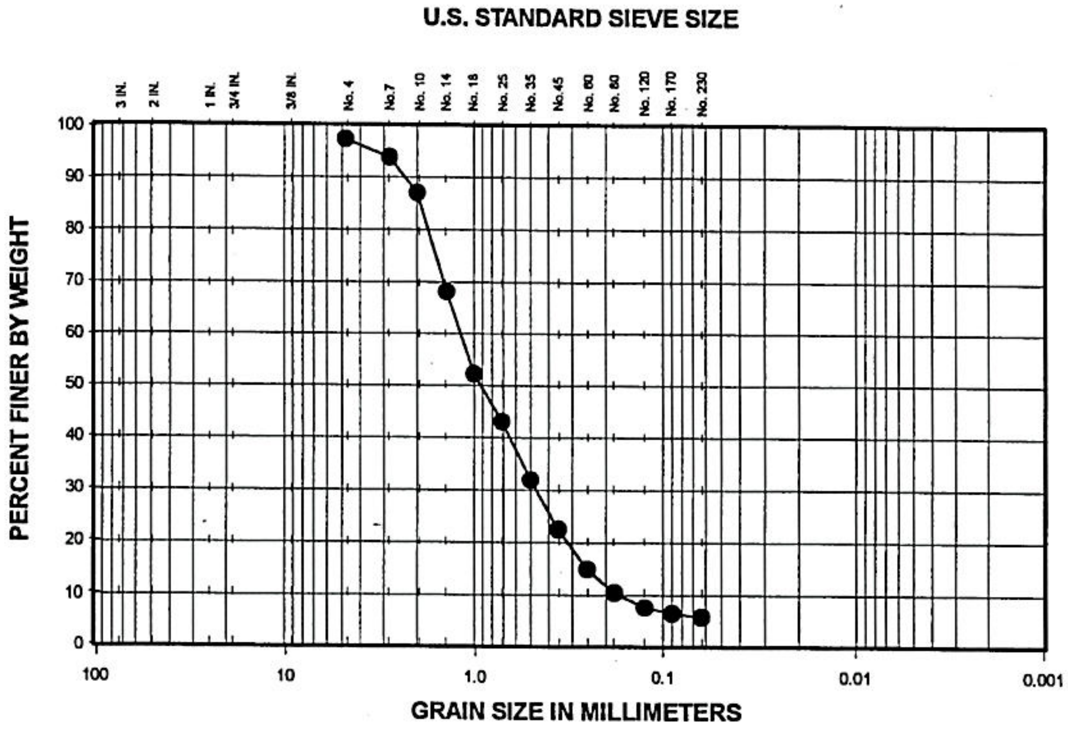
GRAIN-SIZE DISTRIBUTION

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

Dade County SSP

DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-189	18.0	●	SP-SM

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

Dade County SSP

DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

GRAIN-SIZE DISTRIBUTION

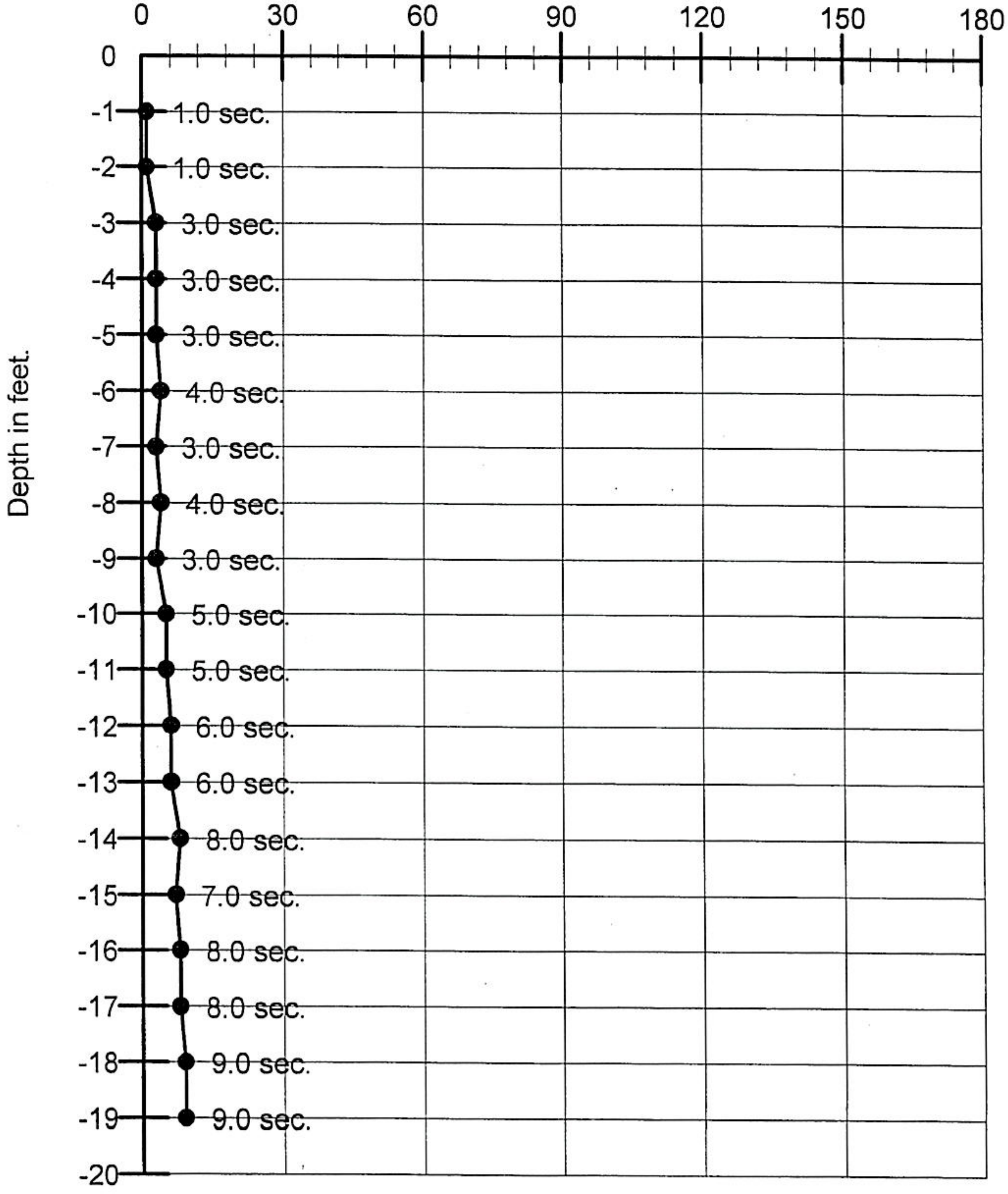
FILE # dade1.pre2

PENETRATION GRAPH

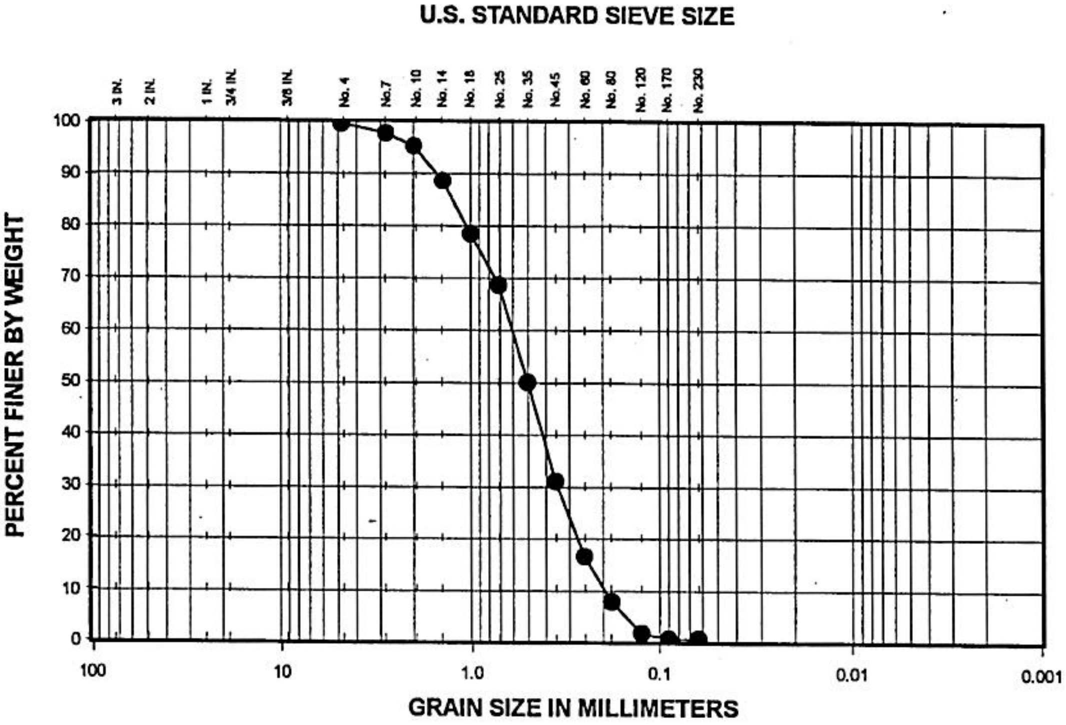
Core No: CBDAC 190 Run#: 1 Location: East: 955393.3 ft. North: 493056.7 ft.

Date: 7/4/96 Start Time: 12:17 P Stop Time: 12:19 P Jet to:

W.D. Raw: 41.0 ft. W.D.Corrected: Total Penetration: 19.7 ft. Total Recovery: 17.5 ft.



Time in Seconds



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-190	1.5	●	SP

GRAIN-SIZE DISTRIBUTION

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Dade County SSP

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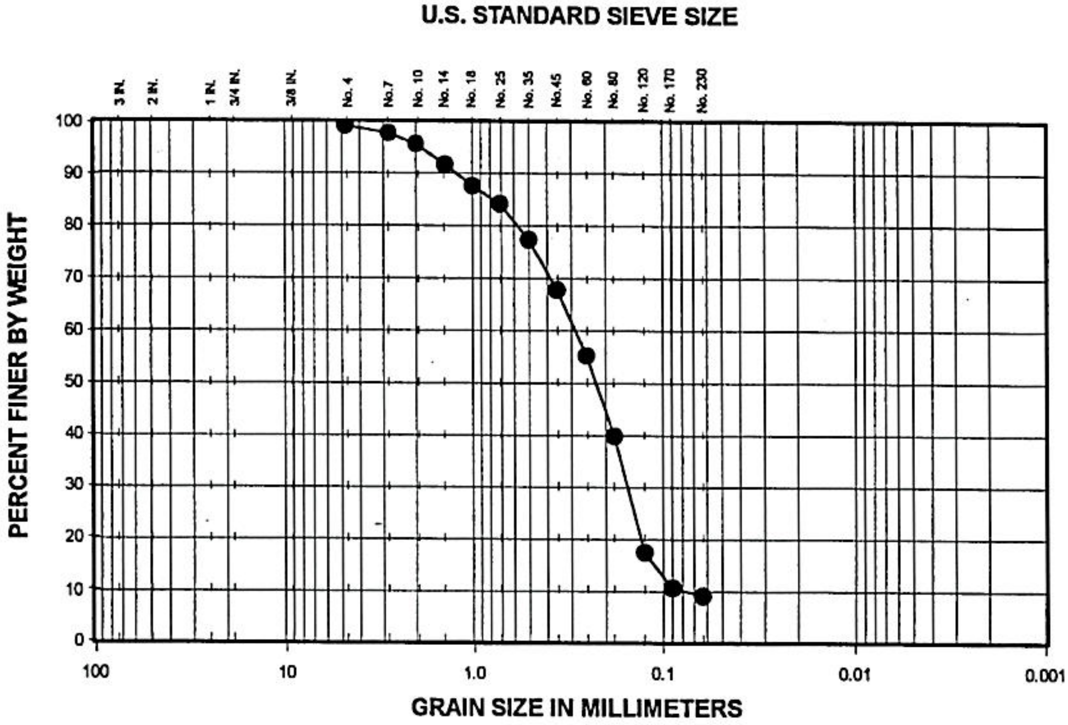
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-190	6.5	●	SP-SM

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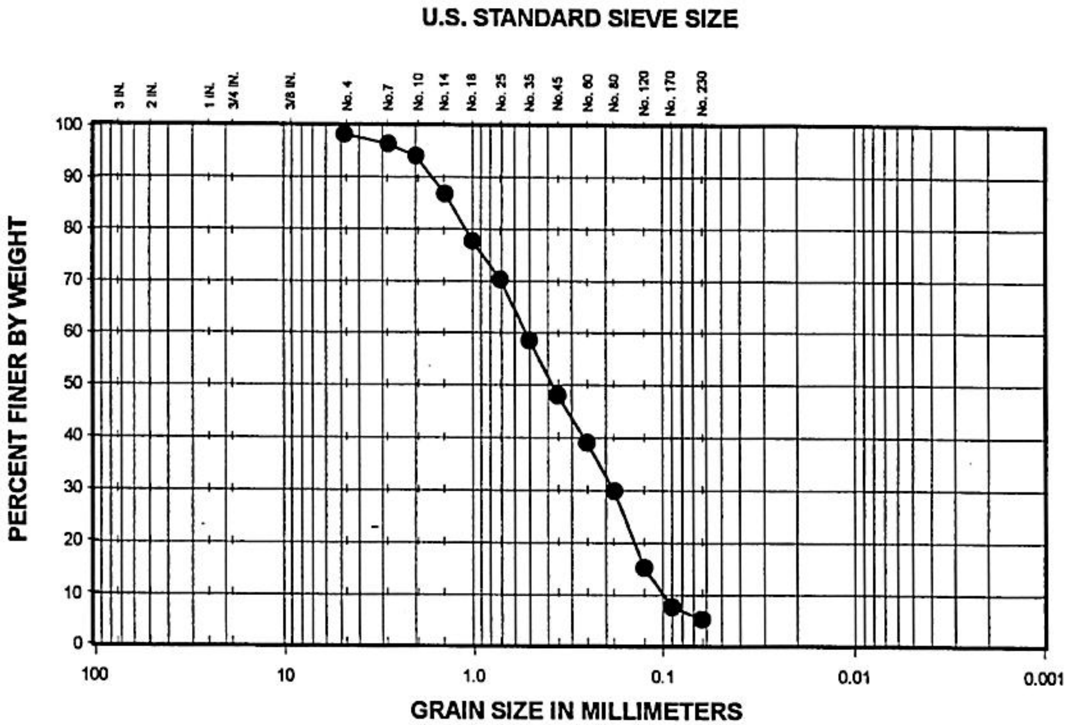
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-190	9.7	●	SP-SM

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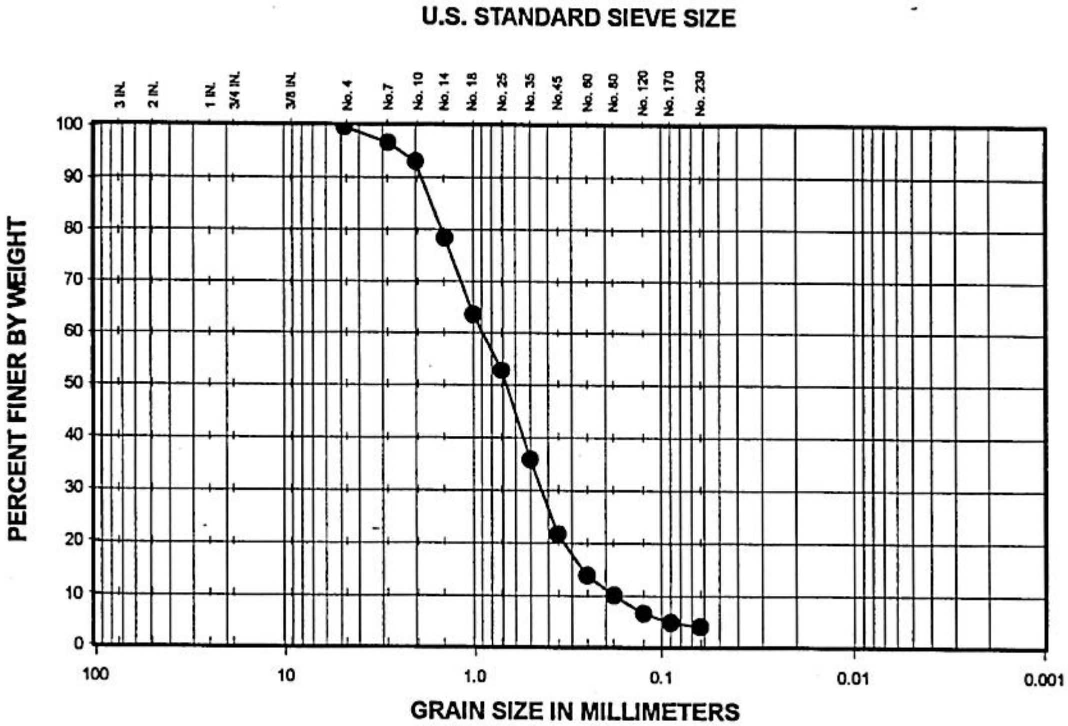
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-190	11.5	●	SP

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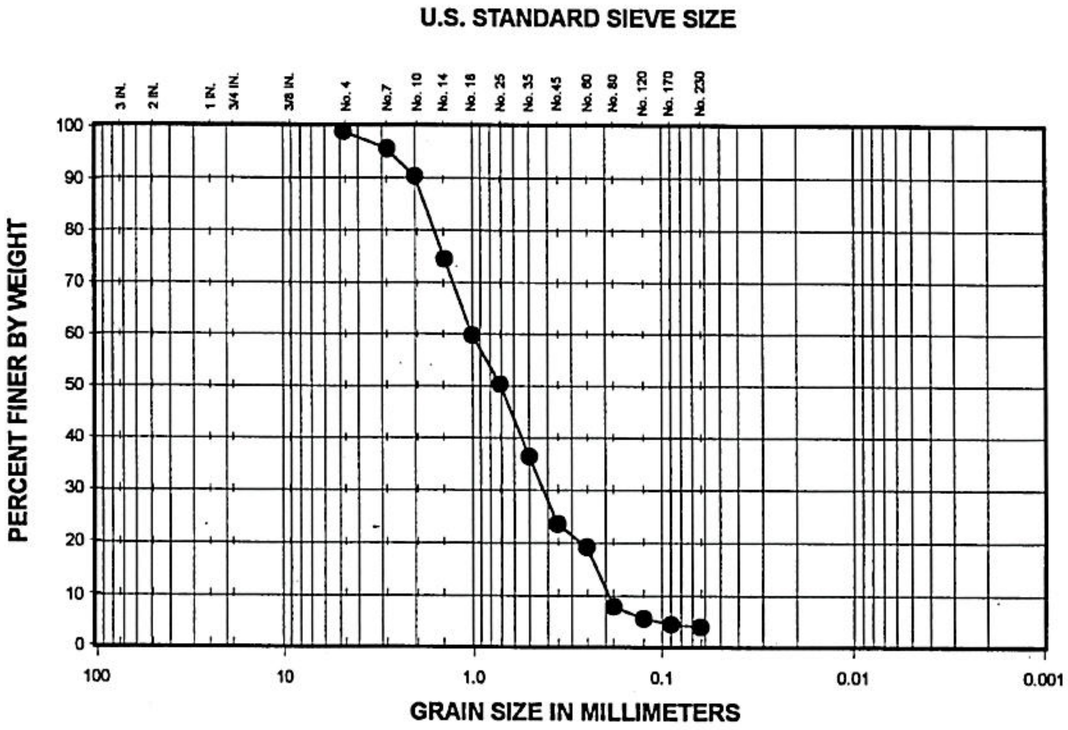
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-190	18.0	●	SP

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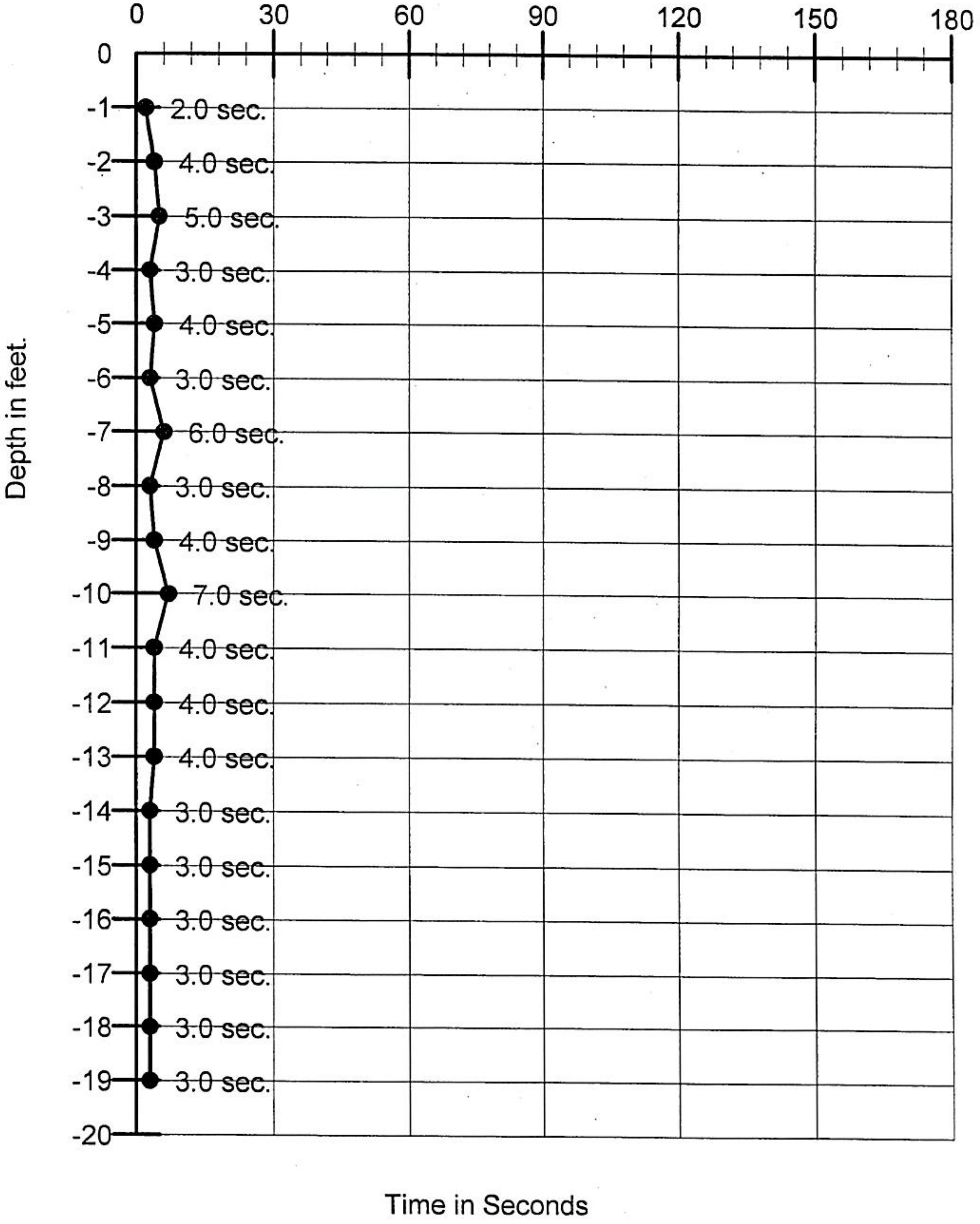
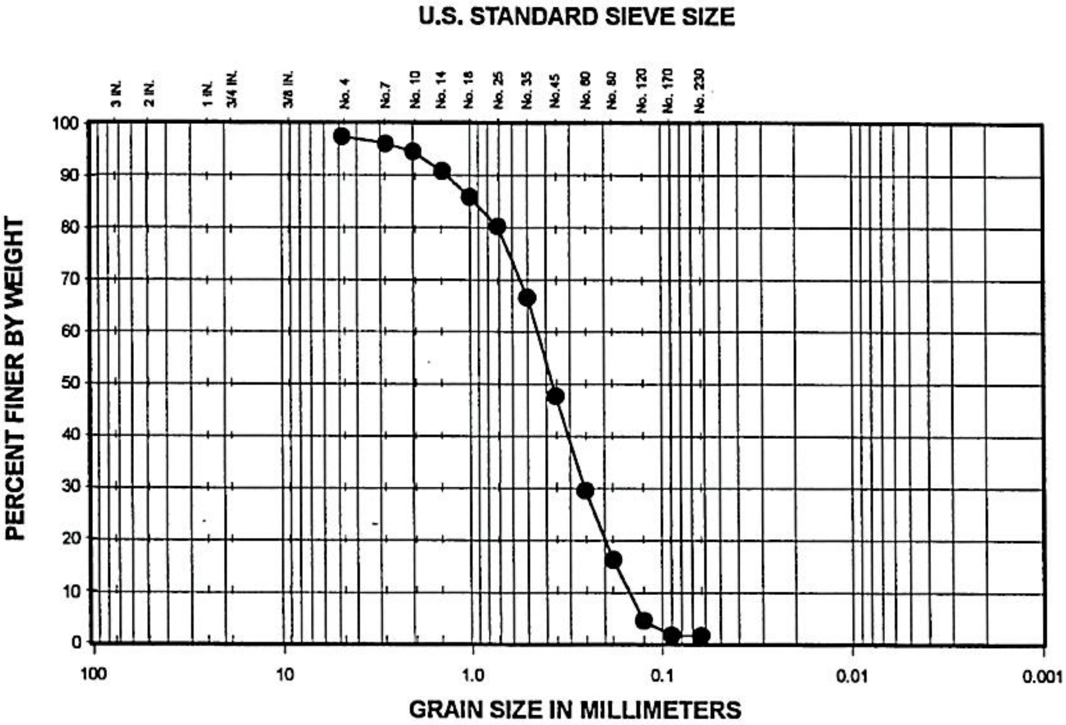
DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2

PENETRATION GRAPH

Core No: CBDAC 191 Run#: 1 Location: East: 955683.8 ft. North: 492334.1 ft.
Date: 7/5/96 Start Time: 1:48 PM Stop Time: 1:50 PM Jet to:
W.D. Raw: 42.3 ft. W.D.Corrected: Total Penetration: 19.9 ft. Total Recovery: 16.0 ft.





GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-191	2.5	●	SP

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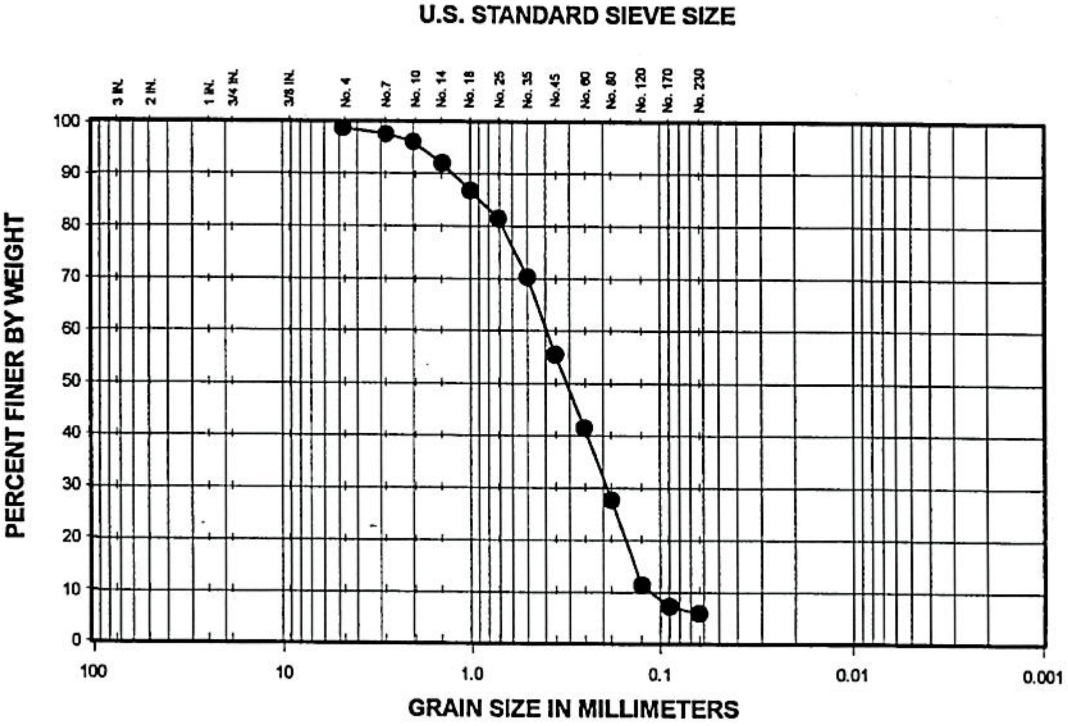
DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION ·	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-191	6.0	●	SP-SM

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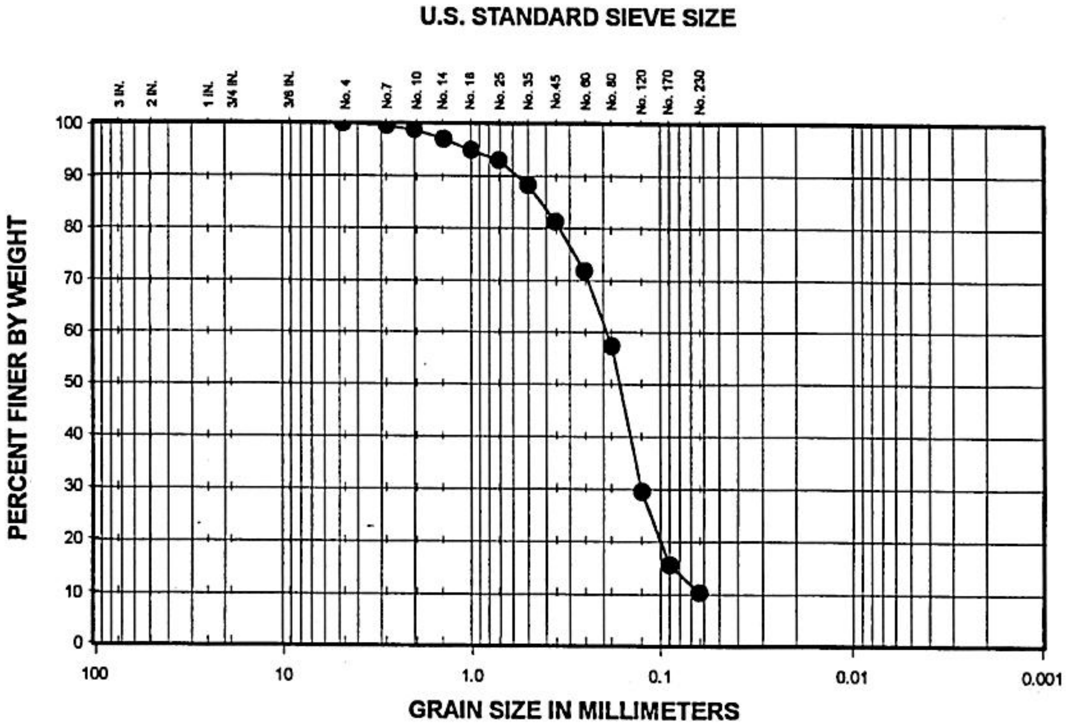
DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-191	8.0	●	SP-SM

GRAIN-SIZE DISTRIBUTION

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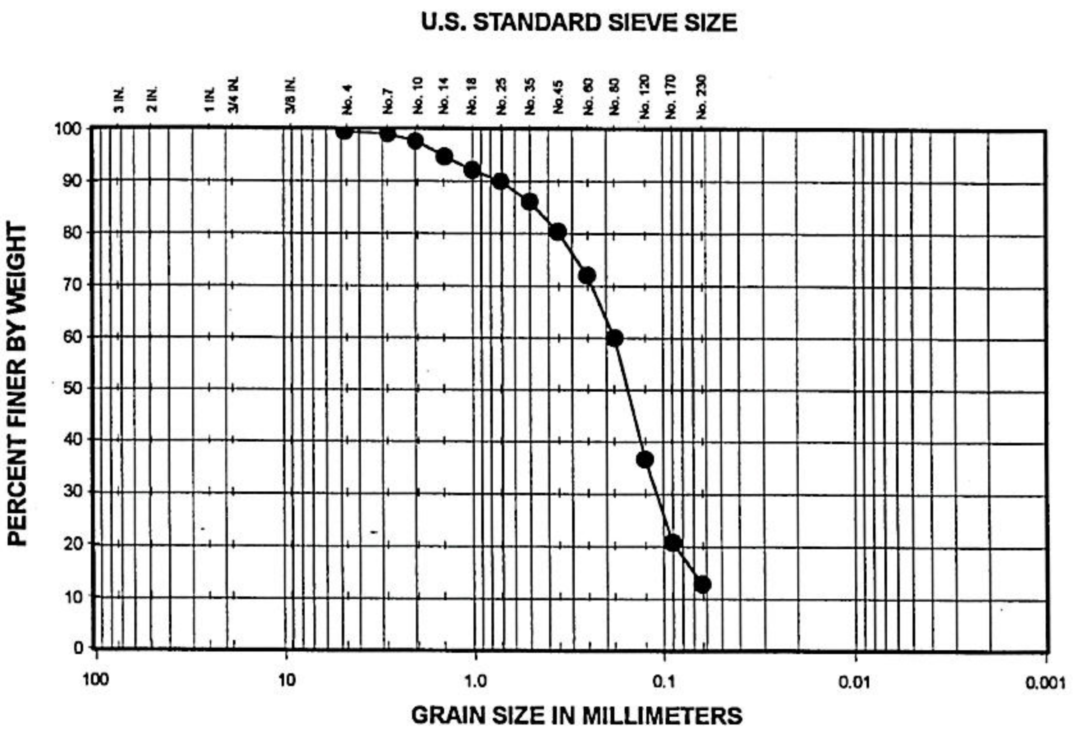
DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-191	12.5	●	SM

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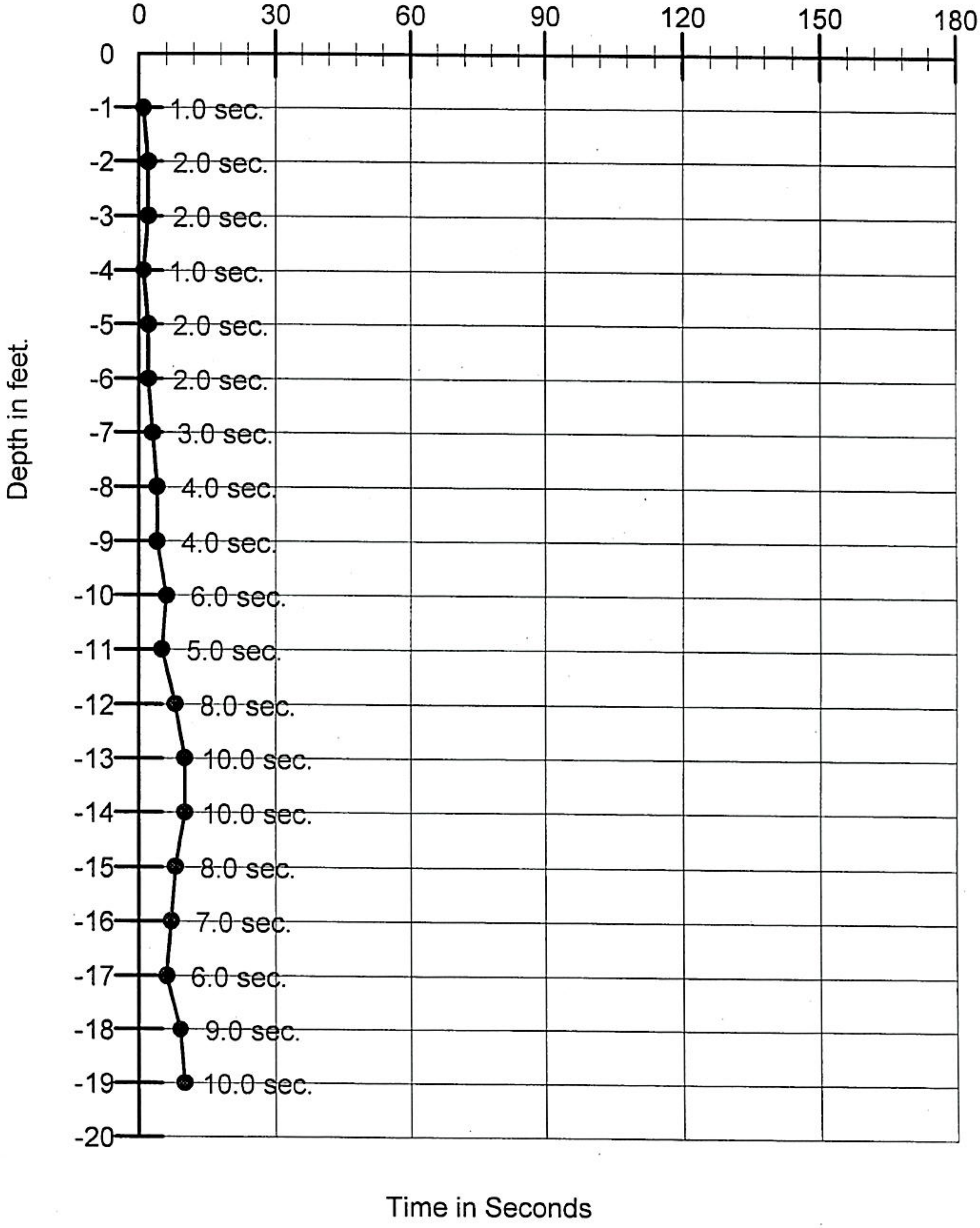
DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2

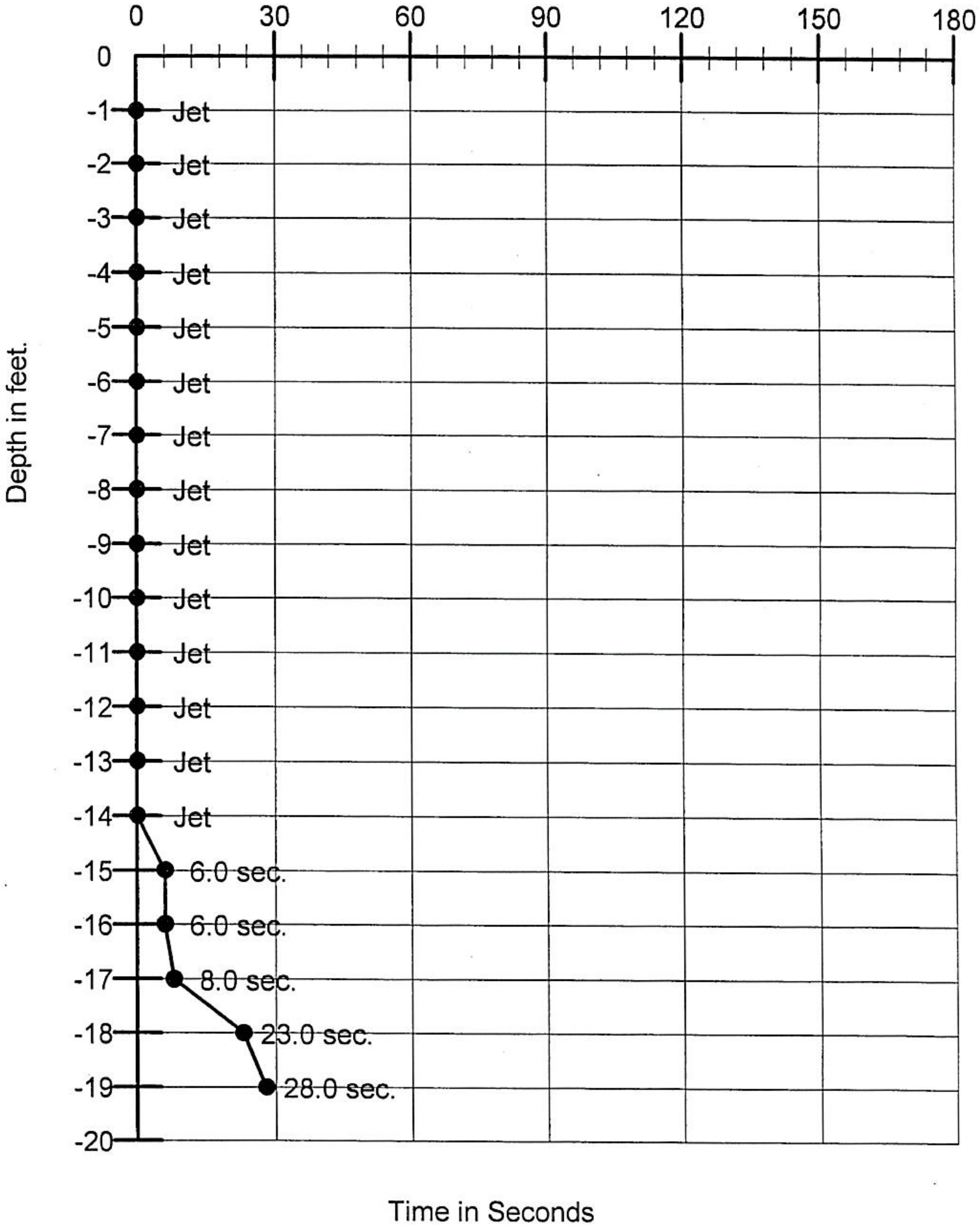
PENETRATION GRAPH

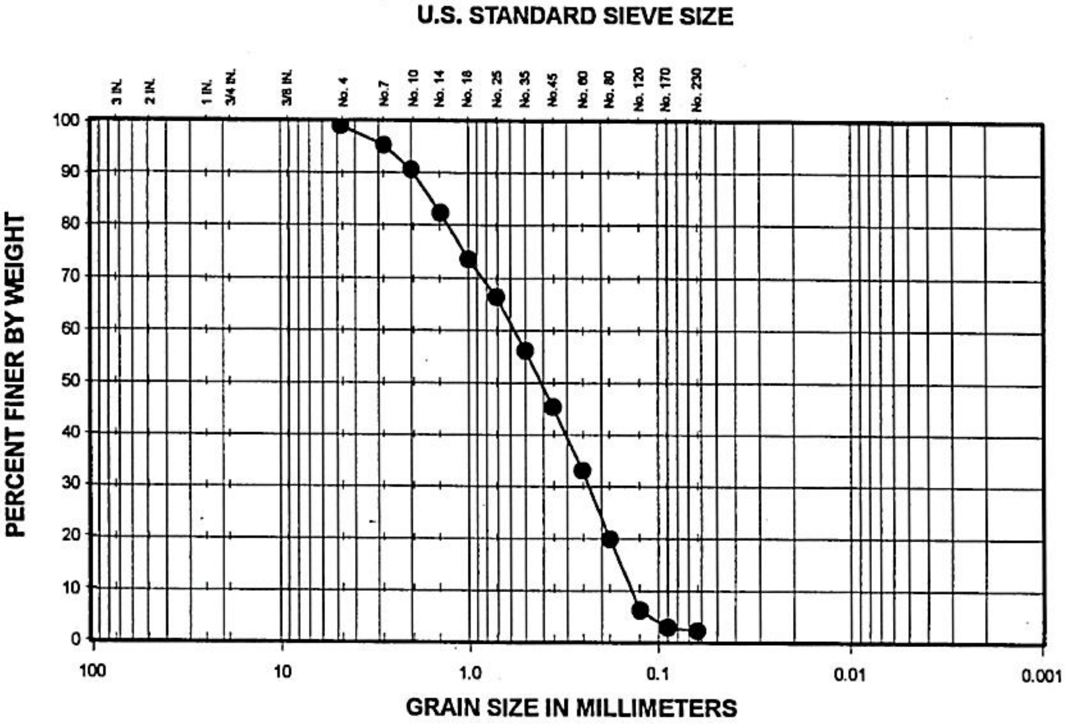
Core No: CBDAC 192 *Run#:* 1 *Location: East:* 954245.2 ft. *North:* 491993.5 ft.
Date: 7/5/96 *Start Time:* 1:04 PM *Stop Time:* 1:06 PM *Jet to:*
W.D. Raw: 36.0 ft. *W.D.Corrected:* *Total Penetration:* 19.6 ft. *Total Recovery:* 14.1 ft.



PENETRATION GRAPH

Core No: CBDAC 192 *Run#:* 2 *Location: East:* 954243.5 ft. *North:* 491993.4 ft.
Date: 7/5/96 *Start Time:* 1:17 PM *Stop Time:* 1:20 PM *Jet to:* 13.6 ft.
W.D. Raw: 35.5 ft. *W.D.Corrected:* *Total Penetration:* 19.9 ft. *Total Recovery:* 4.1 ft.





GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-192	3.0	●	SP

GRAIN-SIZE DISTRIBUTION

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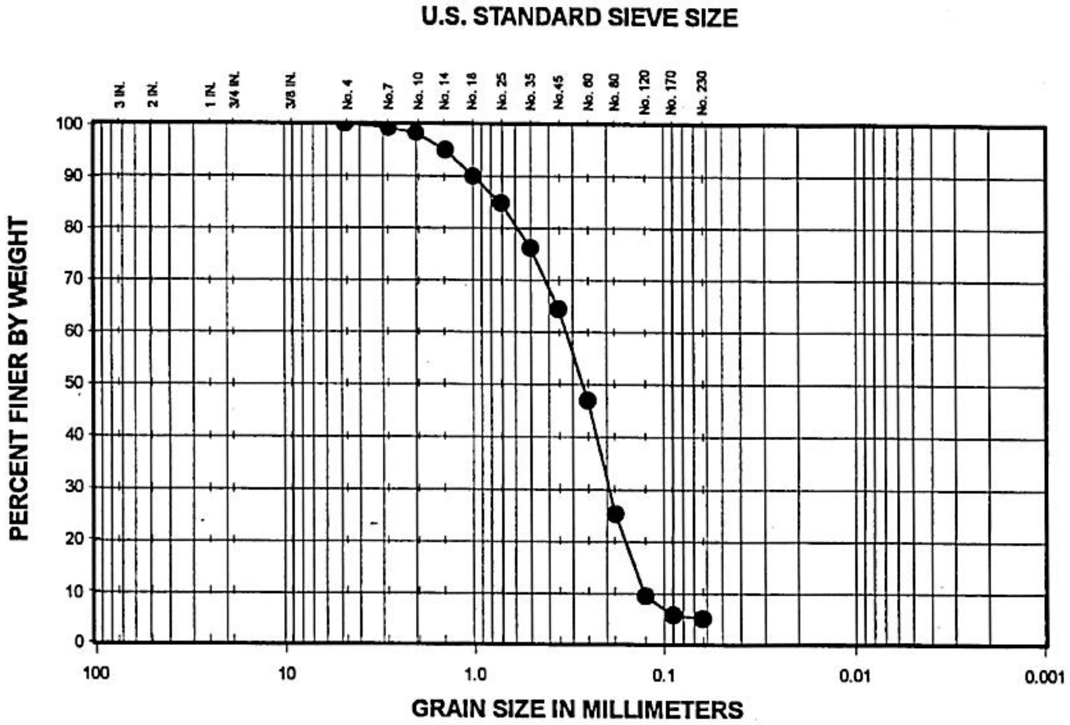
DRAWN BY: GDS
CHECKED BY:
DATE: August,1996
FILE NO. 96-026
APPROVED BY:
FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-192	8.0	●	SP-SM

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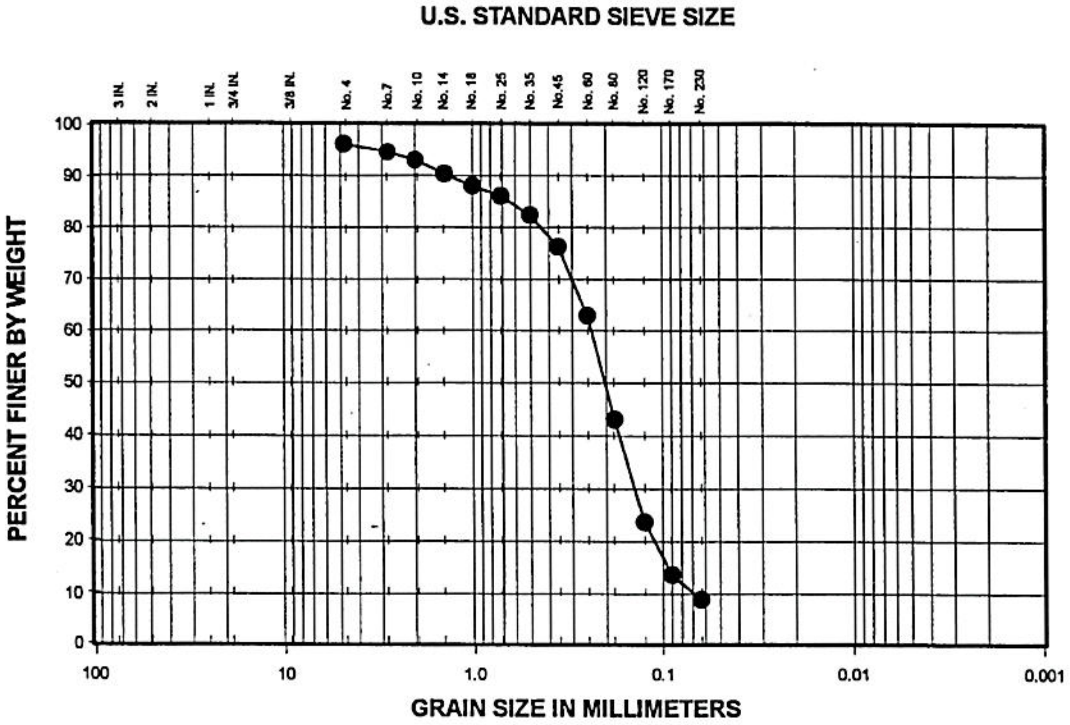
DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-192	13.0	●	SP-SM

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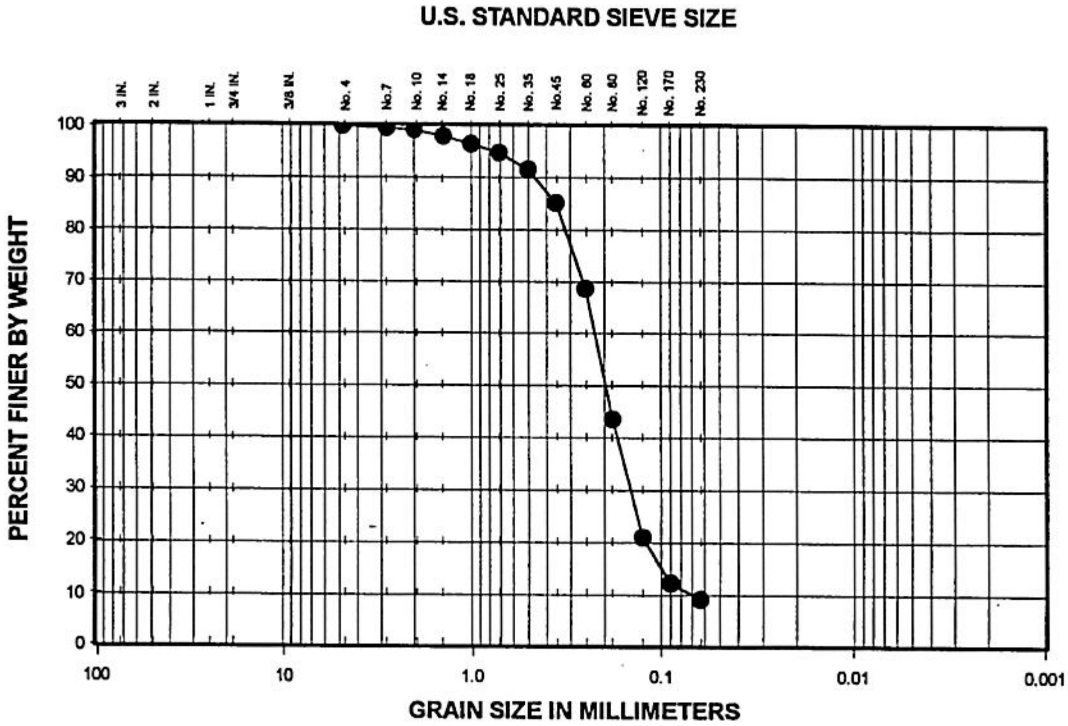
DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE :

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-192	17.0	●	SP-SM

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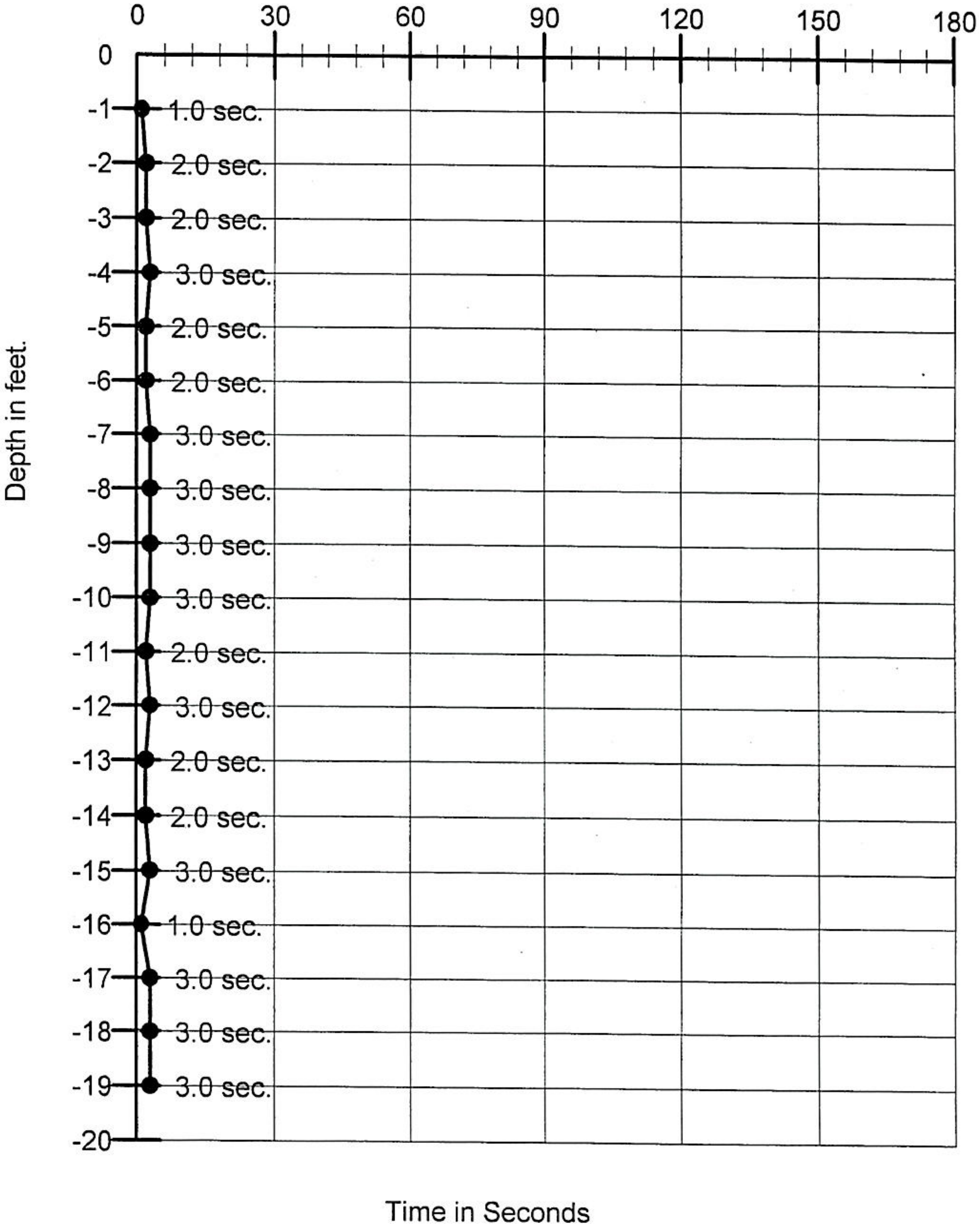
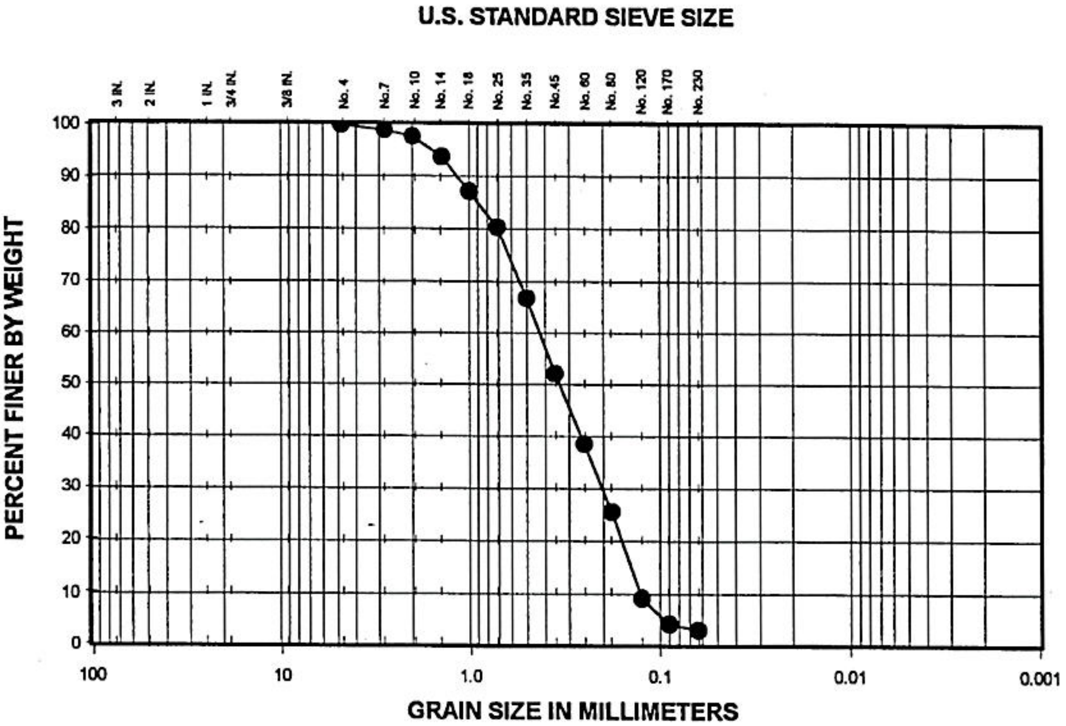
DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2

PENETRATION GRAPH

Core No: CBDAC 193 *Run#:* 1 *Location: East:* 954979.4 ft. *North:* 491632.5 ft.
Date: 7/5/96 *Start Time:* 12:13 P *Stop Time:* 12:15 P *Jet to:*
W.D. Raw: 41.5 ft. *W.D.Corrected:* *Total Penetration:* 19.9 ft. *Total Recovery:* 17.8 ft.





GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-193	2.0	●	SP

GRAIN-SIZE DISTRIBUTION

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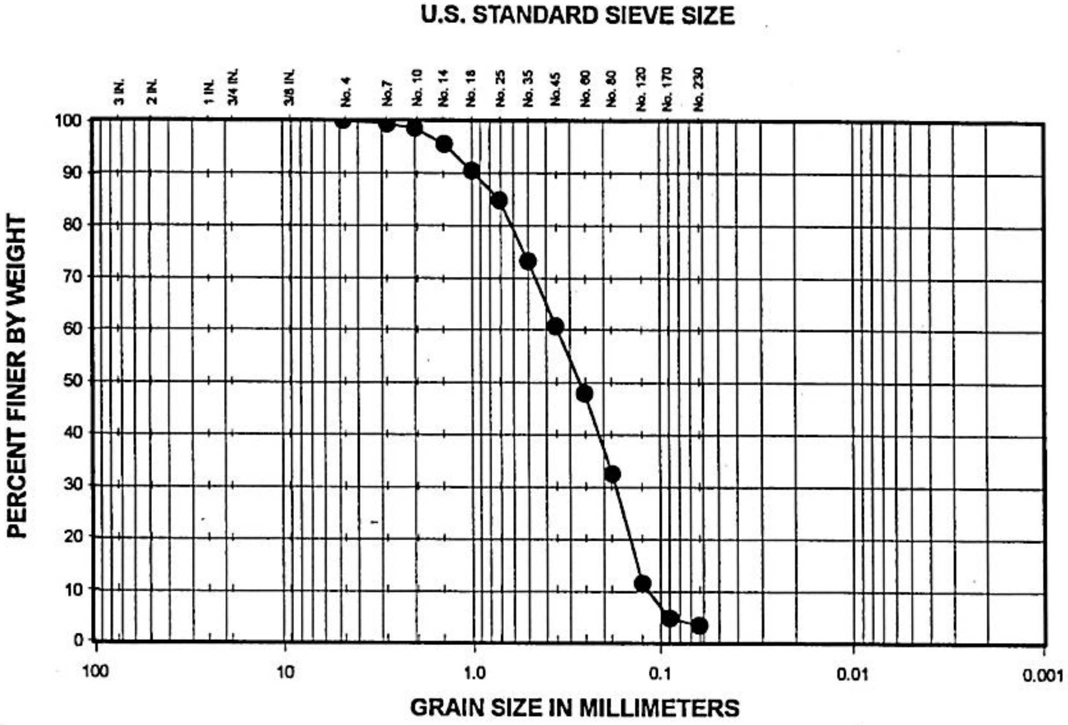
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-193	6.5	●	SP

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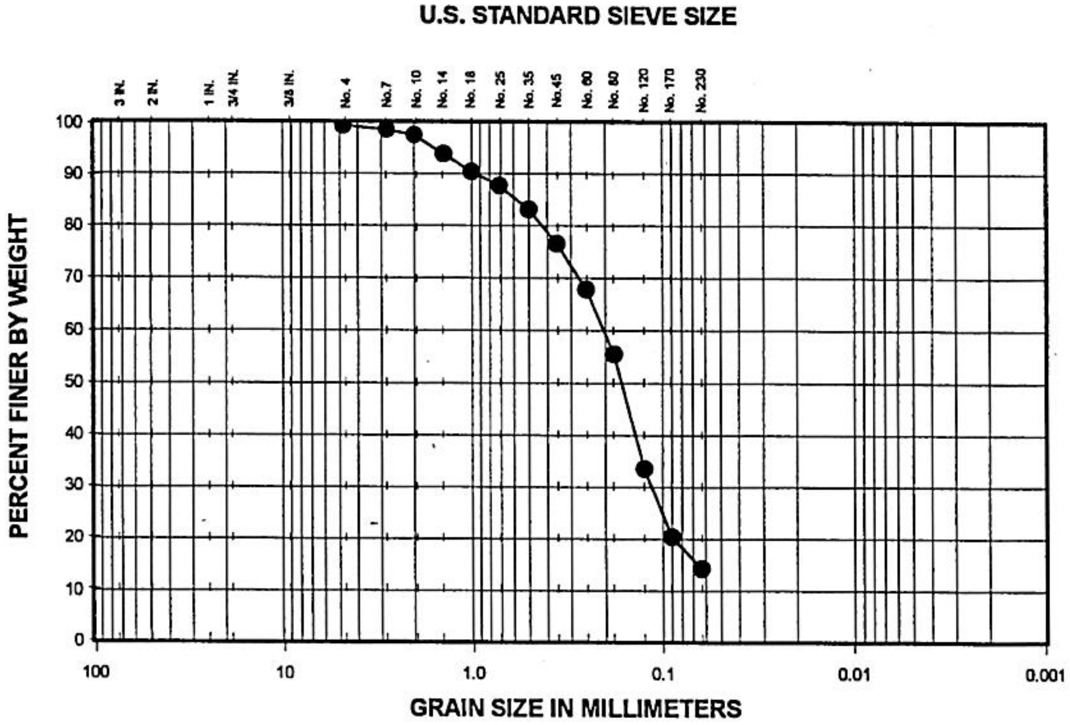
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-193	11.0	●	SM

GRAIN-SIZE DISTRIBUTION

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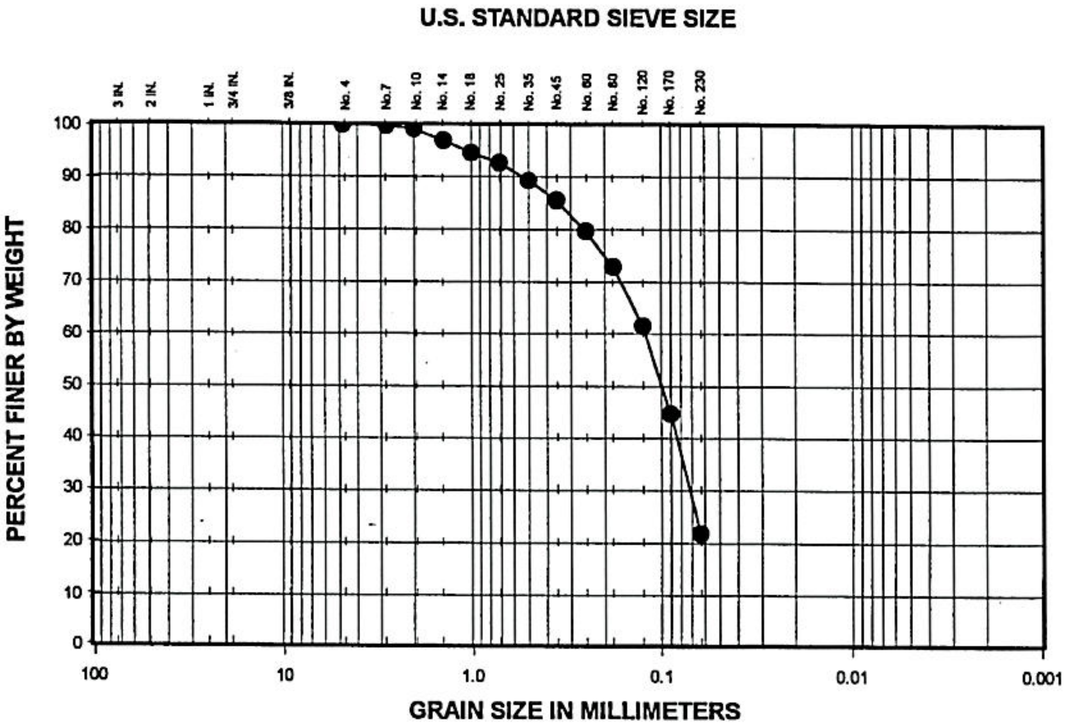
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-193	16.5	●	SM

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FILE NO. 96-026	APPROVED BY:	FIGURE:

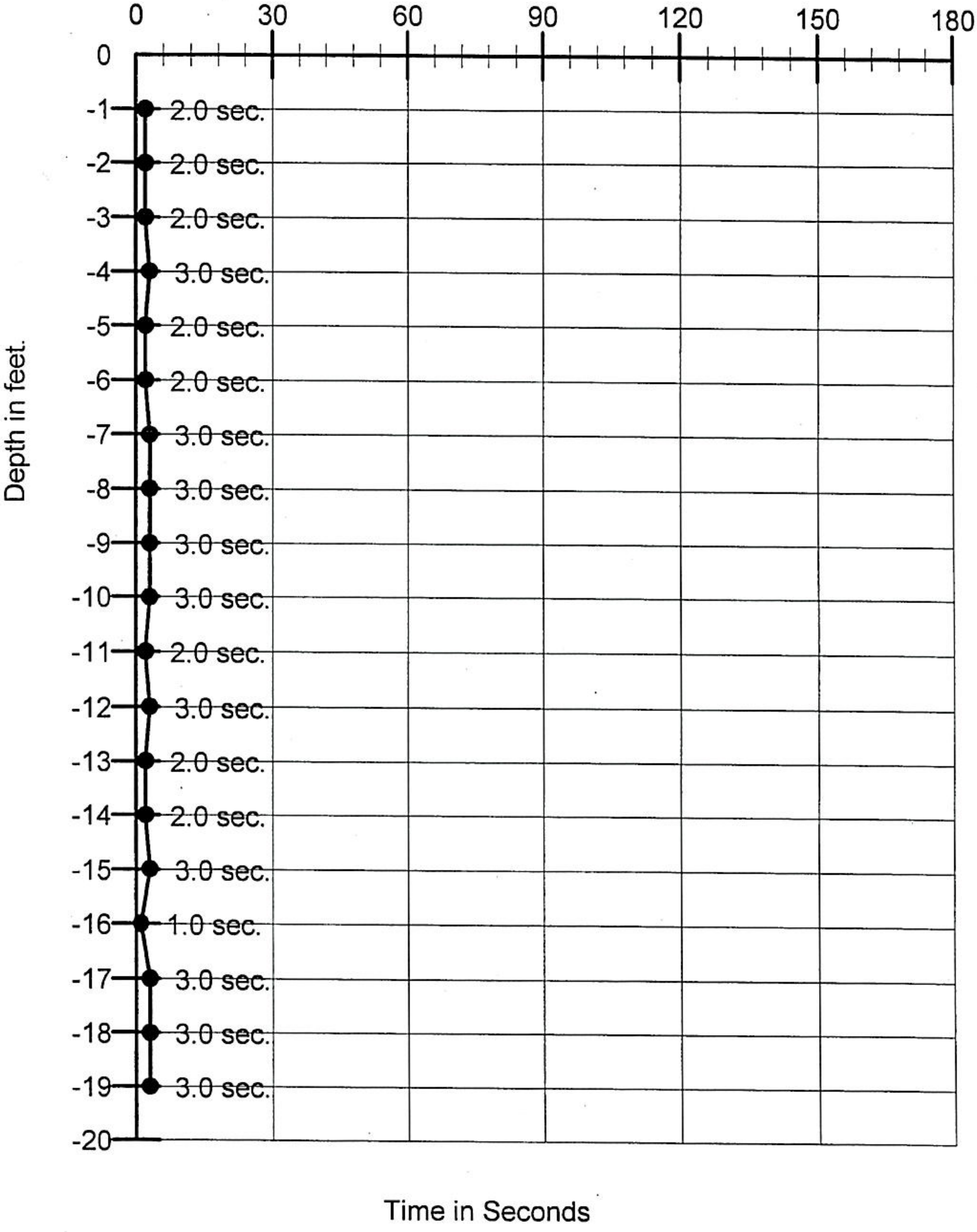
FILE # dade1.pre2

PENETRATION GRAPH

Core No: CBDAC 194 *Run#:* 1 *Location: East:* 955685.0 ft. *North:* 491370.2 ft.

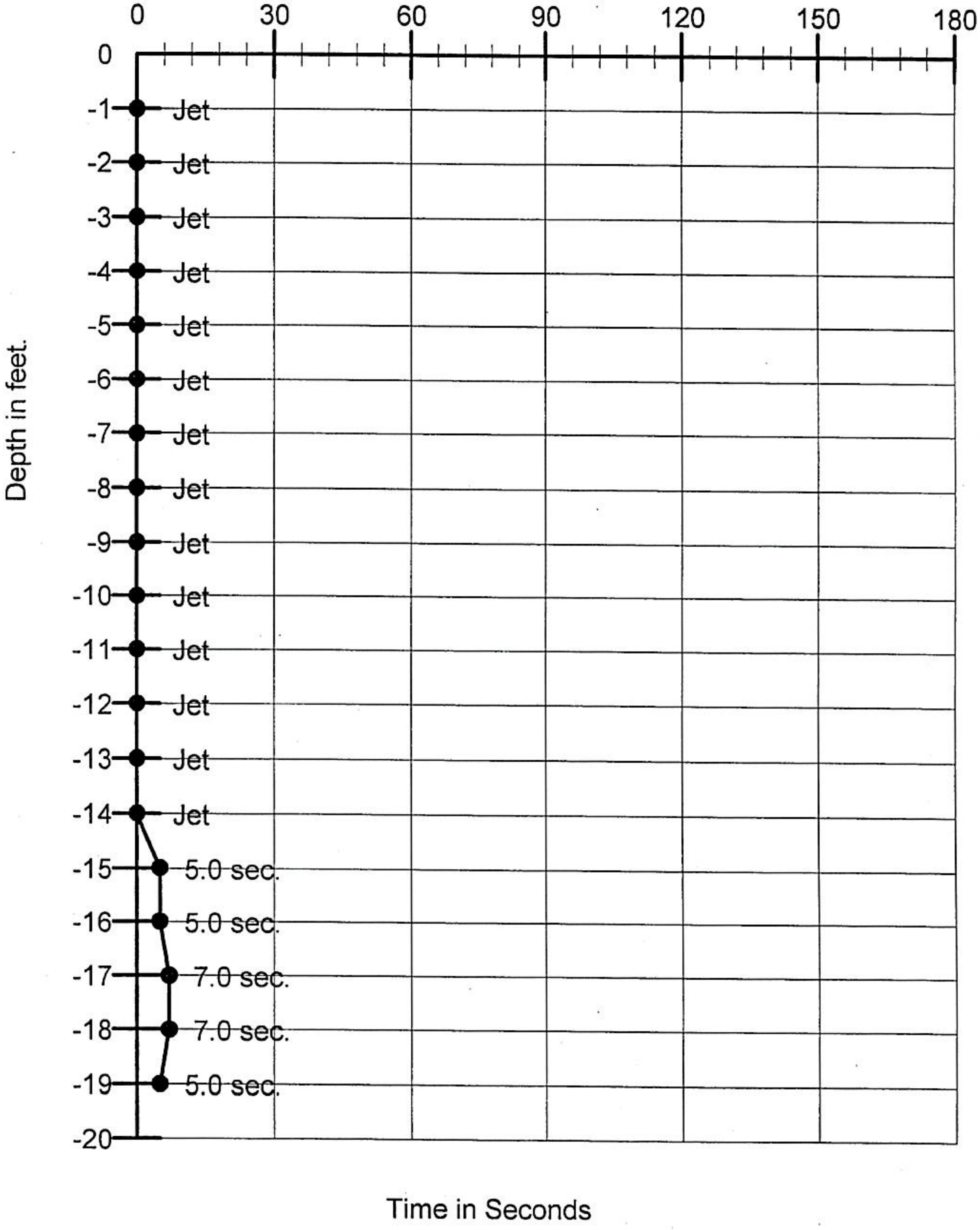
Date: 7/5/96 *Start Time:* 11:00 P *Stop Time:* 11:03 P *Jet to:*

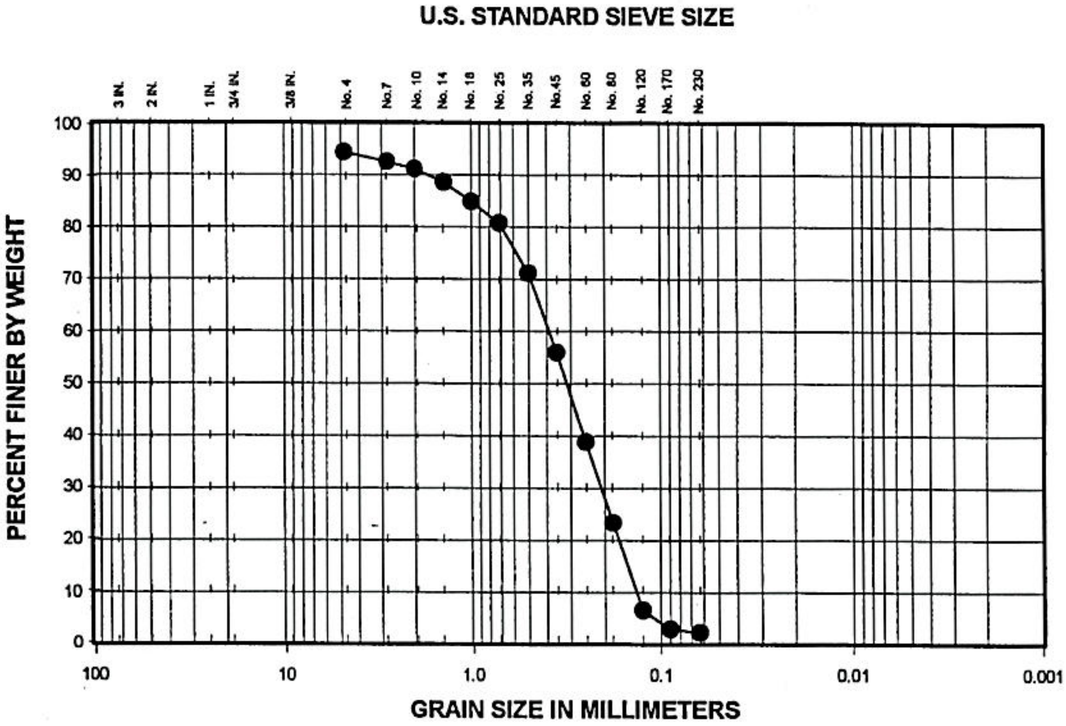
W.D. Raw: 44.1 ft. *W.D.Corrected:* *Total Penetration:* 19.9 ft. *Total Recovery:* 14.1 ft.



PENETRATION GRAPH

Core No: CBDAC 194 Run#: 2 Location: East: 9556413.6 ft. North: 491334.8 ft.
Date: 7/5/96 Start Time: 11:30 AM Stop Time: 11:34 AM Jet to: 13.7 ft.
W.D. Raw: 44.5 ft. W.D.Corrected: Total Penetration: 19.9 ft. Total Recovery: 2.5 ft.





GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-194	2.5	●	SP

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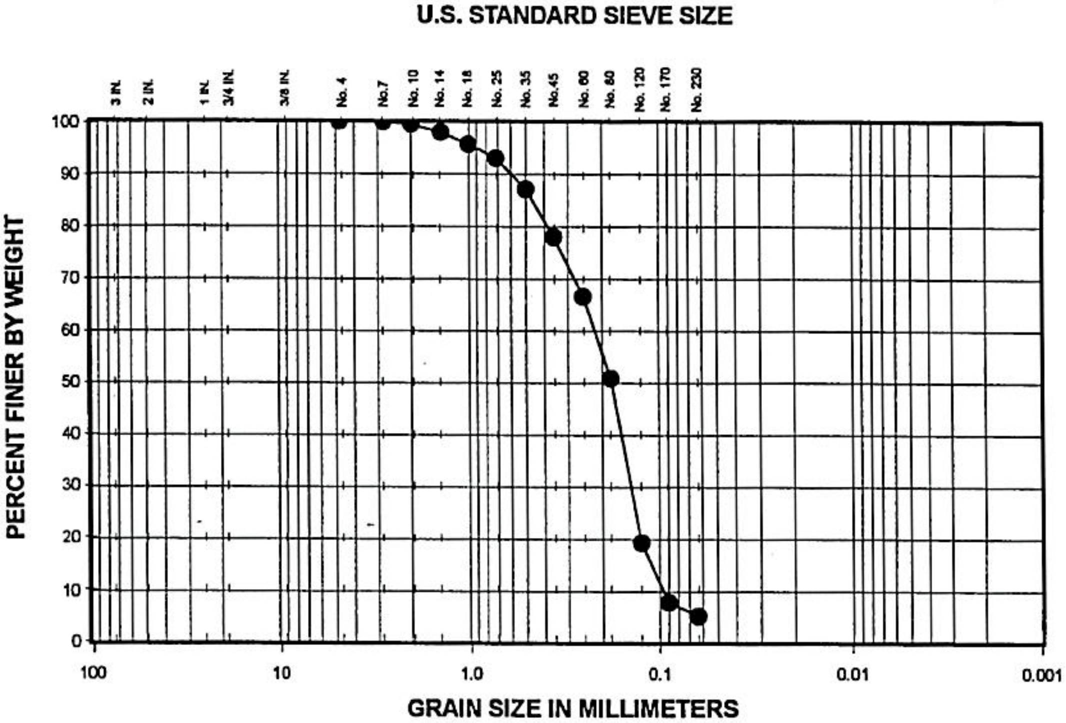
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-194	7.0	●	SP-SM

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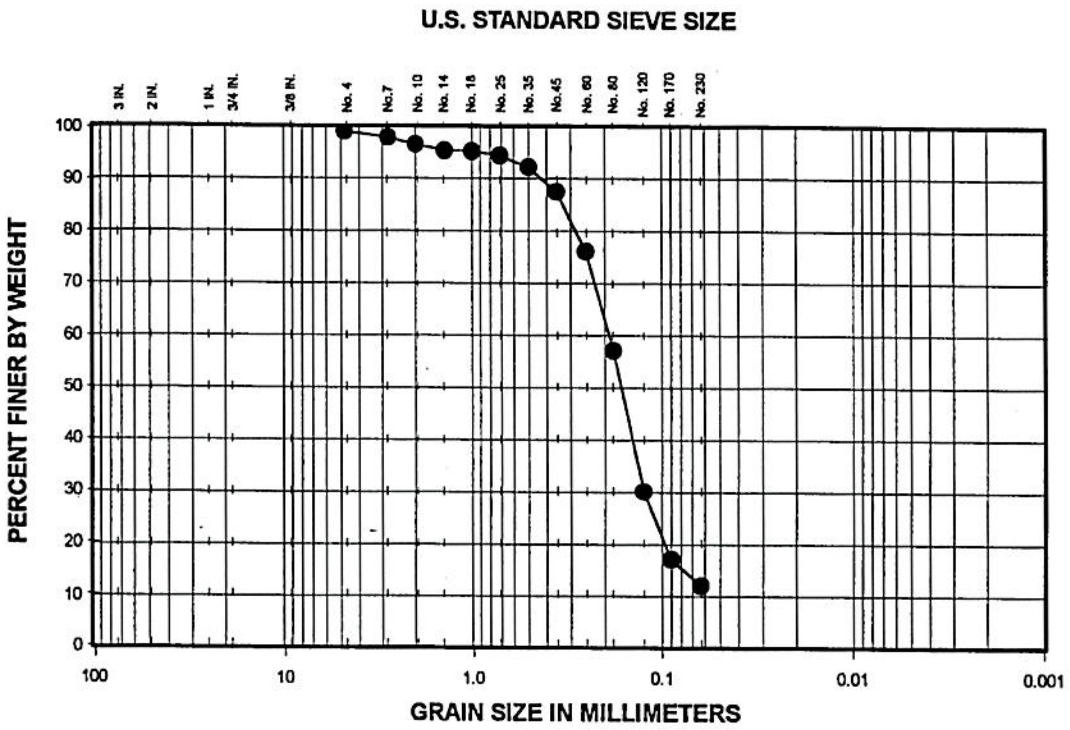
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-194	11.5	●	SP-SM

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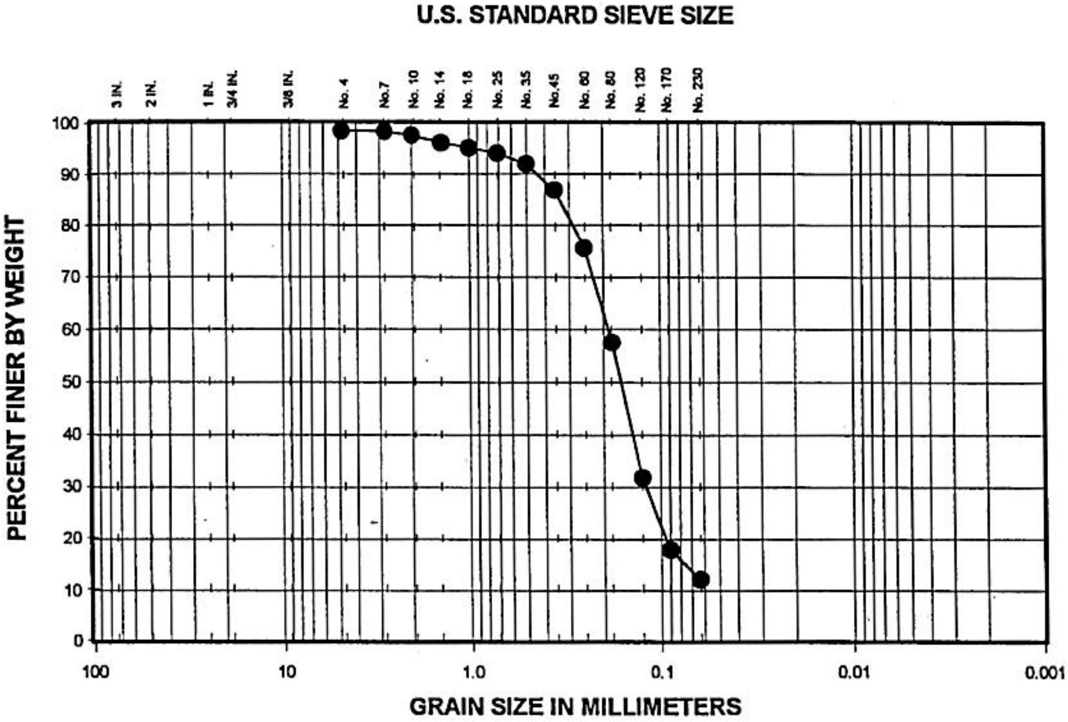
FILE NO. 96-026	APPROVED BY:	FIGURE :

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-194	15.5	●	SP-SM

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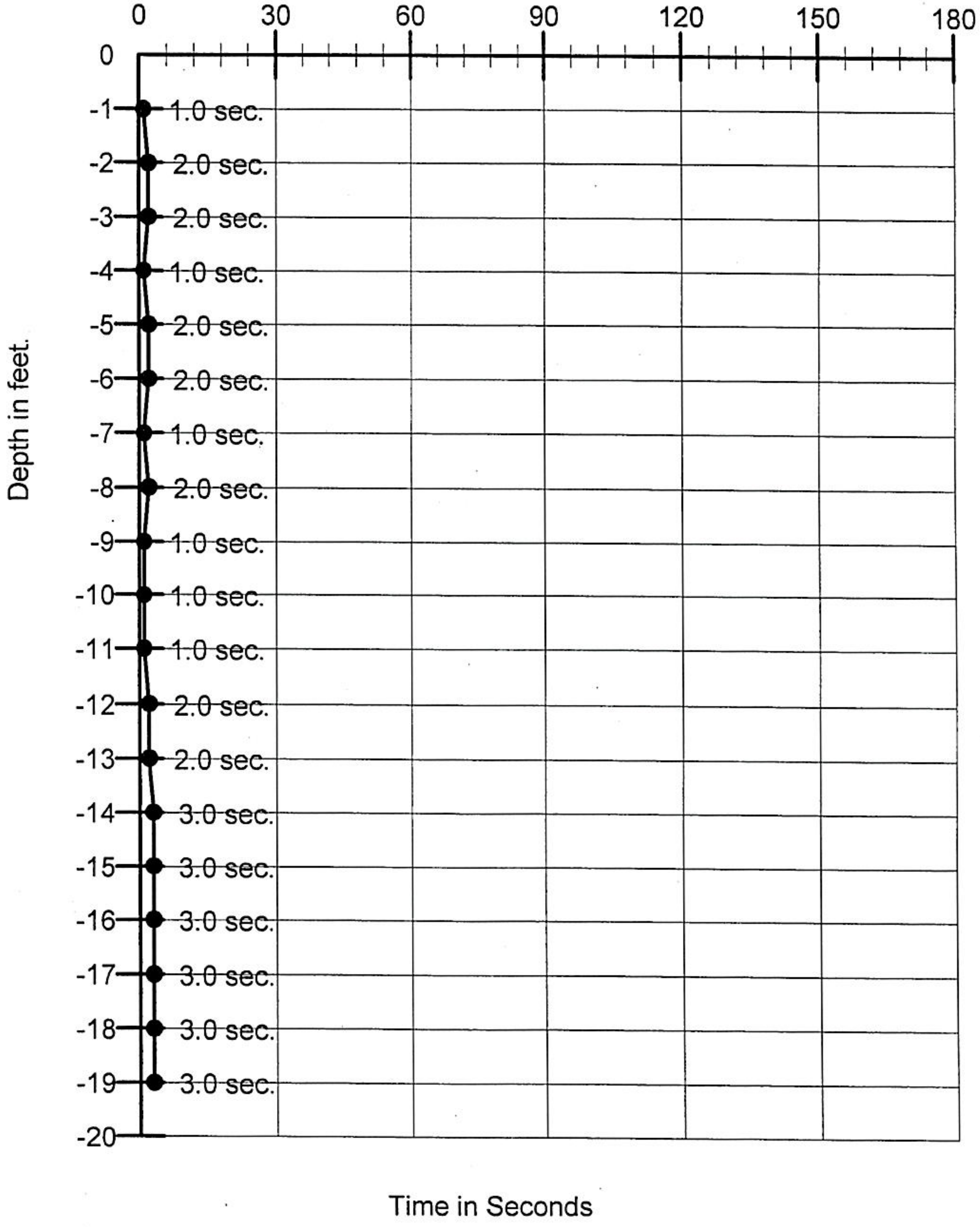
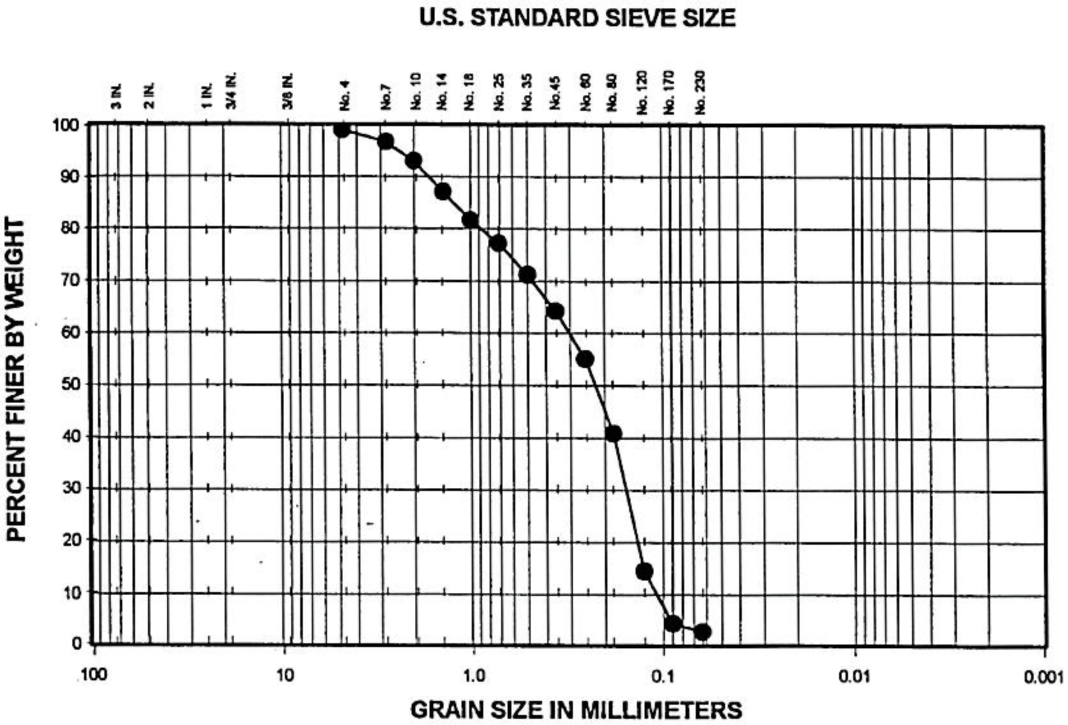
FILE # dade1.pre2

PENETRATION GRAPH

Core No: CBDAC 195 Run#: 1 Location: East: 954102.3 ft. North: 491136.4 ft.
Date: 7/5/96 Start Time: 10:33 A Stop Time: 10:34 A Jet to:
W.D. Raw: 36.6 ft. W.D.Corrected: Total Penetration: 19.9 ft. Total Recovery: 17.7 ft.





GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-195	4.0	●	SP

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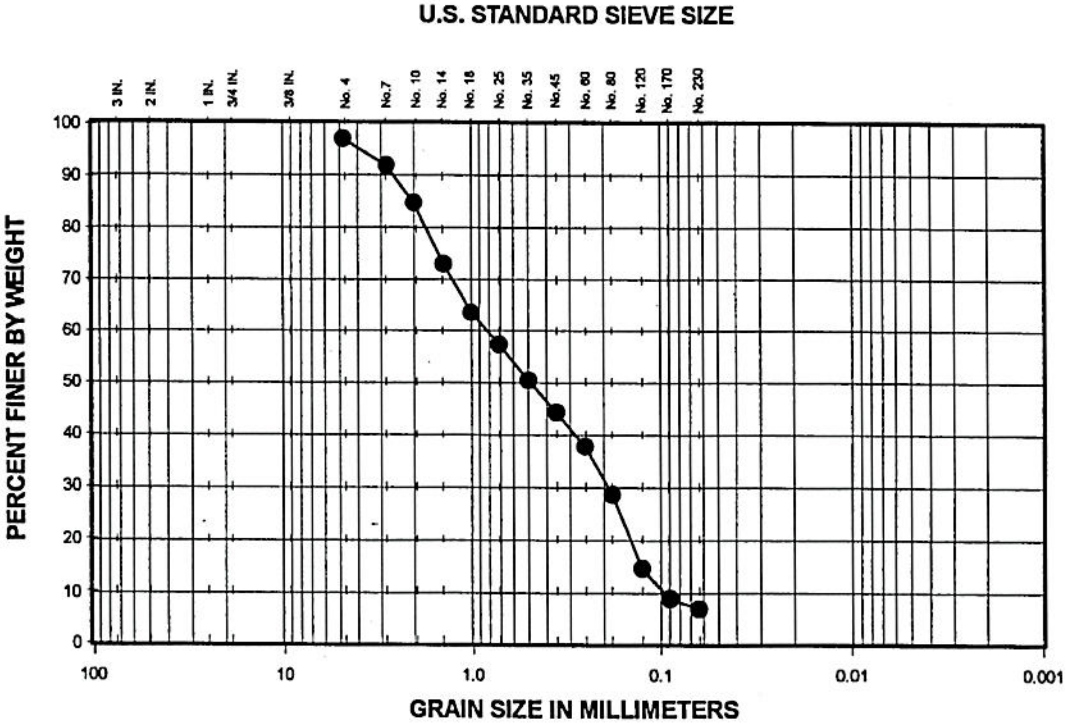
DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-195	6.5	●	SP-SM

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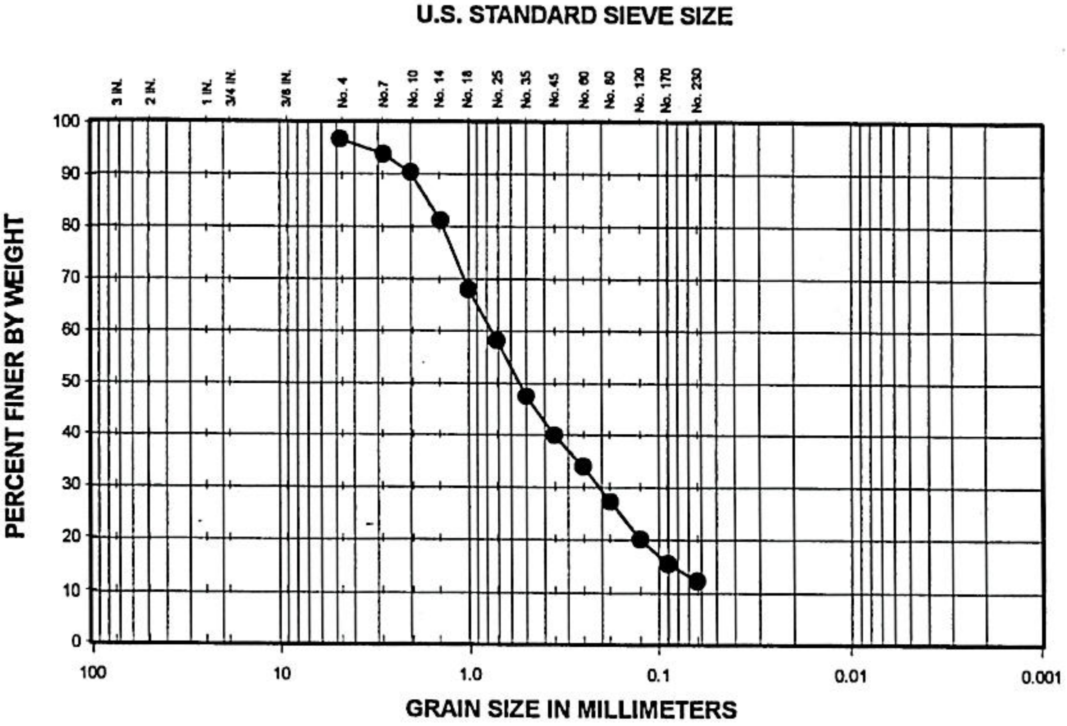
FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-195	13.0	●	SP-SM

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DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
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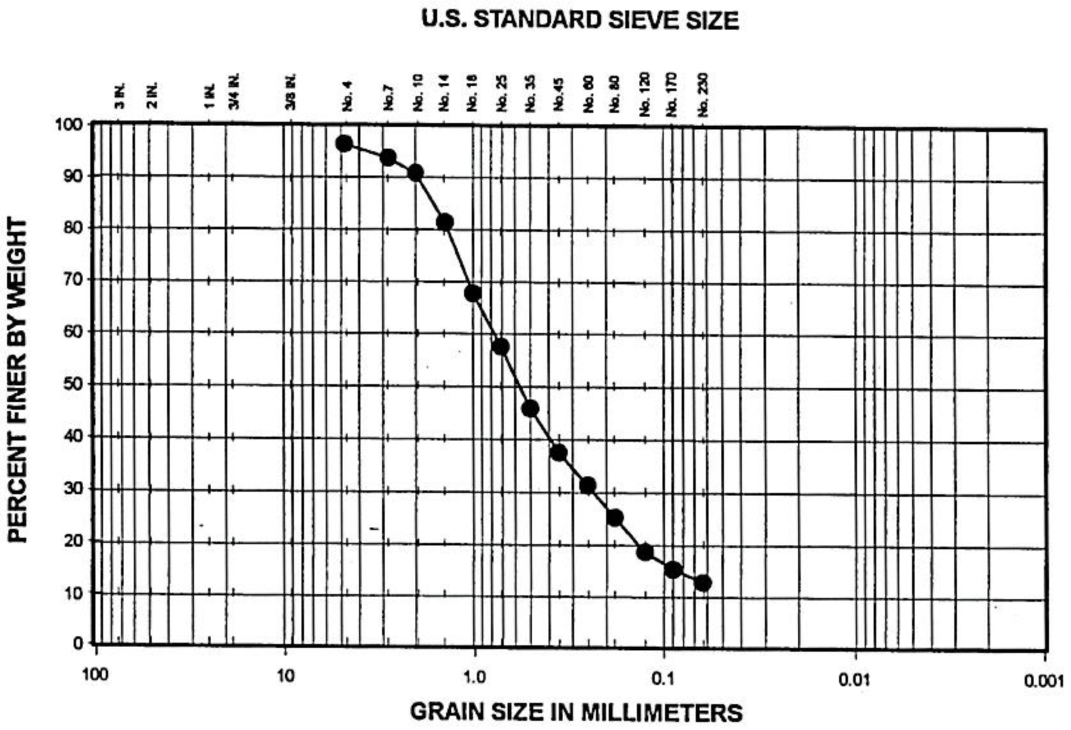
FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-195	15.0	●	SP-SM

GRAIN-SIZE DISTRIBUTION

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Materials Consultants

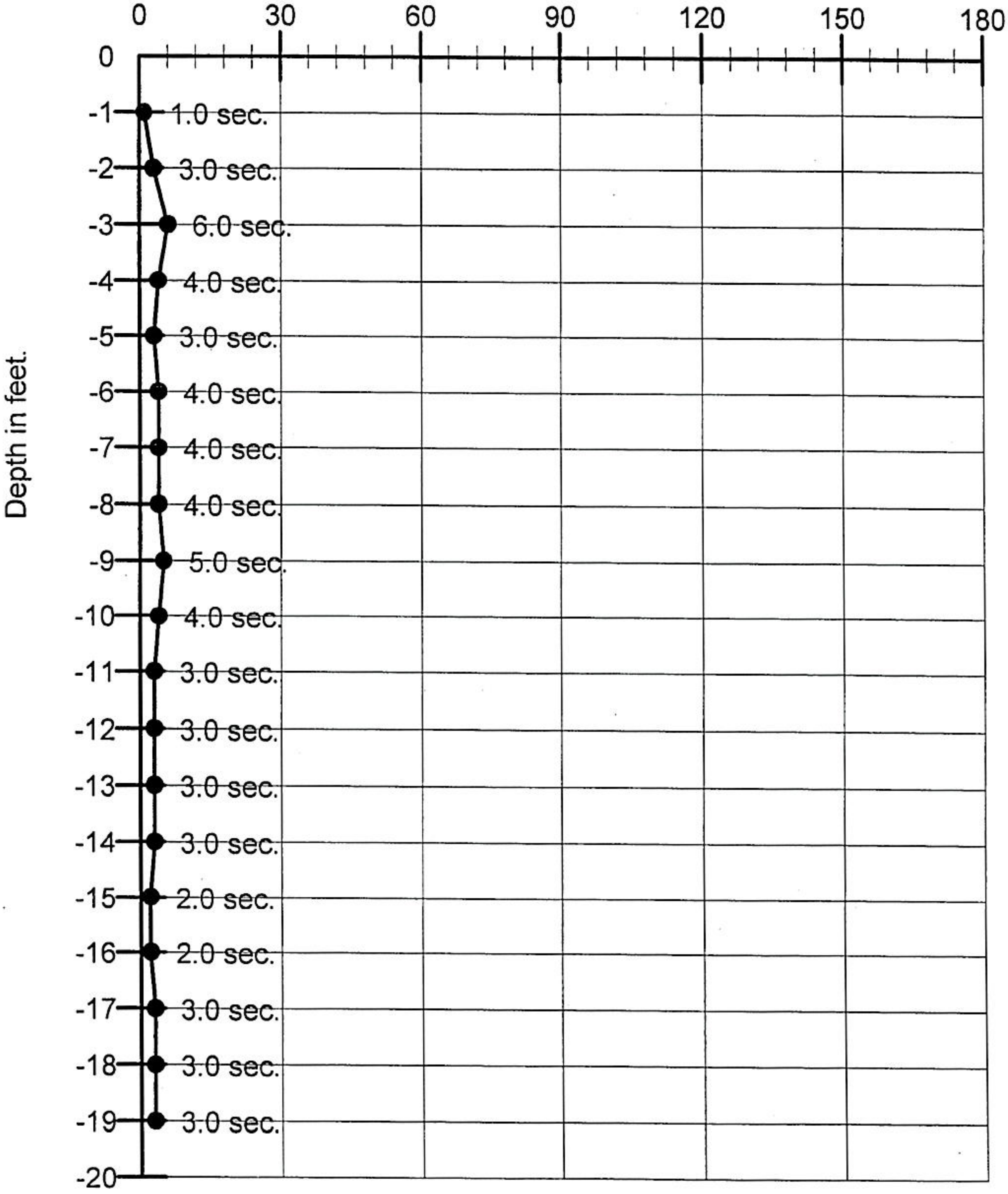
Dade County SSP

DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2

PENETRATION GRAPH

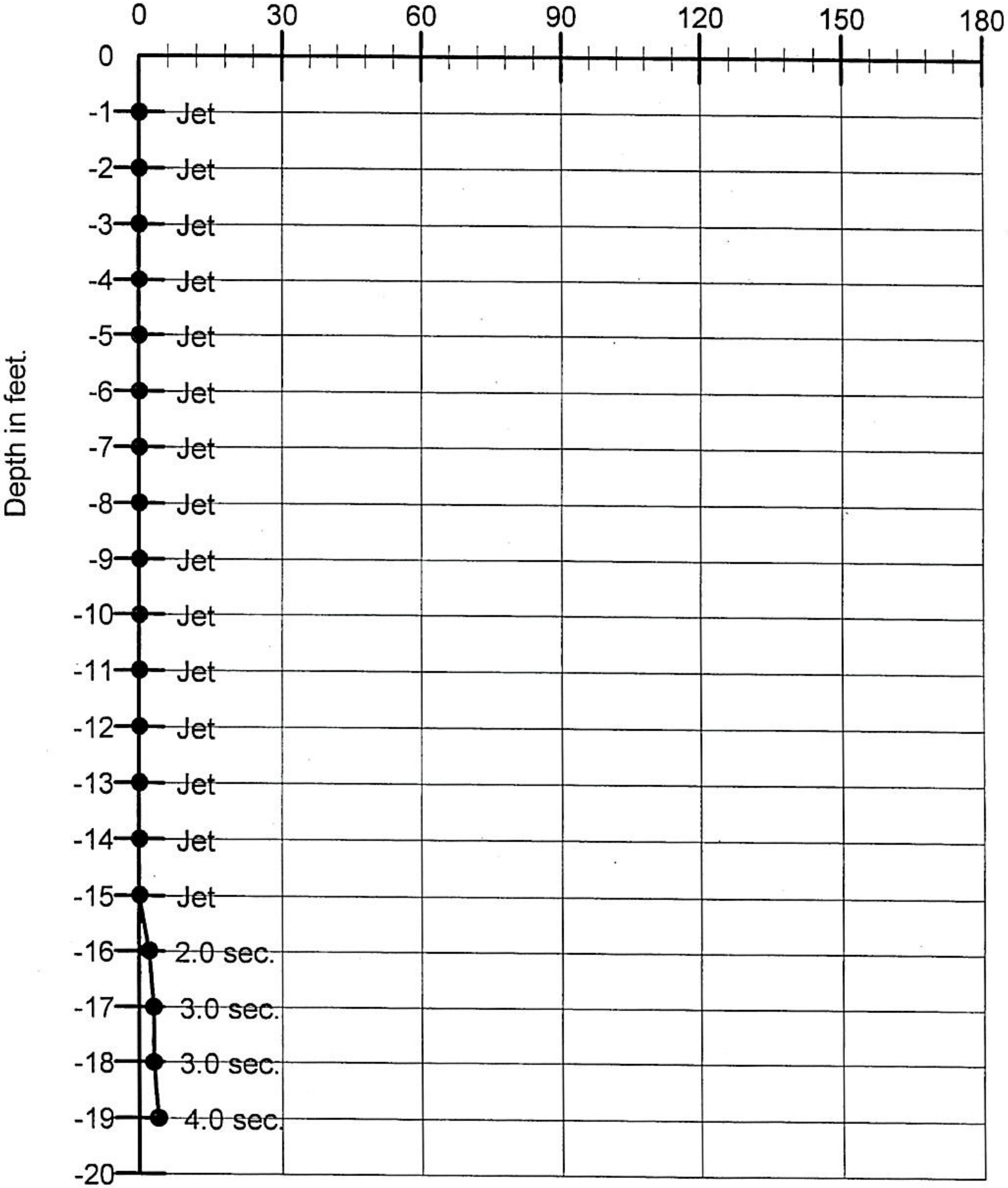
Core No: CBDAC 196 Run#: 1 Location: East: 954724.3 ft. North: 490657.3 ft.
Date: 7/5/96 Start Time: 9:45 AM Stop Time: 9:47 AM Jet to:
W.D. Raw: 37.2 ft. W.D.Corrected: Total Penetration: 19.9 ft. Total Recovery: 15.8 ft.



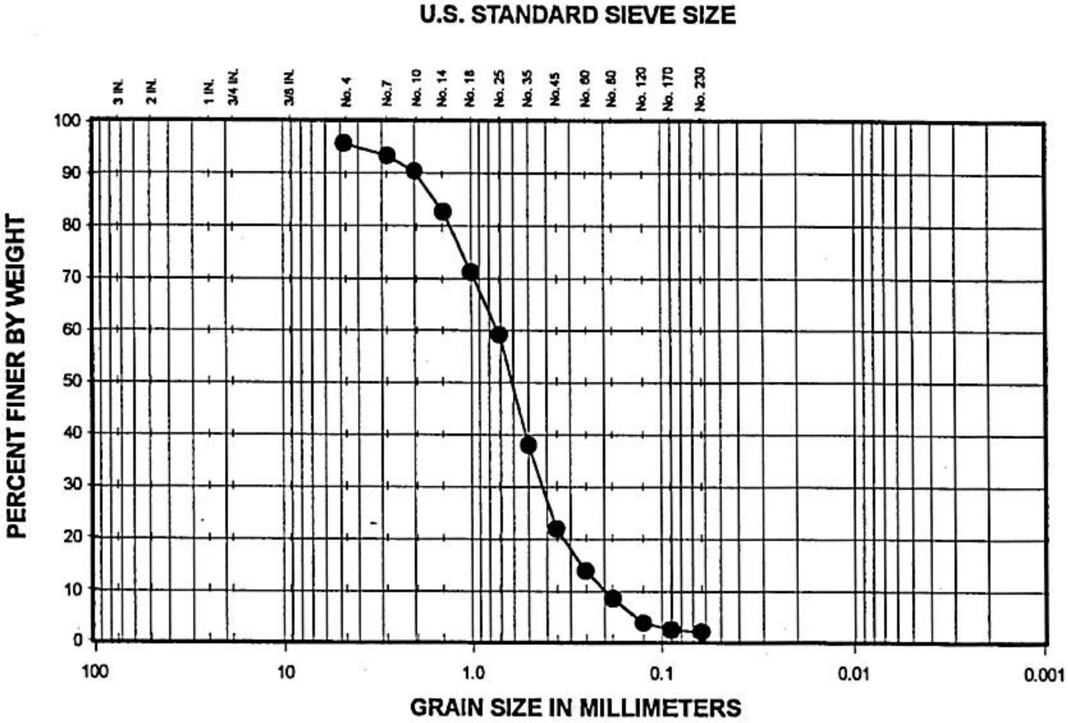
Time in Seconds

PENETRATION GRAPH

Core No: CBDAC 196 Run#: 2 Location: East: 9554712.6 ft. North: 490671.1 ft.
Date: 7/5/96 Start Time: 10:10 A Stop Time: 10:14 A Jet to: 14.3 ft.
W.D. Raw: 36.4 ft. W.D.Corrected: Total Penetration: 19.9 ft. Total Recovery: 2.2 ft.



Time in Seconds



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-196	4.5	●	SP

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DRAWN BY: GDS	CHECKED BY:	DATE: August,1996
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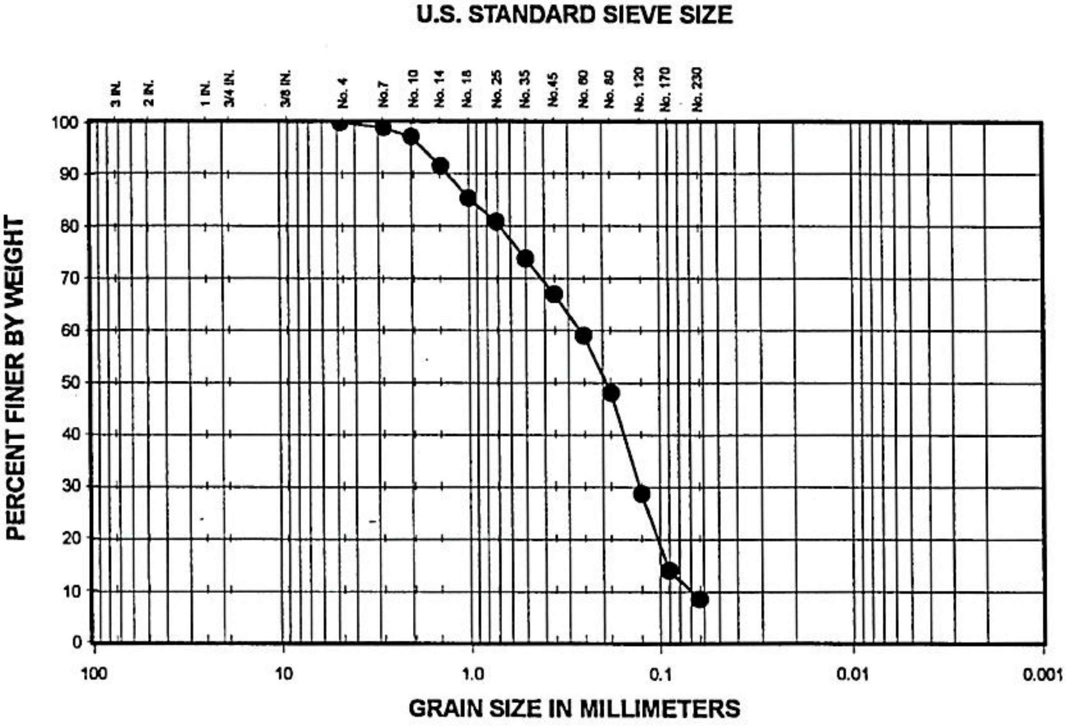
FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-196	8.0	●	SP-SM

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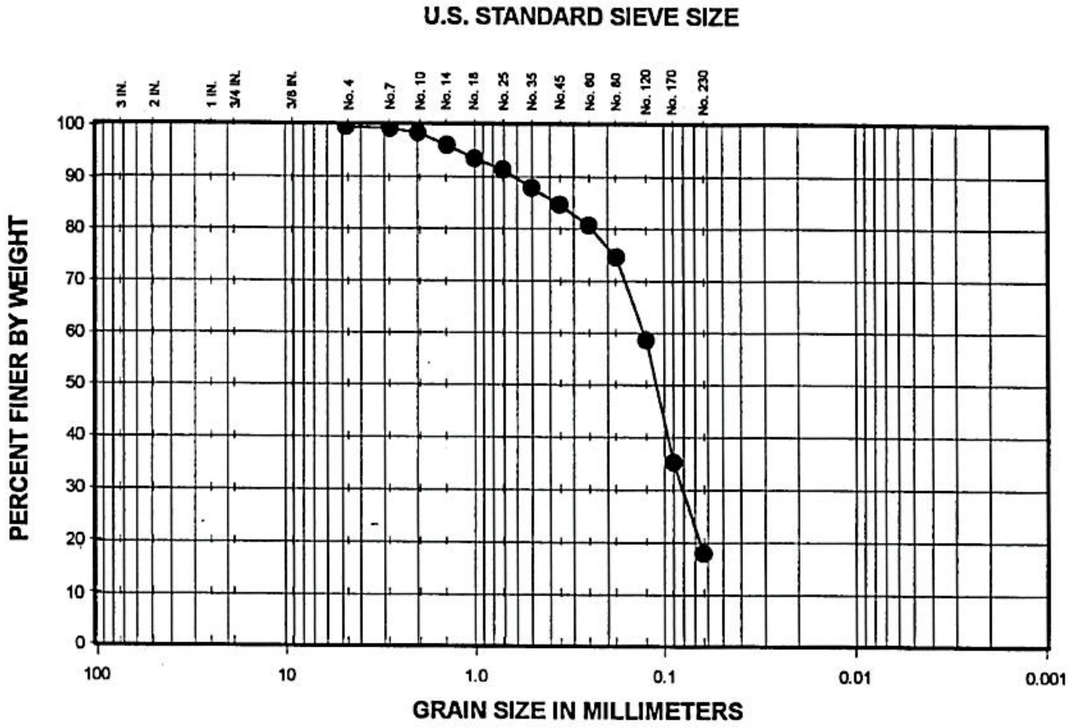
FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-196	9.8	●	SM

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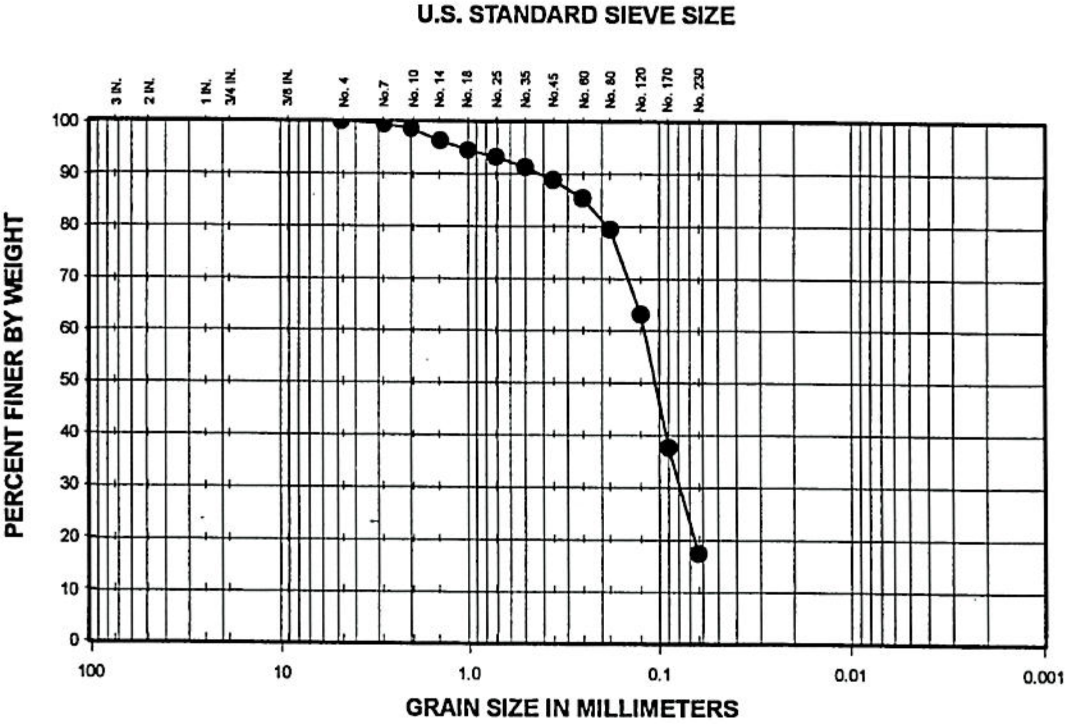
FILE NO. 96-026
APPROVED BY:
FIGURE:

FILE # dade1.pre2



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

SAMPLE LOCATION	DEPTH	SYMBOL	UNIFIED CLASS.
CB-DAC-196	11.0	●	SM

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FILE NO. 96-026	APPROVED BY:	FIGURE:

FILE # dade1.pre2

APPENDIX D – BENTHIC HABITAT SURVEYS

Benthic Habitat Characterization
North Miami Beach Pipeline Corridor and Operational Box associated with Miami-Dade Federal Erosion Control Project (Contract E): JCP File #0295427-001-JC

Note: This information is to address item #28 of RAI #2 (March 10, 2010) associated with the JCP File noted above. This effort is for description and demarcation of habitats within the project area, and will be used to assist in the development of a monitoring plan for the project. The monitoring plan will be provided under separate cover.

The purpose of this work is to provide benthic habitat characterization within the proposed Contract E pipeline corridor, operational box, nearshore hardbottom areas adjacent to the Lummus Park excavation area, and the natural reef habitat adjacent to the SGC-Extension Borrow Area (Figure 1). Results of habitat characterization within the pipeline corridor and around the operational box are described in this report.

Figure 1. Project habitat characterization areas.

Methodology

Belt transect methodology was employed to gather information necessary for the characterization of the habitats in the regions identified. Each belt transect was 15m long by 1.4 m wide for a total survey area of $21m^2$ per transect. Eleven (11) transects in the pipeline corridor were sampled for a total survey area of $231m^2$. Six (6) transects at the reef edges closest to the Operational Box were sampled for a total survey area of $126m^2$. GPS coordinates were recorded for the beginning of each transect (Table 1). Transects were assessed by DERM biologists trained and experienced in the identification of tropical benthic marine organisms. Scleractinians (hard corals) and octocorallia (soft corals) were identified to species (or lowest possible taxon) and enumerated. In addition, the dimensions (longest axis and perpendicular axis) of all scleractinian colonies within the transect were measured to provide an estimate of hard coral cover and size. Other benthic species were enumerated minimally by group (i.e., sponges, zoanthids, etc.). Benthic groups difficult to enumerate such as algae and tunicates were identified and abundance approximated using the Braun Blaquet Cover Abundance methodology. This methodology utilizes visual observations of the habitats to estimate the abundance and benthic cover of the components of the benthic community. Estimates, provided in the subsequent text, are based on the abundance scale in Table 2.

Table 1. GPS Coordinates (decimal minutes - beginning of each transect), depth, and habitat type of each transect in the pipeline corridor and around the operational box.

Location	Transect Number	Latitude	Longitude	Depth	Habitat
Pipeline	1	25 51.221 N	80 06.590 W	18	Ridge-Shallow
Pipeline	2	25 51.214 N	80 06.490 W	19	Ridge-Shallow
Pipeline	3	25 51.217 N	80 06.401 W	20	Ridge-Shallow
Pipeline	4	25 51.215 N	80 06.287 W	22	Linear Reef-Inner
Pipeline	5	25 51.215 N	80 06.224 W	20	Linear Reef-Inner
Pipeline	6	25 51.218 N	80 06.157 W	23	Ridge-Shallow
Pipeline	7	25 51.209 N	80 06.038 W	31	Linear Reef-Inner
Pipeline	8	25 51.214 N	80 05.961 W	28	Linear Reef-Inner
Pipeline	9	25 51.212 N	80 05.924 W	41	Linear Reef-Inner
Pipeline	10	25 51.228 N	80 05.826 W	44	Linear Reef-Middle
Operational Box/Pipeline	11	25 51.212 N	80 05.693 W	50	Linear Reef-Middle
Operational Box	12	25 51.305 N	80 05.707 W	51	Linear Reef-Middle
Operational Box	13	25 51.133 N	80 05.689 W	50	Linear Reef-Middle
Operational Box	14	25 51.327 N	80 05.542 W	55	Linear Reef-Middle
Operational Box	15	25 51.213 N	80 05.565 W	50	Linear Reef-Middle
Operational Box	16	25 51.107 N	80 05.548 W	52	Linear Reef-Middle

Table 2. Braun-Blanquet Abundance Scale

Scale	% Cover	Description
5	> 75%	High
4	50-75%	Moderate
3	25-50%	Low to Moderate
2	5-25%	Low
1	<5%	Sparse
0.5		Few individuals with small cover
0.1		Solitary

Transects were assessed *in situ* by DERM divers, using a 1.0m long X 0.7m wide quadrat. Quadrats were positioned side-to-side and end-to-end, so as to cover the full length and width of the belt transect. Thirty (30) quadrats per transect were required to assess a "transect". A video record of each transect was obtained using a Sony HD video camera. Each transect was shot in two passes of the video (one on each side of the transect), to allow optimal resolution in the video (available upon request). Digital photographs of the transect area were also taken.

Transect locations were strategically chosen based on habitat classifications mapped by Walker[1]. These classifications were based on geomorphologic characteristics and biological assemblages to describe the habitats offshore of Miami-Dade County. Additional bathymetric information was utilized from 2003 LADS surveys[2] and 1996 Bathymetry Contour Lines[3]. Transect locations are described below and shown in Figure 2.

1.) Pipeline Corridor Habitat Characterization (Figure 2)

Eleven (11) transects were completed east to west within the pipeline corridor based on three habitat classifications found along the pipeline: Ridge-Shallow, Linear Reef-Inner, and Linear Reef-Middle. Four (4) transects were located on the Ridge-Shallow, five (5) on the Linear Reef-Inner, and two (2) on the Linear Reef-Middle. The locations depicted on Figure 2 show the eastern origin—transects extended 21m to the west.

- Transects 1-3 and 6 describe the benthic assemblages on the Ridge-Shallow habitat.
- Transects 4-5 and 7-9 describe the benthic assemblages on the Linear Reef-Inner habitat.
- Transects 10 and 11 describe the benthic assemblages on the Linear Reef-Middle.

2.) Operational Box (Figure 2)

Adjacent to the operational box six (6) transects were completed. The transect origins are depicted in Figure 2.

- Transects 11-13 describe the biological assemblages on the Linear Reef-Middle feature to the west of the operational box. These transects start approximately 5m

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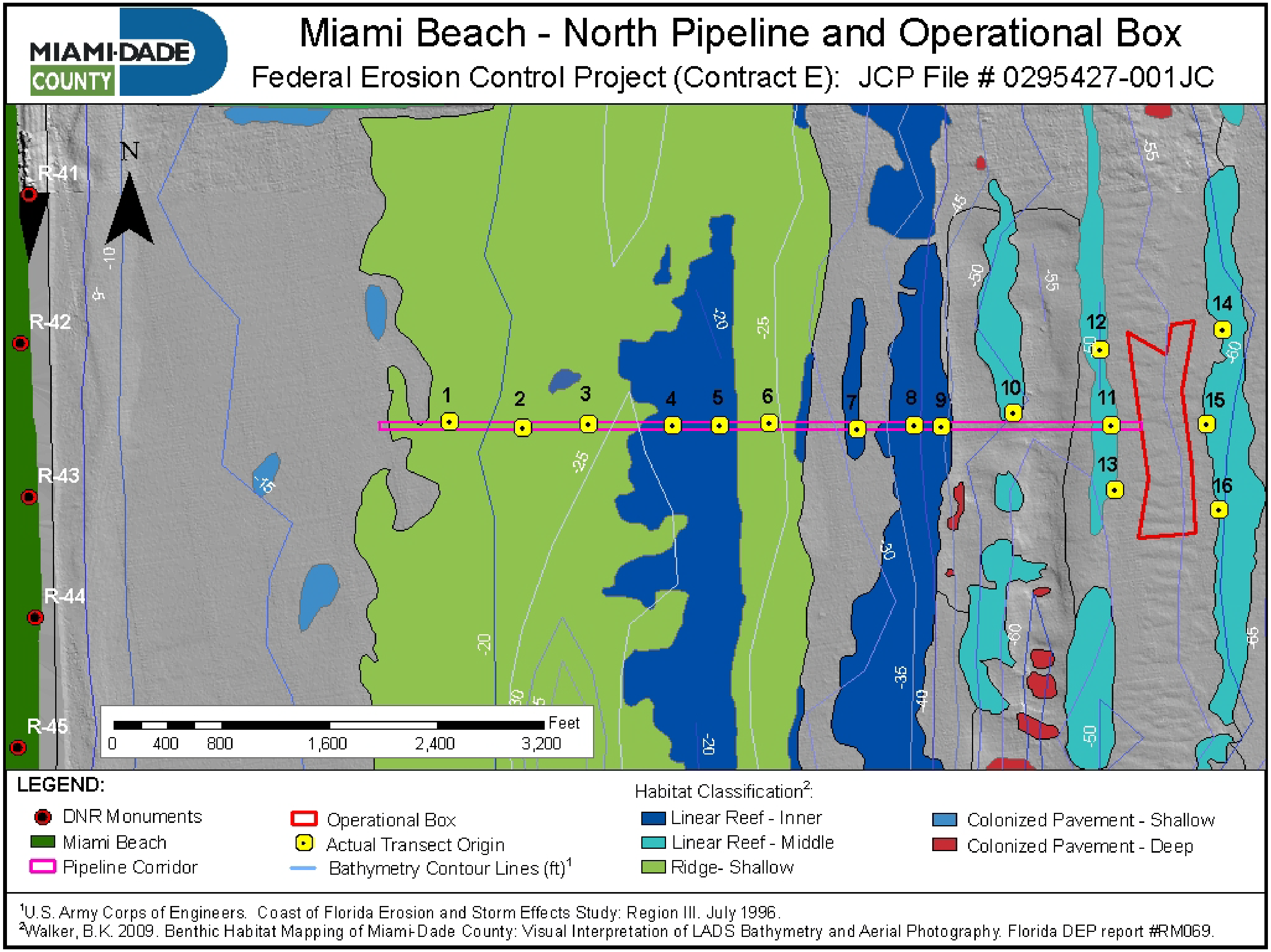
[1] Walker, B.K. 2009. Benthic Habitat Mapping of Miami-Dade County: Visual Interpretation of LADS Bathymetry and Aerial Photography. Florida DEP report #RM069. Miami Beach, FL. Pp. 47.

[2] Coastal Planning and Engineering, Inc. 2003. High Resolution Hydrographic Survey of the Atlantic Coast of Dade and Palm Beach County Using Airborne Laser Technology.

[3] U.S. Army Corps of Engineers. Coast of Florida Erosion and Storm Effects Study: Region III. July 1996.

from the exposed hardbottom edge and extend west 20m. Note that Transect 11 was also used to describe portions of the pipeline corridor.

- Transects 14-16 describe the Linear Reef-Middle feature to the east of the operational box. These transects start approximately 5m from the exposed hardbottom edge and extend east 20m.



Miami Beach - North Pipeline and Operational Box

Federal Erosion Control Project (Contract E): JCP File # 0295427-001JC

LEGEND:

- ● DNR Monuments
- 🟩 Miami Beach
- ▭ Pipeline Corridor
- ▭ Operational Box
- ● Actual Transect Origin
- — Bathymetry Contour Lines (ft)[1]

Habitat Classification[2]:

- ■ Linear Reef - Inner
- ■ Linear Reef - Middle
- ■ Ridge- Shallow
- ■ Colonized Pavement - Shallow
- ■ Colonized Pavement - Deep

[1] U.S. Army Corps of Engineers. Coast of Florida Erosion and Storm Effects Study: Region III. July 1996.

[2] Walker, B.K. 2009. Benthic Habitat Mapping of Miami-Dade County: Visual Interpretation of LADS Bathymetry and Aerial Photography. Florida DEP report #RM069.

Figure 2. Survey areas on benthic resources in pipeline corridor and adjacent to operational box.

Pipeline Corridor Habitat Characterization Results

Eleven transects (total survey area of 231m^2) were surveyed on the pipeline corridor from May 10, 2010 to June 18, 2010. Scleractinians exhibited a total of 1.21% cover and a species richness of 18 for all the pipeline corridor transects. Total density was 1.23 colonies per m^2. Transect 5 on the Linear Reef-Inner had the highest scleractinian percent cover (4.31%) while Transect 10 on the Linear Reef-Middle had the highest density (3.57 colonies per m^2) (Table 3). *Porites astreoides*, *Siderastrea siderea*, and *Stephanocoenia intersepta* were the most common species (Table 4). One *Acropora cervicornis* colony was documented in Transect 5 on the Linear Reef-Inner habitat. Table 5 lists all scleractinian species and their density (# of colonies per m^2) within two diameter size ranges: 0-25cm and 25-50cm. Overall, 1.73 colonies per m^2 were observed with a diameter between 0-25cm and 0.06 colonies per m^2 were observed with a diameter between 25-50cm. No colonies greater than 50cm in diameter were observed within the transects. Scleractinians were most dense (1.86 colonies per m^2) on the Linear Reef-Middle and had the greatest percent cover (1.40%) on the Linear Reef-Inner transects (Figure 3). Table 6 lists all scleractinian species' density (# of colonies per m^2) and percent (%) cover on each habitat type.

Table 3. Percent (%) cover and density (# of colonies per m^2) of scleractinians in each pipeline corridor transect.

Transect Number	Percent (%) Cover	Density (per m^2)	Habitat Type
1	1.229	1.095	Ridge-Shallow
2	0.753	0.429	Ridge-Shallow
3	0.300	0.429	Ridge-Shallow
4	1.830	1.476	Linear Reef-Inner
5	4.310	3.476	Linear Reef-Inner
6	1.938	1.286	Ridge-Shallow
7	0.075	0.238	Linear Reef-Inner
8	0.453	0.476	Linear Reef-Inner
9	0.324	0.952	Linear Reef-Inner
10	2.010	3.571	Linear Reef-Middle
11	0.052	0.143	Linear Reef-Middle

Table 4. Density (# of colonies per m^2) and percent (%) cover of each scleractinian species in the pipeline corridor transects.

	Density (per m^2)	**Percent % cover**
Acropora cervicornis	0.004	0.010
Agaricia agaricites	0.013	0.003
Agaricia fragilis	0.048	0.028
Agaricia species	0.009	0.004
Colpophyllia natans	0.004	0.003
Dichocoenia stokesii	0.052	0.038
Eusmilia fastigiata	0.004	0.006
Madracis decactis	0.043	0.016
Meandrina meandrites	0.013	0.024
Montastraea cavernosa	0.095	0.181
Mycetophyllia aliciae	0.009	0.015
Porites astreoides	0.394	0.466
Porites porites	0.104	0.029
Scolemia species	0.004	0.001
Siderastrea radians	0.056	0.012
Siderastrea siderea	0.186	0.158
Solenastrea bournoni	0.039	0.129
Stephanocoenia intersepta	0.156	0.084

Table 5. Density (# of colonies per m^2) of each scleractinian species in each size range (0-25 cm and 25-50cm) in the pipeline corridor transects.

	Density	
	0-25cm Diameter	**25-50cm Diameter**
Acropora cervicornis	0.004	0.000
Agaricia agaricites	0.013	0.000
Agaricia fragilis	0.048	0.000
Agaricia species	0.009	0.000
Colpophyllia natans	0.004	0.000
Dichocoenia stokesii	0.052	0.000
Eusmilia fastigiata	0.004	0.000
Madracis decactis	0.043	0.000
Meandrina meandrites	0.009	0.004
Montastraea cavernosa	0.078	0.017
Mycetophyllia aliciae	0.009	0.000
Porites astreoides	0.385	0.009
Porites porites	0.104	0.000
Scolemia species	0.004	0.000
Siderastrea radians	0.056	0.000
Siderastrea siderea	0.177	0.009
Solenastrea bournoni	0.022	0.017
Stephanocoenia intersepta	0.152	0.004

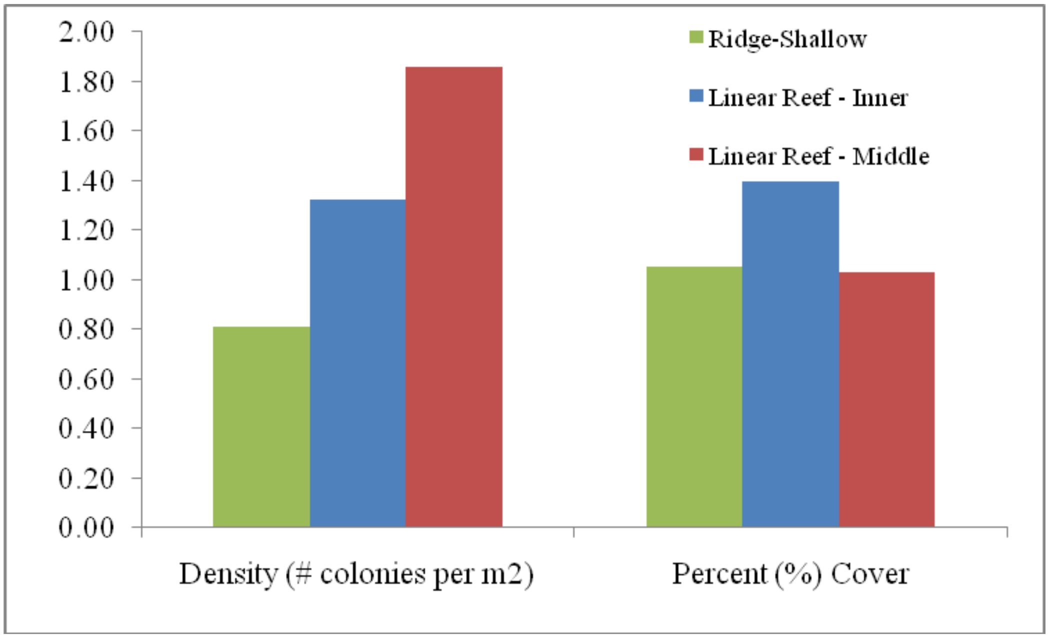


Figure 3. Density (# colonies per m^2) and percent (%) cover of all scleratinians in the pipeline corridor transects.

Table 6. Each scleractinian species density (# of colonies per m^2) and percent (%) cover on each habitat type in the pipeline corridor transects.

	Ridge-Shallow		**Linear Reef - Inner**		**Linear Reef - Middle**	
Species Name	**Density (per m^2)**	**Percent (%) Cover**	**Density (per m^2)**	**Percent (%) Cover**	**Density (per m^2)**	**Percent (%) Cover**
Acropora cervicornis	0.000	0.000	0.010	0.023	0.000	0.000
Agaricia agaricites	0.000	0.000	0.029	0.006	0.000	0.000
Agaricia fragilis	0.000	0.000	0.000	0.000	0.262	0.156
Agaricia species	0.024	0.010	0.000	0.000	0.000	0.000
Colpophyllia natans	0.000	0.000	0.010	0.006	0.000	0.000
Dichocoenia stokesii	0.048	0.054	0.057	0.019	0.048	0.053
Eusmilia fastigiata	0.000	0.000	0.000	0.000	0.024	0.036
Madracis decactis	0.024	0.002	0.000	0.000	0.190	0.082
Meandrina meandrites	0.000	0.000	0.029	0.053	0.000	0.000
Montastraea cavernosa	0.048	0.315	0.067	0.095	0.262	0.130
Mycetophyllia aliciae	0.000	0.000	0.010	0.003	0.024	0.077
Porites astreoides	0.167	0.138	0.686	0.889	0.119	0.063
Porites porites	0.262	0.071	0.019	0.008	0.000	0.000
Scolemia species	0.000	0.000	0.000	0.000	0.024	0.003
Siderastrea radians	0.036	0.002	0.029	0.005	0.167	0.046
Siderastrea siderea	0.024	0.063	0.248	0.225	0.357	0.183
Solenastrea bournoni	0.071	0.284	0.010	0.036	0.048	0.051
Stephanocoenia intersepta	0.107	0.116	0.124	0.031	0.333	0.152

Fourteen (14) species within 11 genera of octocorals were documented in the pipeline corridor transects. Total octocoral density was 11.83 colonies per m^2. Other than *Briareum asbestinum* (6.04 colonies per m^2), *Eunicea* was the most common genera of octocorals (2.40 colonies per m^2). Table 7 shows the density of each octocoral species on all pipeline corridor transects. The Ridge-Shallow had the highest density of octocorals (18.68 colonies per m^2) (Figure 4).

Table 7. Density (# colonies per m^2) of each octocoral species in the pipeline corridor transects.

Octocoral Species	Density (# colonies per m^2)
Briareum asbestinum	6.043
Erythropodium caribaeorium	0.442
Eunicea species	2.398
Gorgonia ventalina	0.229
Muricea species	0.212
Muriceopsis species	0.082
Plexaura flexuosa	0.589
Plexaura species	0.004
Plexaurella species	0.255
Pseudoplexaura species	0.113
Pseudopterogorgia acerosa	0.091
Pseudopterogorgia americana	1.264
Pseudopterogorgia species	0.074
Pterogorgia species	0.030

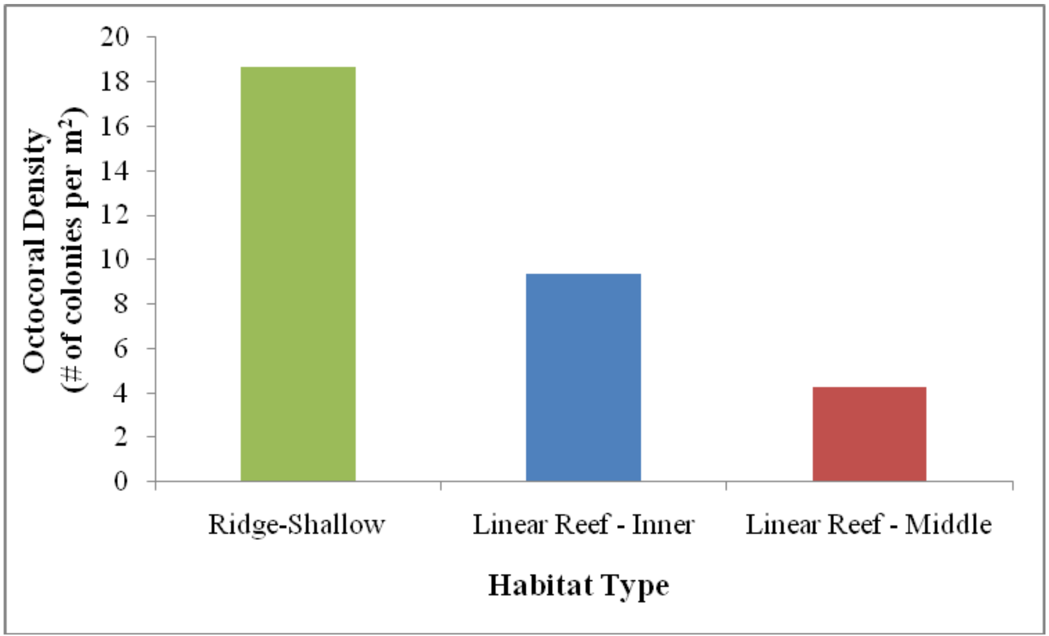


Figure 4. Density (# of colonies per m^2) of octocorals on each habitat type in the pipeline corridor transects.

Fifty (50) porifera species were observed on the pipeline corridor transects (Table 8). Porifera density was 17.20 per m^2 for all transects in the pipeline corridor. Non-encrusting bryozoans had a density of 1.03 per m^2 and zoanthids 1.34 per m^2 for all transects in the pipeline corridor. Zoanthid species included *Palythoa caribaeorum*, *Zoanthus pulchellus* and unidentified zoanthid species. Density on each habitat type of poriferans, non-encrusting bryozoans, and zoanthids is shown in Table 9. Porifera density was greatest on the Linear Reef-Middle (27.33 per m^2).

Table 8. Identified porifera species in the pipeline corridor transects.

Agelas clathrodes	*Ectyoplasia ferox*
Agelas conifera	*Halisarca* species
Agelas orange tubes	*Iotrochota birotulata*
Agelas schmiditi	*Ircinia campana*
Aiolochroia crassa	*Ircinia felix*
Amphimedon compressa	*Ircinia* species
Amphimedon species	*Ircinia strobilina*
Amphiroa species	*Monanchora barbadensis*
Aplysina cauliformis	*Monanchora* species
Aplysina fistularis	*Monanchora unguifera*
Aplysina fulva	*Mycale laevis*
Artemisina melana	*Mycale* species
Callyspongia fallax	*Niphates amorpha*
Callyspongia plicifera	*Niphates digitalis*
Callyspongia species	*Niphates erecta*
Callyspongia vaginalis	*Oceanapia bartschi*
Cinachyra kuekenthali	*Phorbas amaranthus*
Cliona delitrix	*Pseudopterogorgia species*
Cliona species	*Ptilocaulis* species
Cliona varians	*Scopalina ruetzleri*
Desmapsamma anchorata	*Spheciospongia vesparium*
Diplastrella megastellata	*Strongylacidon* species
Diplastrella species	Unidentified Encrusting sponge species
Dragmacidon explicatum	Unidentified sponge species
Dysidea etheria	*Xestospongia muta*

Table 9. Density (individuals per m^2) of non-encrusting bryozoans, poriferans, and zoanthids on each habitat type in the pipeline corridor transects.

	Ridge-Shallow	**Linear Reef - Inner**	**Linear Reef - Middle**
Non-encrusting Bryozoans	0.119	2.152	0.048
Poriferans	11.321	17.848	27.333
Zoanthids	1.012	2.067	0.167

Organisms difficult to enumerate were divided into five categories: Macro Algae (includes blue-green algae), Turf Algae, Encrusting Algae (Crustose Coraline Algae, *Peysonnelia* species) Tunicates, and Other. Species observed in the macro algae, other, and tunicate categories in the pipeline corridor transects are shown in Table 10. Each category was given a BBCA value. Mean BBCA values for all pipeline corridor transects are shown in Table 11. Table 12 shows mean BBCA values for each habitat type. Figure 5 shows overall images of each habitat type in the pipeline corridor transects.

Table 10. Species observed in the macro algae, other and tunicate BBCA categories in the pipeline corridor transects.

Macro Algae	Other	Tunicates
Blue-Green Algae	*Bartholomea annulata*	*Ascidian* species
Dictyota species	Bryozoan species-encrusting	*Botrylloides* species
Galaxaura species	*Eucidaris tribuloides*	*Eudistoma* species
Green Filamentous Algae	*Filograna huxleyi*	*Polycarpa spongiabilis*
Halimeda goreaui	*Hermodice carunculata*	*Stolonicus sabulosa*
Halimeda species	Hydroid species	
Lyngbya species	*Lima* species	
Red Filamentous Algae	*Sabellidae* species	
Udotea species	*Spirobranchus giganteus*	
Unidentified Green Algae	Unidentifed Brittle Star	
Unidentified Red Algae	Unidentified Bivalve	
Wrangelia argus		

Table 11. Mean BBCA values for each category in all the pipeline corridor transects (5 = >75%, 4 = 50-75%, 3 = 25-50%, 2 = 5-25%, 1 = <5% cover, 0.5 = a few individuals, 0.1 = a solitary individual).

BBCA Category	Mean BBCA Value
Tunicates	0.42
Encrusting Algae	0.88
Macro Algae	1.82
Other	0.13
Turf Algae	4.61

Table 12. Mean BBCA values for each category on each habitat type in the pipeline corridor transects (5 = >75%, 4 = 50-75%, 3 = 25-50%, 2 = 5-25%, 1 = <5% cover, 0.5 = a few individuals, 0.1 = a solitary individual).

BBCA Category	Ridge-Shallow	Linear Reef - Inner	Linear Reef - Middle
Tunicates	0.439	0.426	0.370
Encrusting Algae	0.814	0.987	0.733
Macro Algae	2.117	1.694	1.550
Other	0.068	0.146	0.188
Turf Algae	4.825	4.520	4.400

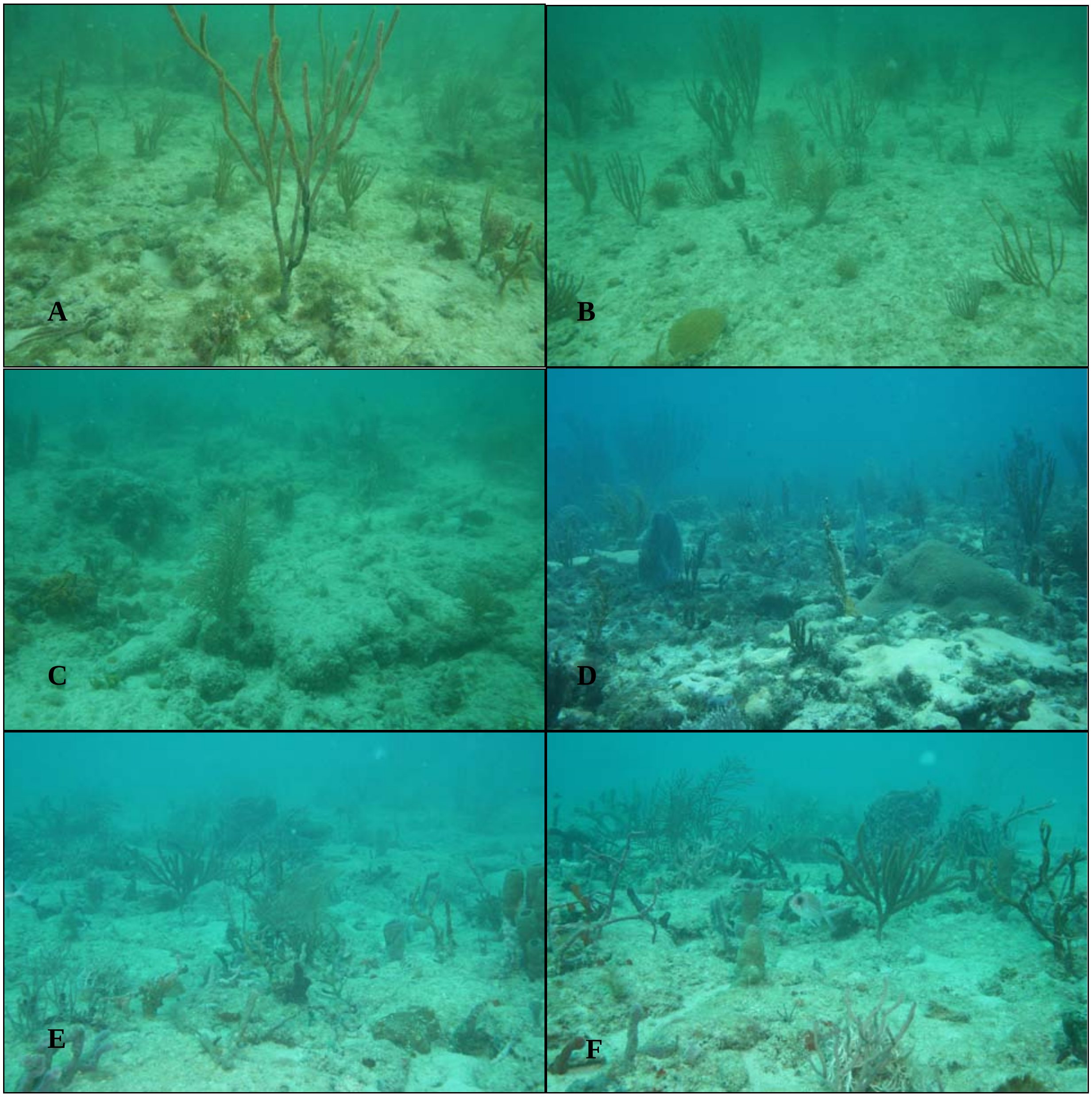


Figure 5. Images of the pipeline corridor area on the: A,B). Ridge-Shallow habitat; C,D). Linear Reef-Inner habitat; E,F). Linear Reef-Middle habitat.

Operational Box Habitat Characterization Results

Six transects (total survey area of 126m^2) were surveyed around the operational box from June 1, 2010 to June 29, 2010. All transects were on the Linear Reef-Middle habitat (3 west of the operational box and 3 east of the operational box). Scleractinians exhibited a total of 0.35% cover and a species richness of 13 for all the operational box transects. Total density was 0.62 colonies per m^2. Transect 14 on the reef area to the northeast of the operational box had the highest scleractinian percent cover (0.94%) and density (1.29 colonies per m^2) (Table 13). No other obvious differences occurred between the transects east of the operational box and transects west of the operational box. *Meandrina meandrites, Montastraea cavernosa,* and *Stephanocoenia intersepta* were the most common species. Table 14 lists all scleractinian species and their density (# of colonies per m^2) and percent (%) cover. All scleractinians had less than 25cm diameter in the operational box transects.

Table 13. Percent (%) cover and density (# of colonies per m^2) of scleractinians at each operational box transect.

Transect Number	Percent (%) Cover	Density (per m^2)	Location
11	0.052	0.143	West of Operational Box
12	0.370	1.095	West of Operational Box
13	0.348	0.333	West of Operational Box
14	0.941	1.286	East of Operational Box
15	0.058	0.238	East of Operational Box
16	0.346	0.619	East of Operational Box

Table 14. Density (# of colonies per m^2) and percent (%) cover of each scleractinian species in the operational box transects.

	Density (per m^2)	Percent % cover
Agaricia fragilis	0.024	0.013
Dichocoenia stokesii	0.008	0.004
Eusmilia fastigiata	0.008	0.017
Favia fragum	0.008	0.001
Madracis decactis	0.016	0.014
Meandrina meandrites	0.103	0.068
Montastraea cavernosa	0.063	0.063
Oculina diffusa	0.024	0.016
Porites astroides	0.032	0.043
Siderastrea radians	0.040	0.018
Siderastrea siderea	0.048	0.013
Solenastrea bournoni	0.016	0.012
Stephanocoenia intersepta	0.230	0.073

Fourteen (14) species within 11 genera of octocorals were documented in the operational box transects. Total octocoral density was 15.59 colonies per m^2. Other than *Briareum asbestinum* (5.46 colonies per m^2), *Eunicea* was the most common genera of octocorals (4.05 colonies per m^2). Table 15 shows the density of each octocoral species on all transects.

Table 15. Density (# colonies per m^2) of each octocoral species in the operational box transects.

Octocoral Species	Density (# colonies per m^2)
Briareum asbestinum	5.460
Erythropodium caribaeorium	0.476
Eunicea species	4.048
Gorgonia ventalina	0.040
Muricea species	0.056
Muriceopsis species	0.016
Plexaura flexuosa	1.587
Plexaura species	0.008
Plexaurella species	0.333
Pseudoplexaura species	0.325
Pseudopterogorgia acerosa	1.516
Pseudopterogorgia americana	1.698
Pseudopterogorgia species	0.016
Pterogorgia guadalupensis	0.008

Forty five (45) porifera species were observed in the operational box transects (Table 16). Porifera density was 31.10 per m^2 for all operational box transects. Non-encrusting bryozoans had a density of 0.20 per m^2 and zoanthids 1.43 per m^2 for all operational box transects. Zoanthid species included *Palythoa caribaeorum, Zoanthus pulchellus* and unidentified zoanthid species.

Table 16. Identified porifera species in the operational box transects.

Agelas clathrodes	*Iotrochota birotulata*
Agelas conifera	*Ircinia campana*
Agelas Species	*Ircinia felix*
Aiolochroia crassa	*Ircinia* species
Amphimedon compressa	*Ircinia strobilina*
Aplysina cauliformis	*Monanchora barbadensis*
Aplysina fistularis	*Monanchora* species
Aplysina lacunosa	*Monanchora unguifera*
Artemisina melana	*Mycale* species
Callyspongia fallax	*Niphates amorpha*
Callyspongia plicifera	*Niphates digitalis*
Callyspongia species	*Niphates erecta*
Callyspongia tenerrima	*Oceanapia bartschi*
Callyspongia vaginalis	*Peyssonnelia* species
Cliona delitrix	*Phorbas amaranthus*
Cliona species	*Pseudopterogorgia americana*
Cliona varians	*Ptilocaulis* species
Desmapsamma anchorata	*Scopalina ruetzleri*
Diplastrella megastellata	*Spheciospongia vesparium*
Dragmacidon explicatum	*Strongylacidon* species
Dysidea etheria	Unidentified sponge species
Ectyoplasia ferox	*Xestospongia muta*
Haliscara species	

Organisms difficult to enumerate were divided into five categories: Macro Algae (includes blue-green algae), Turf Algae, Encrusting Algae (Crustose Coraline Algae, *Peysonnelia* species) Tunicates, and Other. Species observed in the macro algae, other, and tunicate categories in the operational box transects are shown in Table 17. Each category was given a BBCA value. Mean BBCA values for all operational box transects are shown in Table 18. Figure 6 shows overall images of operational box transects.

Table 17. Species observed in the macro algae, other and tunicate BBCA categories in the operational box transects.

Macro Algae	Other	Tunicates
Acetabularia species	*Bartholomea annulata*	*Ascidian* species
Blue-Green Algae	*Filograna huxleyi*	*Botrylloides* species
Dictyota species	*Sabellidae* species	*Eudistoma* species
Halimeda species	Unidentified Bivalve	*Stolonicus sabulosa*
Lyngbya species		Tunicate (unidentified)
Red Filamentous Algae		
Udotea species		
Unidentified Red Algae		
Wrangelia argus		

Table 18. Mean BBCA values for each category in the operational box transects (5 = >75%, 4 = 50-75%, 3 = 25-50%, 2 = 5-25%, 1 = <5% cover, 0.5 = a few individuals, 0.1 = a solitary individual).

BBCA Category	Mean BBCA Value
Tunicates	0.544
Encrusting Algae	0.619
Macro Algae	1.376
Other	0.433
Turf Algae	4.492

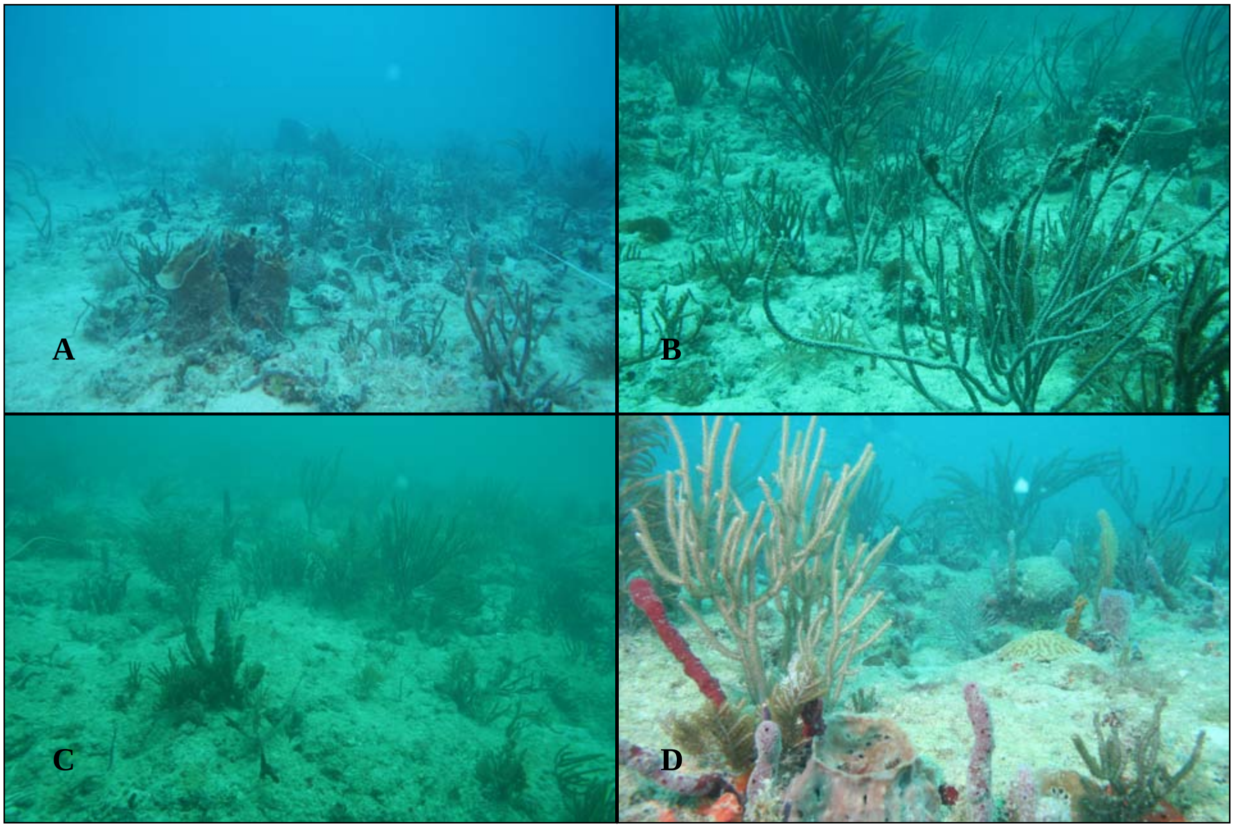


Figure 6. Images of the operational box transect area on the: A,B). East side of the box C,D). West side of the box.

Benthic Habitat Characterization
SGC-Extension South Borrow Area associated with Miami-Dade Federal Erosion Control Project (Contract E): JCP File #0295427-001-JC

Note: This information is to address item #28 of RAI #2 (March 10, 2010) associated with the JCP File noted above. This effort is for description and demarcation of habitats within the project area, and will be used to assist in the development of a monitoring plan for the project. The monitoring plan will be provided under separate cover.

The purpose of this work is to provide benthic habitat characterization within the proposed Contract E pipeline corridor, operational box, nearshore hardbottom areas adjacent to the Lummus Park excavation area, and the natural reef habitat adjacent to the SGC-Extension South Borrow Area (Figure 1). Results of habitat characterization surrounding the SGC-Ext. South Borrow Area are described in this report.

Figure 1. Project habitat characterization areas.

Methodology

Belt transect methodology was employed to gather information necessary for the characterization of the habitats in the regions identified. Each belt transect was 15m long by 1.4m wide for a total survey area of $21m^2$ per transect. Twenty-three (23) transects at 11 sites near the SGC-Ext. Borrow Area were sampled for a total survey area of $483m^2$. GPS coordinates were recorded at the beginning of each transect (Table 1). Transects were assessed by DERM biologists trained and experienced in the identification of tropical benthic marine organisms. Scleractinians (hard corals) and octocorallia (soft corals) were identified to species (or lowest possible taxon) and enumerated. In addition, the dimensions (longest axis and perpendicular axis) of all scleractinian colonies within the transect were measured to provide an estimate of hard coral cover and size. Other benthic species were enumerated minimally by group (i.e., sponges, zoanthids, etc.). Benthic groups difficult to enumerate such as algae and tunicates were identified and abundance approximated using the Braun Blaquet Cover Abundance methodology. This methodology utilizes visual observations of the habitats to estimate the abundance and benthic cover of the components of the benthic community. Estimates, provided in the subsequent text, are based on the abundance scale in Table 2.

Table 1. GPS Coordinates (decimal minutes), depth, and habitat type of each site near the SGC.-Ext South Borrow Area.

Site Name	Number of Transects	Latitude	Longitude	Depth (ft.)	Habitat Type
BA2R-CPD	2	25 41.183	80 05.729	37	Colonized Pavement-Deep
BA2R-N1	2	25 41.408	80 05.808	20	Linear Reef-Inner
BA2R-N2	2	25 41.072	80 05.802	23	Linear Reef-Inner
BA2R-S1	2	25 40.873	80 05.821	24	Linear Reef-Inner
BA2R-S2	2	25 40.626	80 05.723	28	Linear Reef-Inner
BA3R-N	3	25 41.181	80 05.321	37	Linear Reef-Outer
BA3R-S	2	25 40.977	80 05.312	44	Linear Reef-Outer
BAEmerg-S	2	25 40.865	80 05.479	40	Colonized Pavement-Shallow
BAMR-S	2	25 40.737	80 05.484	38	Linear Reef-Inner
BAPatch-N	3	25 41.194	80 05.600	38	Colonized Pavement-Shallow
BAPatchS	1	25 40.769	80 05.669	35	Individual Patch Reef

Table 2. Braun-Blanquet Abundance Scale

Scale	% Cover	Description
5	> 75%	High
4	50-75%	Moderate
3	25-50%	Low to Moderate
2	5-25%	Low
1	<5%	Sparse
0.5		Few individuals with small cover
0.1		Solitary

Transects were assessed *in situ* by DERM divers, using a 1.0m long X 0.7m wide quadrat. Quadrats were positioned side-to-side and end-to-end, so as to cover the full length and width of the belt transect. Thirty (30) quadrats per transect were required to assess a "transect". Digital photographs of the transect area were taken (video not available due to equipment malfunction).

Site locations were strategically chosen based on habitat classifications mapped by Walker[1]. These classifications were based on geomorphologic characteristics and biological assemblages to describe the habitats offshore of Miami-Dade County. Additional bathymetric information was utilized from 2003 LADS surveys[2] and 1996 Bathymetry Contour Lines[3]. Transect locations are shown in Figure 2. Locations were chosen in order to provide the most complete characterization of all habitats surrounding the borrow area. The orientation of each transect depended on the location and width of the habitat type. Additionally, sand thickness (mm) was measured at 1m intervals along transects at site BAEmerg-S (no exposed hard bottom) to provide baseline information as to the sand overburden.

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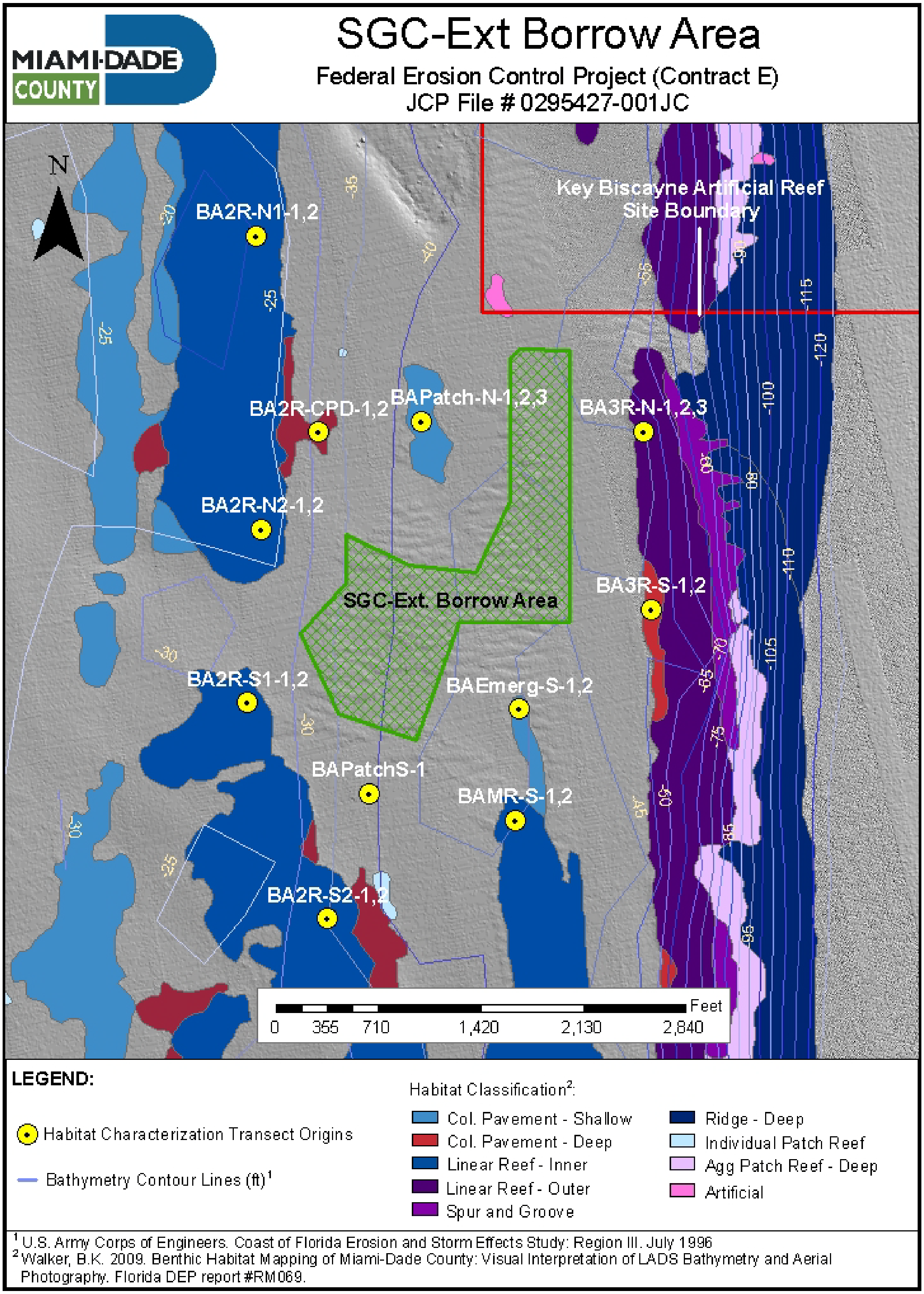
[1] Walker, B.K. 2009. Benthic Habitat Mapping of Miami-Dade County: Visual Interpretation of LADS Bathymetry and Aerial Photography. Florida DEP report #RM069. Miami Beach, FL. Pp. 47.

[2] Coastal Planning and Engineering, Inc. 2003. High Resolution Hydrographic Survey of the Atlantic Coast of Dade and Palm Beach County Using Airborne Laser Technology.

[3] U.S. Army Corps of Engineers. Coast of Florida Erosion and Storm Effects Study: Region III. July 1996.



[1] U.S. Army Corps of Engineers. Coast of Florida Erosion and Storm Effects Study: Region III. July 1996

[2] Walker, B.K. 2009. Benthic Habitat Mapping of Miami-Dade County: Visual Interpretation of LADS Bathymetry and Aerial Photography. Florida DEP report #RM069.

Figure 2. Survey areas for the SGC-Ext. South Borrow Area.

Results

Twenty-three (23) transects (total survey area of 483m^2) were surveyed around the SGC-Ext. South Borrow Area from August 17, 2010 to November 11, 2010. All areas were comprised of a wide variety of benthic organisms but were dominated by octocorallia followed by sponges and scleractinians. Numerous other organisms such as tunicates, zoanthids, and macroalgae were also present. Some differences were noted between the areas as described below.

Across all transects at all sites scleractinians exhibited a total of 3.50% cover and a species richness of 29 (Table 3,4). Total density was 2.05 colonies per m^2. No scleractinians were observed at site BAEmerg-S. The habitat on the western side of the borrow area (Linear Reef-Inner) had higher percent cover of scleractinians than the eastern side with site BA2R-S1 exhibiting the highest percent cover (15.10%) (Table 3, Figure 3). Scleractinian density was also higher on the western side of the borrow area (Linear Reef-Inner) with the northern most site (BA2R-N1) exhibiting the highest density (4.02 colonies/m^2) (Table 4, Figure 4). *Montastraea faveolata* had the highest coverage of all species (1.02% cover), while *Porites astreoides* was the most abundant species (0.50 colonies/m^2). *Acropora* species were not observed in any of the habitat characterization transects but *A. cervicornis* was observed during tier one and tier two surveys in September 2008 (Appendix A).

Table 3. Percent (%) cover of all scleractinian species at each habitat characterization site near the SGC-Ext. South Borrow Area.

	BA2R-CPD (42m^2)	**BA2R-N1 (42m^2)**	**BA2R-N2 (42m^2)**	**BA2R-S1 (42m^2)**	**BA2R-S2 (42m^2)**	**BA3R-N (63m^2)**	**BA3R-S (42m^2)**	**BAMR-S (42m^2)**	**BAPatch-N (63m^2)**	**BAPatch-S (21m^2)**	**BAEmerg-S (42m^2)**	**Overall (483m^2)**
Agaricia agaricites	0.044	1.425	0.322	0.213	0.135	0.003	0.020	0.076	0.621	0.168	0.000	**0.283**
Agaricia fragilis	0.002	0.046	0.044	0.000	0.010	0.000	0.000	0.000	0.004	0.000	0.000	**0.009**
***Agaricia* species**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.000	0.000	**0.002**
Colpophyllia natans	0.000	0.000	0.063	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	**0.006**
Dichocoenia stokesii	0.000	0.105	0.014	0.072	0.102	0.007	0.005	0.004	0.000	0.337	0.000	**0.042**
Diploria clivosa	0.000	0.274	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.070	0.000	**0.027**
Diploria labyrinthiformis	0.000	0.229	0.215	0.000	0.000	0.000	0.000	0.000	0.044	0.000	0.000	**0.044**
Diploria strigosa	0.000	0.812	0.111	0.360	0.000	0.000	0.000	1.048	0.164	0.000	0.000	**0.224**
Eusmilia fastigiata	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.001**
Helioceris cucullata	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.001**
Madracis decactis	0.004	0.000	0.031	0.000	0.000	0.047	0.000	0.000	0.000	0.000	0.000	**0.009**
***Madracis* species**	0.000	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.001**
Meandrina meandrites	1.267	0.003	0.155	0.000	0.212	0.327	0.027	0.203	0.213	0.629	0.000	**0.260**
Montastraea annularis	0.000	0.000	0.000	2.921	0.000	0.000	0.000	0.016	0.040	0.000	0.000	**0.261**
Montastraea cavernosa	0.718	0.011	0.003	0.000	0.019	1.011	0.393	0.056	0.086	10.207	0.000	**0.691**
Montastraea faveolata	0.000	0.847	0.082	10.747	0.067	0.000	0.000	0.000	0.000	0.000	0.000	**1.021**
Mussa angulosa	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.056	0.000	**0.004**
Mycetophyllia aliciae	0.000	0.000	0.000	0.000	0.000	0.018	0.000	0.000	0.000	0.000	0.000	**0.002**
Mycetophyllia lamarckiana	0.000	0.000	0.000	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.004**
***Mycetophyllia* species**	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.000	0.000	**0.004**
Porites astreoides	0.172	0.554	0.442	0.153	0.237	0.109	0.245	0.137	0.272	0.505	0.000	**0.240**
Porites porites	0.005	0.031	0.090	0.052	0.018	0.021	0.000	0.006	0.040	0.013	0.000	**0.026**
Scolemia cubensis	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	**0.000**
***Scolemia* species**	0.000	0.000	0.000	0.004	0.000	0.000	0.002	0.000	0.000	0.000	0.000	**0.001**
Siderastrea radians	0.004	0.007	0.000	0.000	0.028	0.000	0.002	0.023	0.046	0.000	0.000	**0.012**
Siderastrea siderea	0.090	0.380	0.184	0.319	0.269	0.101	0.116	0.037	0.117	0.296	0.000	**0.163**
Solenastrea bournoni	0.702	0.000	0.152	0.120	0.030	0.029	0.000	0.000	0.033	0.000	0.000	**0.095**
***Solenastrea* species**	0.000	0.000	0.000	0.037	0.000	0.000	0.000	0.000	0.047	0.000	0.000	**0.009**
Stephanocoenia intersepta	0.003	0.056	0.072	0.056	0.064	0.038	0.120	0.050	0.104	0.096	0.000	**0.059**
Total	**3.011**	**4.787**	**2.011**	**15.100**	**1.189**	**1.713**	**0.980**	**1.655**	**1.866**	12.377	**0.000**	**3.503**

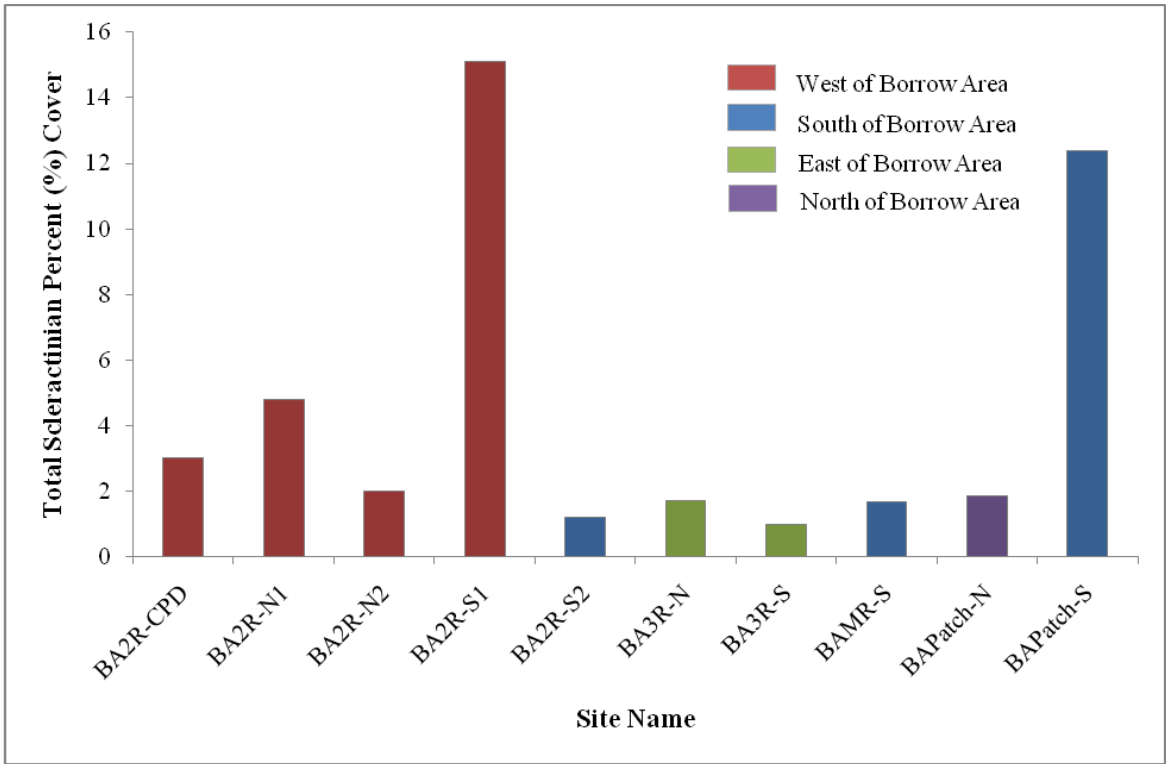


Figure 3. Total percent (%) cover of all scleractinians at each site near the SGC Ext. South Borrow Area.

Table 4. Density (# of colonies per m^2) of all scleractinian species at each habitat characterization site near the SGC-Ext. South Borrow Area.

	BA2R-CPD (42m^2)	BA2R-N1 (42m^2)	BA2R-N2 (42m^2)	BA2R-S1 (42m^2)	BA2R-S2 (42m^2)	BA3R-N (63m^2)	BA3R-S (42m^2)	BAMR-S (42m^2)	BAPatch-N (63m^2)	BAPatch-S (21m^2)	BAEmerg-S (42m^2)	Overall (483m^2)
Agaricia agaricites	0.071	1.595	0.619	0.286	0.429	0.016	0.048	0.119	0.873	0.190	0.000	**0.400**
Agaricia fragilis	0.048	0.119	0.095	0.000	0.143	0.000	0.000	0.000	0.016	0.000	0.000	**0.037**
***Agaricia* species**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.000	**0.002**
Colpophyllia natans	0.000	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.000	**0.004**
Dichocoenia stokesii	0.000	0.214	0.071	0.143	0.214	0.032	0.024	0.024	0.000	0.095	0.000	**0.068**
Diploria clivosa	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.048	0.000	**0.004**
Diploria labyrinthiformis	0.000	0.071	0.071	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.000	**0.014**
Diploria strigosa	0.000	0.071	0.048	0.024	0.000	0.000	0.000	0.071	0.048	0.000	0.000	**0.025**
Eusmilia fastigiata	0.000	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.002**
Helioceris cucullata	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.002**
Madracis decactis	0.024	0.000	0.024	0.000	0.000	0.032	0.000	0.000	0.000	0.000	0.000	**0.008**
***Madracis* species**	0.000	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.002**
Meandrina meandrites	0.048	0.024	0.048	0.000	0.071	0.127	0.048	0.071	0.143	0.238	0.000	**0.072**
Montastraea annularis	0.000	0.000	0.000	0.262	0.000	0.000	0.000	0.024	0.016	0.000	0.000	**0.027**
Montastraea cavernosa	0.143	0.048	0.024	0.000	0.143	0.190	0.190	0.143	0.175	1.381	0.000	**0.168**
Montastraea faveolata	0.000	0.190	0.024	0.024	0.071	0.000	0.000	0.000	0.000	0.000	0.000	**0.027**
Mussa angulosa	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.048	0.000	**0.004**
Mycetophyllia aliciae	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.000	**0.002**
Mycetophyllia lamarckiana	0.000	0.000	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.002**
***Mycetophyllia* species**	0.000	0.000	0.000	0.000	0.000	0.000	0.024	0.000	0.000	0.000	0.000	**0.002**
Porites astreoides	0.381	0.905	0.833	0.357	0.786	0.254	0.476	0.262	0.619	0.905	0.000	**0.501**
Porites porites	0.024	0.095	0.238	0.095	0.095	0.032	0.000	0.048	0.032	0.048	0.000	**0.062**
Scolemia cubensis	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
***Scolemia* species**	0.000	0.000	0.000	0.048	0.000	0.000	0.024	0.000	0.000	0.000	0.000	**0.006**
Siderastrea radians	0.024	0.024	0.000	0.000	0.119	0.000	0.024	0.071	0.143	0.000	0.000	**0.041**
Siderastrea siderea	0.167	0.500	0.500	0.500	1.143	0.238	0.262	0.143	0.238	0.429	0.000	**0.360**
Solenastrea bournoni	0.143	0.000	0.167	0.048	0.048	0.048	0.000	0.000	0.048	0.000	0.000	**0.048**
***Solenastrea* species**	0.000	0.000	0.000	0.024	0.000	0.000	0.000	0.000	0.032	0.000	0.000	**0.006**
Stephanocoenia intersepta	0.024	0.119	0.167	0.095	0.238	0.143	0.238	0.143	0.270	0.190	0.000	**0.151**
Total	**1.095**	**4.024**	**3.000**	**1.929**	**3.500**	**1.127**	**1.357**	**1.119**	**2.714**	**3.571**	**0.000**	**2.050**

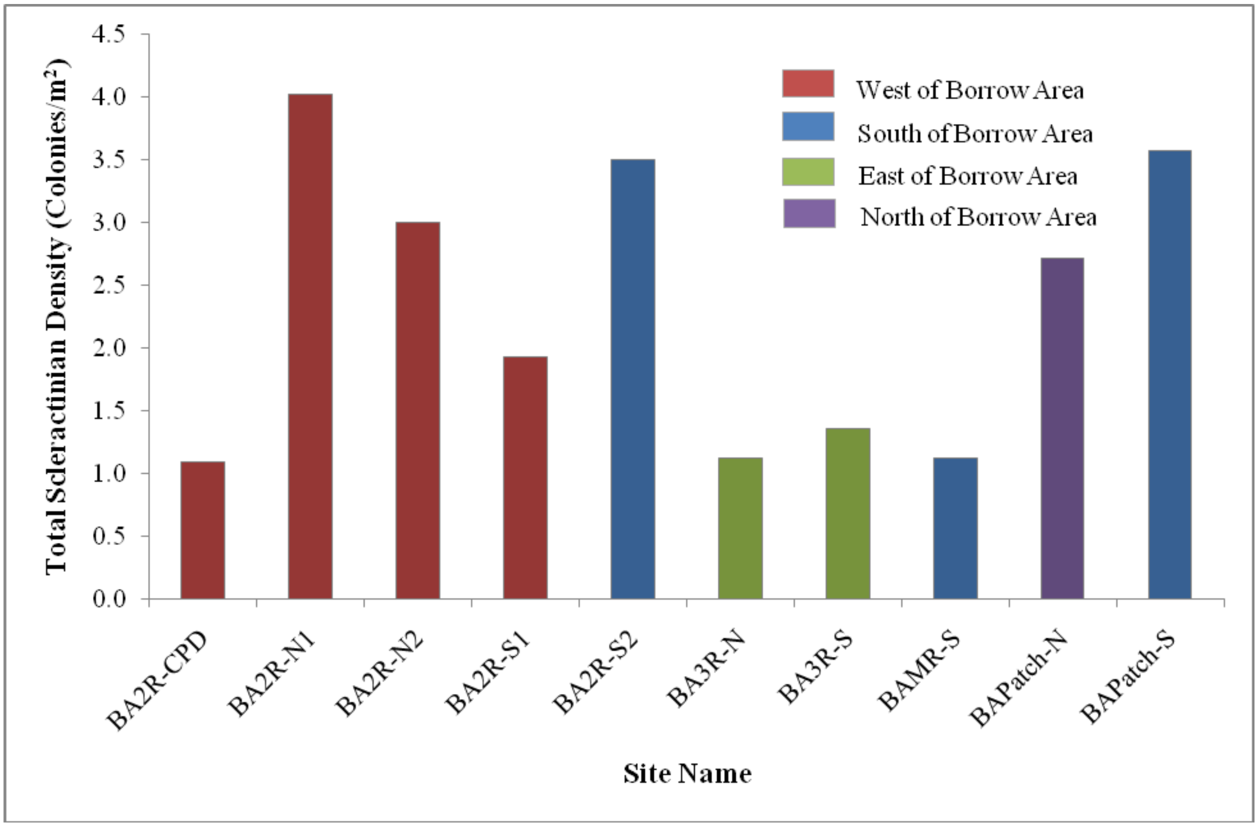


Figure 4. Density (# colonies/m^2) of all scleractinians at each site near the SGC Ext. South Borrow Area.

Fifteen (15) species within ten (10) genera of octocorals were documented at the sites near the SGC Ext. South Borrow Area. Total octocoral density was 10.06 colonies per m^2. *Briareum asbestinum* was the most common species (3.27 colonies per m^2) followed by *Pseudopterogorgia americana* (2.83 colonies per m^2) as shown in Table 5. The sites west of the borrow area had the highest octocoral densities (Figure 5).

Table 5. Density (# colonies/m^2) of each octocoral species in the SGC Ext. South Borrow Area sites.

	BA2R-CPD (42m^2)	**BA2R-N1 (42m^2)**	**BA2R-N2 (42m^2)**	**BA2R-S1 (42m^2)**	**BA2R-S2 (42m^2)**	**BA3R-N (63m^2)**	**BA3R-S (42m^2)**	**BAEmerg-S (42m^2)**	**BAMR-S (42m^2)**	**BAPatch-N (63m^2)**	**BAPatch-S (21m^2)**	**Overall (483m^2)**
Briareum asbestinum	0.00	11.86	6.64	5.83	3.12	1.75	3.45	0.00	1.45	1.68	0.19	**3.27**
Erythropodium caribaeorium	0.00	1.07	1.93	0.00	0.05	0.30	0.76	0.00	0.79	0.00	0.10	**0.44**
Eunicea species	3.24	0.83	0.69	0.98	1.45	1.92	1.74	0.07	1.88	0.73	3.10	**1.43**
Gorgonia species	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Gorgonia ventalina	0.24	0.29	0.40	0.24	0.76	0.06	0.12	0.00	0.36	0.30	0.62	**0.28**
Muricea species	0.81	0.14	0.07	0.31	0.48	0.25	0.17	0.00	1.00	0.13	0.57	**0.33**
Muriceopsis species	0.33	0.02	0.00	0.05	0.19	0.05	0.00	0.00	0.07	0.00	5.33	**0.30**
Plexaura flexuosa	0.12	0.55	0.43	0.45	0.17	0.43	0.38	0.02	0.67	0.35	1.24	**0.40**
Plexaura homomalla	0.07	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.00	**0.01**
Plexaura species	0.00	0.00	0.14	0.17	0.02	0.00	0.24	0.00	0.00	0.05	0.10	**0.06**
Plexaurella species	0.10	0.00	0.10	0.05	0.00	0.03	0.10	0.02	0.29	0.02	0.24	**0.07**
Pseudoplexaura species	0.48	0.14	0.07	0.14	0.17	0.29	0.00	0.00	0.10	0.03	0.05	**0.14**
Pseudopterogorgia acerosa	0.19	0.05	0.19	0.19	0.31	0.81	0.60	0.00	0.05	0.05	0.00	**0.25**
Pseudopterogorgia americana	2.31	4.48	4.24	4.05	5.40	3.84	3.31	0.10	2.21	0.35	0.43	**2.83**
Pseudopterogorgia species	0.07	0.12	0.00	0.00	0.00	0.10	0.05	0.00	0.10	0.05	0.05	**0.05**
Pterogorgia species	0.60	0.07	0.33	0.48	0.33	0.13	0.17	0.00	0.02	0.03	0.05	**0.20**
Total	**8.57**	**19.62**	**15.24**	**12.93**	**12.48**	**9.95**	**11.07**	**0.21**	**8.98**	**3.78**	**12.05**	**10.06**

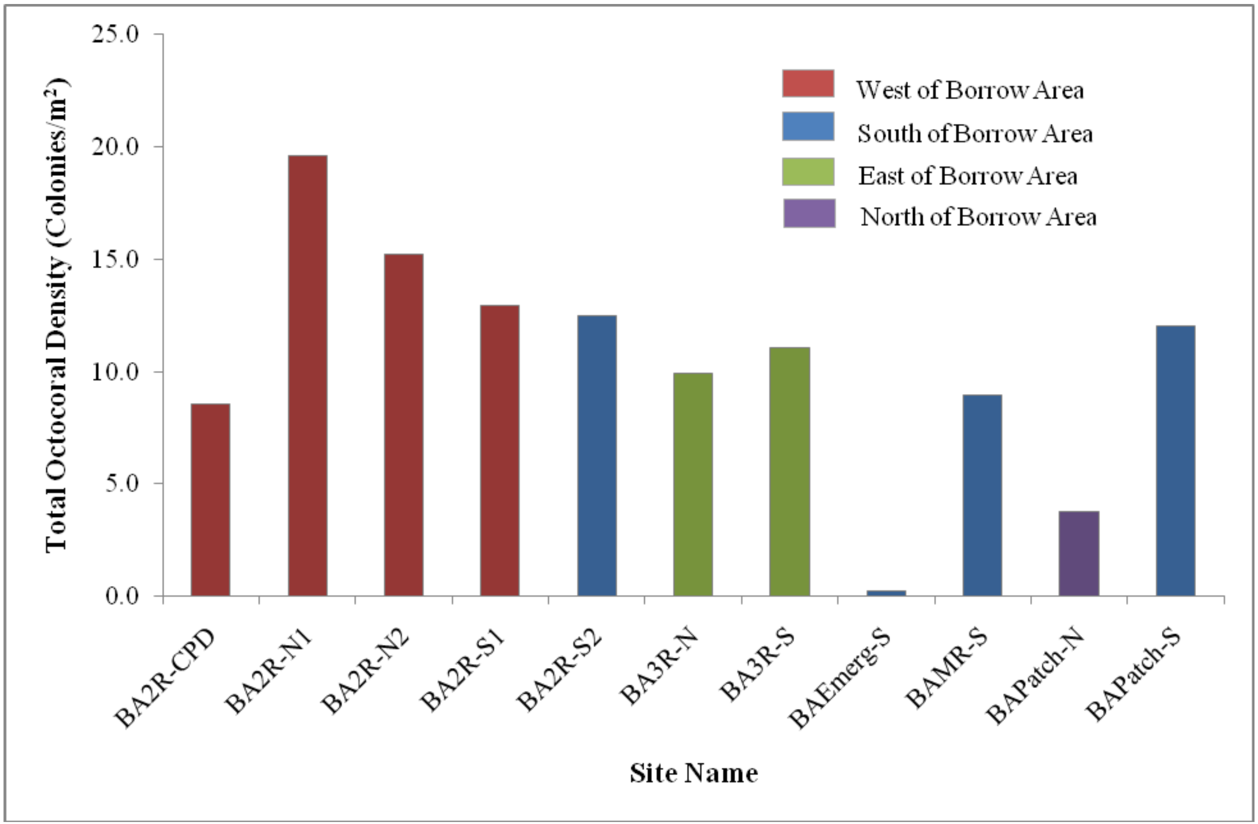


Figure 5. Density (# of colonies per m^2) of octocorals at each site near the SGC Ext. South Borrow Area.

For all transects near the SGC Ext. South Borrow Area, porifera density was 18.88 per m^2 while zoanthid density was 2.29 per m^2 (Table 6). Porifera density was greatest at BA3R-N (26.24 per m^2). Overall, fifty-three (53) porifera (sponge) species were observed at the SGC Ext. Borrow Area sites (Table 7). Zoanthid species included *Palythoa caribaeorum*, *Zoanthus pulchellus* and unidentified zoanthid species.

Table 6. Density (individuals per m^2) of poriferans and zoanthids at each SGC Ext. South Borrow Area site.

	Sponges	Zoanthids
BA2R-CPD (42m^2)	12.26	0.45
BA2R-N1 (42m^2)	14.26	5.38
BA2R-N2 (42m^2)	17.07	5.74
BA2R-S1 (42m^2)	13.26	3.74
BA2R-S2 (42m^2)	21.71	6.00
BA3R-N (63m^2)	26.24	0.76
BA3R-S (42m^2)	20.93	0.83
BAEmerg-S (42m^2)	1.79	0.00
BAMR-S (42m^2)	23.52	0.74
BAPatch-N (63m^2)	24.46	0.63
BAPatch-S (21m^2)	32.62	2.71
Total	**18.88**	**2.29**

Table 7. Identified porifera species in the SGC Ext. South Borrow Area sites.

Agelas clathrodes	*Cinachyra kuekenthali*	*Monanchora* species
Agelas conifera	*Cinachyra* species	*Monanchora unguifera*
Agelas schmiditi	*Clathria* species	*Mycale laevis*
Agelas wiedenmyeri	*Cliona delitrix*	*Mycale* species
Aiolochroia crassa	*Cliona* species	*Niphates amorpha*
Amphimedon compressa	*Cliona varians*	*Niphates digitalis*
Anthosigmella varians	*Desmapsamma anchorata*	*Niphates erecta*
Aplysina cauliformis	*Diplastrella megastellata*	*Oceanapia bartschi*
Aplysina fistularis	*Dragmacidon explicatum*	*Phorbas amaranthus*
Aplysina fulva	*Dysidea etheria*	*Ptilocaulis* species
Aplysina lacunosa	*Ectyoplasia ferox*	*Scopalina ruetzleri*
Artemisina melana	*Halisarca* species	*Spheciospongia vesparium*
Callyspongia armigera	*Iotrochota birotulata*	*Spirastrella coccinea*
Callyspongia fallax	*Ircinia campana*	*Strongylacidon* species
Callyspongia plicifera	*Ircinia felix*	Unidentified sponge species
Callyspongia species	*Ircinia* species	*Xestospongia muta*
Callyspongia tenerrima	*Ircinia strobilina*	
Callyspongia vaginalis	*Monanchora barbadensis*	

Organisms difficult to enumerate were divided into five categories: Macro Algae (includes blue-green algae), Turf Algae, Encrusting Algae (Crustose Coraline Algae, *Peysonnelia* species) Tunicates, and Other. Species observed in the macro algae, other, and tunicate categories at the SGC Ext. South Borrow Area sites are shown in Table 8. Each category was given a BBCA value (Table 9). Figures 6 and 7 show representative images of habitat near the SGC Ext. South Borrow Area.

Table 8. Species observed in the macro algae, other and tunicate BBCA categories at the SGC Ext. South Borrow Area sites.

Macro Algae	Other	Tunicates
Amphiroa species	*Astrophyton muricatum*	*Ascidia nigra*
Blue-Green Algae	*Bartholomea annulata*	*Botrylloides* species
Calcareous Algae	Bryozoan species	*Clavelina* species
Dictyota bartayresii	Bryozoan species-encrusting	*Didemnum* species
Dictyota species	*Ceriantharia* species	*Eudistoma* species
Galaxaura species	*Eucidaris tribuloides*	*Polycarpa spongiabilis*
Halimeda incrassata	*Filograna huxleyi*	*Stolonicus sabulosa*
Halimeda species	*Hermodice carunculata*	Unidentified Tunicate
Lyngbya species	Hydroid species	
Peyssonnelia species	*Lima* species	
Red Filamentous Algae	*Ricordia florida*	
Udotea species	*Sabellidae* species	
Unidentified Red Algae	*Spirobranchus giganteus*	
Ventricaria ventricosa	Unidentified Brittle Star	
Wrangelia argus	Unidentified Bivalve	

Table 9. Mean BBCA values for each category at the SGC Ext. South Borrow Area sites (5 = >75%, 4 = 50-75%, 3 = 25-50%, 2 = 5-25%, 1 = <5% cover, 0.5 = a few individuals, 0.1 = a solitary individual).

	Encrusting Algae	Macro Algae	Turf Algae	Tunicates	Other	**Overall**
BA2R-CPD	0.25	0.53	2.28	0.27	0.06	**0.68**
BA2R-N1	1.21	2.52	3.22	0.05	0.13	**1.42**
BA2R-N2	1.54	3.00	3.65	0.30	0.30	**1.76**
BA2R-S1	1.23	2.24	2.97	0.25	0.18	**1.38**
BA2R-S2	1.67	1.67	3.55	1.38	0.09	**1.67**
BA3R-N	0.56	2.13	3.98	0.38	0.18	**1.45**
BA3R-S	0.93	2.43	4.60	0.77	0.39	**1.82**
BAEmerg-S	0.07	0.77	1.13	0.19	0.04	**0.44**
BAMR-S	1.18	2.15	4.05	0.86	0.58	**1.76**
BAPatch-N	1.17	1.30	3.20	0.38	0.30	**1.27**
BAPatch-S	1.20	1.78	3.40	1.03	0.79	**1.64**
Total	**0.98**	**1.86**	**3.30**	**0.50**	**0.25**	**1.38**

Figure 6. Images of the sites near the SGC Ext. South Borrow Area.

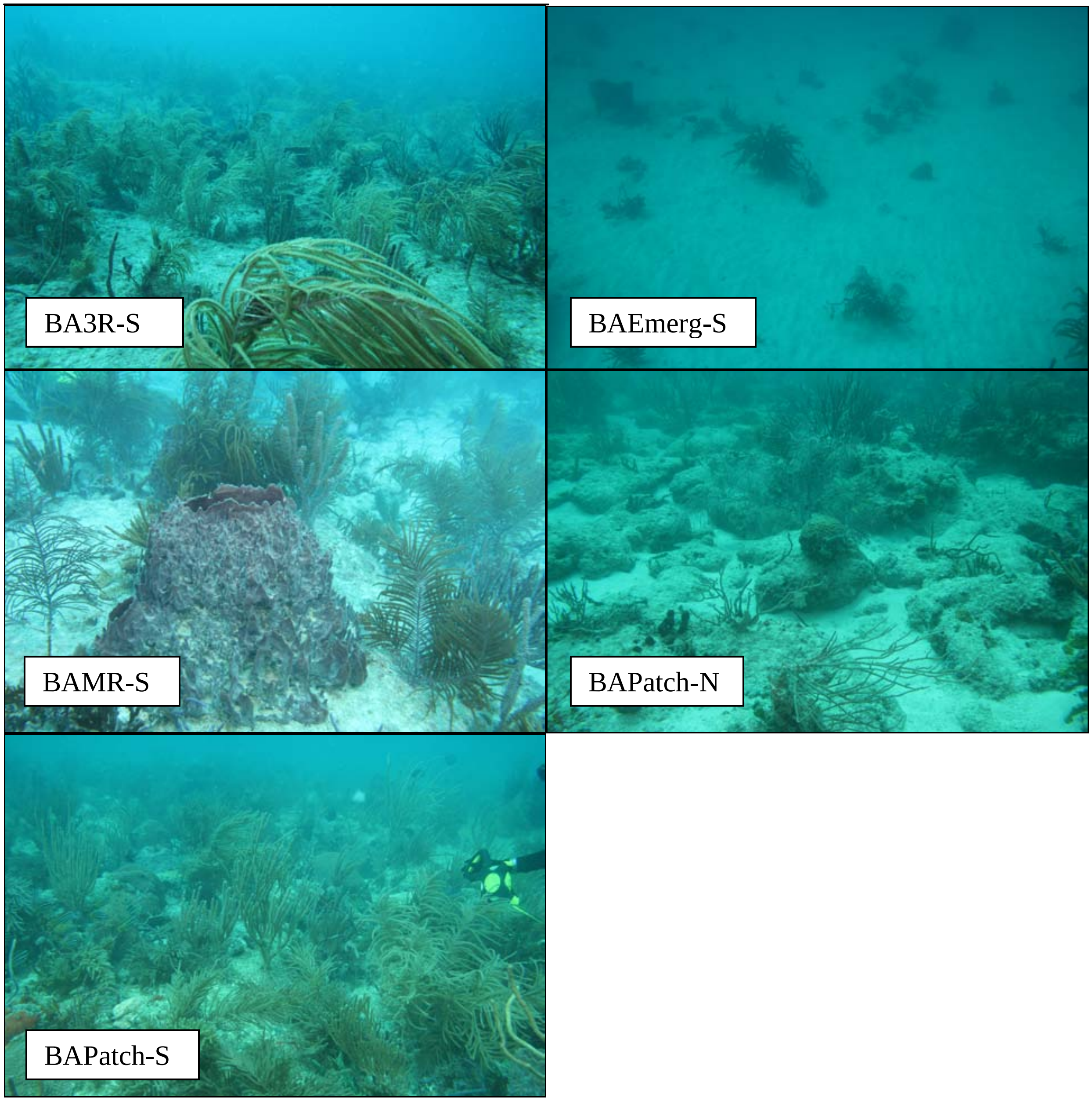


Figure 7. Images of the sites near the SGC Ext. South Borrow Area.

The benthic resources at site BAEmerg-S near the SGC Ext. South Borrow Area are subject to periodic shifts in sand cover with varying degrees of sand overburden. Therefore, sediment measurements were taken along both transects to gauge the current sand overburden. The mean sediment depth for this site was 23.28mm.

Presence, density and proximity of *Acropora cervicornis* and *A. palmata* in the project areas for the Miami-Dade Test Beach Nourishment- Contract E Project

Introduction:

The South Government Cut Extension Borrow Area (SGC Ext.) and the Miami Beach – North or Test Beach Pipeline utilization is proposed for the Miami-Dade Test Beach Nourishment- Contract E Project. Therefore, the hard bottom resources in the two project areas were surveyed for the presence of the threatened stony coral species *Acropora cervicornis* and *Acropora palmata.* The location of the borrow area and pipeline are shown in Figure 1.

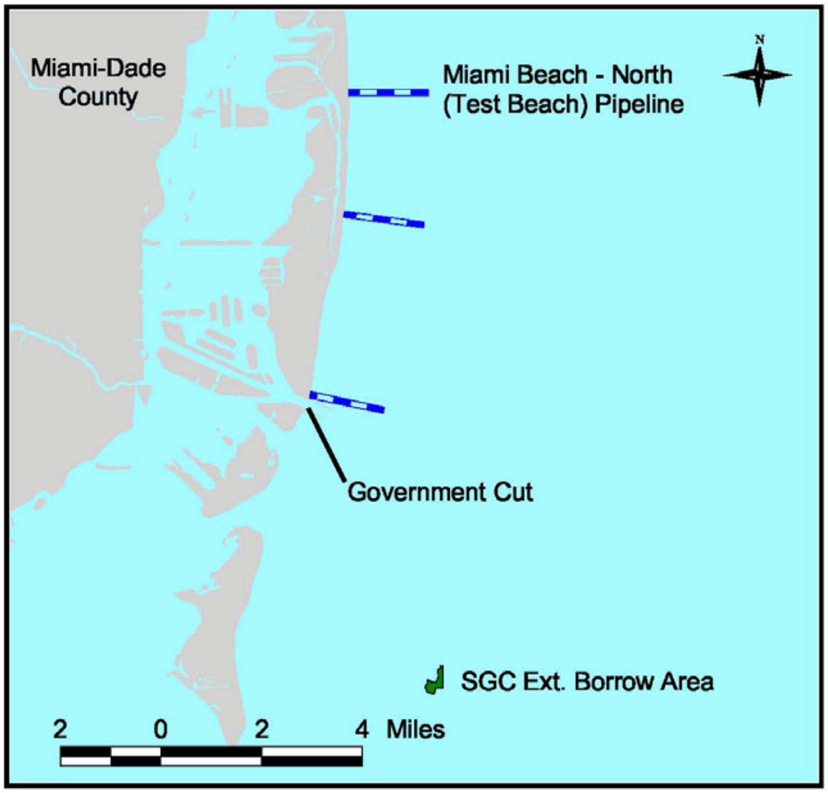


Figure 1. Location of SGC Ext. Borrow Area and Miami Beach-North (Test Beach) Pipeline.

Methods:

The survey methods were based on the "Recommended Survey Protocol for *Acropora* spp. In Support of Section 7 Consultation (revised October 2007)" approved by the National Marine Fisheries Service. The surveys were conducted between September 16th and 29th, 2008.

Pipeline Corridor—The total project area for the pipeline corridor is approximately 38,550m^2 (15.24m x 2,530m) of which approximately 17,560m^2 falls on hard bottom resources. Preliminary reconnaissance or a 'tier one' survey was conducted by divers due to the width—over 1.5 miles—and the large depth profile found within the project corridor—18’ in the west to 55’ in the east. During the reconnaissance surveys, divers swam from the eastern end of the hard bottom resources to the western end. GPS coordinates and general site description were recorded when *Acropora* colonies were observed. Belt transects or ‘tier two’ surveys were established in the general area where *Acropora* spp. were present. Transects were set up east to west (opposed to using random degree headings) due to the narrow width of the pipeline (15.24m) north to south. Each transect was 50m x 4m. The length, width, and height of each colony were recorded along with general comments about health and percent live tissue. The colony dimensions were based on the entire colony skeleton and measurements were not limited to the live tissue.

Hard Bottom Adjacent to Borrow Area— Surveys were conducted on hard bottom resources within 450’ to the east and west and within 1000’ to the north and south of the borrow area. The survey area was extended to the north and south due to prevailing current directions and susceptibility of these areas to turbidity plums from dredging in the borrow area. Based on these buffers, the total project area is approximately 926,900m^2. The borrow area is centered in this project area and covers approximately 232,300m^2. Hard bottom resources cover approximately 114,400m^2 of the project area and are comprised of patch reef areas and the eastern edge of the second reef tract. The third reef tract was over 450’ east of the borrow area and excluded from the surveys. Due to the varying sizes and discontinuous nature of the hard bottom resources within the project area, preliminary reconnaissance surveys or ‘tier one’ surveys were conducted. These ‘tier one’ surveys involved a structured swim over each hard bottom area generally in a north-south direction. With the exception of two areas, the ‘tier one’ swims were traced with a Garmin GPS unit. The two areas not traced included a small area in the northeast portion of the project area that contained artificial reef material (limerock boulders and prefabricated modules) and a centrally located patch reef. At these two locations, the boundaries of the resources (artificial material and natural hard bottom) were well defined (i.e. completely within project area) and divers could confidently cover the entire area during the reconnaissance surveys. During the ‘tier one’ surveys GPS coordinates and general site description were recorded when *Acropora* colonies were observed. If more than five *Acropora* colonies were present, the ‘tier two’ surveys were conducted in that area. The ‘tier two’ surveys involved three belt transects at random degree headings from a referenced center point. Each transect was 50m x 4m. The length, width, and height of each colony were recorded along with general comments about health and percent live tissue. The colony dimensions were based on the entire colony skeleton and measurements were not limited to the live tissue.

Results:

The Miami Beach – North (Test Beach) Pipeline and the hard bottom adjacent to the SGC-Ext. Borrow Area were surveyed for the presence of both *Acropora cervicornis* and *Acropora palmata*. *Acropora palmata* was not observed in either area. Therefore, the results below describe the presence, density and proximity of *Acropora cervicornis* to the project areas.

Pipeline Corridor—Figure 2 shows the Miami Beach-North (Test Beach) pipeline project area. *Acropora* spp. were not observed in the eastern portion of the pipeline corridor where the depth ranged from 30’ to 55’. *Acropora cervicornis* was first observed approximately 230’ west of the eastern edge of the first reef tract in about 25’ of water at approximately 25 51.212° N and 80 06.149° W. The observed range of *A. cervicornis* extended to the western edge of first reef, approximately 25 51.212°N and 80 06.625° W, with varying densities. Four belt transects (P1, P2, P3, and P4b) were conducted in the areas where more than five colonies were observed. On the ‘tier one’ reconnaissance surveys for the hardbottom area between transect P4b and P1, only three Acropora cervicornis colonies were observed. Therefore, the ‘tier two’ belt transects were not conducted in this region. In Transect P2 and P4b, *A. cervicornis* colonies were not observed. However, at both locations several colonies were observed outside of the belt transects (see Figure 3). In Transects P1 and P3, the densities of *A. cervicornis* colonies were 0.125/m^2 and 0.095/m^2 respectively as summarized in Table 1. Overall the four ‘tier two’ belt transects on the first reef tract had an average density of 0.055 colonies per m^2. In both P1 and P3 transects, numerous colonies exhibited tissue loss—both old and recent. Appendix A provides the detailed information on the dimensions and apparent health of each individual colony.

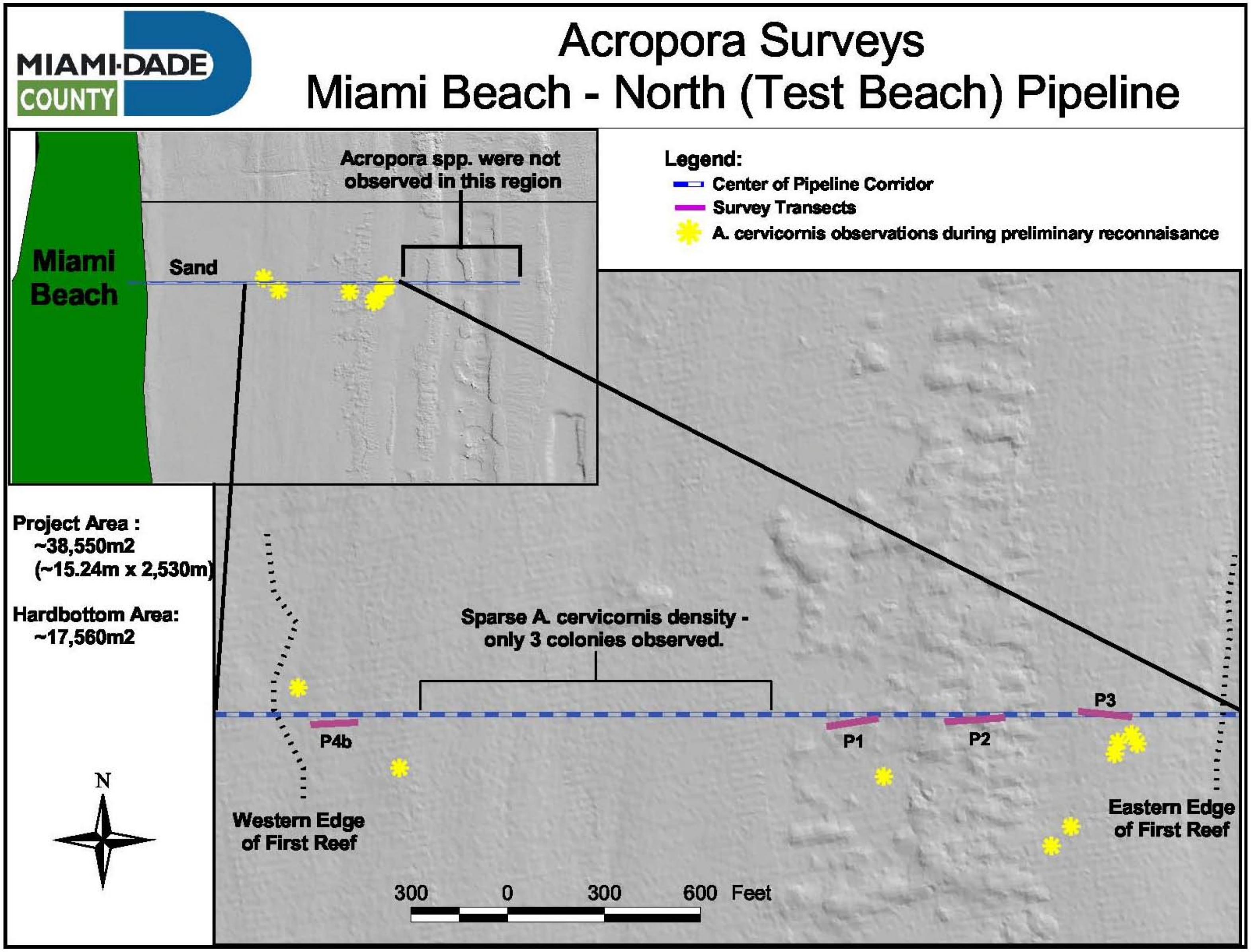


Figure 2. Hard bottom resources surveyed along the Miami Beach – North (Test Beach) Pipeline.

Table 1. Summary of 'tier 2' belt transect surveys on the Miami Beach – North (Test Beach) Pipeline Corridor.

Transect	# Colonies/ Transect	Density (Ind./m^2)	Average Largest Dimension (cm)
P1	25	0.125	18.7
P2	0	0	
P3	19	0.095	21.1
P4b	0	0	
Average	11	0.055	19.7

Figure 3. *Acropora cervicornis* approximately 100' south of Transect P4b.

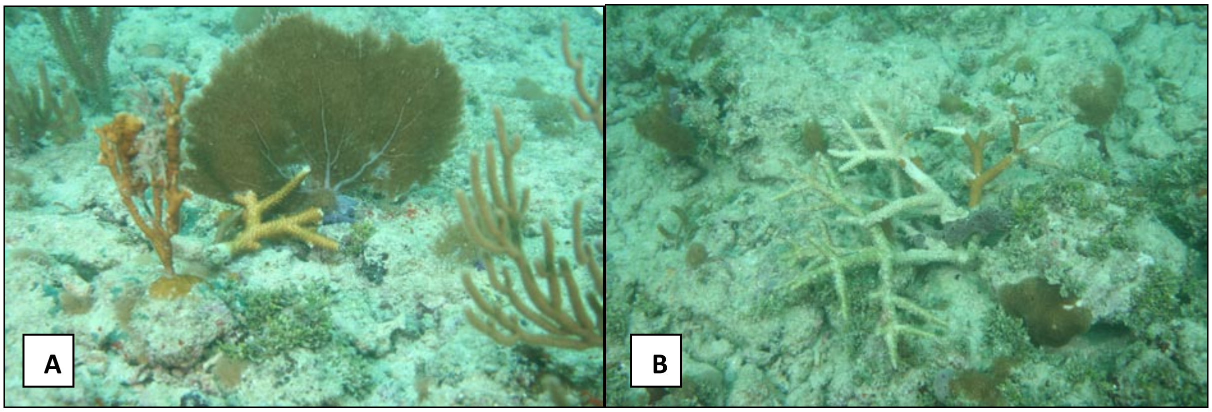


Figure 4 A). *Acropora cervicornis* colony on P1. B.) *Acropora cervicornis* colony on P1 exhibiting recent and old death.

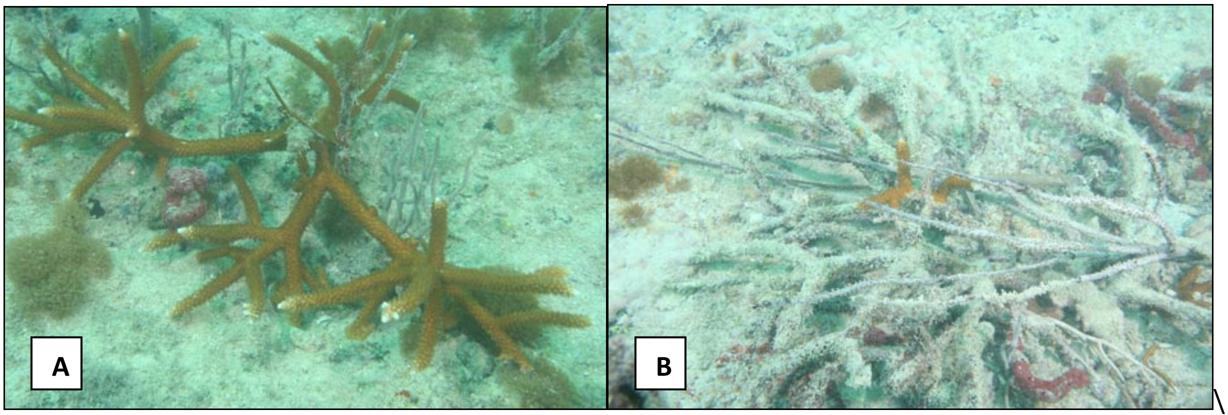


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Figure 5A). *Acropora cervicornis* colony on P3. B.) *Acropora cervicorn*is colony on P3 with majority of colony exhibiting old death.

<u>Hard Bottom Adjacent to Borrow Area</u>—Figure 6 shows the hard bottom adjacent to the borrow area and the results of the 'tier one' reconnaissance surveys. *Acropora* spp. were not observed on the artificial reef material located in the northeast section of the figure, the central patch reef, or the southern significant habitat and patch reef areas. As shown in Figure 6 and in more detail in Figure 7, *Acropora cervicornis* was observed on the second reef tract to the southwest and west of the borrow area. Three colonies were documented on the second reef tract approximately 485' to the southwest of the borrow area (Figure 8) in about 20-25' of water. Multiple colonies were documented on the eastern portion of the second reef tract directly west of the borrow area in water 20' to 33' deep. Three belt transects centered at 25 41.155° N and 80 05.793° W were conducted in the area with more than five *A. cervicornis* colony observations. This area with the high *A. cervicornis* abundance is within 725' of the borrow area. In Transects 1 and 2, the densities of *A. cervicornis* colonies were 0.115/m^2 and 0.040/m^2 respectively as summarized in Table 2. Photographs of *A. cervicornis* colonies observed in Transect 1 are shown in Figure 9. *Acropora cervicornis* colonies were not observed in the Transect 3. Appendix B provides the information for each individual colony observed in the 'tier two' belt transects.

Table 2. Summary of 'tier 2' belt transect surveys on the 2nd Reef Tract east of the SGC-Ext. Borrow Area.

Transect	# Colonies	Density (Ind./m^2)	Average Largest Dimension (cm)
1	23	0.115	24.7
2	8	0.040	36.5
3	0	0	N/A
Average	10.33	0.052	27.7

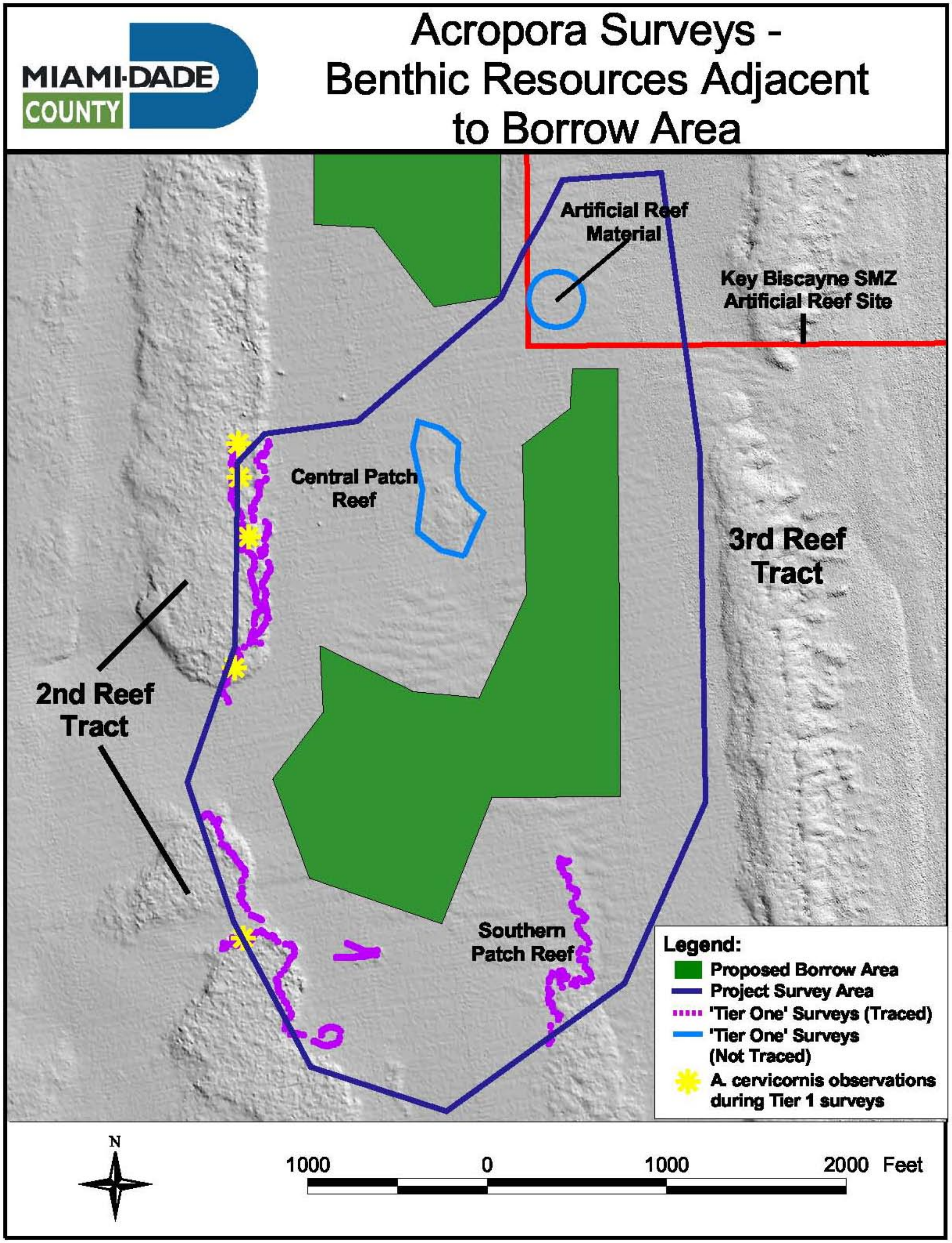

Figure 6. Hard bottom resources assessed during the 'tier one' reconnaissance surveys near the SGC-Ext. Borrow Area.

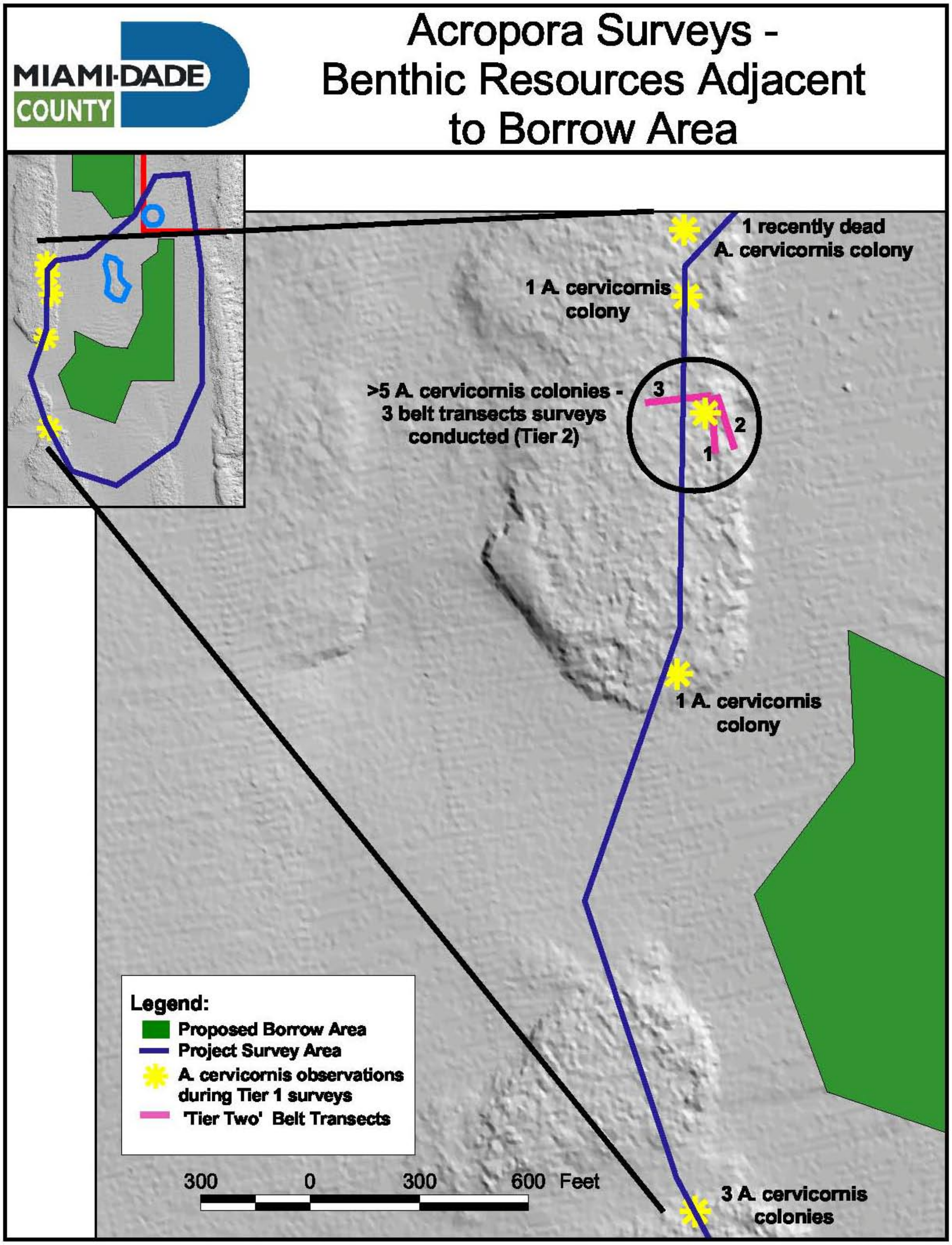

Figure 7. Eastern hard bottom area where *Acropora cervicornis* colonies were observed during ‘tier one’ surveys and where the ‘tier two’ belt transect surveys were conducted near the SGC-Ext. Borrow Area.

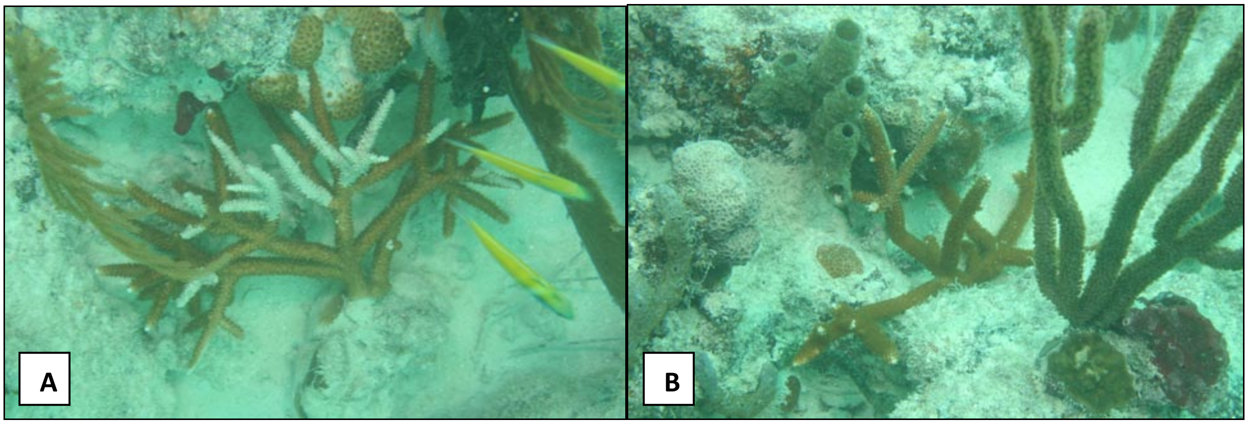

Figure 8. Two of three *Acropora cervicornis* colonies observed at the hard bottom reef area southwest of borrow area.

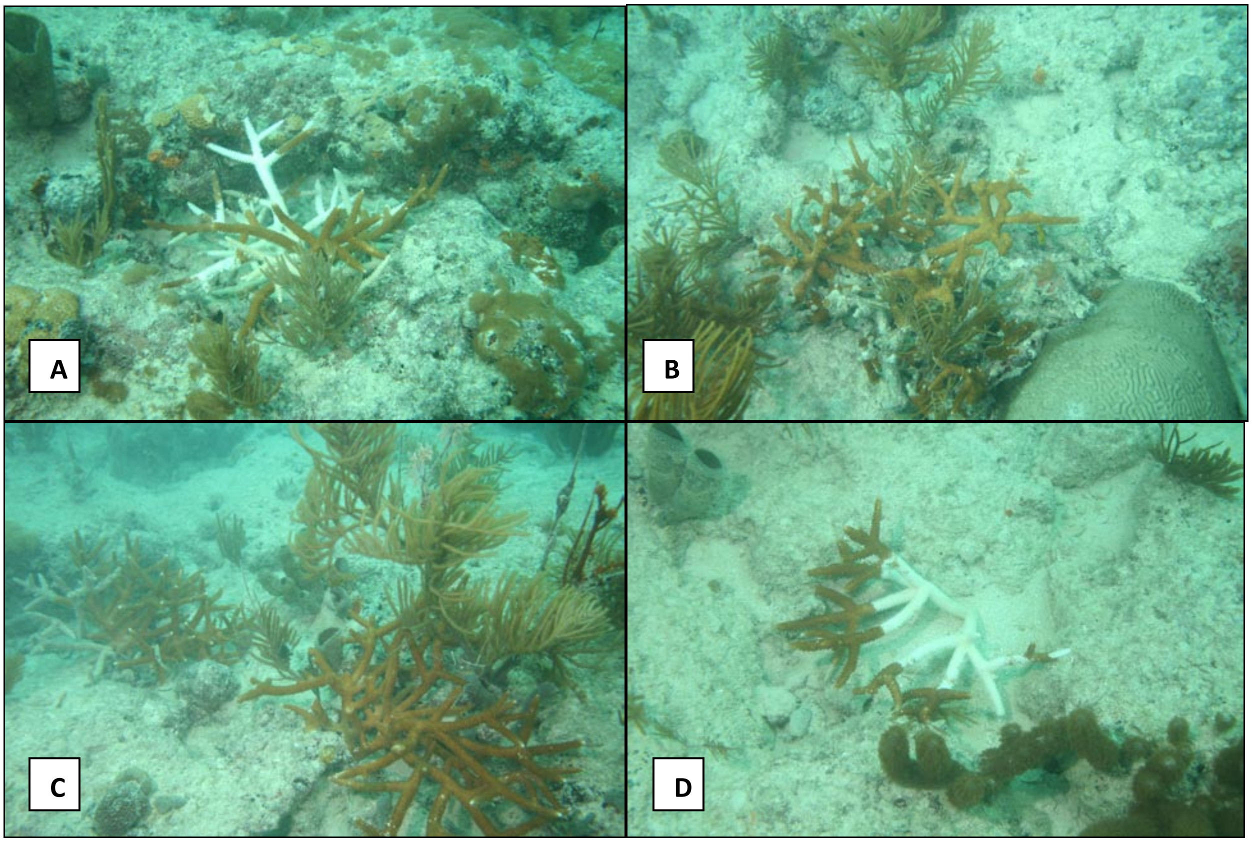

Figure 9. Acropora cervicornis colonies found on Transect 1 of the ‘tier two’ belt transect surveys. Photographs A and D exhibit recent death. Old death can be seen on the colony to the left in Photograph C.

Summary:

Acropora palamata was not found in either project area. However, *Acropora cervicornis* was documented in surveys of the hardbottom resources in both the Miami Beach-North (Test Beach) pipeline corridor and in the area surrounding the proposed SGC-Ext. borrow area. In the pipeline corridor, *A. cervicornis* colonies were restricted to the shallow (20’ – 25’) first reef tract area. On the hard bottom resources surrounding the borrow area, *A. cervicornis* colonies were only found on the western second reef tract in depths ranging from 20’ to 33’. In both areas, *Acropora cervicornis* exhibited varying densities from small areas with numerous colonies to sparse coverage with only a few colonies observed for hundreds of meters.

APPENDIX E – MITIGATION AND MONITORING PLANS

MITIGATION PLAN FOR PLACEMENT OF A DREDGE PIPELINE ON HARDGROUND AREAS IN ASSOCIATION WITH CONSTRUCTION OF ”CONTRACT E” BEACH RENOURISHMENT IN MIAMI, BEACH FLORIDA

Ref: Florida Department of Environmental Protection Permit No.: 0295427-001-JC-Miami-Dade (including 008082-001-JC and Subsequent Modifications)

I. BACKGROUND

The U.S. Army Corps of Engineers (ACOE), Jacksonville District is currently obtaining approvals from the Florida Department of Environmental Protection (FDEP) to nourish three eroded segments of the Federally-authorized shore protection in Miami Beach. The first section, located in northern Miami Beach includes approximately 1.65 miles of shoreline (R37.5 through R46.25) This area will be nourished using sand obtained from a borrow site located in Federal waters offshore of Key Biscayne. This sand will then be offloaded from the dredge through a submerged pipe to the beach. The two other sites are areas of localized erosion located farther south (R53.7 through R55.5, and R60 through R61.1). These two segments will utilize sand accreted near the southern terminus of the Federal project. This sand will be transferred to the two fill sites by dredge via an upland pipeline buried on the beach. Because only the nourishment of the northern segment will involve a submerged pipeline with the potential to impact resources, this mitigation plan will be limited to addressing impacts associated with the nourishment of that portion of the project.

The renourishment will be accomplished using a conventional hopper dredge, which will collect sand from the approved borrow area and pump the sand slurry to the beach via a submerged pipeline. Due to draft restrictions of the vessel and the topography of the ocean floor off the work areas, the dredge will be restricted to areas seaward of the eastern edge of the first reef. Thus, it will be necessary for the submerged pipeline to be placed across the first reef hardground areas. This pipeline corridor is one of seven, 50’-wide, corridors previously approved to facilitate multiple beach nourishment projects, while minimizing cumulative resource impacts. The pipeline corridor proposed for this project was previously used in 2001.

Prior to pipeline placement, a biological assessment of the pipeline corridor is conducted by Miami-Dade Department of Environmental Resources Management (DERM) to document habitat characteristics, identify any particularly sensitive resources within the 50’-wide corridor that can be avoided or relocated prior to placement, and provide a pre-project estimate of anticipated impacts. Upon removal of the pipeline, a detailed assessment of the actual impact to resources associated with the placement of the pipe is made, which will form the basis for implementation of the mitigation plan.

II. MITIGATION CONSIDERATIONS:

Mitigation for impacts associated with this project would have two components: (A) salvage (collection and re-stabilization) of dislodged and or fractured hard corals, and (B) "In-kind" mitigation by creation of benthic habitat through the placement of limestone boulders, and/or designed artificial reef modules.

A. Hard Coral Salvage and Stabilization. The salvaging and re-stabilization of hard corals would occur immediately after placement of the pipeline.

1. Early identification and isolation of impacted hard coral colonies or hard coral colonies in jeopardy (shaded by or directly under the path of the pipeline) is imperative. This work should be completed as soon as possible (within two weeks) following placement of the pipeline.
2. Relocation areas will be identified into which fractured and dislodged corals will be placed. This will facilitate tracking the survivorship of the relocated corals.
3. Corals will be relocated as close as possible to the location they were taken from.
4. Corals need to be re-stabilized using proven techniques and adhesives. The methods established and utilized by NOAA National Marine Sanctuary Restoration and Assessment Program (H. Hudson, pers. comm.) will be followed.

B. In-Kind Mitigation. Considerations for mitigation material includes:

1. Relief of mitigation material should be relatively low to approximate the relief of the impacted habitat.
2. Materials should provide habitat for a wide variety of fish, invertebrate (both motile and benthic) organisms
3. Mitigation should be constructed of materials similar to that of the impacted habitat (i.e., limestone or carbonate based).
4. Materials should be placed in as close a proximity to the impacted areas as possible.

III. MITIGATION COMPONENTS

Two material types are proposed for this project to satisfy the in-kind mitigation requirement: limestone boulders, and/ or pre-fabricated artificial reef modules. The advantages of each of these materials are:

1. Limestone boulders have been used throughout Miami-Dade County both for hardbottom habitat mitigation, as well as for artificial reefs. Boulders are readily available locally, most closely mimic the substrate for the communities being impacted, and will generally be colonized more rapidly than concrete or other carbonate based materials. They also provide flexibility during deployment in that they can be placed in a single layer to provide low profile structure, or placed in multiple layers to provide higher relief, more complex habitat. Boulder sizes can also be specifically selected to insure stability at any given deployment depth.
2. Prefabricated modules of various types have also been used at numerous locations in Miami-Dade County for artificial reefs as well as to mitigate impacts from beach nourishment and port expansion projects. While a number of commercially

produced designs are available, Miami-Dade County has predominantly used modules either designed in-house, or by third parties to our specification. The most common design used is an in-house design which consists of pre-cast concrete culverts set in a high-pressure concrete base, and 6-12 inch limerock grouted to the exterior surfaces of the culverts. The exterior limestone surface provides for superior colonization than concrete alone, while providing greater surface complexity. To date, Miami-Dade has deployed in excess of 800 of these modules with good success. An advantage to these modules is that the design has a high degree of flexibility by varying the size of the base, and the number and size of culvert pipes used. The modules are relatively easy to deploy, although it does require placement by barge and crane due to their weight, and the need to insure upright deployment of the module. Although the module design above has been used successfully in the past, we would request the ability to propose an alternative design for consideration by the Department, which might improve on the habitat characteristics or other aspects of the design.

It is recommended that the mitigation for this project consist of limestone boulders or artificial reef modules, or a combination of the two. If limestone is used exclusively, sufficient boulders will be placed to insure an equivalent or greater areal coverage than the area impacted, based on a single rock layer. Alternatively, if the Department desired limestone placement with a slightly higher profile and more habitat complexity, we would propose placing an equivalent tonnage of limestone needed to achieve the mitigation requirement in single layer coverage, but would deploy the boulders in two layers, with less overall bottom coverage. Boulders used for this project would be in the 4’ diameter range, which would meet stability requirements based on using the Florida Fish and Wildlife Conservation Commission artificial reef stability model. If prefabricated modules are utilized, the area of the bases of the module would be used to determine the number of modules needed to meet the mitigation requirement. Lastly, a combination of limestone and prefabricated modules could be used. This last alternative would likely provide a more diverse habitat than either material individually. In this scenario, the respective areal coverage by limestone boulders and module bases would be adjusted as needed to provide the mitigation requirement.

IV. PROPOSED IN-KIND MITIGATION SITES

There are 11 designated offshore artificial reef sites in Dade County. Given that the area impacted by the pipeline will range from approximately 25’ to 45’, the closest and preferred reef site, with depths comparable to those found in and around the first reef areas, is the “Anchorage Site” (center point - 25°48’43.5”; 80°05’35.5”; depth range 30 to 55 ft.), located approximately 3 miles south of the proposed pipeline corridor. The next best location is the “Port of Miami Mitigation Site – A”, which is approximately 2 miles further south, with a water depth of 25 feet. These sites have current permits and are available for use on this project.

V. CALCULATION OF MITIGATION

The amount of impact within the corridor will be controlled by a number of factors: (i.e., need of repair or re-positioning of the pipeline which requires lifting and replacement; impact by accessory equipment [i.e., marker buoys]; the ability of the pipeline 'collars' to hold the portions of the pipeline off the reef; irregularities of the bottom assisting in holding the pipeline off the reef; and utilization of floating lines or cable motion dampeners on needed marking or lifting buoys to minimize impacts to areas adjacent to pipeline). The varied factors that can affect the amount of area impacted, and past assessments of pipeline impacts indicate actual impact will be less than estimated in the pre-project assessments. Therefore the area of impact, and subsequently, the area of mitigation will be determined by post-pipeline removal assessments.

Impact Assessment Methodology. The impact will be assessed by DERM biologists with experience in identification and evaluation of benthic impacts. Biologists will visually inspect the entire pipeline path to identify and quantify the area and amount (degree) of impact to benthic communities. Such methods will include measurement of all areas of scarification, denudation, crushing or other modified bottom characteristics attributable to the pipeline and or accessory equipment. The degree of impact will be estimated on a scale of 0-25%, 25-50%, 50-75%, 75-100% and 100%. The actual area of impact will be the product of the measured area and the decimal equivalent of the 'mid-point' of the level of impact. The area requiring mitigation will be the sum of those products, plus the overall area of hard corals impacted (i.e., crushed, fractured, scraped or dislodged).

Mitigation Ratio Considerations. In previous coordination with the Department, it was determined that a 1:1 mitigation ratio for this project. This ratio is reasonable given the following:

1. The project is being conducted in the interest of public health and safety (protection of property and life from storms, hurricanes and coastal flooding)
2. Physical alterations to the hardground will be minimal. Past pipeline placements indicate disturbance to the bottom from the pipeline will be significantly less than estimated in the pre-project assessment.
3. The region the pipeline traverses is dominated by sponges, algae and moderate sized soft corals, which have a relatively short recovery time (2-8 years).

Estimated Mitigation Requirement.

For the 2001 project which used this corridor, it was estimated based on pre-project assessments that approximately 306m^2 of hardbottom would be impacted, however following the post-project impact assessment, the actual impact was 126m^2 . Based on these results, and results from other Miami-Dade projects where pipelines have been used, it has been documented that the actual impact is typically from 20% to 60% less than the pre-project estimate. Given that this corridor has been previously used, and that recently completed biological surveys of the corridor shows little change in the habitat characteristics present in the corridor from 2001 surveys, we would anticipate a similar or lesser level of measured impact to occur in the pending project. As such, it is proposed that for the purposes of this mitigation plan, that the pre-project estimate of impact be established at 130 m^2 , or 1399 square feet. To mitigate this level of impact using limestone boulders, approximately 90, 4’ diameter boulders equaling approximately 270 tons would be required. If modules were used, assuming a 54 ft^2 base as has been used in other projects, 26 modules would be required. If a combination of the two materials, or am alternative module design is utilized, a revised plan will be submitted to the Department for approval prior to construction. If post project impact assessments indicate a greater or lesser level of impact, the construction plan would be adjusted accordingly.

Construction Schedule

A final mitigation plan based on the documented level of impact and the specific materials to be used will be submitted to the Department within 90 days of completion of the post project impact assessment will be submitted to the Department for approval. Construction of the required mitigation will be completed within one year of the completion of the project.

Physical and Biological Monitoring Program
FOR DADE COUNTY BEACH SUSTAINABILITY PROJECT

Submitted by
Miami-Dade County Department of Environmental Resources Management

To:
Florida Department of Environmental Protection,
Bureau of Beaches and Coastal Systems
Tallahassee, FL

As partial fulfillment of provisions of the
U.S. ARMY CORPS OF ENGINEERS PLANS AND SPECIFICATIONS

and Special Conditions of
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP)
Joint Coastal Permit 0295427-001C

MONITORING PROGRAM COMPONENT OUTLINE

Part A. Biological Resource Protection and Monitoring

I. RESOURCES IN AND ADJACENT TO THE PIPELINE CORRIDOR AND OPERATIONAL BOX
   A. Pre-Construction Corridor Marking
   B. Coral Protection Measures
   C. Visual Surveys of Habitats Adjacent to the Operational Box and Pipeline during construction
   D. Post-Construction Pipeline Removal Assessment

II. RESOURCES ADJACENT TO LUMMUS PARK EXCAVATION AREA
   A. Monitoring Stations
   B. Construction Surveys for Qualitative Indications of Coral Stress
   C. Sediment Monitoring

III. RESOURCES ADJACENT TO THE SGC-EXT BORROW AREA
   A. Monitoring Stations
   B. Construction Surveys for Qualitative Indications of Coral Stress
   C. Sediment Monitoring
   D. Long-term (3yr) Benthic Monitoring—include frequency and methodology
   E. Water Quality

IV. SEA TURTLE MONITORING AND NEST RELOCATION PROGRAM
   A. Daily Beach Surveys For Nesting Activities
   B. Other Actions as Required by Permit Conditions
   C. Reporting

Part B. Physical Parameter Monitoring

I. FILL MATERIAL ANALYSIS, COMPACTION, AND BEACH TILLING
   A. Construction Sand Grain Analysis
   B. Compaction Monitoring
   C. Escarpment Leveling
   D. Reporting

II. HYDROGRAPHIC SURVEYS AND BEACH FILL PERFORMANCE
   A. Scope of Hydrographic Survey Plan
   B. Monitoring Plan Objectives
   C. Monitoring Plan Components
   D. Reporting

Part A. Biological Resource Protection and Monitoring

All resource protection and biological surveys, data collection, analysis, and reporting will be supervised by an advanced degreed marine biologist (M.S. minimum) with at least 3 years experience in assessment and evaluation of coral reef and hardground habitats.

Precise locations of monitoring stations will be established once habitat characterizations are complete. Station locations will be reviewed and approved by the Florida Department of Environmental Protection (FDEP) prior to the commencement of pre-construction monitoring.

I. Resources In and Adjacent to the Pipeline Corridor and Operational Box . The activities defined below will be utilized to protect and conserve coral resources in the area.

   A. Marking of the Pipeline Corridor. A Differential Global Positioning System (DGPS) will be used to determine the corridor's location and buoy placement.
      1. Prior to pipeline placement, DERM will mark the southern boundary of the pipeline corridor using 6-8" styrofoam buoys. The buoys will be attached to durable fixtures placed on the substrate in areas void of benthic organisms and placed sufficiently apart (no greater than 100m) to allow divers to swim the length of the pipeline during pre and post placement surveys. These buoys will remain in place during the positioning and deployment of the pipeline.
      2. After the pipeline is placed, the targeted placement location of the pipeline (to be used by the contractors to align the pipeline) will be marked with temporary buoys. These buoys will remain in place after removal of the pipeline to aid in the post placement survey.

   B. Coral Protection Measures
      1. Relocation. After the corridor is marked as specified in I.A.1 above, qualified biologists will survey the 15m (~50') width of the corridor. Hard (stony) corals within the corridor will be relocated prior to pipeline placement based on the criteria below. It should be noted that this procedure was conducted in summer 2001, prior to the construction of a segment of the "Sunny Isles Design Modification" project (FDEP #0126527-001).
         a. *Acropora cervicornis* colonies greater than 10cm in diameter found within the corridor width will be relocated. *Acropora palmata* colonies were not observed in this area during previous survey efforts. However, if *A. palmata* is found, they will be relocated based on the same protocols as *A. cervicornis*. The transplantation protocols will follow those outlined in *Appendix A: Acropora cervicornis Transplantation Protocols for Miami-Dade County Beach Renourishment Project—Contract "E"* of the National Marine Fisheries Service's (NMFS) biological opinion dated October 21, 2009 with the following modifications:
            1) Colonies will be relocated a minimum of 50m (~150') from the pipeline corridor in a similar habitat and depth as shown in Figure 2.
            2) If allowable, fragments from the relocated coral colonies will be transferred to *Acropora cervicornis* nurseries within Miami-Dade and/or Broward County. Otherwise, all fragments will be stabilized in locations adjacent to the corridor (as noted in B.1.a.1).
         b. Non-Acropora colonies of hard corals will also be relocated if the colony diameter is greater than 25cm and if feasible without causing significant damage to the colony.

        1) Vertically oriented colonies and encrusting colonies greater than 25cm may be left *in-situ* if transplantation will cause excessive damage during the removal process.
        2) Colonies will be relocated a minimum of 50m (~150’) from the pipeline corridor in a similar habitat and depth as shown in Figure 1.
        3) Colonies will be dislodged from original location carefully with the use of a hammer and chisel. The colonies will be reattached to a cleaned area of substrate (i.e., sediment and turf algae removed) at the transplant site using a Portland cement mixture.
        4) Colony description and locations will be recorded as specified in Section I.B.4 below.

2. Marking of Large Coral Heads. All large hard coral heads within the corridor that cannot relocated will be marked with a distinctive buoy (e.g. colored) prior to positioning of the pipeline. This will allow visualization of the line of minimal impact to the contractor, to assist in minimizing impact to coral heads.
    a. The GPS position of each marked coral head will be provided to the contractor prior to pipeline placement to aid in avoidance.
    c. DERM will work as closely as possible with the contractor to insure the pipeline is placed in such a manner to minimize impact and avoid marked large coral heads.
3. Post Pipeline Placement—Biological Assessment and Salvage. The contractor will notify DERM within 24hrs of completion of the pipeline placement. Biologists will survey the entire length of the pipeline placed on hardbottom, and document impacts to the reef and any corals that remained in place. All impacted corals will be salvaged when possible within 1 week of the notification of the pipeline placement.
    a. The exact location of the pipeline corridor will be traced using differential GPS.
    b. Underwater video surveys will be conducted to document the condition of the corridor after pipeline placement. Surveys will include both sides of the pipeline, at a distance of no greater than 5’ from the pipe as well as any noted incidental impacts adjacent to the pipeline.
    c. Biologists will document the observed impacts to the benthic organisms after pipeline placement recording species (to lowest possible taxonomic rank), size, health, and injury type (dislodged, fractured, or abraded). To the maximum extent possible, damaged, dislodged, or threatened hard and soft corals would be relocated and stabilized outside of the 15m (~50’) pipeline corridor.
        1) Relocated hard corals and soft corals will be stabilized in as natural a position as possible and reattached to a cleaned area of substrate (i.e., wire-brushed free of sediment and algae) at the transplant site using a Portland cement mixture.
        2) Threatened coral colonies (i.e., within the shadow of the pipeline after placement) will be chiseled from the substrate, where possible, and moved to an area outside the pipeline corridor as described above.
        3) Colony description and locations will be recorded as specified in Section I.B.4 below.
4. Monitoring of Relocated and Salvaged Hard and Soft Corals. Each relocated or salvaged hard and soft coral will be evaluated on a quarterly basis for the initial year after relocation and semi-annually thereafter for an additional two years.
    a. Prior to relocation:
        1) A unique identifier will be assigned to each colony. This identifier will be used to ‘mark’ the colony at the transplant site.
        2) Each colony will be photographed with a ruler present for scale. At least one photograph will be above the colony, and parallel with its surface to allow estimation of the surface area of the colony.

3) The following information will be recorded for each colony:
    a) Species (to the lowest taxonomic rank possible)
    b) Colony size.
        (1) Hard corals: This will include length (longest axis), width (perpendicular to longest axis), and height (in direction of growth).
        (2) Soft corals: the height of the colony will be recorded.
    c) Depth
    d) Colony orientation
    e) Overall health (i.e., presence of disease or bleaching or description of damage if salvaged post pipeline placement)
    f) Percent live and dead tissue
    g) GPS coordinates

b. After relocation:
    1) Each relocated colony will be photographed with a ruler present for scale. At least one photograph will be above the colony, and parallel with its surface to allow estimation of the surface area of the colony and at least one photograph will contain the unique identifier label assigned prior to relocation. For *Acropora* colonies, photographs will be taken before and after fragment collection.
    2) The following information will be recorded for each relocated colony:
        a) Any incidental damaged that may have occurred during relocation efforts.
        b) GPS coordinates for the colony or GPS coordinates for the origin of the relocation site and distance and compass bearing from origin.
        c) For *Acropora* colonies, fragment collection, recorded, and tracked protocols will be established in cooperation with the nursery recipients.
    3) For each relocated species, a reference colony will be identified in a similar habitat and in a similar size class. The reference colonies will be ‘healthy’ colonies free of obvious disease or bleaching tissue. They will serve as controls to evaluate changes that may occur in the relocated colonies independent of the relocation activities (i.e. reef wide coral bleaching due to thermal stress).
        a) The reference colonies will be assigned a unique identifier.
        b) Each reference colony will be photographed with a ruler present for scale. At least one photograph should be above the colony from fixed distance to be able to estimate surface area of the colony. At least one photograph should contain the unique identifier label assigned prior to relocation.
        c) The following information will be recorded for each reference colony:
            (1) Species (to the lowest taxonomic rank possible)
            (2) Colony size. For hard corals, this will include length (longest axis), width (perpendicular to longest axis), and height (in direction of growth). For soft corals, only height will be recorded.
            (3) Depth
            (4) Colony orientation
            (5) Overall health (i.e. presence of disease or bleaching, percent live tissue). Reference colonies will, to the greatest extent possible be free of notable disease, bleaching or other indicators of stress. It is recognized, however, that this may not be possible when regional or broader scale stress inducing events occur.

        (6) Location of the colony, through either GPS coordinates of the colony or GPS coordinates for a reference location (or relocation) and distance and compass bearing from the reference location.

    c. Quarterly and Semi-annual monitoring will involve documenting the condition of the relocated and reference corals and will minimally include the following:
        1) Photographing each colony with a ruler present for scale. At least one photograph should be above the colony from fixed distance to be able to estimate surface area of the colony. At least one photograph should contain the assigned unique identifier label.
        2) Colony size. For hard corals, this will include measurement of the length (longest axis), width (perpendicular to longest axis), and height (in direction of growth) with a ruler graduated in millimeters. For soft corals, only height will be recorded.
        3) Overall health (i.e., presence of disease or bleaching or description of damage if salvaged post pipeline placement)
        4) Percent live and dead tissue.
    d. Reporting
        1) The raw data on the status and location of corals relocated prior to the pipeline placement or during post pipeline placement salvage efforts will be submitted within 60 days after completion of the post pipeline placement salvage work is completed. A summary report will be submitted within 90 days.
        2) Raw data from the quarterly and semi-annual monitoring will be submitted within 60 days upon completion of monitoring. A summary report will be submitted on an annual basis for the duration of the 3 year monitoring.

C. Visual Surveys of Habitats Adjacent to the Operational Box and Pipeline.

During construction, the following surveys will be conducted, to the greatest extent possible, while the pipeline is in operation to enhance the chance of detecting leaks (i.e., visible ‘boils’ from the surface or obvious sediment discharge observed through in-water inspections). These tasks may be conducted by the contractor (not DERM biologists).

1. Surface surveys will be conducted daily by boat along the length of benthic resources proximal to the operational box and along the pipeline. The location of possible leaks will be noted, reported immediately as per notification requirements of the permit.
2. The benthic resources proximal to the operational box and along the pipeline will be inspected biweekly through in-water surveys. Every other inspection will be videotaped. The diver will record the location, nature, and extent of any leaks or irregular conditions (i.e., pipeline movement) and immediately report findings as per notification requirements of the permit.
3. Any leakage or substantial movement will cease the use of the pipeline and appropriate action will be taken to remedy the situation.

D. Post-Construction Pipeline Removal Assessment

The actual impact from the placement of the pipeline will be determined by post-placement surveys of the pipeline corridors. Quantitative surveys of the corridor will be conducted to document pre-project conditions. The post-construction surveys will be conducted within 7 days after the removal of the pipeline. The damage assessment will be conducted as follows:

1. The contractor will notify DERM 24 hrs prior to, and within 24 hours of the completion of removal of the pipeline location. Marker buoys will be used to marker the true location of the pipeline, and will be left in place until post assessment is complete.

2. Qualified biologist will document the condition of the corridor after pipeline removal via video camera. The video survey will cover the entire length of the corridor where the pipeline was placed on hardbottom and will cover the ‘aerial’ width where the pipeline was placed.
3. Qualified biologists will also survey the damage path along the pipeline's length to determine the actual area of impact.
    a. The width of the path will be considered the area within which the limestone "bedrock" has been cleared and exposed, and/or benthic organisms directly in the path or adjacent to the pipeline are crushed, fractured, abraded, heavily bleached or otherwise damaged.
    b. Impact to organisms and areas of benthic damage will be quantified by direct measurement. Quantification will include:
        1) Measurement of all fractured, abraded, bleached or otherwise impacted hard corals.
        2) Count of all damaged (abraded, broken, loose) soft corals.
        3) Measurement of fractured, scarified, abraded or otherwise damaged substrate, where encrusting or low-profile organisms were growing.
        4) Digital photographs will be taken as warranted.
    c. Impact from the pipeline will be the total sum of impacts to hard coral, soft corals, and substrate. The calculated area of damage and subsequently used to calculate mitigation requirements.
4. Raw data collected will be submitted within 60 days upon completion of the monitoring. A summary report documenting the impacts associated with the pipeline placement will be submitted within 90 days of the post-construction Pipeline Removal Assessment.

II. Resources Adjacent to Lummus Park Excavation Area

A. Monitoring Stations. Stations will be established on each habitat type offshore from the Lummus Park Excavation Area to evaluate potential construction and sediment impacts (Figure 3). These stations will be selected once habitat characterizations and delineation is completed and approved by FDEP prior to pre-construction monitoring.

B. Construction Surveys for Qualitative Indications of Coral Stress
1. Construction surveys will be conducted by qualified biologists and involve:
    a. Evaluating all benthic organisms (hard corals, soft corals, sponges, etc) for standing sediment that is not removed by normal currents or wave action.
    b. Evaluating hard corals for additional indications of sedimentation stress such as excessive mucus, extruded polyps, and color changes (bleaching or paling).
    c. *Acropora* colonies will be further evaluated as outlined in *Appendix B: Monitoring Acropora cervicornis Health and Sedimentation Near the Offshore Borrow Area* of the National Marine Fisheries Service’s (NMFS) biological opinion dated October 21, 2009. This additional evaluation will involve:
        1) Assessing and assigning a ‘stress value’ to representative Acropora colonies based on four (4) health parameters: bleaching, excess mucus production, polyp extension, and disease. The ‘stress value’ scale will range from 0- 3 with o representing minimal to low stress and 3 represents advanced acute stress. A colony receiving a stress score of 1.5 or higher in two or more parameters will be classified as stressed and in declining health.

        2) Each Acropora health evaluation will be documented through approximately 15 seconds of video per colony. In the event a video camera is not available, digital photographs will be taken from the main directional headings and above each colony.

2. Reef conditions during construction surveys will also be documented through digital photographs. Photographs will include:
    a. Wide angle reef scenes (if visibility allows).
    b. Reference photographs of the same organism across surveys to show possible changes over time.
    c. Close-up photographs documenting organism experiencing sediment stress (i.e., burial, excess mucus, extruding polyps, color change).
3. Survey Frequency
    a. Before active excavation, the reef habitat offshore the Lummus Park excavation area will be surveyed at least once a week for four (4) weeks to establish baseline conditions.
    b. For the duration of active sand excavation (construction), the reef habitat offshore the Lummus Park excavation area will be surveyed twice a week.
    c. After active excavation, the reef habitat offshore the Lummus Park excavation area will be surveyed at least once a week for four (4) weeks.
3. A sediment stress violation will be defined as a significant build-up of sediment sufficient to cause any one or more of the following conditions:
    a. A frequency of observed bleaching (partial or complete) of hard coral colonies, significantly above the level found at the control or reference stations.
    b. Excessive mucus produced by hard corals to remove sediment from their surface, resulting in binding of sediments and transport of bound sediments off the coral's surface and subsequent accumulation of the sediments at the base of the coral head. Such accumulations have been seen to initiate a "self burial" process, causing death of the lower tissue of the coral head.
    c. Covering of benthic community components (i.e., sponge, algae) by sediment for sufficient time or sufficient sediment so as to note death or degradation (i.e., bleaching, pigmentation changes) of the underlying organisms.
4. Reporting.
    a. One report will be submitted documenting the survey efforts prior to sand excavation. This report along with raw data will be submitted within 60 days upon monitoring completion.
    b. During active excavation, weekly reports will be submitted via e-mail describing survey results.
    c. One report will be submitted after construction detailing the results for the four week post construction surveys. This report along with raw data will be submitted within 60 days upon monitoring completion.
    d. Notification of sediment stress violations will be by phone, fax, or e-mail, and followed by a written report to be submitted within 24 hours to FDEP, ACOE, NMFS-PRD, and DERM will be notified immediately of the possibility of violation of sediment levels on the reefs (or on the next work day if the indicators are noted on a weekend or holiday). If stress is recorded, the dredging operation must move to a new location or discontinue dredging until effected organisms have recovered.

C. Sediment Monitoring

1. Sediment deposition rates. Sediment traps will be used to measure sediment deposition rates.
    a. Sedimentation traps will be constructed and installed according to *Appendix B: Monitoring Acropora cervicornis Health and Sedimentation Near the Offshore Borrow Area* of the National Marine Fisheries Service's (NMFS) biological opinion dated October 21, 2009.
    b. Each sediment station will consist of six (6) sediment traps.
    c. When collected, sediment traps will be transported to a laboratory where the samples will be processed according to *Appendix B: Monitoring Acropora cervicornis Health and Sedimentation Near the Offshore Borrow Area* of the National Marine Fisheries Service's (NMFS) biological opinion dated October 21, 2009.
    c. As per *Appendix B: Monitoring Acropora cervicornis Health and Sedimentation Near the Offshore Borrow Area* of the National Marine Fisheries Service's (NMFS) biological opinion dated October 21, 2009, if sediment traps show a net accumulation rate greater than 1.5mm/day above any levels at a reference station, a survey of Acropora health will be conducted. If Acropora health is determined to be declining the excavation location must re-locate or cease operations.
2. Reef Sediment Depth/Accumulation. The depth of sediment on the reef areas will be measured at, and adjacent to the fixed sediment deposition stations.
    a. Random Measures. At each sediment deposition station, 15 random measures of the sediment depth will be taken on the reef surface during each assessment in the immediate area of the fixed station (measurements will exclude crevasses, depressions and gullies). Measures will be made with a ruler graduated in millimeter. Measures will be recorded to the nearest millimeter.
    b. Fixed Station Measures. At each sediment deposition station, a stainless steel pin will be placed 1m away from the sediment sampler. A measure of sediment depth will be taken at the base of the each pin. Measures will be made with a ruler graduated in millimeter. Measurements will be recorded to the nearest millimeter.
3. Survey Frequency
    a. Installation of sediment traps and sediment depth reference stakes will occur a minimum of 9 weeks prior to excavation activity.
    b. Before active excavation:
        1) Reef sediment traps will be collected just before excavation is to commence.
        2) Reef sediment accumulation measures will be surveyed at least once a week for four (4) weeks to establish baseline conditions.
    c. For the duration of active excavation (construction):
        1) Reef sediment traps will be changed out every 28 days during construction.
        2) Reef sediment accumulation measures will be taken twice a week during construction.
    d. After active excavation is completed:
        1) Reef sediment traps will be changed out 28 days after excavation work is completed at all sediment stations.
        2) Reef sediment accumulation measures will be taken once a week for four weeks after excavation work is completed.
4. Reporting.
    a. Raw data documenting the sedimentation deposition rates (traps) and accumulation measurements prior to excavation will be submitted within 60 days upon completion of the monitoring with a summary reported submitted within 90 days of completion.

        b. During active excavation, weekly reports will be submitted via e-mail describing sediment accumulation measurements. Raw data from sediment deposition rate data (traps) will be submitted within 60 days after lab analysis is completed with a summary report submitted within 90 days of completion.
        c. Raw data collected after excavation will be submitted 60 days after last sampling event detailing the results for the four week post construction surveys. A summary report will be submitted within 90 days of completion.
    5. Notification of sediment violations will be by phone, fax, or e-mail, and followed by a written report to be submitted within 24 hours to FDEP, ACOE, NMFS-PRD, and DERM will be notified immediately of the possibility of violation of sediment levels on the reefs (or on the next work day if the indicators are noted on a weekend or holiday). If stress is recorded, the dredging operation must move to a new location or discontinue dredging until effected organisms have recovered.

III. Resources Adjacent to the SGC-Extension Borrow Area

A. Monitoring Stations. Stations will be established on each habitat type surrounding the borrow area to evaluate potential construction and sediment impacts as well as evaluate any long term impacts to the benthic assemblages. Stations locations will be reviewed and approved by FDEP prior to pre-construction monitoring.

1. Construction and sediment monitoring stations will be established similar to that shown in Figure 4. These stations have been strategically selected to help monitor any environmental change or sedimentation impact and/or stress on biological organisms attributed to construction activities. Sediment stations will be established at all of the long-term biological monitoring stations as well as a additional sites as outlined in the *Appendix B: Monitoring Acropora cervicornis Health and Sedimentation Near the Offshore Borrow Area* of the National Marine Fisheries Service's (NMFS) biological opinion dated October 21, 2009.
2. Long-term biological monitoring stations will be established surrounding the borrow area similar to that shown in Figure 4. Long term monitoring stations will also be established approximately one (1) to five (5) miles south of the borrow in areas with similar water depths and, based on qualitative assessment, show similar composition and densities of biological community components to serve as control or reference stations. Long term monitoring will involve benthic, sedimentation, and water quality monitoring. These stations will also be evaluated during construction.

B. Qualitative Construction Surveys for Indication of Sediment Impact and/or Stress

1. Construction surveys will be conducted by qualified biologists and involve:
    a. Evaluating all benthic organisms (hard corals, soft corals, sponges, etc) for standing sediment that is not removed by normal currents or wave action.
    b. Evaluating hard corals for additional indications of sedimentation stress such as excessive mucus, extruded polyps, and color changes (bleaching or paling).
    c. *Acropora* colonies will be further evaluated as outlined in *Appendix B: Monitoring Acropora cervicornis Health and Sedimentation Near the Offshore Borrow Area* of the National Marine Fisheries Service's (NMFS) biological opinion dated October 21, 2009. This additional evaluation will involve:

        1). Assessing and assigning a 'stress value' to representative Acropora colonies based on four (4) health parameters: bleaching, excess mucus production, polyp extension, and disease. The 'stress value' scale will range from 0- 3 with o representing minimal to low stress and 3 represents advanced acute stress. A colony receiving a stress score of 1.5 or higher in two or more parameters will be classified as stressed and in declining health.
        2) Each Acropora health evaluation will be documented through approximately 15 seconds of video per colony. In the event a video camera is not available, digital photographs will be taken from the main directional headings and above each colony.
    d. Reef conditions during construction surveys will also be documented through digital photographs. Photographs will include:
        1). Wide angle reef scenes (if visibility allows).
        2). Reference photographs of the same organism across surveys to show possible changes over time.
        3). Close-up photographs documenting organism experiencing sediment stress (i.e., burial, excess mucus, extruding polyps, color change).

2. Survey Frequency
    a. Before active dredging, the reef habitat surrounding the borrow area will be surveyed at least once a week for four (4) weeks to establish baseline conditions.
    b. For the duration of active dredging (construction), the reef habitat surrounding the borrow area will be surveyed twice a week.
    c. After active dredging, the reef habitat surrounding the borrow area will be surveyed at least once a week for four (4) weeks.
3. A sediment stress violation will be defined as a significant build-up of sediment sufficient to cause any one or more of the following conditions:
    a. A frequency of observed bleaching (partial or complete) of hard coral colonies, significantly above the level found at the control or reference stations.
    b. Excessive mucus produced by hard corals to remove sediment from their surface, resulting in binding of sediments and transport of bound sediments off the coral's surface and subsequent accumulation of the sediments at the base of the coral head. Such accumulations have been seen to initiate a "self burial" process, causing death of the lower tissue of the coral head.
    c. Covering of benthic community components (i.e., sponge, algae) by sediment for sufficient time or sufficient sediment so as to note death or degradation (i.e., bleaching, pigmentation changes) of the underlying organisms.
4. Reporting.
    a. One report will be submitted documenting the survey efforts prior to dredging. This report along with raw data will be submitted within 60 days upon monitoring completion.
    b. During active dredging, weekly reports will be submitted via e-mail describing survey results.
    c. One report will be submitted after construction detailing the results for the four week post construction surveys. This report along with raw data will be submitted within 60 days upon monitoring completion.
    d. Notification of sediment stress violations will be by phone, fax, or e-mail, and followed by a written report to be submitted within 24 hours to FDEP, ACOE, NMFS-PRD, and DERM will be notified immediately of the possibility of violation of sediment levels on the reefs (or on the next work day if the indicators are noted on a weekend or holiday). If

stress is recorded, the dredging operation must move to a new location or discontinue dredging until effected organisms have recovered.

C. Quantitative Sediment Monitoring
1. Sedimentation Traps. Sediment traps will be used to measure sediment deposition rates.
    a. Sedimentation traps will be constructed and installed according to *Appendix B: Monitoring Acropora cervicornis Health and Sedimentation Near the Offshore Borrow Area* of the National Marine Fisheries Service's (NMFS) biological opinion dated October 21, 2009.
    b. Each sediment station will consist of six (6) sediment traps.
    c. When collected, sediment traps will be transported to a laboratory where the samples will be processed according to *Appendix B: Monitoring Acropora cervicornis Health and Sedimentation Near the Offshore Borrow Area* of the National Marine Fisheries Service's (NMFS) biological opinion dated October 21, 2009.
    c. As per *Appendix B: Monitoring Acropora cervicornis Health and Sedimentation Near the Offshore Borrow Area* of the National Marine Fisheries Service's (NMFS) biological opinion dated October 21, 2009, if sediment traps show a net accumulation rate greater than 1.5mm/day above any levels at a reference station, a survey of Acropora health will be conducted. If Acropora health is determined to be declining the dredge must re-locate or cease operations.
2. Reef Sediment Depth/Accumulation. The depth of sediment on the reef areas will be measured at, and adjacent to the fixed sediment deposition stations.
    a. Random Measures. At each sediment deposition station, 15 random measures of the sediment depth will be taken on the reef surface during each assessment in the immediate area of the fixed station (measurements will exclude crevasses, depressions and gullies). Measures will be made with a ruler graduated in millimeter. Measures will be recorded to the nearest millimeter.
    b. Fixed Station Measures. At each sediment deposition station, a stainless steel pin will be placed 1m away from the sediment sampler. A measure of sediment depth will be taken at the base of the each pin. Measures will be made with a ruler graduated in millimeter. Measurements will be recorded to the nearest millimeter.
3. Survey Frequency
    e. Installation of sediment traps and sediment depth reference stakes will occur a minimum of 9 weeks prior to dredging activity.
    f. Before active dredging:
        1). Reef sediment traps will be collected just before dredging is to commence.
        2). Reef sediment accumulation measures will be surveyed at least once a week for four (4) weeks to establish baseline conditions.
    g. For the duration of active dredging (construction):
        1). Reef sediment traps will be changed out every 28 days during construction.
        2). Reef sediment accumulation measures will be taken twice a week during the construction.
    h. After active dredging is completed:
        1). Reef sediment traps will be changed out 28 days after dredging is completed at all sediment stations and quarterly or semi-annually thereafter at the long-term monitoring stations.

2). Reef sediment accumulation measures will be taken once a week for four weeks after dredging is completed and quarterly or semi-annually thereafter at the long-term monitoring stations.

4. Reporting.
   a. Raw data documenting the sedimentation deposition rates (traps) and accumulation measurements prior to dredging will be submitted within 60 days upon completion of the monitoring with a summary reported submitted within 90 days of completion.
   b. During active dredging, weekly reports will be submitted via e-mail describing sediment accumulation measurements. Raw data from sediment deposition rate data (traps) will be submitted within 60 days after lab analysis is completed with a summary report submitted within 90 days of completion.
   c. Raw data will be submitted after construction 60 days after last sampling event detailing the results for the four week post construction surveys. A summary report will be submitted within 90 days of completion.
   d. Raw data for the long-term sediment monitoring (quarterly and semi-annual after construction is complete) will be submitted within 60 days upon completion. An annual report will also be submitted along with the long-term benthic (Section I.D) and water quality (Section I.E) monitoring described below within 90 days upon the last monitoring event completion.
   d. Notification of sediment violations will be by phone, fax, or e-mail, and followed by a written report to be submitted within 24 hours to FDEP, ACOE, NMFS-PRD, and DERM will be notified immediately of the possibility of violation of sediment levels on the reefs (or on the next work day if the indicators are noted on a weekend or holiday). If stress is recorded, the dredging operation must move to a new location or discontinue dredging until effected organisms have recovered.

D. Long-term Benthic Monitoring

The biological monitoring will utilize a BACI (Before-After-Control-Impact) design (Underwood, 1996[1]). This design establishes monitoring stations within an area of probable impact, and in areas of similar habitat outside the region of possible impact, as comparisons sites. The inclusion of the “comparison” locations allows for correction of differences noted in the pre/post evaluations, for variations or differences that were not specifically associated with the project (i.e. ‘system wide impacts such as storm effects, regional habitat disruptions, etc.).

1. Sample size. Each long term benthic monitoring station will be comprised of five randomly placed 2.1 m X 2.0 m quadrats (total sample area of 21.0 m^2/site) for determination of benthic community components. The quadrat location will allow for determination of any impacts across the entire reef tract.
   a. The location of each of the quadrats will be determined by randomly choosing a distance and direction from a reference point (max distance = 100 m or one-half the width of the reef at the reference point, which ever is less).
   b. Each quadrat will be oriented normal to the prevailing direction of the reef tract (i.e., N/S), marked with an iron bar, and all have corner points marked with stainless steel pins to allow precise relocation.

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[1] Underwood, A.J., 1996. On Beyond BACI: Sampling Designs that might reliably detect environmental disturbances. *IN*: *Detecting Ecological Impacts Concepts and Applications in Coastal Habitats*. R.J. Schmitt, and C.W. Osenberg EDS. Associated Press. New York, NY. pp 151-178.

        1). Each quadrat will be subdivided into six 1.0 m X 0.7 meter subplots, to aid in photogrammetric analysis of the quadrat.
        2). Each subplot will be marked with stainless steel pins to allow precise relocation.

2. Monitoring Frequency. The sampling frequency for each monitoring task is summarized in Table 1.
    a. Quantitative assessments will be conducted minimally once prior to, once immediately after completion of project construction and every six months thereafter for a minimum of three years.
    b. Qualitative assessments will be conducted three months after the post construction quantitative survey, and every six months thereafter until completion of the monitoring program.
3. Sampling Methodology. The quantitative and qualitative sampling procedures and techniques are described below.
    a. Quantitative Benthic Monitoring. The methodology will include digital photography and ground-truthing.
        1). All hard and soft corals, sponges, algae, and other benthic invertebrates will be enumerated and field identified to the lowest possible taxonomic rank via mapping of 1.0 m X 0.7 m subplots of the 2.0 m X 2.1 m quadrats (six subplots per quadrat). All hard corals will be measured (major and minor axis) to determine hard coral coverage.
        2). Each subplot will be photographed using an underwater camera and strobe, mounted on a prefabricated "framer". The framer will hold and position the camera and strobe for optimal resolution of the subplot area. The photographs will be used to verify the percent of cover of hard corals through planimetric analysis of projected images as necessary (Kohler and Gill, 2006[2]. Further, the photographs will serve as documentation of the benthic community components within the subplots.
    b. Qualitative Benthic Monitoring. Each station will be assessed visually for any abnormal or unusual characteristics. Each of the five quadrats at each station will be photographed using the techniques as described for the quantitative surveys, to document the interim status of the monitoring sites. Ground-truthing of the sites will not be conducted during these surveys. However, divers will note any obvious alterations or changes in the general hard-bottom habitat.
4. Raw data will be submitted within 60 days upon completion of monitoring. An annual summary report will also be submitted along with the long-term sediment (section I.C) and water quality (section I.E) monitoring results within 90 days upon completion of the last monitoring event.

E. Water Quality.
    1. Sampling Stations. Water quality parameters will be sampled at each the long term monitoring stations. Parameters will be collected based on profiles of the water column at each station, in 3 m depth increments (i.e., surface, 3 m, 6 m, 9 m, etc.), from the surface to the bottom.

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[2] Kohler, K.E. and S.M. Gill, 2006. Coral Point Count with Excel extensions (CPCe): A Visual Basic program for the determination of coral and substrate coverage using random point count methodology. *Computers and Geosciences*: 32 1259-1269.

2. Monitoring Frequency. The water quality parameters listed below will be sampled minimally once prior to construction, every other week during construction, and on a quarterly basis after construction for a period of 3 years.
3. A single sampling assemblage consisting of a multi-sensor array, light sensor and water sampling tube, will be lowered into the water to insure simultaneous sampling of measured parameters and collection of water samples for laboratory analysis.
    a. Light levels will be measured using a Li-Cor® dual sensor array (one surface, one underwater sensor). Surface and at-depth photon flux densities will be recorded with a Li-Cor® LI-1000 datalogger. Light measurement units will be $\mu E/m^2/s$ (of PAR).
    b. Turbidity levels will be determined on samples collected during the Water Quality Profiling (minimally for the surface, mid depth and bottom samples). Samples will be read on a laboratory calibrated Hach® portable turbidity meter (or equivalent) and recorded in NTU's (Nephlometric Turbidity Units). This is independent of the third party turbidty sampling requirements under the permit conditions.
    c. Temperature, pH, salinity, dissolved oxygen and oxidation-reduction potential will be measured using a YSI® multi-sensor data logger.
4. Raw data will be submitted within 60 days upon completion of the monitoring. An annual summary report will also be submitted along with the long-term sediment (section I.C) and benthic (section I.D) monitoring results within 90 days upon completion of the last monitoring event.

IV. Sea Turtle Monitoring and Nest Relocation Program

Sea Turtle monitoring may be subcontracted during construction by the selected contractor, however, Dade County DERM will ensure that Sea Turtle Monitoring is conducted in a manner which meets the criteria and conditions established in the above referenced permits and existing FDEP Protected Species permit.

A. Daily Beach Surveys for Nesting Activities

1. If the beach nourishment project will be conducted during the marine turtle nesting season (May 1 through November 1), daily early morning surveys for sea turtle nests shall occur beginning May 1 or 65 days prior to project initiation (whichever is later), and continue through September 30 for the initial nesting season following the completion of construction and for a minimum of three additional nesting seasons.
2. Survey activities will be conducted by an individual approved and permitted by the Florida Fish & Wildlife Conservation Commission (FFWCC) for such activities. All nest surveys and egg relocations shall only be conducted by personnel with prior experience and training in these activities and who is duly authorized to conduct such activities through a valid permit issued by the Fish and Wildlife Conservation Commission (FWC), pursuant to Florida Administrative Code 68E-1.
3. As per special condition in the FWC Protected Species Permit for Miami-Dade County beaches, all nests found on Miami-Dade will be left in-situ with the exception of areas where excessive lighting or other threats like active beach construction to the nest exist. In these cases, the nest shall be relocated to a nearby area on the beach where lighting or other threats are not present. Mr. Bill Ahern from Miami-Dade Parks and Recreation Dept.(Crandon Park) is the FWC permitted sea turtle monitor for all of Dade County (excluding Virginia Key) and manages the county's sea turtle hatchery and nest relocation program.
    a. Relocations will be conducted prior to 9 AM each day.

    b. Construction activity shall not occur in any location prior to the completion of necessary sea turtle protection measures

B. Reporting. Report on all nesting activity and marine turtle protection measures taken after construction shall be provided for the initial nesting season following the completion of construction and for a minimum of three additional nesting seasons. Monitoring shall include daily surveys and additional measures for sea turtle protection authorized by FWC. Reports shall include daily activity including nesting success rates, hatching success of all relocated nests, dates of construction, and names of all personnel involved in nest surveys and relocation. Reports detailing activities relative to the Sea Turtle monitoring and nest relocation activities will be forwarded to the FDEP:
   1. Within 60 days of the completion of construction.
   2. By December 31 of each year following construction.

C. Notification. Upon locating a dead, injured, or sick endangered or threatened sea turtle specimen, initial notification must be made to the FWC at 1-888-404-FWCC. Care should be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

Part B. Physical Parameter Monitoring

I. Beach Compaction and Beach Tilling

A. Compaction Monitoring. Compaction monitoring of the in-place beach fill will be conducted within one week of final grading of the beach fill, and annually thereafter for three years.
   1. A cone penetrometer, equivalent to that used by Nelson (1988) will be used for each assessment.
   2. Penetrometer analysis of the beach fill areas will be conducted along lines perpendicular to the shoreline, at 500 foot intervals, throughout the length of the beach fill segments.
   3. Two stations per line will be established when beach width is greater than 50' with the first station one-third the distance between the dune (or seawall) and the mean high water line, and the second station two-thirds the distance between the dune (or seawall) and the mean high water line. If beach width is less than 50' only one station will be established half way between the dune and mean high water line.
   4. Triplicate readings will be made at three depths (6, 12 and 18 inches) at each station.

B. Tilling Criteria. Beach tilling will occur to a depth of 24 inches under the following situations.
   1. Tilling will occur along the entire length of filled beach as soon as possible following completion of the placement and grading of fill material.
   2. Tilling will occur prior to initiation of the sea turtle nesting season if indicated by the beach compaction assessment. If the average value for any depth exceeds 500 psi for any two or more adjacent stations, then that area shall be tilled prior to April 15. 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 consultation with the FWC shall be required to determine if tilling is required.

D. Escarpment Leveling. Visual surveys for escarpments along the beach fill area shall be made immediately after completion of the beach nourishment project and prior to May 1 for the following three years if placed sand still remains on the beach. All scarps shall be leveled or the beach profile shall be reconfigured to minimize scarp formation. In addition, weekly surveys of the project area shall be conducted during the two nesting seasons following completion of fill placement as follows.
   1. The number of escarpments and their location relative to DNR-DEP reference monuments shall be recorded during each weekly survey and reported relative to the length of the beach surveyed (e.g., 50% scarps). Notations on the height of these escarpments shall be included (0 to 2 feet, 2 to 4 feet, and 4 feet or higher) as well as the maximum height of all escarpments.
   2. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet shall be leveled to the natural beach contour by April 15. Any escarpment removal shall be reported relative to R-monument.
   3. If weekly surveys during the marine turtle nesting season document subsequent reformation of escarpments that exceed 18 inches in height for a distance of 100 feet, the FWC shall be contacted immediately to determine the appropriate action to be taken. Upon notification, the permittee shall level escarpments in accordance with mechanical methods prescribed by the FWC.
   4. In the event a sea turtle nest is excavated during scarp remediation activities, all work shall cease in that area immediately and the permitted person responsible for egg relocation for the project should be notified so the eggs can be moved to a suitable relocation site.

II. Hydrographic Monitoring Plan

A. Scope of the plan. This is presented to document Miami-Dade County's comprehensive, long-term monitoring plan for assessment of the performance of the Dade County Beach Erosion Control and Hurricane Surge Protection Project, inclusive of the 10.5 miles of Beach restored from 1975 to 1982, 2.5 miles of Sunny Isles Beach restored in 1988 and segments of Key Biscayne (approximately from reference monument DA-R7 through DA-R113).

B. Monitoring Plan Objectives
   1. Insure a spatially and temporally consistent beach survey program on an annual basis over the full length of the Dade County Beach Erosion Control and Hurricane Surge Protection Project.
   2. Establish a comprehensive beach profile database which will provide for easy data access and will be compatible with all existing State and federal agency database and GIS applications.
   3. Provide greater flexibility than the current project-specific survey schedule to allow for the assessment of acute erosion events due to storms or other causes.

C. Monitoring Plan Components
   1. Annual Project Surveys. This component will consist of project-wide profile surveys at approximately 1000 ft intervals extending from the north Dade County line to the southern tip of Key Biscayne, inclusive of Golden Beach, Fisher Island and Virginia Key (Reference monuments R1 - R113). Survey profiles will be referenced to specific monuments (i.e.,

Range 0+00 = monument location). The profiles will extend from a position landward of the monument sufficient to include existing dune features or other topographic features located on the beach proper out to a distance of 2,500 feet seaward, or closure, whichever is greater. Elevations will be determined minimally at 25 ft intervals along the full length of the profile. In addition, digital georectified (GIS compatible) aerial photography of the County coastline will be provided biannually.

2. Project Specific Monitoring of Alternate Test Beach Sites. New nourishment sites along the project length will have additional interim surveys, which will be conducted midway between the annual surveys for a period of 2 years, to better assess fill adjustment and project performance.
3. Aerial Photography. Miami Dade County conducts digital rectified aerial photography of the county every other year. Dade County will submit copies of digital aerial photography on Compact Disks after each flight.
4. Surveys will be conducted to assess the erosional effects of major storms or other acute erosion events. The timing and extent of these surveys will be determined jointly by Dade County, FDEP and the Corps of Engineers. These surveys would serve to complement, not duplicate any storm effects assessments that may be underway by other state, federal or local agencies.
5. Erosion Triggers and Mitigation of Adverse Impacts. Prior to the Department issuing a Notice to Proceed, the county shall provide a plan proposing criteria by which potential adverse shoreline impacts shall be evaluated and mitigated, including specific thresholds which will trigger mitigation of adverse impacts. The mitigation plan shall include time frames for evaluating impacts, along with specific mitigation actions.

D. Hydrographic Profiles.

1. Annual Reports. An annual report assessing the performance of the project over the prior year will be provided. The report will provide a discussion of erosion/accretion trends documented by the survey program for the entire project with a specific emphasis on recently nourished areas. Specific problem areas will be identified and possible solutions discussed.
2. Storm Monitoring Reports. A report detailing and analyzing the results from Post-Storm hydrographic monitoring conducted during the previous year will be submitted with the annual reports.
3. Data Format. Data will be provided to FDEP on CDs or DVDs within 14 days of the completion of survey activities and data compilation. Data will be submitted in accordance with the FDEP “Procedures for submittal of Beach Monitoring Data” as revised on August 13, 1999.
4. Table 3 provides the timeline for the scheduling of all hydrographic surveys (County Annual and project specific permit required monitoring), for all projects presently existing or under contract. Timing of projects under contract or construction (i.e., the Alternate Test Beach Project).

Table 1. Monitoring tasks and sampling periodicity conducted in association with Contract E: Alternate Test Beach project.

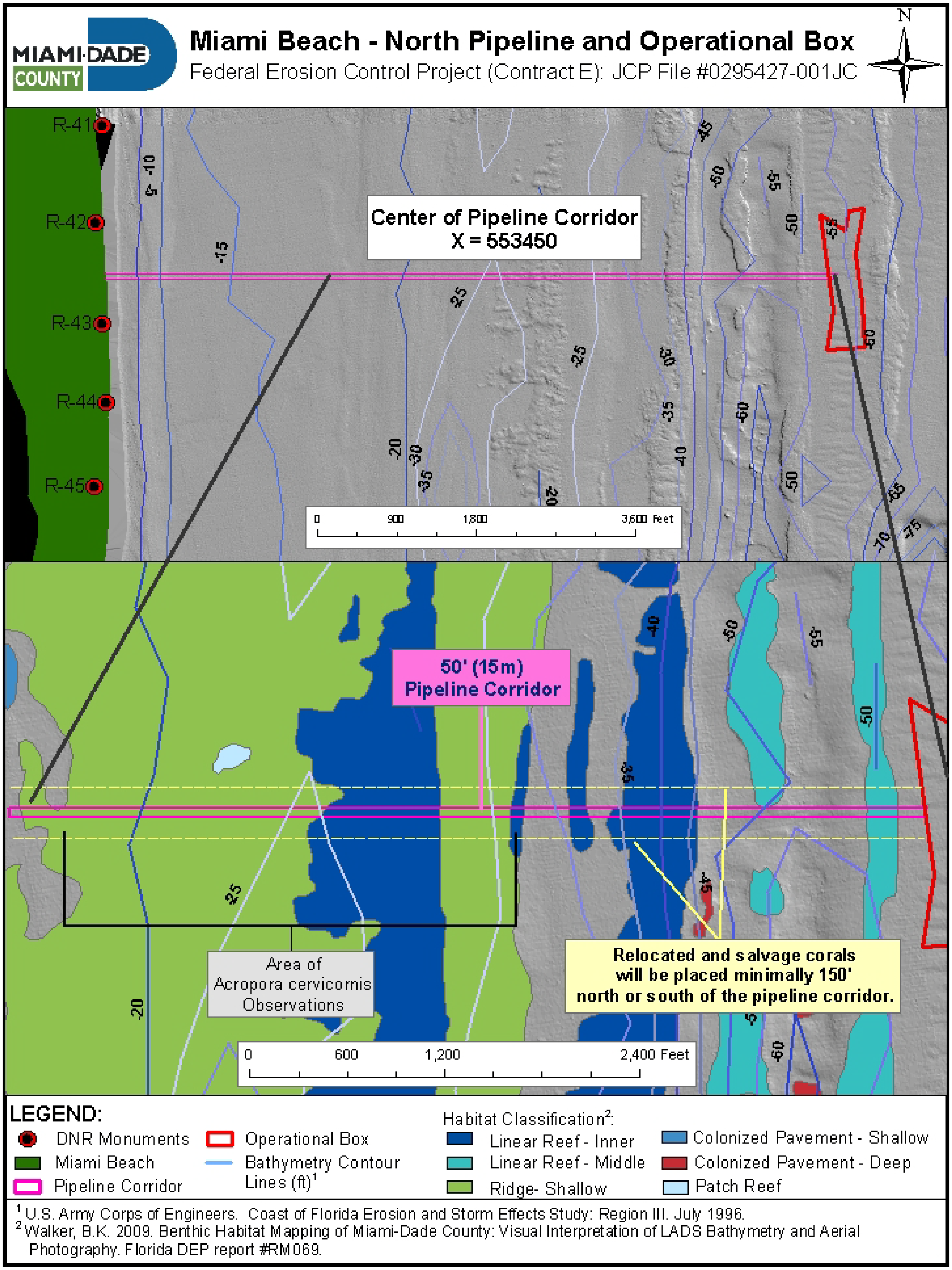
	Task	Pre	Con	Q1-Post	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Pipeline and Op. Box	Hard Coral Relocation	X													
	Hard/Soft Coral Salvage		X												
	Hard/Soft Coral Monitoring		X	X	X	X	X		X		X		X		X
	Pipeline / Op. Box Survey		X												
	Post Pipeline Survey			X											
Lummus	Qualitative Sediment Stress Surveys														
	Quantitative Sediment Monitoring														
Borrow Area	Qualitative Sediment Stress Surveys	X	X	X											
	Quantitative Sediment Monitoring	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Benthic Monitoring	X		X	X	X	X	X	X	X	X	X	X	X	X
	Water Quality Monitoring	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Beach	Compaction/ Escarpment Monitoring*			X				X				X			
	Hydropgraphic Monitoring			X				X				X			

*Compaction/Escarpment Monitoring will be conducted within one week of final beach grading and annual thereafter for 3 years. Annual monitoring will be prior to sea turtle nesting season.

Sea Turtle Nest Monitoring will be conducted as needed during nesting season and as required by permit conditions.

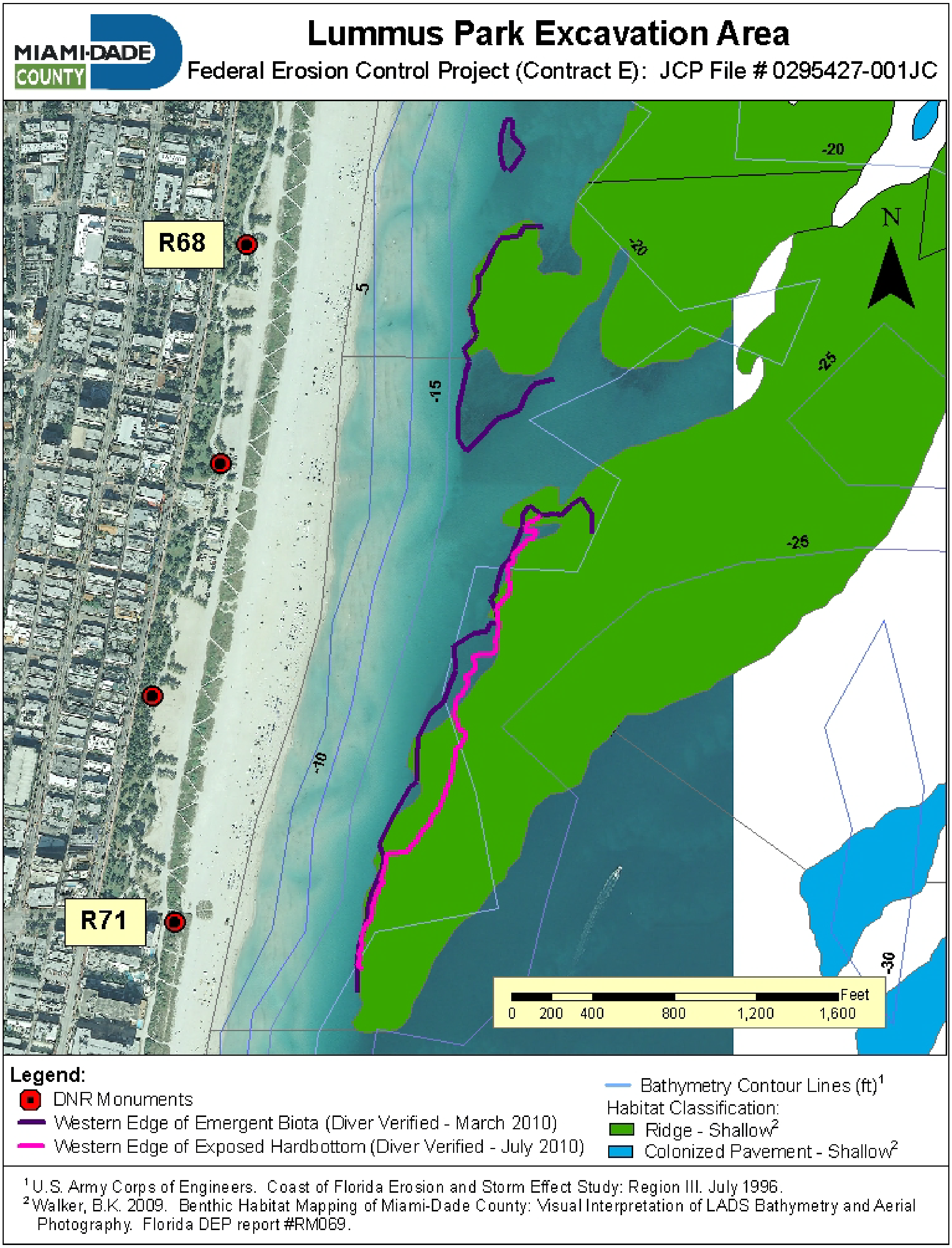
Tilling of beach fill will be conducted on an "as needed" basis, when indicated by the compaction tests and prior to the beginning of the sea turtle nesting season, or with consultation with the FDEP and FWC at other times as deemed necessary and appropriate.

Figure 1. Project Map indicating locations of beach fill and excavation areas, pipeline corridor, borrow area, and reference monitoring station locations.



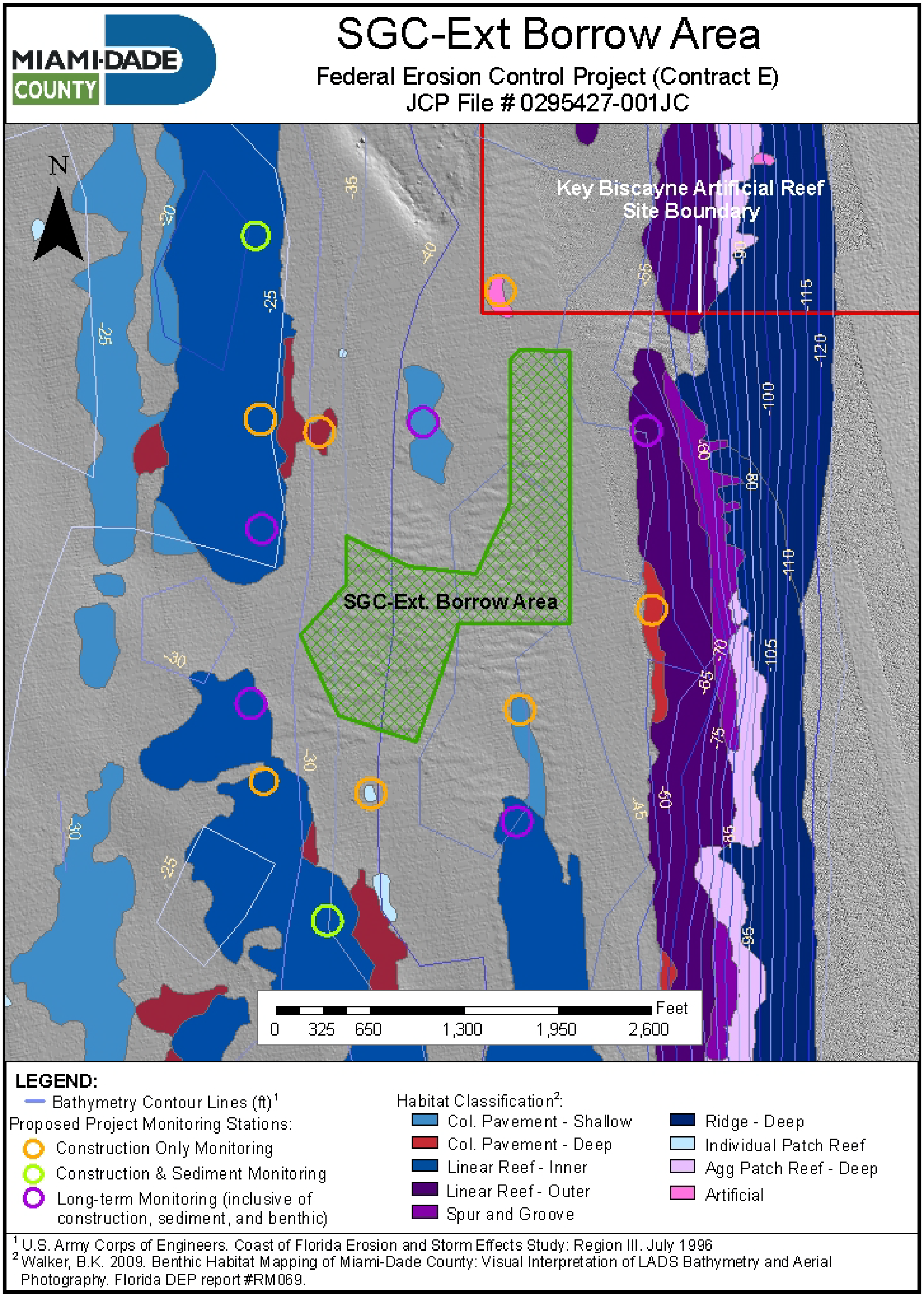
[1] U.S. Army Corps of Engineers. Coast of Florida Erosion and Storm Effects Study: Region III. July 1996.
[2] Walker, B.K. 2009. Benthic Habitat Mapping of Miami-Dade County: Visual Interpretation of LADS Bathymetry and Aerial Photography. Florida DEP report #RM069.

Figure 2. Miami Beach – North Pipeline and Operational Box.



[1] U.S. Army Corps of Engineers. Coast of Florida Erosion and Storm Effect Study: Region III. July 1996.
[2] Walker, B.K. 2009. Benthic Habitat Mapping of Miami-Dade County: Visual Interpretation of LADS Bathymetry and Aerial Photography. Florida DEP report #RM069.

Figure 3. Resources offshore from Lummus Park Excavation Area



[1] U.S. Army Corps of Engineers. Coast of Florida Erosion and Storm Effects Study: Region III. July 1996

[2] Walker, B.K. 2009. Benthic Habitat Mapping of Miami-Dade County: Visual Interpretation of LADS Bathymetry and Aerial Photography. Florida DEP report #RM069.

Figure 4. SGC-Ext Borrow Area and adjacent resources.

APPENDIX F – PERTINENT CORRESPONDENCE

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

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

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

RECEIVED 10/30/08
2:25 pM

OCT 28 2008

Ms. Renee Orr
Chief, Sand and Gravel Program
Minerals Management Service
381 Elden Street, Mail Stop 4010
Herndon, Virginia 22071

Dear Ms. Orr:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is preparing an updated Environmental Assessment for the Dade County Beach Erosion Control Project (BEC) located in Dade County, Florida. The proposed action would involvement beach re-nourishment of the existing federal project in an area approximately 14 miles long in designated "hot spots" along the length of the Dade County BEC project area between the Florida Department of Environmental Protection Range Monuments R-7 and R-62 as denoted in enclosure 1. The designated borrow sites include two areas located more than 3 miles offshore south of the Port of Miami entrance channel, "SCG-EXT" and "Deep water". The need for the project is between 1.8 and 3.0 million cubic yards of sand.

Pursuant to 40 CFR 1501, the Jacksonville District requests the participation of the Minerals Management Service (MMS) as a cooperating agency during the required National Environmental Policy Act (NEPA) process. The purpose of this request is to designate the Corps as the lead federal agency to ensure NEPA compliance for The Dade County BEC Project. Since the Dade BEC project involves the use of Outer Continental Shelf mineral resources, we request that the MMS serve as a cooperating agency during the required NEPA process. The Corps further requests that MMS serve as a cooperating or joint agency on environmental requirements related to the Endangered Species Act (ESA), National Historic Preservation Act (NHPA), Coastal Zone Management Act, and Magnusson-Stevens Fishery Management and Conservation Act. This letter serves as the coordinating request prescribed for ESA Section 7 (50 CFR 402), NHPA Section 106 (36 CFR 800), Subpart C Consistency (15 CFR 930), and Magnusson-Stevens Section 305 (50 CFR 600). Pursuant to 50 CFR 402, the Corps will notify the U.S. Fish and Wildlife Service and NOAA Fisheries Service of its lead role and MMS' cooperating role provided your agreement to serve as a cooperating agency.

Please advise us, at your earliest convenience, as to your agency's willingness to serve as a cooperating agency in the NEPA process for this project. Ms. Terri Jordan will serve as the major point of contact for any MMS involvement in this project and can be reached at 904-232-1817 and

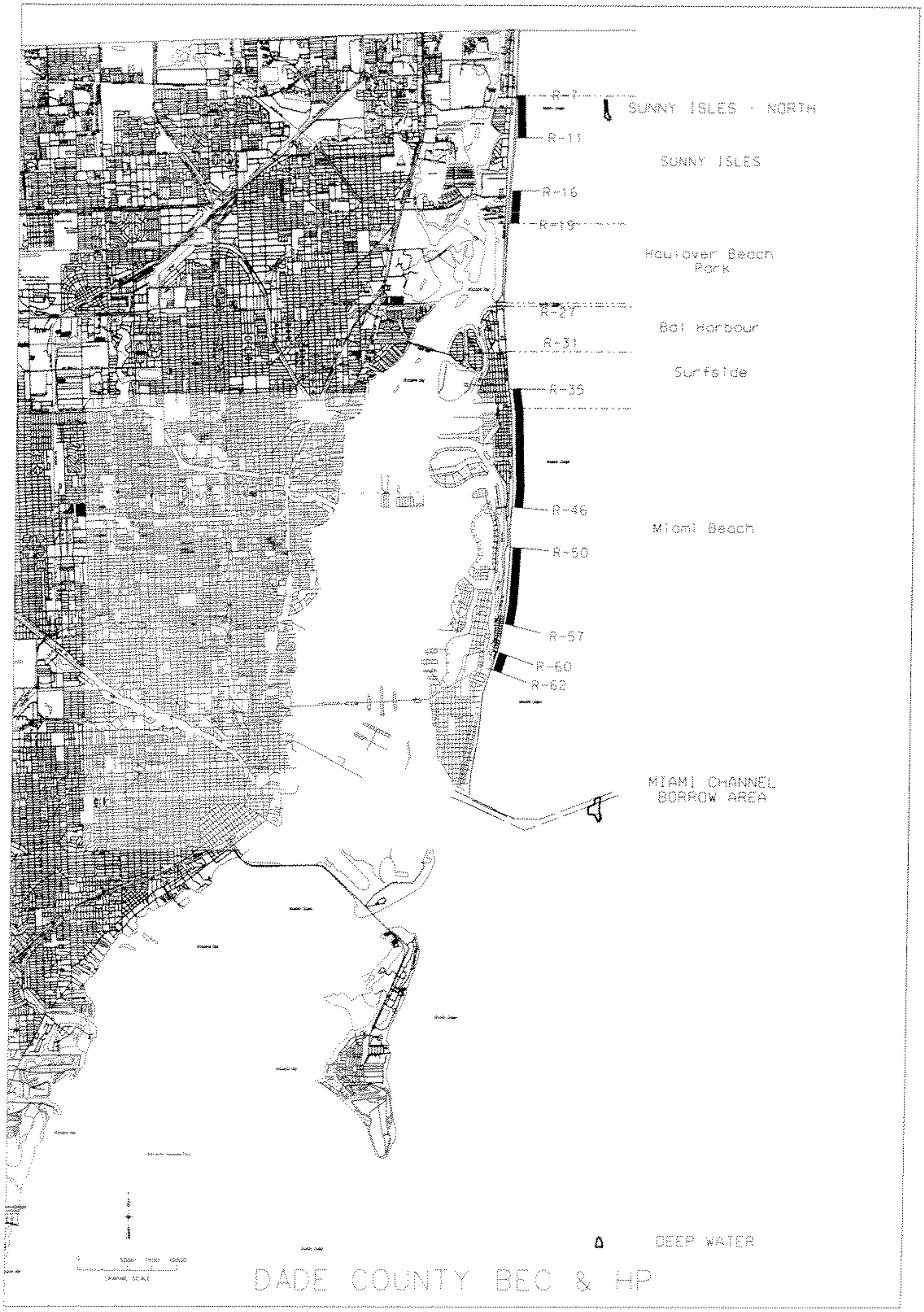
and by email at Terri.L.Jordan@usace.army.mil in the event that you would like additional information regarding this matter. We look forward to an efficient and productive relationship with MMS regarding this important shore protection project.

Sincerely,

Kenneth R Dugger

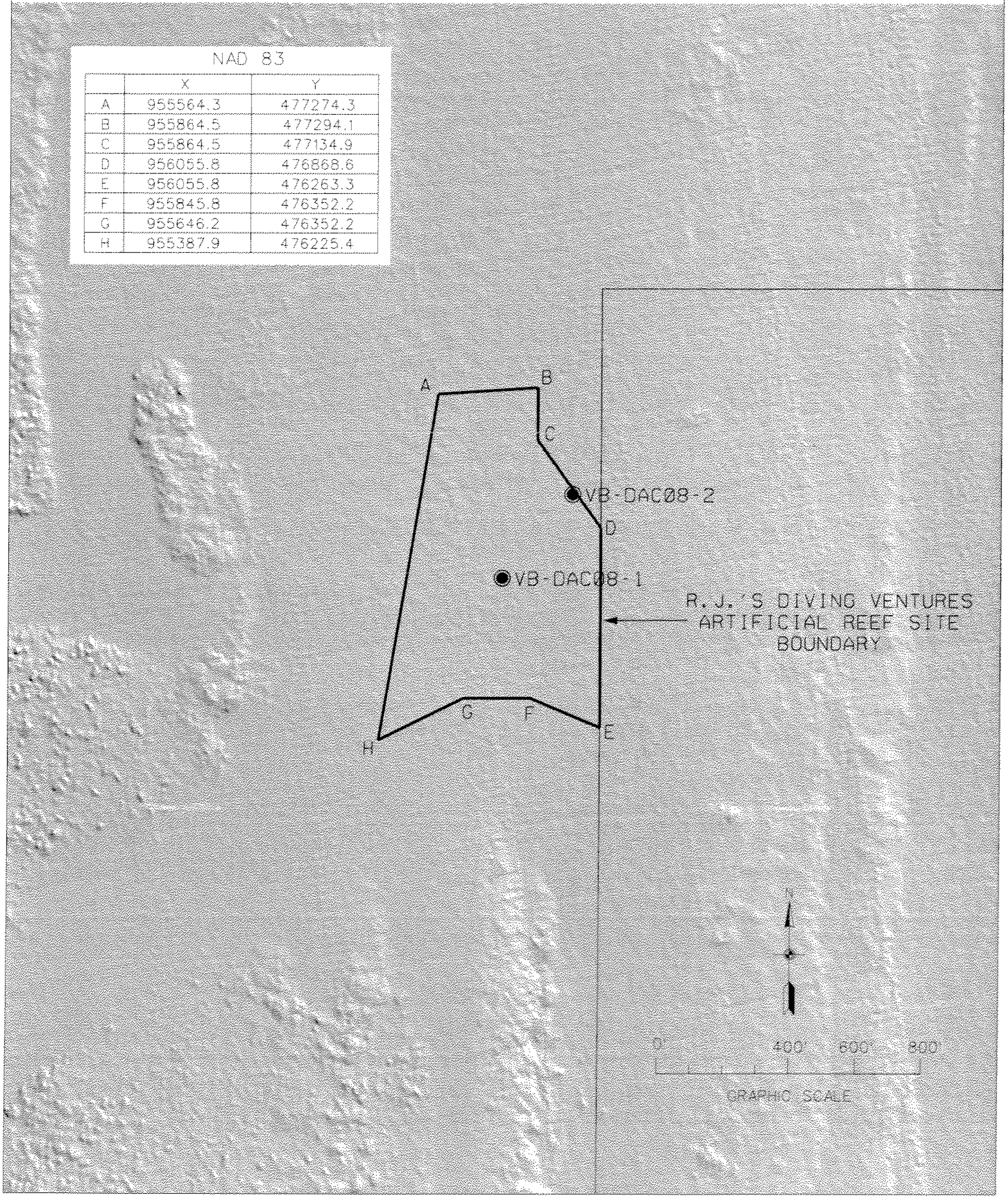
for Eric P. Summa
Chief, Environmental Branch

Enclosure



DADE COUNTY BEC & HP

DEEP WATER

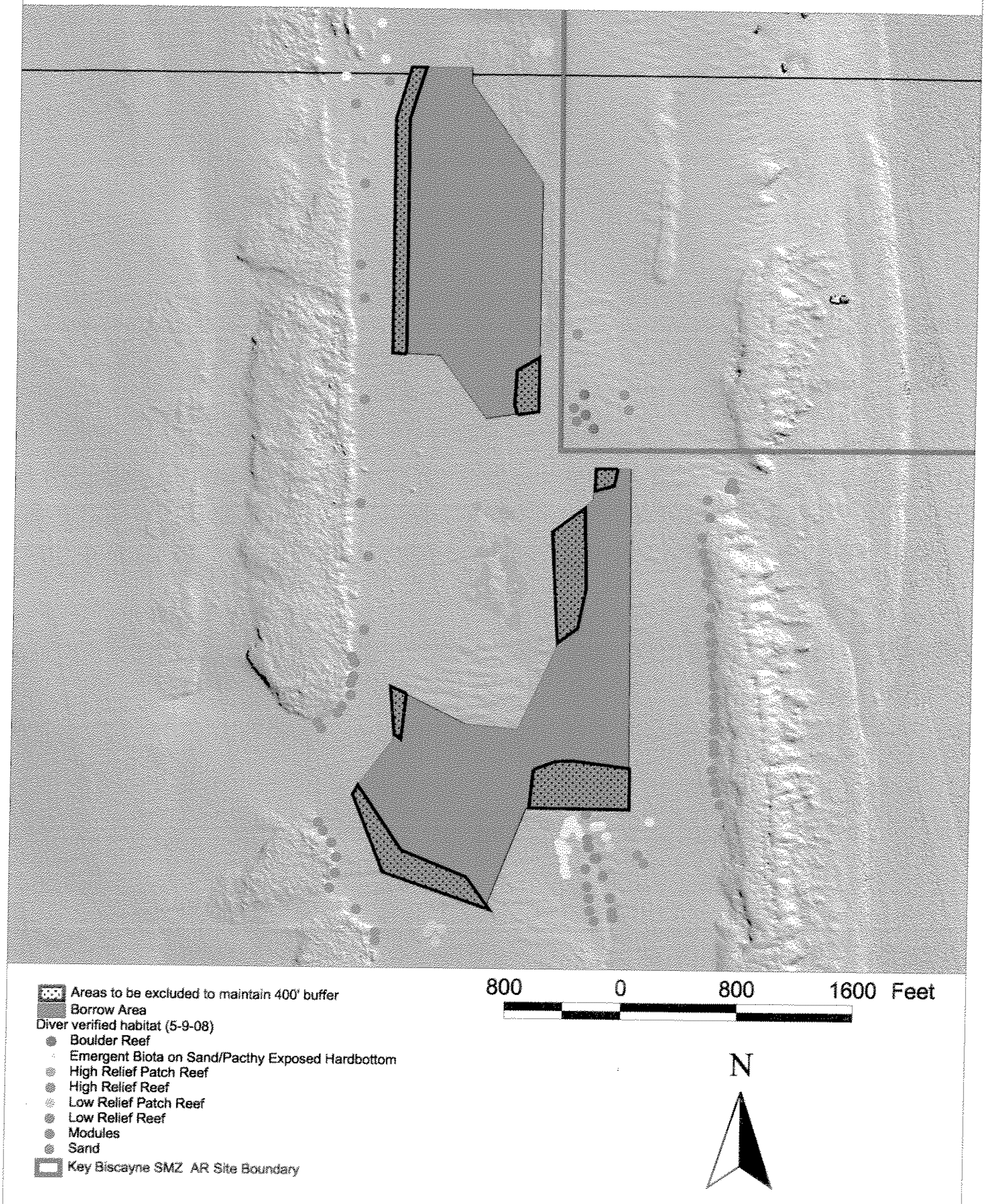


NAD 83

	X	Y
A	955564.3	477274.3
B	955864.5	477294.1
C	955864.5	477134.9
D	956055.8	476868.6
E	956055.8	476263.3
F	955845.8	476352.2
G	955646.2	476352.2
H	955387.9	476225.4

MIAMI-DADE
COUNTY

Borrow Area - SGC-Ext.



United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Washington, DC 20240

NOV 26 2008

Mr. Eric Summa
U.S. Army Corps of Engineers - Jacksonville District
Planning Division, Environmental Branch
P.O. Box 4970
Jacksonville, Florida 32232

Dear Mr. Summa:

Thank you for your October 28, 2008, letter requesting that the Minerals Management Service (MMS) become a cooperating agency during the development of an updated Environmental Assessment (EA) for the Dade County Beach Erosion Control Project located in Dade County, Florida. The proposed action would involve beach re-nourishment of the existing federal project using sand from two borrow areas more than 3 nautical miles offshore the Port of Miami entrance channel.

The MMS welcomes the opportunity to participate in the current NEPA effort and agrees to serve as a cooperating agency since the MMS has jurisdiction over mineral leasing on the Outer Continental Shelf (OCS). As a cooperating agency, the MMS expects to: participate and provide input in the NEPA process at the earliest possible time; assume, on the request of the Corps, responsibility for developing information and preparing environmental analyses for which the MMS has special expertise; make available staff support, at the lead agency's request, to enhance the interdisciplinary capability of the Corps; provide comment on preliminary and draft versions of the EA; and use our own funds to accomplish these responsibilities.

The MMS also recognizes the importance of initiating and agrees to participate in the required Endangered Species Act (ESA) Section 7 consultation; the Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat (EFH) consultation (Section 305); the National Historic Preservation Act Section (NHPA) 106 process; and the Coastal Zone Management Act (CZMA) Section 307 consistency process. As the lead federal agency for ESA Section 7 and the EFH consultations, the Corps must notify the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) of its lead role and MMS' cooperating role. The MMS would expect the Corps, as lead agency, to work with MMS to ensure existing biological opinions from FWS and NMFS are applicable to MMS' part of the Federal action and/or expect to jointly submit the ESA Section 7 and EFH assessments to FWS and NMFS. The MMS expects the Corps to be the lead federal agency for NHPA Section 106 and CZMA Section 307 compliance with the MMS acting in a consulting role.

It is MMS policy to negotiate a new agreement for each use of OCS material; therefore, this agreement only applies to the NEPA and environmental requirements for this project. The final NEPA document, as well as the outcome of other environmental requirements, may be used to establish stipulations of conditions in future negotiated agreements.

The MMS looks forward to working with the Corps during this process. If you would like to discuss any of these items further, please contact Geoffrey Wikel at (703) 787-1283 or by e-mail at Geoffrey.Wikel@mms.gov.

Sincerely,

James F. Bennett
Chief, Branch of Environmental Assessment

cc: Ms. Terri Jordan
U.S. Army Corps of Engineers, Planning Division

Ms. Renee Orr
Minerals Management Service, Leasing Division

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

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

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

DEC 28 2009

To Whom It May Concern:

Pursuant to the National Environmental Policy Act, this letter constitutes the Notice of Availability of the Finding of No Significant Impact (FONSI) for the Beach Erosion Control and Hurricane Protection Project, Contract E, Miami-Dade County, Florida.

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

Please provide all comments to the Draft EA within 60 days, February 26, 2010.

A copy of the EA and FONSI can also be requested by contacting Mr. Pat Griffin at 904-232-2286.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

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

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

MAY 01 2009

Mr. Paul Souza, Field Supervisor
South Florida Field Office
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960

Dear Mr. Souza:

Pursuant to Section 7(a) of the Endangered Species Act, please find enclosed the Biological Assessment for the Dade County Beach Erosion Control Project, Contract "E", addressing the concerns of the threatened and endangered species under the purview of the U.S. Fish and Wildlife Service (FWS). Listed species which may occur in the vicinity of the proposed work and are under the jurisdiction of the National Marine Fisheries Service are: green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), Kemp's ridley turtle (*Lepidochelys kempii*), Hawksbill sea turtle (*Eretmochelys imbricata*), leatherback turtle (*Dermochelys coriacea*), and the West Indian manatee (*Trichecus manatus)*. Based on the enclosed Biological Assessment, the U.S. Army Corps of Engineers has determined that the proposed action may affect, but is not likely to adversely affect the West Indian manatee, Kemp's Ridley turtle, and the Hawksbill sea turtle. The Corps has determined that the project may adversely affect the nesting sea turtle species included in this assessment [loggerhead, green and leatherback turtle]. The Corps requests formal consultation with the FWS regarding these species.

If you have any questions or need further information, please contact Mr. Pat Griffin at 904-232-2286, email Patrick.M.Griffin@usace.army.mil or Ms. Terri Jordan at 904-232-1817, email Terri.L.Jordan@usace.army.mil.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Enclosure

BIOLOGICAL ASSESSMENT TO
THE US FISH AND WILDLIFE SERVICE FOR
DADE COUNTY BEACH EROSION CONTROL PROJECT –
CONTRACT E – BEACH NOURISHMENT

The Corps has initiated an Environmental Assessment (EA) for the placement of approximately 700,000 cubic yards of sand dredged from two borrow areas in Miami-Dade county for placement on priority hot-spots of high rates of erosion along the Miami-Dade County shoreline. This EA looks to combine data from an EIS, an EA a Department of Army permit and two Florida Department of Environmental Protection permits into one project and evaluate those actions under one NEPA umbrella. For this project, Minerals Management Service (MMS), Department of Interior, will serve as co-consulter, with the Corps of Engineers as the lead agency as dictated under Section 7 of the Endangered Species Act.

The preferred alternative of the EA is the dredging of sand from an offshore borrow area located in federal waters (greater than three miles offshore) referred to as “South of Government Cut – Extension” (SGC-Ext) and an onshore borrow site located at Lumus Park on Miami Beach. The proposed placement areas and the Lumus Park borrow areas are previously permitted by the Department of the Army, and those permits remain current, and have been previously consulted on by USFWS as recently as August of 2008.

Project Location

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

There are four areas along the Dade County Beach Erosion Control Project (BEC) that are designated as erosional hot spots in need of immediate nourishment to protect structures. Due to the scarcity of beach quality sand in Dade County – the County is working with the Corps on longer term plans to completely renourish the entire project in the future, however until that can be completed – these hot spots must be addressed. The two highest priority sites are (Figure #1):

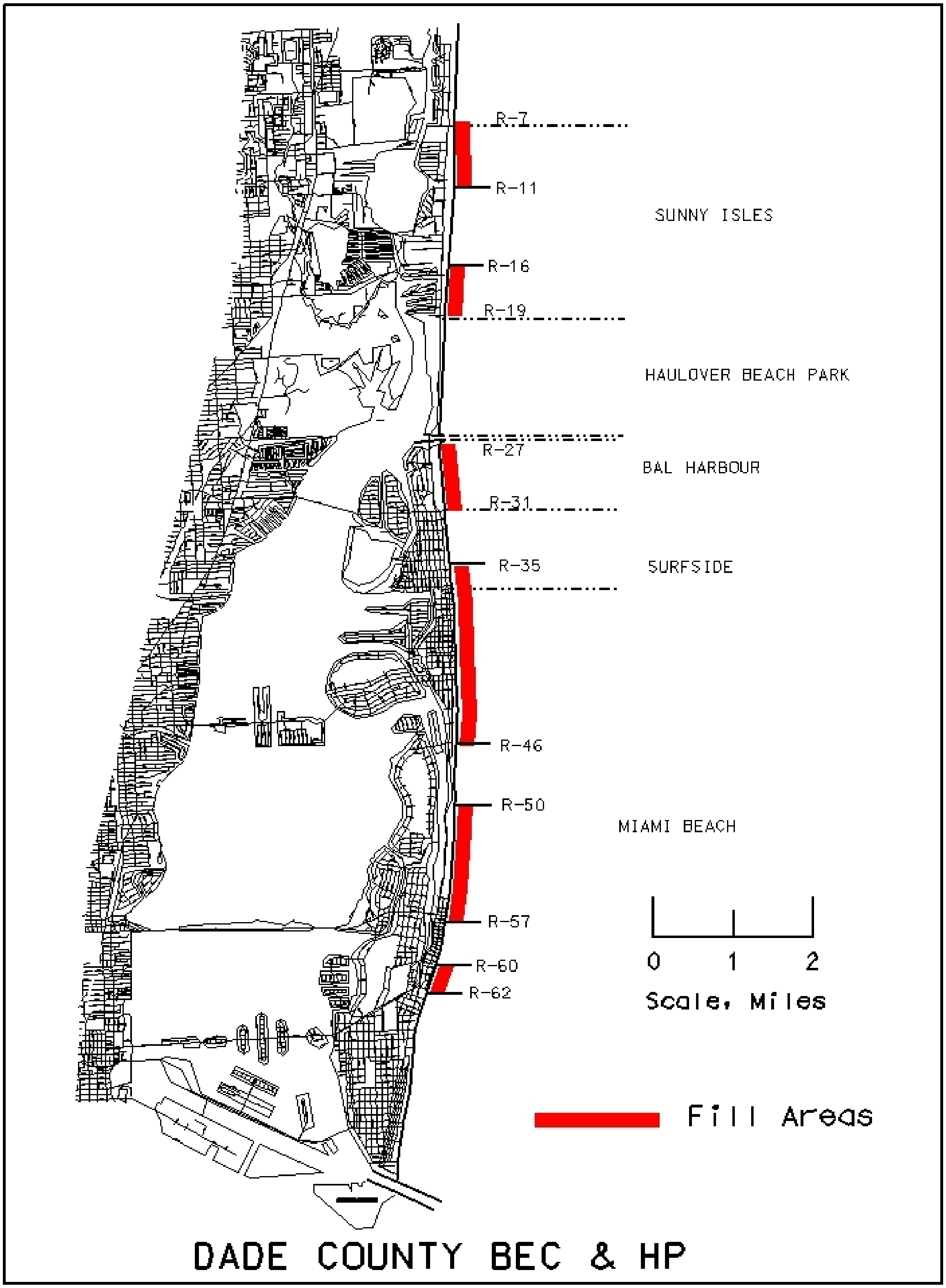


Figure 1 - Dade County BEC Priority Fill Areas

Priority Area #1 (northern Miami Beach - 63rd St): State R-Monuments 37.75 through 46.25 consisting of approximately 8,500 feet of beach. Permit current through 2010. This area has undergone four nourishment events starting with the original project nourishment in 1974 with subsequent renourishment events listed in the table below. USFWS has also previously reviewed activities proposed for this priority area under Department of the Army Permit #SAJ-1999-3761 issued on 08/04/2006 and modified on 09/06/2007 as well as Florida Department of Environmental Protection Permit #0233882-004-JC issued on 09/22/2006 and expires on 09/22/2011.

Date	Cubic Yardage Placed	R-Monument Boundaries
1975-1982	Original nourishment	
1985	110,000	R42-R46
1998	18,000	R44-R45
2001	192,000	

* Source: Dade County Beach Erosion Control Master Plan

Figure 2 - R-Monument 45 Looking North in February 2009

Figure 3 - R-Monument 45 Looking South in February 2009

Priority Area #2 (Miami Beach - 32nd St) from R53.7 to R55.5 consisting of approximately 1,800 feet and R60 to R61 approx 1,000 feet. This area is also referred to as the “Test Beach” area and has been the subject of an Environmental Assessment completed by the Corps with a FONSI determination on 17 September 2002. In addition to review of the EA for the Test Beach, USFWS has also previously reviewed activities proposed for this priority area under well as Florida Department of Environmental Protection Permit #0126527-JC issued on 11/20/2000. This permit expires on August 30, 2010.

This area has undergone numerous nourishment events starting with the original project nourishment in 1974 with subsequent renourishment events listed in the table below.

Date	Cubic Yardage Placed	R-Monument Boundaries
1975-1982	Original Nourishment	
1985	50,000	R57-R60
1994	122,096	R55-R56
1994	30,000	R54-R59
1996	8,000	R54-R60
1997	30,000	R57-R59
1997	478,938	R53-R58
2001	125,000	
2005	35,000	
2006	35,000	R48.7-R61

2008	70,000	R60-R70

* Source: Dade County Beach Erosion Control Master Plan

These two areas combined are referred to as “Contract E” in the long-term management plan for the Dade County BEC. All estimates of required placement volumes were developed based on January 2009 surveys conducted by the County.

EA Preferred Alternative – Placement of approximately 474,000 cubic yards of beach quality sand in Priority placement area #1 and approximately 218,000 cubic yards of beach quality sand into placement area #2.

Material for placement at area #1 would be dredged from the SGC-Ext borrow area and material for placement areas #2 would be dredged from accretion areas to the south, on the beach itself and pumped north to the site using a “dredge on land” as was used previously in Dade County in 2008 at Lumus park (Figure 5 and 6). SCG-Ext borrow area is expected to provide approximately 500,000 CYs of beach quality sand based on geotechnical investigations conducted for this study. The Corps has previously provided these findings to USFWS and other resource agencies during interagency coordination meetings.

To ensure containment of placement materials, a temporary sand dike will be constructed to aid in holding the material in the desired locations as well as to dewater the placement material. Bulldozers will be used on the beach to assist in even distribution of sand and to create proper sand height and slope.

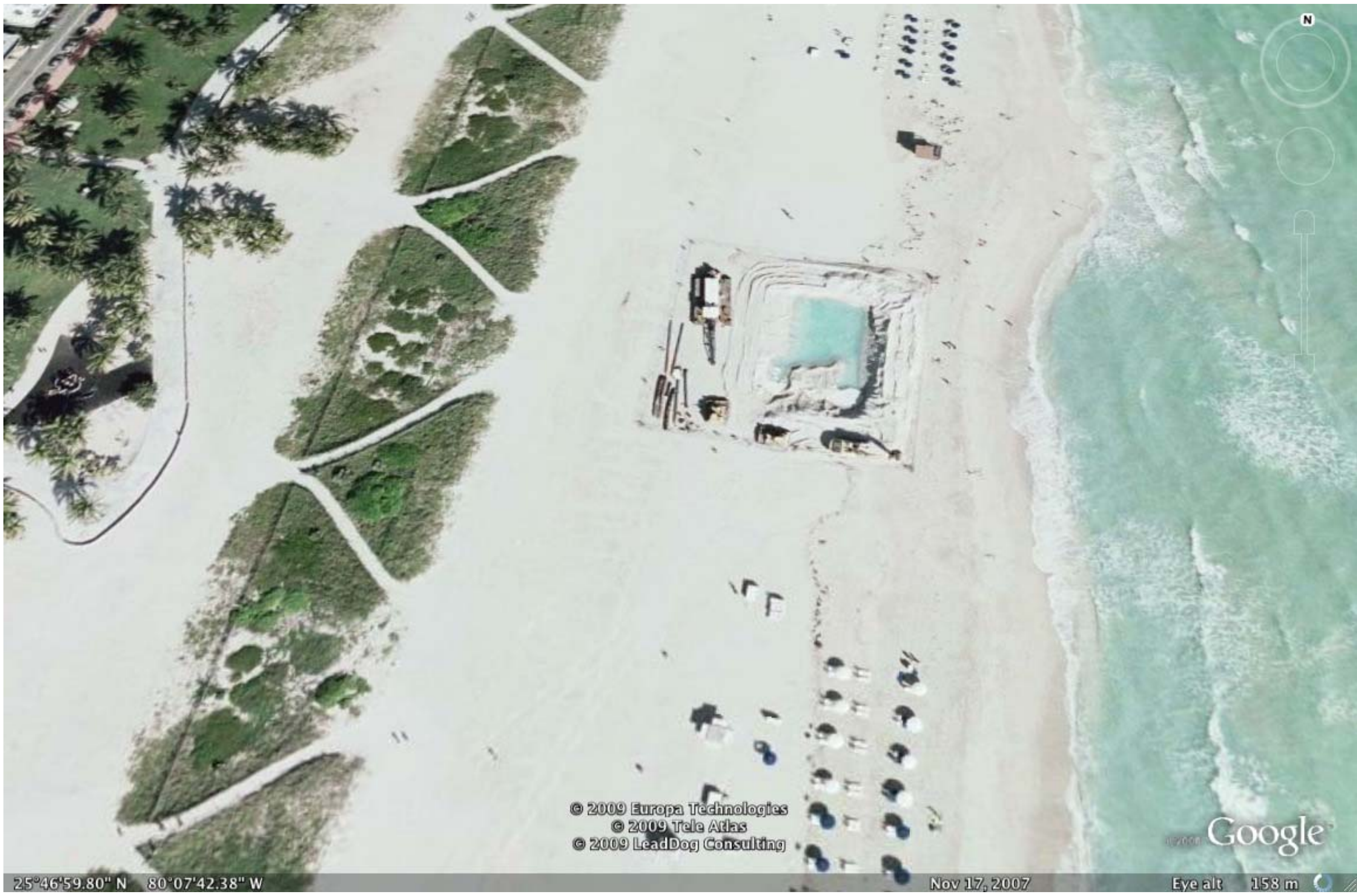


Figure 4 - Dredge on the Beach at Lumus Park

Figure 5 - Dredge on the Beach in Back-passing program at Lumus Park

Protected Species Under USFWS Jurisdiction Included in this Assessment

The Corps has reviewed the biological, status, threats and distribution information available through recovery plans, status reviews, previous biological assessments and biological opinions and believes that the following species will be in or near the action area and thus may be affected by the proposed project: the West Indian manatee (*Trichecus manatus*) and nesting sea turtles [loggerhead sea turtle, *(Caretta caretta)*, green turtles (*Chelonia mydas)*, leatherback turtles (*Dermochelys coriacea)*, hawksbill turtles (*Eretmochelys imbricate)*, and the Kemp's ridleys (*Lepidochelys kempii)*]. No designated critical habitat is located in the project area.

West Indian Manatee

Status. Endangered.

Background.

The West Indian manatee (*Trichechus manatus*), also known as the Florida manatee, is a Federally-listed endangered aquatic mammal protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), the Marine Mammal Protection Act of 1972, as amended (16 U.S.C 1461 et seq.), and the Florida

Manatee Sanctuary Act of 1978, as amended. Manatees inhabit both salt and fresh water and can be found in shallow (5 ft to usually <20 ft), slow-moving rivers, estuaries, saltwater bays, canals, and coastal areas (USFWS, 1991) throughout their range. On occasion, manatees have been observed as much as 3.7 miles off the Florida Gulf coast. The West Indian manatee is herbivorous and eats aquatic plants such as hydrilla, eelgrass, and water lettuce.

During the cooler months between October and April, Florida manatees concentrate in areas of warmer water. Manatees are thermally stressed at water temperatures below 18ºC (64.4ºF) (Garrott *et al*., 1995); therefore, during winter months, when ambient water temperatures approach 20ºC (68ºF), the U.S. manatee population confines itself to the coastal waters of the southern half of peninsular Florida and to springs and warm water industrial outfalls as far north as southeast Georgia. Manatees also winter in the St. Johns River near Blue Spring State Park. Severe cold fronts have been known to kill manatees when the animals did not have access to warm water refuges. During summer months, they may migrate as far north as coastal Virginia on the east coast and the Louisiana coast on the Gulf of Mexico and appear to choose areas based on an adequate food supply, water depth, and proximity to fresh water (USFWS, 1983). Annual migratory circuits of some individuals through the intracoastal waterway of the Atlantic Coast are 1,700 km round trips at seasonal travel rates as high as 50 km/day (Reid *et al*., 1991)

Manatee population trends are poorly understood, but deaths have increased steadily. The population of manatees in Florida has been estimated to be at least 1,865 individuals. In the last decade, yearly mortality in Florida has averaged nearly 150 animals a year (USFWS, 1983). A large percent of mortality is due to collisions with watercrafts, especially of calves. Another closely related factor in their decline has been the loss of suitable habitat through incompatible coastal development, particularly destruction of sea grass beds by boating facilities (USFWS, 2001).

Critical Habitat.

The following areas in Florida (exclusive of those existing manmade structures or settlements which are not necessary to the normal needs or survival of the species) are critical habitat for the manatee: Crystal River and its headwaters known as King's Bay, Citrus County; the Little Manatee River downstream from the U.S. Highway 301 bridge, Hillsborough County, the Little Manatee River downstream from the Lake Manatee Dam, Manatee County; the Myakka River downstream from Myakka River State Park, Sarasota and Charlotte Counties; the Peace River downstream from the Florida State Highway 760 bridge, DeSoto and Charlotte Counties; and Charlotte Harbor north of the Charlotte-Lee County line, Charlotte County; Caloosahatchee River downstream from the Florida State Highway 31 bridge, Lee County; all United States territorial waters adjoining the coast and islands of Lee County; all United States territorial waters adjoining the coast and islands and all connected bays, estuaries, and rivers from Gordon's Pass near Naples, Collier County, southward to and including Whitewater Bay, Monroe County; all waters of Card, Barnes, Blackwater, Little Blackwater, Manatee, and Buttonwood Sounds between Key Largo, Monroe County; and the mainland of Dade County; Biscayne Bay, and all adjoining and connected lakes, rivers, canals, waterways from the southern tip of Key Biscayne northward to and including Maule Lake, Dade County; all of Lake Worth, from its northernmost point immediately south of the intersection of U.S. Highway 1 and Florida State Highway A1A 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 Sewalls Point, Martin County, to Jupiter Inlet, Palm Beach County; the entire section of water known as the Indian River, from its northernmost point immediately south of the intersection of U.S. Highway 1, and Florida State Highway 3, Volusia County, southward to its southernmost point near the town of Sewalls Point, Martin County; the entire inland section of water known as the Banana river and all waterways between the Indian and Banana rivers, Brevard County; the St. Johns River including Lake George, and including Blue Springs and Silver Glen Springs from their points of origin to their confluences with the St. Johns River; that section of the Intracoastal Waterway from its confluence with the St. Marys River on the Georgia-Florida border to the Florida State Highway A1A bridge south of Coastal City, Nassau and Duval Counties (http://www.fws.gov/northflorida/Manatee/Documents/Critical-Habitat-Manatee.pdf).

Conservation Measures Taken in the Project Area as Part of the Proposed Action

The Corps will incorporate the standard manatee protection construction conditions into our plans and specifications for this project. These standard conditions are:

1. The contractor instructs all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel are responsible for observing water-related activities for the presence of manatee(s), and shall implement appropriate precautions to ensure protection of the manatee(s).

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

3. Prior to commencement of construction, the prime contractor involved in the construction activities shall construct and display at least two temporary signs (placard) concerning manatees. For all vessels, a temporary sign (at least 8 1/2" x 11") reading "Manatee Habitat/Idle Speed In Construction Area" will be placed in a prominent location visible to employees operating the vessels. A second temporary sign (at least 8 1/2" x 11") reading "Warning, Manatee Habitat: Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment. Any collision with and/or injury to a manatee shall be reported immediately to the Florida Marine Patrol at 1-800-DIAL-FMP" will be located prominently adjacent to the displayed

issued construction permit. Temporary notices are to be removed by the permittee upon completion of construction.

4. All vessels associated with the project operate at "idle speed/no wake" at all times while in the construction area and while in waters where the draft of the vessel provides less than a four foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

5. If manatees are seen within 100 yards of the active daily construction/dredging operation, all appropriate precautions shall be implemented to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet of a manatee. Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment.

6. Any collision with and/or injury to a manatee shall be reported immediately to the Florida Marine Patrol (1-800-DIALFMP) and to the Florida Department of Protection, Office of Protected Species Management at (904)922-4330.

7. The contractor maintains a log detailing sightings, collisions, or injuries to manatees should they occur during the contract period. A report summarizing incidents and sightings shall be submitted to the Florida Department of Protection, Office of Protected Species Management, Mail Station 245, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399 and to the U.S. Fish and Wildlife Service, 3100 University Boulevard, Jacksonville, FL 32216. This report must be submitted annually or following the completion of the project if the contract period is less than a year.

Sea Turtles

Species/Critical Habitat Description

Loggerhead Sea Turtle

The loggerhead sea turtle, listed as a threatened species on July 28, 1978, (43 FR 32800) inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. Loggerhead sea turtles nest within the continental United States (U.S.) from Louisiana to Virginia. Major nesting concentrations in the U.S. are found on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida (Hopkins and Richardson 1984).

On 16 November 2007, the NMFS received a petition from Oceana and the Center for Biological Diversity requesting that loggerhead turtles in the western North Atlantic Ocean be reclassified as a Distinct Population Segment (DPS) with endangered status and that critical habitat be designated. On 05 March 2008, the NMFS position finding was published in the Federal Register indicating that a re-classification of the loggerhead in the western North Atlantic Ocean as a DPS and listing of the DPS as endangered may be warranted (Federal Register/Vol. 73, No. 44/Wednesday, March 5, 2008/Proposed

Rules). An affirmative 90-day finding requires that the NMFS commence a status review on the loggerhead turtle. Upon completion of this review, the NMFS will make a finding on whether reclassification of the loggerhead in the western North Atlantic Ocean as endangered is warranted, warranted but precluded by higher priority listing actions, or not warranted.

No critical habitat has been designated for the loggerhead sea turtle.

Green Sea Turtle

The green sea turtle was federally listed as a protected species on July 28, 1978 (43 FR 32800). Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. The green sea turtle has a worldwide distribution in tropical and subtropical waters. Major green sea turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surinam. Within the U.S., green sea turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida, particularly in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties (National Marine Fisheries Service [NOAA Fisheries] and Service 1991a). Nesting has also been documented along the Gulf coast of Florida on Santa Rosa Island (Okaloosa and Escambia Counties) and from Pinellas County through Collier County (Florida Fish and Wildlife Conservation Commission [FWC] 2004). Green sea turtles also nest sporadically in Georgia, North Carolina, and South Carolina. Unconfirmed nesting of green sea turtles in Alabama has also been reported according to unpublished Bon Secour National Wildlife Refuge nesting reports.

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys.

Leatherback Sea Turtle

The leatherback sea turtle was listed as an endangered species on June 2, 1970, (35 FR 8491) and nests on shores of the Atlantic, Pacific, and Indian Oceans. Non-breeding animals have been recorded as far north as the British Isles and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard 1992). Nesting grounds are distributed worldwide, with the Pacific Coast of Mexico supporting the world's largest known concentration of nesting leatherbacks. The largest nesting colony in the wider Caribbean region is found in French Guiana, but nesting occurs frequently, although in lesser numbers, from Costa Rica to Columbia and in Guyana, Surinam, and Trinidad (NOAA Fisheries and Service 1992; National Research Council [NRC] 1990). The leatherback regularly nests in the U.S. in Puerto Rico, the U.S. Virgin Islands, and along the Atlantic coast of Florida as far north as Georgia (NOAA Fisheries and Service 1992). Leatherback turtles occasionally nest in Georgia, South Carolina, and North Carolina. Leatherback nesting has also been reported on the northwest coast of Florida (LeBuff 1990; FWC 2004); a false crawl (non-nesting emergence) has been observed on Sanibel Island (LeBuff 1990).

Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of Saint Croix, U.S. Virgin Islands.

Hawksbill Sea Turtle

Hawksbills nest on average about 4.5 times per season at intervals of approximately 14 days (Corliss et al. 1989). In Florida and the U.S. Caribbean, clutch size is approximately 140 eggs, although several records exist of over 200 eggs per nest (NOAA Fisheries and Service 1993). On the basis of limited information, nesting migration intervals of 2 to 3 years appear to predominate. Hawksbills are recruited into the reef environment at about 14 inches in length and are believed to begin breeding about 30 years later. The time required to reach 14 inches in length however, is unknown and growth rates vary geographically. As a result, actual age at sexual maturity is not known.

Critical habitat for the hawksbill sea turtle has been designated for selected beaches and/or waters of Mona, Monito, Culebrita, and Culebra Islands, Puerto Rico.

Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle was listed as endangered on December 2, 1970 (35 FR 18320). The range of the Kemp's ridley includes the Gulf coasts of Mexico and the U.S., and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland. Most Kemp's ridleys nest on the coastal beaches of the Mexican states of Tamaulipas and Vera Cruz, although a very small number of Kemp's ridleys nest consistently along the Texas coast (Turtle Expert Working Group 1998). In addition, rare nesting events have been reported in Florida, Alabama, South Carolina, and North Carolina. Hatchlings, after leaving the nesting beach, are believed to become entrained in eddies within the Gulf of Mexico, where they are dispersed within the Gulf and Atlantic by oceanic surface currents until they reach about 20 cm in length, at which size they enter coastal shallow water habitats (Ogren 1989). Outside of nesting, adult Kemp's ridleys are believed to spend most of their time in the Gulf of Mexico, while juveniles and subadults regularly occur along the eastern seaboard of the United States (Service and NOAA Fisheries 1992).

No critical habitat has been designated for the Kemp's ridley sea turtle.

Life History

Loggerhead Sea Turtle

Loggerheads are known to nest from one to seven times within a nesting season (Talbert et al. 1980; Richardson and Richardson 1982; Lenarz et al. 1981; the mean is approximately 4.1 (Murphy and Hopkins 1984). The interval between nesting events within a season varies around a mean of about 14 days (Dodd 1988). Mean clutch size varies from about 100 to 126 along the southeastern U.S. coast (NOAA Fisheries and Service 1991b). Nesting migration intervals of 2 to 3 years are most common in loggerheads, but the number can vary from 1 to 7 years (Dodd 1988). Age at sexual maturity is believed to be about 20 to 30 years (Turtle Expert Working Group 1998).

Green Sea Turtle

Green sea turtles deposit from one to nine clutches within a nesting season, but the average is about 3.3. The interval between nesting events within a season varies around a mean of about 13 days (Hirth 1997). Mean clutch size varies widely among populations. Average clutch size reported for Florida was 136 eggs in 130 clutches (Witherington and Ehrhart 1989). Only occasionally do females produce clutches in successive years. Usually 2, 3, 4, or more years intervene between breeding seasons (NOAA Fisheries and Service 1991a). Age at sexual maturity is believed to be 20 to 50 years (Hirth 1997).

Leatherback Sea Turtle

Leatherbacks nest an average of five to seven times within a nesting season, with an observed maximum of 11 (NOAA Fisheries and Service 1992). The interval between nesting events within a season is about 9 to 10 days. Clutch size averages 80 to 85 yolked eggs, with the addition of usually a few dozen smaller, yolkless eggs, mostly laid toward the end of the clutch (Pritchard 1992). Nesting migration intervals of2 to 3 years were observed in leatherbacks nesting on the Sandy Point National Wildlife Refuge, Saint Croix, U.S. Virgin Islands (McDonald and Dutton 1996). Leatherbacks are believed to reach sexual maturity in 6 to 10 years (Zug and Parham 1996).

Hawksbill Sea Turtle

Hawksbills nest on average about 4.5 times per season at intervals of approximately 14 days (Corliss et al. 1989). In Florida and the U.S. Caribbean, clutch size is approximately 140 eggs, although several records exist of over 200 eggs per nest (NOAA Fisheries and Service 1993). On the basis of limited information, nesting migration intervals of 2 to 3 years appear to predominate. Hawksbills are recruited into the reef environment at about 14 inches in length and are believed to begin breeding about 30 years later. The time required to reach 14 inches in length however, is unknown and growth rates vary geographically. As a result, actual age at sexual maturity is not known.

Kemp's Ridley Sea Turtle

Nesting occurs from April into July during which time the turtles appear off the Tamaulipas and Vera Cruz coasts of Mexico. Precipitated by strong winds, the females swarm to mass nesting emergences, known as arribadas or arribazones, to nest during daylight hours. Clutch size averages 100 eggs (Service and NOAA Fisheries 1992). Some females breed annually and nest an average of one to four times in a season at intervals of 10 to 28 days. Age at sexual maturity is believed to be between 7 to 15 years (Turtle Expert Working Group 1998).

Population Dynamics

Loggerhead Sea Turtle

Total estimated nesting in the southeastern U.S. is approximately 68,000 to 90,000 nests per year, according to the FWC statewide nesting database 2002, the Georgia Department of Natural Resources statewide nesting database 2002, the South Carolina Department of Natural Resources statewide nesting database 2002, and the North Carolina Wildlife Resources Commission statewide nesting database 2002. In 1998, there were over 80,000 nests in Florida alone. From a global perspective, the southeastern U.S. nesting aggregation is of paramount importance to the survival of the species and is second in size only to that which nests on islands in the Arabian Sea off Oman (Ross 1982; Ehrhart 1989; NOAA Fisheries and Service 1991b). The status of the Oman colony has not been evaluated recently (Meylan et al. 1995). The loggerhead nesting aggregations in Oman, the southeastern U.S., and Australia account for about 88 percent of nesting worldwide (NOAA Fisheries and Service 1991b). About 80 percent of loggerhead nesting in the southeastern U.S. occurs in six Florida counties (Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties) (NOAA Fisheries and Service 1991b).

Green Sea Turtle

Between 1989 and 2006, the annual number of green turtle nests at core index beaches ranged from 267 to 7,158 (Florida Marine Research Institute Statewide Nesting Database). While the pattern of green turtle nesting shows biennial peaks in abundance, there is a generally positive trend since establishment of index beaches in Florida in 1989. In the U.S. Pacific, over 90 percent of nesting throughout the Hawaiian archipelago occurs at the French Frigate Shoals, where about 200 to 700 females nest each year (NOAA Fisheries and Service 1998a). Elsewhere in the U.S. Pacific, nesting takes place at scattered locations in the Commonwealth of the Northern Marianas, Guam, and American Samoa. In the western Pacific, the largest green sea turtle nesting aggregation in the world occurs on Raine Island, Australia, where thousands of females nest nightly in an average nesting season (Limpus et al. 1993). In the Indian Ocean, major nesting beaches occur in Oman where 30,000 females are reported to nest annually (Ross and Barwani 1995).

Leatherback Sea Turtle

Estimates of global nesting populations indicate 26,000 to 43,000 nesting females annually (Spotila et al. 1996). The largest nesting populations at present occur in the western Atlantic in French Guiana (4,500 to 7,500 females nesting per year), Colombia (an estimated several thousand nests annually), and in the western Pacific in West Papua (formerly Irian Jaya) and Indonesia (about 600 to 650 females nesting per year). In the U.S., small nesting populations occur on the Florida east coast (100 females per year) (FWC 2004), Sandy Point, U.S. Virgin Islands (50 to 190 females per year) (Alexander et al. 2002), and Puerto Rico (30 to 90 per year).

Hawksbill Sea Turtle

About 15,000 females are estimated to nest each year throughout the world with the Caribbean accounting for 20 to 30 percent of the world's hawksbill population. Only five regional populations remain with more than 1,000 females nesting annually (Seychelles, Mexico, Indonesia, and two in Australia) (Meylan and Donnelly 1999). Mexico is now the most important region for hawksbills in the Caribbean with about 3,000 nests per year (Meylan 1999). Other significant, but smaller populations in the Caribbean still occur in Martinique, Jamaica, Guatemala, Nicaragua, Grenada, Dominican Republic, Turks and Caicos Islands, Cuba, Puerto Rico, and U.S. Virgin Islands. In the U.S. Caribbean, about 150 to 500 nests per year are laid on Mona Island, Puerto Rico, and 70 to 130 nests per year on Buck Island Reef National Monument, U.S. Virgin Islands. In the U.S. Pacific, hawksbills nest only on main island beaches in Hawaii, primarily along the east coast of the island of Hawaii. Hawksbill nesting has also been documented in American Samoa and Guam (NOAA Fisheries and Service 1998b).

Kemp's Ridley Sea Turtle

The 40,000 nesting females estimated from a single mass nesting emergence in 1947 reflected a much larger total number of nesting turtles in that year than exists today (Carr 1963; Hildebrand 1963). Nesting in Mexico, however, has steadily increased from 702 nests in 1985 to over 6,000 nests in 2000 (Service 2001). Despite protection for the nests, turtles have been and continue to be lost to incidental catch by shrimp trawls (Service and NOAA Fisheries 1992).

Status and Distribution

Loggerhead Sea Turtle

A number of stock assessments (TEWG, 1998; TEWG, 2000; NMFS 2001a; Heppell *et al*. 2003) have examined the stock status of loggerheads in the waters of the United States, but have been unable to develop any reliable estimates of absolute population size. Based on nesting data of the five western Atlantic subpopulations, the south Florida-nesting and the northern-nesting subpopulations are the most abundant (TEWG 2000; NMFS 2001a). Between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,014 to 92,182 annually with a mean of 73,751 (TEWG 2000). On average, 90.7 percent of these nests were of the south Florida subpopulation and 8.5 percent were from the northern subpopulation (TEWG 2000). The TEWG (2000) assessment of the status of these two better-studied populations concluded that the south Florida subpopulation was increasing at that time, while no trend was evident (may be stable but possibly declining) for the northern subpopulation. A more recent analysis of nesting data from 1989-2005 by the Florida Wildlife Research Institute indicates there is a declining trend in nesting at beaches utilized by the south Florida nesting subpopulation (McRae letter to NMFS, October 25, 2006). Nesting data obtained for the 2006 nesting season are also consistent with the decline in loggerhead nests (Meylan pers. comm. 2006). It is unclear at this time whether the nesting decline reflects a decline in population, or is indicative of a failure to nest by the reproductively mature females as a result of other factors (resource depletion, nesting beach problems, oceanographic conditions, etc.).

For the northern subpopulations, recent estimates of loggerhead nesting trends in Georgia from standardized daily beach surveys showed significant declines ranging from 1.5 to 1.9 percent annually (Mark Dodd, Georgia Department of Natural Resources, pers. comm., 2006). Nest totals from aerial surveys conducted by the South Carolina Department of Natural Resources showed a 3.3 percent annual decline in nesting since 1980. Another consideration that may add to the importance and vulnerability of the northern subpopulation is the sex ratios of this subpopulation. NMFS scientists have estimated that the northern subpopulation produces 65 percent males (NMFS 2001a). However, new research conducted over a limited time frame has found opposing sex ratios (Wyneken *et al*. 2004) so further information is needed to clarify the issue. Since nesting female loggerhead sea turtles exhibit nest fidelity, the continued existence of the northern subpopulation is related to the number of female hatchlings that are produced. Producing fewer females will limit the number of subsequent offspring produced by the subpopulation.

The remaining three subpopulations – Dry Tortugas, Florida Panhandle, and Yucatán – are much smaller, but also relevant to the continued existence of the species. Nesting surveys for the Dry Tortugas subpopulation are conducted as part of Florida's statewide survey program. Survey effort has been relatively stable during the 9-year period from 1995-2003 (although the 2002 year was missed). Nest counts ranged from 168-270 but with no detectable trend during this period (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Statewide Nesting Beach Survey Data). Nest counts for the Florida Panhandle subpopulation are focused on index beaches rather than all beaches where nesting occurs. Currently, there is not enough information to detect a trend for the subpopulation (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Index Nesting Beach Survey Database). Similarly, nesting survey effort has been inconsistent among the Yucatán nesting beaches and no trend can be determined for this subpopulation. However, there is some optimistic news. Zurita *et al.* (2003) found a statistically significant increase in the number of nests on seven of the beaches on Quintana Roo, Mexico, from 1987-2001 where survey effort was consistent during the period.

Threats include incidental take from channel dredging and commercial trawling, long line, and gill net fisheries; loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and disease. There is particular concern about the extensive incidental take of juvenile loggerheads in the eastern Atlantic by long line fishing vessels from several countries.

Green Sea Turtle

Total population estimates for the green sea turtle are unavailable, and trends based on nesting data are difficult to assess because of large annual fluctuations in numbers of nesting females. For instance, in Florida, where the majority of green sea turtle nesting in the southeastern U.S. occurs, estimates range from 150 to 2,750 females nesting annually (FWC 2004). Populations in Surinam, and Tortuguero, Costa Rica, may be stable, but there is insufficient data for other areas to confirm a trend. A major factor contributing to the green sea turtle's decline worldwide is commercial harvest for eggs and food. Fibropapillomatosis, a disease of sea turtles characterized by the development of multiple tumors on the skin and internal organs, is also a mortality factor and has seriously impacted green sea turtle populations in Florida, Hawaii, and other parts of the world. The tumors interfere with swimming, eating, breathing, vision, and reproduction, and turtles with heavy tumor burdens may die. Other threats include loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and incidental take from channel dredging and commercial fishing operations.

Leatherback Sea Turtle

Declines in leatherback nesting have occurred over the last 2 decades along the Pacific coasts of Mexico and Costa Rica. The Mexican leatherback nesting population, once considered to be the world's largest leatherback nesting population (65 percent of the worldwide population), is now less than 1 percent of its estimated size in 1980. Spotila et al. (1996) estimated the number of leatherback sea turtles nesting on 28 beaches throughout the world from the literature and from communications with investigators studying those beaches. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on these beaches with a lower limit of about 26,200 and an upper limit of about 42,900. This is less than one third the 1980 estimate of 115,000. Leatherbacks are rare in the Indian Ocean and in very low numbers in the western Pacific Ocean. The largest population is in the western Atlantic. Using an age-based demographic model, Spotila et al. (1996) leatherback populations in the Indian Ocean and western Pacific Ocean cannot withstand even moderate levels of adult mortality and even the Atlantic populations are being exploited at a rate that cannot be sustained. They concluded leatherbacks are on the road to extinction and further population declines can be expected unless we take action to reduce adult mortality and increase survival of eggs and hatchlings. The crash of the Pacific leatherback population is believed primarily to be the result of exploitation by humans for the eggs and meat, as well as incidental take in numerous commercial fisheries of the Pacific. Other factors threatening leatherbacks globally include: loss or degradation of nesting habitat from coastal development; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; and watercraft strikes.

Hawksbill Sea Turtle

The hawksbill sea turtle has experienced global population declines of 80 percent or more during the past century and continued declines are projected (Meylan and Donnelly 1999). Most populations are declining, depleted, or remnants of larger aggregations. Hawksbills were previously abundant, as evidenced by high-density nesting at a few remaining sites and by trade statistics. The decline of this species is primarily due to human exploitation for tortoiseshell. While the legal hawksbill shell trade ended when Japan agreed to stop importing shell in 1993, a significant illegal trade continues. It is believed that individual hawksbill populations around the world will continue to disappear under the current regime of exploitation for eggs, meat, and tortoiseshell, loss of nesting and foraging habitat, incidental capture in fishing gear, ingestion of and entanglement in marine debris, oil pollution, and boat collisions. Hawksbills are closely associated with coral reefs, one of the most endangered of all marine ecosystem types.

Kemp's Ridley Sea Turtle

The decline of this species was primarily due to human activities, including the direct harvest of adults and eggs and incidental capture in commercial fishing operations. Today, under strict protection, the population appears to be in the early stages of recovery. The recent nesting increase can be attributed to full protection of nesting females and their nests in Mexico resulting from a bi-national effort between Mexico and the U.S. to prevent the extinction of the Kemp's ridley, and the requirement to use turtle excluder devices in shrimp trawls both in the United States and Mexico. The Mexican government also prohibits harvesting and is working to increase the population through more intensive law enforcement, by fencing nest areas to diminish natural predation, and by relocating all nests into corrals to prevent poaching and predation. While relocation of nests into corrals is currently a necessary management measure, this relocation and concentration of eggs into a "safe" area is of concern since it makes the eggs more susceptible to reduced viability due to movement-induced mortality, disease vectors, catastrophic events like hurricanes, and marine predators once the predators learn where to concentrate their efforts.

Project Area Specific Information for Species Included in this Assessment

Loggerhead Sea Turtle

The loggerhead sea turtle nesting and hatching season for southern Florida Atlantic beaches (Brevard through Miami-Dade Counties) extends from March 15 through November 30. Incubation ranges from about 45 to 95 days. The number of loggerhead sea turtle nests laid in the project area between 2000 and 2007 ranged from 289 to 516 (Table 1).

Green Sea Turtle

The green sea turtle nesting and hatching season for southern Florida Atlantic beaches (Brevard through Miami-Dade Counties) extends from May 1 through November 30. Incubation ranges from about 45 to 75 days. Green sea turtle nests reported within the project area between 2000 and 2007 range from 0 to 20. (Table 1).

Leatherback Sea Turtle

The leatherback sea turtle nesting and hatching season for southern Florida Atlantic beaches (Brevard through Miami-Dade Counties) extends from February 15 through November 15. Incubation ranges from about 55 to 75 days. Leatherback sea turtle nests reported within the project area between 2000 and 2007 range from 1 to 9. (Table 1).

Table 1: Number of turtle nests from 2000 – 2007 in Miami-Dade County

Year	C. mydas (Green)	D. coriacea (Leatherback)	C. caretta (Loggerhead)
2000	5	2	516
2001	0	9	496
2002	15	4	374
2003	0	3	489
2004	2	1	289
2005	15	9	301
2006	0	3	302
2007	20	8	295

Hawksbill Sea Turtle

The hawksbill sea turtle nesting and hatching season for southern Florida Atlantic beaches

(Brevard through Miami-Dade Counties) extends from June I through December 31. Incubation lasts about 60 days. Although hawksbill sea turtles are known to occur offshore from the project area, no nests have been reported for this species within the project area (FWC 2005a).

Kemp's Ridley Sea Turtle

Kemp's ridley sea turtles rarely nest along the eastern seaboard of the U.S. (Turtle Expert Working Group 2000; FWC 2005b). No nests have been recorded for Miami-Dade County between 1979 and 2004 (FWC 2005b), though false crawls have been recorded for Palm Beach County (Meylan et al. 1995; FWC 2005b).

DISCUSSION OF POTENTIAL IMPACTS TO LISTED SPECIES:

Manatees - The estuarine waters around the inlets and bays within Dade County provide year-round habitat for the West Indian manatee, *Trichecus manatus.* Although manatees have been observed in the open ocean, they feed and reside mainly in the estuarine areas and around inlets. No significant foraging habitat is known to exist in the areas around the project sites, nor have manatees been known to congregate in the nearshore environment within the project area. Because of the nature of the work and the precautions to be taken, as described in protective and conservation measures above, the proposed project should not have adverse impacts on manatees.

Sea Turtles – Since construction may occur during the sea turtle nesting season, construction activities have the potential to impact nesting activities. The Corps has determined that the proposed work may affect sea turtles.

EFFORTS TO ELIMINATE POTENTIAL IMPACTS ON LISTED SPECIES:

Potential negative impacts on manatees and/or sea turtles will be avoided or minimized through the implementation of special precautionary measures. Construction activities will be kept under surveillance, management, and control to minimize interference with, disturbance of, or damage to wildlife resources.

To insure the contractor and his personnel are aware of the potential presence of the manatee in the project area, their endangered status, and the need for precautionary measures, the contract specifications will include the standard manatee protection clauses. All small vessels associated with the project will be required to operate at “no wake” speeds at all times while in shallow water, or channels, where the draft of the vessel provides less than three feet clearance from the bottom. Boats used to transport personnel shall be shallow draft vessels, preferably of the light-displacement category, where navigational safety permits. Workboats shall follow routes of deep water when possible. The contractor shall be held responsible for any manatee harmed, harassed, or killed as a result of construction activities. If a manatee is sighted within a hundred yards of the dredging area, appropriate safeguards will be taken, including suspension of dredging, if necessary, to avoid injury to manatees.

The following precautions shall be implemented as part of the project in order to minimize potential impacts to sea turtles:

a. Only beach quality sand suitable for sea turtle nesting, successful incubation and hatchling emergence shall be used on the project site.

b. If the beach nourishment project will be conducted during the period from March 1 through April 30, surveys for early nesting sea turtles shall be conducted.

c. If the beach nourishment project will be conducted during the period from March 1 through November 30, surveys for sea turtle nests will be conducted 65 days prior to project initiation and continue through November 30.

d. Nest surveys and will be conducted by personnel with prior experience and training in nest survey procedures, and with a valid Florida Department of Environmental Protection (FDEP) permit.

e. If relocation is implemented, Nests will be relocated between sunrise and 9 a.m. following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation.

f. Immediately after completion of the beach nourishment project and prior to March 1 for three subsequent years, sand compaction will be monitored and tilling will be conducted. Nourished beach areas will be plowed to a depth of at least 36 inches if sand compaction is greater than 500 cone penetrometer units.

g. Visual surveys will be conducted immediately after completion of the beach nourishment project and prior to March 1 for three subsequent years to determine if escarpments are present. Escarpments in excess of 18 inches (45 cm) extending more than 100 feet (30 m) in length and exceeding 500 cpu's will be mechanically leveled to a natural beach contour prior to March 1.

h. Construction equipment and pipes will be stored in a manner that will minimize effects to sea turtles.

i. Lighting associated with the project will be kept minimized to reduce the possibility of disrupting and disorienting nesting and/or hatchling sea turtles while in accordance with Coast Guard, EM 385-1-1, and Occupational Safety and Health Administration (OSHA) requirements.

j. Any incident involving the death or injury of any listed threatened or endangered species described in this Biological Assessment shall be immediately reported to the U.S. Army Corps of Engineers (Jacksonville) and the U.S. Fish and Wildlife Service (Jacksonville).

Determination

The estuarine waters around the inlets and bays within Dade County provide year-round habitat for the West Indian manatee, *Trichecus manatus.* Although manatees have been observed in the open ocean, they feed and reside mainly in the estuarine areas and around inlets. No significant foraging habitat is known to exist in the areas around the project sites, nor have manatees been known to congregate in the nearshore environment within the project area. The Corps has determined that based on the location of the borrow areas, and the lack of foraging habitat near the placement areas, the proposed action may affect, but not likely to adversely affect the West Indian manatee.

Placement of sand on Miami-Dade County beaches may adversely affect the nesting sea turtle species included in this assessment [loggerhead, green and leatherback turtle]. The USACE requests formal consultation with the USFWS regarding these species.

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United States Department of the Interior

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

December 17, 2009

Colonel Alfred A. Pantano, Jr.
District Commander
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service Federal Activity Code:	41420-2009-FA-0415
Date Received:	May 4, 2009
Formal Consultation Initiation Date:	June 30, 2009
Project:	Sand Placement
County:	Miami-Dade

Dear Colonel Pantano:

This document transmits the Fish and Wildlife Service's (Service) biological opinion based on our review of a proposal to place sand adjacent to 32nd and 63rd Streets comprising approximately 2.14 miles of shoreline in Miami-Dade County, Florida. The U.S. Army Corps of Engineers (Corps) determined on May 1, 2009, the proposed project "may affect, likely to adversely affect" the threatened loggerhead sea turtle (*Caretta caretta*), the endangered leatherback sea turtle (*Dermochelys coriacea*), the endangered green sea turtle (*Chelonia mydas*), the endangered hawksbill sea turtle (*Eretmochelys imbricata*), and the endangered Kemp's ridley sea turtle (*Lepidochelys kempii*), and we concur with your determination. 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*.).

In the May 1, 2009, letter, the Corps also determined the proposed action "may affect, but is not likely to adversely affect," the endangered West Indian manatee (*Trichechus manatus*). In order to protect this species, the Corps will ensure specific construction safety precautions are implemented as outlined in the *Standard Manatee Conditions for In-Water Work* (Florida Fish and Wildlife Conservation Commission [FWC] 2009a). Although the Lummus Park borrow area is within designated critical habitat for the manatee, no specific primary or secondary constituent elements were included in the designation. In addition, no seagrasses are located within or adjacent to the borrow area. Consequently, no effect to designated critical habitat is anticipated. Based upon implementation of the above stated conditions, the Service concurs with the Corps' determination in regard to the West Indian manatee.

This biological opinion is based on information provided in the Corps' letter and biological assessment dated May 1, 2009, and correspondence with the Corps, National Marine Fisheries

Service (NOAA Fisheries), and FWC. A complete administrative record of this consultation is on file at the South Florida Ecological Services Office, Vero Beach, Florida.

FISH AND WILDLIFE RESOURCES

This section is provided in accordance with the Fish and Wildlife Coordination Act 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

It is estimated that approximately 0.1 acre of nearshore hardbottom will be impacted due to the placement of the offshore pipeline associated with the hopper dredge. In the past, mitigation for these impacts has consisted of prefabricated artificial reef modules placed in nearshore waters. However, since Miami-Dade County's grant application filed with National Marine Fisheries Service for construction and placement of 140 artificial reef modules was denied, a contingency mitigation plan will be developed for agency approval prior to construction. We recommend the Corps consult with the National Marine Fisheries Service concerning potential impacts to nearshore hardbottom reef habitat and seagrasses.

CONSULTATION HISTORY

On May 4, 2009, the Service received a letter and biological assessment from the Corps dated May 1, 2009, requesting initiation of formal consultation concerning nesting sea turtles. Because the proposed offshore borrow site is located in Federal waters, the Mineral Management Service is a coconsulter for this project and the Corps as the lead action agency.

On May 7, 2009, the Service emailed the Corps requesting additional information.

On May 21, 2009, the Corps provided partial information in regard to the Service's request for additional information.

On May 22, 2009, and June 2, 2009, the Corps provided additional information in regard to the Service's request for additional information.

On June 23, 2009, the Service emailed the Corps requesting additional information.

On October 28, 2009, the Service received the last of the requested information from the Corps and initiated formal consultation.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Corps proposes to place beach compatible sand on approximately 2.14 miles of shoreline along Miami Beach, Miami-Dade County, Florida (Figure 1). The project area consists of the fill template which extends adjacent to 63rd Street between Florida Department of Environmental Protection (DEP) reference monuments R-37.75 and R-46.25 (approximately 1.61 miles), and 32nd Street between DEP reference monuments R-53.7 and R-55.5 (approximately 0.34 mile) and DEP reference monuments R-60 and R-61 (approximately 0.19 mile) (Figure 1). The proposed project involves the placement of approximately 218,000 cubic yards (cy) and 474,000 cy at 32nd and 63rd Street fill template, respectively, per sand placement event. The proposed design berm template will provide a berm width of 205 feet with a height of +6.1 North American Vertical Datum and a 1 vertical:15 horizontal slope. In addition, the frequency of sand placement events over the course of the 10-year DEP permit will not exceed more than one every 2 years. The intent of the project is to renourish the shoreline in order to protect infrastructure and property, improve the shoreline for recreational use, and stop shoreline erosion. Beach compatible sand will be dredged from the offshore South of Government Cut – Extension (SGC-Ext) borrow area and excavated from South Beach in front of Lummus Park between DEP reference monuments R-67 and R-70 for sand placement along 63rd and 32nd Streets, respectively (Figure 1). The offshore sand source and sand from Lummus Park must be approved by DEP and meet all requirements as outlined in the Florida Administrative Code (FAC) subsection 62B-41.007.

Sand excavated from Lummus Park will be transferred to the 32nd Street fill template by hydraulic transfer. The hydraulic transfer of sand will involve the placement of a cutterhead dredge on the dry portion of the beach in an excavated slurry pit. The dimensions of the slurry pit will be approximately 100 square feet and 15 feet deep. Sand will be excavated from the accretional portions of the beach by backhoe, loaded into all-terrain dump trucks, piled adjacent to the slurry pit, and pushed into the pit using a bulldozer. All vehicle corridors will be located on existing portions of the beach currently utilized by emergency services and beach maintenance vehicles. In order to float the dredge and provide adequate water to allow the dredge to pump the slurried sand, water will be pumped into the slurry pit through a pipe extending approximately 50 feet offshore from Lummas Park. The pipe will be approximately 10 inches in diameter and buried a minimum 3 feet deep for the section of pipe located above mean high water (MHW). A booster pump located directly adjacent to the dredge at the slurry pit may be required to pump the slurry to the discharge site, located between 27th and 29th Streets (DEP reference monuments R-60.5 and R-60, respectively [(Figure 1]). The slurry pit, dredge, and booster pump will be located within a chain link fence enclosure with privacy screening. The sand slurry will be pumped to the discharge site using a 12 to 16 inch pipe buried a minimum 3 feet deep. If weather permits, the pipeline will be floated in from the water in 1,000 foot sections. If adverse weather prevails, 50 foot sections of pipe will be trucked to the site and fused together in 1,000 foot lengths. The pipe from the slurry pit will be positioned approximately 10 feet seaward of the existing dune and then travel north to the discharge site. At the discharge site, a bulldozer will construct a longitudinal dike for turbidity reduction. As the material is discharged from the pipe, it will be graded to the permitted design fill template. The beach access corridor for equipment and pipe is located at 10th Street located just south of DEP reference monument R-69.

Sand for placement in the 63rd Street fill template will be dredged from the offshore SGC-Ext borrow area by hopper dredge. At the discharge site (DEP reference monument R-43), dredged sand will be transferred within the fill template by front-end loaders and graded to the permitted design fill template by bulldozer. The beach access corridor for equipment and vehicles will be located at 79th Street located just north of DEP reference monument R-39.

Sand placement is scheduled to commence in July 2010 and be completed in March 2011. If construction extends into the sea turtle nesting season (March 1 to November 30), no work will commence until daily nesting surveys have been completed. Construction activities will take place 24 hours per day, although work in Lummus Park may be restricted to daylight hours.

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 (DEP reference monument R-37.75 to R-46.25 and R-53.7 to R-70; approximately 4.7 miles) to include the 32nd and 63rd Street sand placement fill templates, 32nd and 63rd Street access corridors, shoreline pipeline footprint, Lummus Park excavation area, inshore and offshore pipeline corridors, the SGC-Ext borrow area, and downdrift effects (approximately 2,000 to 3,000 feet). The project is located along the Atlantic Ocean, at Miami Beach, Miami-Dade County, Florida at latitude 25.8068 and longitude -80.1228, and latitude 25.8446 and longitude -80.1190.

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/critical habitat description

Loggerhead Sea Turtle

The loggerhead sea turtle, listed as a threatened species on July 28, 1978 (43 Federal Register [FR] 32800), inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. Loggerhead sea turtles nest within the continental United States (U.S.) from Louisiana to Virginia. Major nesting concentrations in the U.S. are found on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida (Hopkins and Richardson 1984).

No critical habitat has been designated for the loggerhead sea turtle.

Green Sea Turtle

The green sea turtle was federally listed on July 28, 1978 (43 FR 32800). Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. The green turtle has a worldwide distribution in tropical and subtropical waters. Major green turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Suriname. Within the U.S., green turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida, particularly in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties (NOAA Fisheries and Service 1991a). Nesting has also been documented along the Gulf coast of Florida on Santa Rosa Island (Okaloosa and Escambia Counties) and from Pinellas County through Collier County. Green turtles have been known to nest in Georgia, but only on rare occasions, and sporadically in North Carolina and South Carolina. Unconfirmed nesting of green turtles in Alabama has also been reported.

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys (63 FR 46693)

Leatherback Sea Turtle

The leatherback sea turtle, listed as an endangered species on June 2, 1970 (35 FR 8491), nests on shores of the Atlantic, Pacific and Indian Oceans. Nonbreeding animals have been recorded as far north as the British Isles and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard 1992). Nesting grounds are distributed worldwide, with the Pacific Coast of Mexico supporting the world's largest known concentration of nesting leatherbacks in the Pacific. The largest nesting colony in the wider Caribbean region is found in French Guiana, but nesting occurs frequently, although in lesser numbers, from Costa Rica to Columbia and in Guyana, Suriname, and Trinidad (National Research Council 1990; NOAA Fisheries and Service 1992).

The leatherback regularly nests in the U.S. in Puerto Rico, the U.S. Virgin Islands, and along the Atlantic coast of Florida as far north as Georgia (NOAA Fisheries and Service 1992). Leatherback turtles have been known to nest in Georgia, South Carolina, and North Carolina, but only on rare occasions. Leatherback nesting has also been reported on the northwest coast of Florida (LeBuff 1990); a false crawl (nonnesting emergence) has been observed on Sanibel Island (LeBuff 1990).

Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of St. Croix, U.S. Virgin Islands (44 FR 17710).

Hawksbill Sea Turtle

The hawksbill sea turtle was listed as an endangered species on June 2, 1970 (35 FR 8491). The hawksbill is found in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean. Within the continental U.S., hawksbill sea turtle nesting is rare and is restricted to the southeastern coast of Florida (Volusia through Miami-Dade Counties) and the Florida Keys (Monroe County) (Meylan 1992; Meylan et al. 1995). However, hawksbill tracks are difficult to differentiate from those of loggerheads and may not be recognized by surveyors. Therefore, surveys in Florida likely underestimate actual hawksbill nesting numbers (Meylan et al. 1995). In the U.S. Caribbean, hawksbill nesting occurs on beaches throughout Puerto Rico and the U.S. Virgin Islands (NOAA Fisheries and Service 1993).

Critical habitat for the hawksbill sea turtle has been designated for selected beaches or waters of Mona, Monito, Culebrita, and Culebra Islands, Puerto Rico (63 FR 46693).

Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle was listed as endangered on December 2, 1970 (35 FR 18320). The range of the Kemp's ridley includes the Gulf of Mexico coasts of Mexico and the U.S., and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland. Most Kemp's ridleys nest on the coastal beaches of the Mexican states of Tamaulipas and Veracruz, although a very small number of Kemp's ridleys nest consistently along the Texas coast (Turtle Expert Working Group 1998). In addition, rare nesting events have been reported in Florida, Alabama, South Carolina, and North Carolina. Outside of nesting, adult Kemp's ridleys are believed to spend most of their time in the Gulf of Mexico, while juveniles and subadults also regularly occur along the eastern seaboard of the U.S. (Service and NOAA Fisheries 1992).

No critical habitat has been designated for the Kemp's ridley sea turtle.

Life history

Loggerhead Sea Turtle

Loggerheads are known to nest from one to seven times within a nesting season (Talbert et al. 1980; Lenarz et al. 1981; Richardson and Richardson 1982); the mean is approximately 4.1 (Murphy and Hopkins 1984). The interval between nesting events within a season varies around a mean of about 14 days (Dodd 1988). Mean clutch size varies from about 100 to 126 eggs along the southeastern U.S. coast (NOAA Fisheries and Service 1991b). Incubation ranges from about 45 to 95 days. Nesting migration intervals of 2 to 3 years are most common in loggerheads, but the number can vary from 1 to 7 years (Dodd 1988). Age at sexual maturity is believed to be about 20 to 30 years (Turtle Expert Working Group 1998).

Green Sea Turtle

Green turtles deposit from one to nine clutches within a nesting season, but the overall average is 3.3. The mean interval between nesting events within a season is 13 days (Hirth 1997). Mean clutch size varies widely among populations. Average clutch size reported for Florida was 136 eggs in 130 clutches (Witherington and Ehrhart 1989). Incubation ranges from about 45 to 75 days. Only occasionally do females produce clutches in successive years. Usually 2 or more years intervene between breeding seasons (NOAA Fisheries and Service 1991a). Age at sexual maturity is believed to be 20 to 50 years (Hirth 1997).

Leatherback Sea Turtle

Leatherbacks nest five to seven times within a nesting season, with an observed maximum of 11 (NOAA Fisheries and Service 1992). The interval between nesting events within a season is about 10 days. Clutch size averages 80 to 85 yolked eggs, with the addition of usually a few dozen smaller, yolkless eggs, mostly laid toward the end of the clutch (Pritchard 1992). Incubation ranges from about 55 to 75 days. Nesting migration intervals of 2 to 3 years were observed in leatherbacks nesting on Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands (McDonald and Dutton 1996). Leatherbacks are believed to reach sexual maturity in 6 to 10 years (Zug and Parham 1996).

Hawksbill Sea Turtle

Hawksbills nest on average four and one half times per season at intervals of approximately 14 days (Corliss et al. 1989). In Florida and the U.S. Caribbean, clutch size is approximately 140 eggs, although several records exist of over 200 eggs per nest (NOAA Fisheries and Service 1993). Incubation lasts for about 60 days. On the basis of limited information, nesting migration intervals of 2 to 3 years appear to predominate. Hawksbills are recruited into the reef environment at about 14 inches in length and are believed to begin breeding about 30 years later. The time required to reach 14 inches in length however, is unknown, and growth rates vary geographically. As a result, actual age at sexual maturity is not known.

Kemp's Ridley Sea Turtle

Nesting occurs from April into July during which time the turtles appear off the Tamaulipas and Veracruz coasts of Mexico. Precipitated by strong winds, the females swarm to mass nesting emergences, known as *arribadas* or *arribazones*, to nest during daylight hours. Clutch size averages 100 eggs (Service and NOAA Fisheries 1992). The incubation period ranges from 45 to 70 days. Hatchlings, after leaving the nesting beach, are believed to become entrained in eddies within the Gulf of Mexico, where they are dispersed within the Gulf and Atlantic by oceanic surface currents until they reach about 8 inches in length, at which size they enter coastal shallow water habitats (Ogren 1989). Some females breed annually and nest an average of one to four times in a season at intervals of 10 to 28 days. Age at sexual maturity is believed to be between 7 to 15 years (Turtle Expert Working Group 1998).

Population dynamics

Loggerhead Sea Turtle

The loggerhead occurs throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. However, the majority of loggerhead nesting is at the western regions of the Atlantic and Indian Oceans. The most recent reviews show that only two loggerhead nesting beaches (South Florida [U.S.] and Masirah [Oman]) have greater than 10,000 females nesting per year (Baldwin et al. 2003; Ehrhart et al. 2003; Kamezaki et al. 2003; Limpus and Limpus 2003; Margaritoulis et al. 2003). Beaches with 1,000 to 9,999 females nesting each year are Georgia through North Carolina (U.S.), Quintana Roo and Yucatán (Mexico), Cape Verde Islands (Cape Verde, eastern Atlantic off Africa), and Western Australia (Australia). Smaller nesting aggregations with 100 to 999 nesting females annually occur in the Northern Gulf of Mexico (U.S.), Dry Tortugas (U.S.), Cay Sal Bank (Bahamas), Sergipe and Northern Bahia (Brazil), Southern Bahia to Rio de Janerio (Brazil), Tongaland (South Africa), Mozambique, Arabian Sea Coast (Oman), Halaniyat Islands (Oman), Cyprus, Peloponnesus (Greece), Island of Zakynthos (Greece), Turkey, Queensland (Australia), and Japan.

The loggerhead is commonly found throughout the North Atlantic including the Gulf of Mexico, the northern Caribbean, the Bahamas archipelago, and eastward to West Africa, the western Mediterranean, and the west coast of Europe.

The major nesting concentrations in the U.S. are found in South Florida; however, loggerheads nest from Texas to Virginia. Total estimated nesting in the U.S. has fluctuated between 47,000 and 90,000 nests per year over the last decade (FWC, unpublished data; Georgia and South Carolina Department of Natural Resources, unpublished data; North Carolina Wildlife Resources Commission, unpublished data). About 80 percent of loggerhead nesting in the southeast U.S. occurs in six Florida counties (Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties). Adult loggerheads are known to make considerable migrations between foraging areas and nesting beaches (Schroeder et al. 2003; Foley et al. 2008). During nonnesting years, adult females from U.S. beaches are distributed in waters off the eastern U.S. and throughout the Gulf of Mexico, Bahamas, Greater Antilles, and Yucatán.

From a global perspective, the U.S. nesting aggregation is of paramount importance to the survival of the species as is the population that nests on islands in the Arabian Sea off Oman (Ross 1982; Ehrhart 1989). The status of the Oman loggerhead nesting population, reported to be the largest in the world (Ross 1979), is uncertain because of the lack of long-term standardized nesting or foraging ground surveys and its vulnerability to increasing development pressures near major nesting beaches and threats from fisheries interaction on foraging grounds and migration routes. The loggerhead nesting aggregations in Oman and the U.S. account for the majority of nesting worldwide.

Green Sea Turtle

About 150 to 2,750 females are estimated to nest on beaches in the continental U.S. annually. In the U.S. Pacific, over 90 percent of nesting throughout the Hawaiian archipelago occurs at the French Frigate Shoals, where about 200 to 700 females nest each year (NOAA Fisheries and Service 1998a). Elsewhere in the U.S. Pacific, nesting takes place at scattered locations in the Commonwealth of the Northern Marianas, Guam, and American Samoa. In the western Pacific, the largest green turtle nesting group in the world occurs on Raine Island, Australia, where thousands of females nest nightly in an average nesting season (Limpus et al. 1993). In the Indian Ocean, major nesting beaches occur in Oman where 30,000 females are reported to nest annually (Ross and Barwani 1995).

Leatherback Sea Turtle

A dramatic drop in nesting numbers has been recorded on major nesting beaches in the Pacific. Spotila et al. (2000) have highlighted the dramatic decline and possible extirpation of leatherbacks in the Pacific.

The East Pacific and Malaysia leatherback populations have collapsed. Spotila et al. (1996) estimated that only 34,500 females nested annually worldwide in 1995, which is a dramatic decline from the 115,000 estimated in 1980 (Pritchard 1982). In the eastern Pacific, the major nesting beaches occur in Costa Rica and Mexico. At Playa Grande, Costa Rica, considered the most important nesting beach in the eastern Pacific, numbers have dropped from 1,367 leatherbacks in 1988-1989 to an average of 188 females nesting between 2000-2001 and 2003-2004. In Pacific Mexico, 1982 aerial surveys of adult female leatherbacks indicated this area had become the most important leatherback nesting beach in the world. Tens of thousands of nests were laid on the beaches in the 1980s, but during the 2003-2004 seasons a total of 120 nests was recorded. In the western Pacific, the major nesting beaches lie in Papua New Guinea, Papua, Indonesia, and the Solomon Islands. These are some of the last remaining significant nesting assemblages in the Pacific. Compiled nesting data estimated approximately 5,000 to 9,200 nests annually with 75 percent of the nests being laid in Papua, Indonesia.

However, the most recent population size estimate for the North Atlantic alone is a range of 34,000 to 94,000 adult leatherbacks (Turtle Expert Working Group 2007). In Florida, an annual increase in number of leatherback nests at the core set of index beaches ranged from 27 to 498 between 1989 and 2008. Under the Core Index Nesting Beach Survey (INBS) program, 198.8 miles of nesting beach have been divided into zones, know as core index zones, averaging 0.5 mile in length. Annually, between 1989 and 2008, these core index zones were monitored daily during the 109-day sea turtle index nesting season (May 15 to August 31). On all index beaches, researchers recorded nests and nesting attempts by species, nest location, and date.

Nesting in the Southern Caribbean occurs in the Guianas (Guyana, Suriname, and French Guiana), Trinidad, Dominica, and Venezuela. The largest nesting populations at present occur in the western Atlantic in French Guiana with nesting varying between a low of 5,029 nests in 1967 to a high of 63,294 nests in 2005, which represents a 92 percent increase since 1967 (Turtle Expert Working Group 2007). Trinidad supports an estimated 6,000 nesting leatherbacks annually, which represents more than 80 percent of the nesting in the insular Caribbean Sea. Leatherback nesting along the Caribbean Central American coast takes place between Honduras and Colombia. In Atlantic Costa Rica, at Tortuguero, the number of nests laid annually between 1995 and 2006 was estimated to range from 199 to 1,623. Modeling of the Atlantic Costa Rica data indicated that the nesting population has decreased by 67.8 percent over this time period.

In Puerto Rico, the main nesting areas are at Fajardo on the main island of Puerto Rico and on the island of Culebra. Between 1978 and 2005, nesting increased in Puerto Rico with a minimum of 9 nests recorded in 1978 and a minimum of 469 to 882 nests recorded each year between 2000 and 2005. Recorded leatherback nesting on the Sandy Point National Wildlife

Refuge on the island of St. Croix, U.S. Virgin Islands between 1990 and 2005, ranged from a low of 143 in 1990 to a high of 1,008 in 2001. In the British Virgin Islands, annual nest numbers have increased in Tortola from 0 to 6 nests per year in the late 1980s to 35 to 65 nests per year in the 2000s.

The most important nesting beach for leatherbacks in the eastern Atlantic lies in Gabon, Africa. It was estimated there were 30,000 nests along 60 miles of Mayumba Beach in southern Gabon during the 1999-2000 nesting season. Some nesting has been reported in Mauritania, Senegal, the Bijagos Archipelago of Guinea-Bissau, Turtle Islands and Sherbro Island of Sierra Leone, Liberia, Togo, Benin, Nigeria, Cameroon, Sao Tome and Principe, continental Equatorial Guinea, Islands of Corisco in the Gulf of Guinea and the Democratic Republic of the Congo, and Angola. In addition, a large nesting population is found on the island of Bioko (Equatorial Guinea).

Hawksbill Sea Turtle

About 15,000 females are estimated to nest each year throughout the world with the Caribbean accounting for 20 to 30 percent of the world's hawksbill population. Only five regional populations remain with more than 1,000 females nesting annually (Seychelles, Mexico, Indonesia, and two in Australia) (Meylan and Donnelly 1999). Mexico is now the most important region for hawksbills in the Caribbean with about 3,000 nests per year (Meylan 1999). Other significant but smaller populations in the Caribbean still occur in Martinique, Jamaica, Guatemala, Nicaragua, Grenada, Dominican Republic, Turks and Caicos Islands, Cuba, Puerto Rico, and U.S. Virgin Islands. In the U.S. Caribbean, about 150 to 500 nests per year are laid on Mona Island, Puerto Rico and 70 to 130 nests per year are laid on Buck Island Reef National Monument, U.S. Virgin Islands. In the U.S. Pacific, hawksbills nest only on main island beaches in Hawaii, primarily along the east coast of the island of Hawaii. Hawksbill nesting has also been documented in American Samoa and Guam (NOAA Fisheries and Service 1998b).

Kemp's Ridley Sea Turtle

Most Kemp's ridleys nest on the coastal beaches of the Mexican states of Tamaulipas and Veracruz, although a small number of Kemp's ridleys nest consistently along the Texas coast (Turtle Expert Working Group 1998). In addition, rare nesting events have been reported in Alabama, Florida, Georgia, South Carolina, and North Carolina. Historical information indicates that tens of thousands of Kemp's ridleys nested near Rancho Nuevo, Mexico, during the late 1940s (Hildebrand 1963). The Kemp's ridley population experienced a devastating decline between the late 1940s and the mid 1980s. The total number of nests per nesting season at Rancho Nuevo remained below 1,000 throughout the 1980s, but gradually began to increase in the 1990s. In 2007, 11,268 nests were documented along the 18.6 miles of coastline patrolled at Rancho Nuevo, and the total number of nests documented for all the monitored beaches in Mexico was 15,032 (Service 2007). During the 2007 nesting season, an arribada with an estimated 5,000 turtles was recorded at Rancho Nuevo from May 20 to May 23. In addition, 128 nests were recorded during 2007 in the U.S., primarily in Texas.

Status and distribution

Loggerhead Sea Turtle

Genetic research involving analysis of mitochondrial DNA has identified five different loggerhead subpopulations per nesting aggregations in the western North Atlantic: (1) the Northern Subpopulation occurring from North Carolina to around Cape Canaveral, Florida (about 29° N.); (2) South Florida Subpopulation occurring from about 29° N. on Florida's east coast to Sarasota on Florida's west coast; (3) Dry Tortugas, Florida, Subpopulation, (4) Northwest Florida Subpopulation occurring at Eglin Air Force Base and the beaches near Panama City; and (5) Yucatán Subpopulation occurring on the eastern Yucatán Peninsula, Mexico (Bowen et al. 1993; Bowen 1994, 1995; Encalada et al. 1998; Pearce 2001). These data indicate gene flow between the five regions is very low. If nesting females are extirpated from one of these regions, regional dispersal will not be sufficient to replenish the depleted nesting subpopulation. The Northern Subpopulation has declined substantially since the early 1970s. Recent estimates of loggerhead nesting trends from daily beach surveys showed a significant decline of 1.3 percent annually for the period 1989 to 2008 (NOAA Fisheries and Service 2008). Nest totals from aerial surveys conducted by the South Carolina Department of Natural Resources showed a 3.3 percent annual decline in nesting since 1980 (NOAA Fisheries and Service 2008). Overall, there is strong statistical evidence to suggest the Northern Subpopulation has sustained a long-term decline.

Data from all beaches where nesting activity has been recorded indicate the South Florida Subpopulation has shown significant increases over the last 25 years. However, an analysis of nesting data from the Florida INBS Program from 1989 to 2002, a period encompassing index surveys that are more consistent and more accurate than surveys in previous years, has shown no detectable trend and, more recently (1998 through 2008), has shown evidence of a declining trend. Given inherent annual fluctuations in nesting and the short time period over which the decline has been noted, caution is warranted in interpreting the decrease in terms of nesting trends.

A near complete census of the Florida Panhandle Subpopulation undertaken from 1989 to 2007, revealed a mean of 64,513 nests per year, which represents approximately 15,735 females nesting per year. This near complete census provides the best statewide estimate of total abundance, but because of viable survey effort, these numbers cannot be used to assess trends. Loggerhead nesting trends are best assessed using standardized nest counts made at INBS sites surveyed with constant effort over time. An analysis of these data has shown a decline in nesting from 1989-2008 (Witherington et al. 2009).

A near complete census of the Dry Tortugas Subpopulation undertaken from 1995 to 2004 (excluding 2002), reveals a mean of 246 nests per year, which equates to about 60 females nesting per year. The nesting trend data for the Dry Tortugas Subpopulation are from beaches that were not part of the INBS program, but are part of the Statewide Nesting Beach Survey program. There are 9 continuous years (1995 to 2004) of data for this Subpopulation, but the time series is too short to detect a trend.

Nesting surveys in the Yucatán Subpopulations have been too irregular to date to allow for a meaningful trend analysis (Turtle Expert Working Group 1998, 2000).

Threats include incidental take from channel dredging and commercial trawling, longline, and gill net fisheries; loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and nonnative predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and disease. There is particular concern about the extensive incidental take of juvenile loggerheads in the eastern Atlantic by longline fishing vessels from several countries.

Green Sea Turtle

Total population estimates for the green turtle are unavailable, and trends based on nesting data are difficult to assess because of large annual fluctuations in numbers of nesting females. For instance, in Florida, where the majority of green turtle nesting in the southeastern U.S. occurs, estimates range from 150 to 2,750 females nesting annually. Populations in Suriname and Tortuguero, Costa Rica, may be stable, but there is insufficient data for other areas to confirm a trend.

A major factor contributing to the green turtle's decline worldwide is commercial harvest for eggs and food. Fibropapillomatosis, a disease of sea turtles characterized by the development of multiple tumors on the skin and internal organs, is also a mortality factor and has seriously impacted green turtle populations in Florida, Hawaii, and other parts of the world. The tumors interfere with swimming, eating, breathing, vision, and reproduction, and turtles with heavy tumor burdens may die. Other threats include loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and nonnative predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and incidental take from channel dredging and commercial fishing operations.

Leatherback Sea Turtle

Declines in leatherback nesting have occurred over the last 2 decades along the Pacific coasts of Mexico and Costa Rica. The Mexican leatherback nesting population, once considered to be the world's largest leatherback nesting population (historically estimated to be 65 percent of the worldwide population), is now less than 1 percent of its estimated size in 1980. Spotila et al. (1996) estimated the number of leatherback sea turtles nesting on 28 beaches throughout the world from the literature and from communications with investigators studying those beaches. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on these beaches with a lower limit of about 26,200 and an upper limit of about 42,900. This is less than one third the 1980 estimate of 115,000. Leatherbacks are rare in the Indian Ocean and in very low numbers in the western Pacific Ocean. Presently, the largest population is in the western Atlantic. Using an age-based demographic model, Spotila et al. (1996) determined leatherback populations in the Indian Ocean and western Pacific Ocean cannot withstand even moderate levels of adult mortality and even the Atlantic populations are being exploited at a rate that cannot be sustained. They concluded leatherbacks are on the road to extinction and further population declines can be expected unless we take action to reduce adult mortality and increase survival of eggs and hatchlings.

The crash of the Pacific leatherback population is believed primarily to be the result of exploitation by humans for the eggs and meat, as well as incidental take in numerous commercial fisheries of the Pacific. Other factors threatening leatherbacks globally include loss or degradation of nesting habitat from coastal development; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and nonnative predators; degradation of foraging habitat; marine pollution and debris; and watercraft strikes.

Hawksbill Sea Turtle

The hawksbill sea turtle has experienced global population declines of 80 percent or more during the past century and continued declines are projected (Meylan and Donnelly 1999). Most populations are declining, depleted, or remnants of larger aggregations. Hawksbills were previously abundant, as evidenced by high-density nesting at a few remaining sites and by trade statistics. The decline of this species is primarily due to human exploitation for tortoiseshell. While the legal hawksbill shell trade ended when Japan agreed to stop importing shell in 1993, a significant illegal trade continues. It is believed individual hawksbill populations around the world will continue to disappear under the current regime of exploitation for eggs, meat, and tortoiseshell, loss of nesting and foraging habitat, incidental capture in fishing gear, ingestion of and entanglement in marine debris, oil pollution, and boat collisions. Hawksbills are closely associated with coral reefs, one of the most endangered marine ecosystems.

Kemp's Ridley Sea Turtle

The decline of this species was primarily due to human activities, including the direct harvest of adults and eggs and incidental capture in commercial fishing operations. Today, under strict protection, the population appears to be in the early stages of recovery. The recent nesting increase can be attributed to full protection of nesting females and their nests in Mexico resulting from a binational effort between Mexico and the U.S. to prevent the extinction of the Kemp's ridley, and the requirement to use turtle excluder devices in shrimp trawls in both nations.

The Mexican government also prohibits harvesting, and is working to increase the population through more intensive law enforcement, by fencing nest areas to reduce natural predation, and by relocating all nests into corrals to prevent poaching and predation. While relocation of nests into corrals is currently a necessary management measure, this relocation and concentration of eggs into a "safe" area is of concern since it makes the eggs more susceptible to reduced viability due to movement-induced mortality, disease vectors, catastrophic events like hurricanes, and marine predators once the predators learn where to concentrate their efforts.

Analysis of the species/critical habitat likely to be affected

The proposed action has the potential to adversely affect nesting sea turtles, their nests, and hatchlings within the action area. The effects of the proposed action on sea turtles will be considered further in the remaining sections of this biological opinion. Potential effects include destruction of nests deposited within the boundaries of the proposed project, harassment in the form of disturbing or interfering with female sea turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities, and behavior modification of nesting females due to escarpment formation within the action area during the nesting season that could result in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs. In addition, the quality of the placed sand could affect the ability of female sea turtles to nest, the suitability of the nest incubation environment, and the ability of hatchlings to emerge from the nest.

Critical habitat has not been designated for any sea turtle in the continental U.S.; therefore, the proposed action would not result in an adverse modification to critical habitat.

ENVIRONMENTAL BASELINE

Climate Change

According to the Intergovernmental Panel on Climate Change Report (IPCC 2007), warming of the earth's climate is unequivocal, as is now evident from observations of increases in average global air and ocean temperatures, widespread melting of snow and ice, and rising sea level. The IPCC Report (2007) describes changes in natural ecosystems with potential widespread effects on many organisms, including marine mammals, reptiles, and migratory birds. The potential for rapid climate change poses a significant challenge for fish and wildlife conservation. Species abundance and distribution are dynamic, relative to a variety of factors, including climate. As climate changes, the abundance and distribution of fish and wildlife will also change. Highly specialized or endemic species are likely to be most susceptible to the stresses of changing climate. Based on these findings and other similar studies, the Department of the Interior requires agencies under its direction to consider potential climate change effects as part of their long-range planning activities (Service 2008).

Climate change at the global level drives alterations in weather at the regional level, although weather is also strongly affected by season and local effects (*e.g.*, elevation, topography, latitude, proximity to the ocean). Average temperature is predicted to rise from 36°F to 41°F for North America by the end of this century (IPCC 2007). Other processes to be affected by this projected warming include rainfall (amount, seasonal timing, and distribution), storms (frequency and intensity), and sea level rise. However, the exact magnitude, direction, and distribution of these changes at the regional level are not well understood or easy to predict. Seasonal change and local geography make prediction of the effects of climate change at any location variable. Climatic changes in south Florida could amplify current land management challenges involving habitat fragmentation, urbanization, invasive species, disease, parasites, and water management (Pearlstine 2008).

Air Temperature

Current models predict changes in mean global temperature in the range of 4°F to 8°F by 2100. How this manifests at the regional and local scale is uncertain. A change of just a couple degrees can have profound effects, particularly at temperature extremes. For example, in Florida, winter frost, a 2-degree transition from 33°F to 31°F, greatly affects vegetation. While predicted changes in average annual temperature appear small, local and seasonal temperature variation may be greater. It is also important to consider that an increase in the temperature of the global atmosphere may manifest as an increase or a decrease in local means and extremes. We do not currently know either the direction or anticipated size of temperature change in Florida, but the following possibilities at the local level should be considered:

1. Changes (likely small) in mean annual temperature.
2. Greater extremes of temperature in summer (average highs) and winter (average lows).
3. More prolonged and seasonally extended frosts.
4. Shifts in the distribution of temperature regimes (*e.g.*, isotherms and growing zones).
5. Changes in the seasonal onset of temperature changes (*e.g.*, earlier spring).
6. Changes in the duration of temperature regimes (*e.g.*, longer and warmer summers).
7. Changes in both air and water (lake, river, ocean) temperature.

Most organisms have preferred ranges of temperature and lethal temperature limits they cannot survive. Many organisms require temperature signals or suitable temperature regimes to successfully complete life cycle activities such as nesting and winter dormancy. Some organisms are sensitive to temperature for incubation, sex determination (*e.g.*, sea turtles, alligators), or seed germination. The oxygen content of water (affecting fish) and the water content of vegetation (affecting fire combustion) are temperature-dependent. Some noxious or undesirable organisms may proliferate under different temperature regimes (*e.g.*, blue green algae in lakes and exotic species). Changes in temperature will likely affect fish and wildlife resources in many ways depending on the direction, amount, timing, and duration of the changes.

Rainfall

Ecosystems in Florida are sensitive to variation in rainfall. Well-drained soils, rapid runoff, and high plant transpiration quickly redistribute water available to organisms. Despite a high average rainfall, much of Florida experiences seasonal drought that profoundly affects fish and wildlife resources. Florida's rain depends on both global and regional climate factors (*e.g.*, jet stream, El Niño, frontal progression, storms and hurricanes) and local weather (*e.g.*, thunderstorms, sea breezes, lake effects and local circulation) that are likely affected by climate change. The following possibilities at the local level should be considered:

1. Changes in average annual rainfall (*e.g.*, higher or lower).
2. Changed seasonal distribution of rainfall (*e.g.*, when rain falls).
3. Changed regional distribution of rainfall (*e.g.*, where rain falls).
4. Changed intensity (*e.g.*, more severe storm rain, or dispersed "misty" rain).

Rainfall changes are affected by temperature. The affects of changes in rainfall will likely be mediated through responses by vegetation and the changed availability of surface water (*e.g.*, lakes, ponds, rivers, swamps, and wet prairies) on which many organisms depend. In the longer term, changes in deposition or recharge to surficial and deep aquifers may affect spring flow. Florida has an unusually large area of wetland habitats supporting wildlife. If climate change reduces rainfall, then desertification of much of Florida is possible and it may come to resemble "desert islands" such as much of the Bahamas that occur at the same latitude. Rainfall changes may have the most profound effects on Florida's fish and wildlife resources.

Storms

Another predicted effect of climate change is to increase the frequency and intensity of severe storms, particularly tropical cyclones (hurricanes). Higher sea temperatures and high atmosphere conditions generate energy and conditions suitable for storms. There is some controversy about whether this effect is already discernible against the background of natural variation and cycles of hurricane occurrence.

Hurricanes are generally considered detrimental to human interests and may directly cause wildlife mortality. However, their effect in natural systems is generally transient; plants and animals tend to rapidly recover. Hurricanes do have significant secondary effects, reshaping coastal habitat structure (barrier islands, beaches, salt/freshwater intrusion to marshes, and estuaries), replenishing water bodies and aquifers and renewing plant succession, which are not completely negative for wildlife. Hurricane effects will interact with rainfall and sea level changes, possibly exacerbating coastal flooding. Hurricanes also redistribute organisms, particularly plants, by spreading seeds and other propagules. The following possibilities at the local level should be considered:

1. Changes in storm intensity and frequency.
2. Changes in the possibility of more concentrated storm tracks leading to more frequent storm landfall.
3. Interaction of surge and sea level for more severe coastal and adjacent inland effects.
4. Distribution of invasive species.

Sea Level Rise

All current predictions suggest sea level will rise due to melting of continental and glacial ice and thermal expansion of the oceans. Florida, with its extensive coastline and low topography is highly vulnerable to sea level rise. The magnitude of the predicted rise is currently unknown and estimates vary from a few inches to yards. Modeled predictions using median consensus sea level rise estimates indicate that significant portions of Florida's coastline will be inundated and a major redistribution of coastal habitats is likely. However, to put this in context, Florida's coast currently experiences sea level fluctuations of 2 to 6 feet twice daily as tides and is exposed to storm surges of 10 to 16 feet in occasional hurricanes. Sea level changes will be superimposed on these normal, larger fluctuations. While these changes will likely be disastrous to human structures and activities, the effect on wildlife and its habitat may be less damaging. In essence, coastal habitats will migrate inland and Florida's flat coastal topography, a result of previous sea level changes, will mitigate the effect. Current coastal forests, dunes and beaches will migrate inland and be displaced by marsh, while current marsh will become sea grass, barrier islands will become sandbars and new barrier islands arise. The primary effect for wildlife will be redistribution, and possibly increase in some habitats at the expense of others.

More profound changes in the coastal and marine environment may be driven by the temperature and rainfall effects that may promote the distribution of mangroves and coral reefs into the expanded coastal zone. The main hazard to wildlife from sea level rise will arise from efforts to protect human structures from these changes by dikes, seawalls, dredging, beach nourishment and similar engineering responses. Changes in temperature regimes in the ocean may cause shifts in distribution of marine species, and profound but entirely unpredictable effects may be generated if climate changes causes large scale change in ocean circulation such as the Florida Current. The following possibilities at the local level should be considered:

1. Transient but damaging effects on vulnerable coastal species (*e.g.*, beach nesting shorebirds, and sea turtles).
2. Redistribution of coastal habitats with disruptions of productivity.
3. Sedimentation effects during the transition.
4. Interactive synergy with other climate effects (*e.g.*, temperature, and storm frequency) to generate unanticipated second order effects.
5. Disruption of coastal migration patterns, particularly "passive" migrations of larvae driven by local water movement effects.
6. Secondary effects of protection of human structures.
7. Migration zones and corridors available to allow changes in distribution.

To summarize, effects of climate change on wildlife in Florida are likely to be widespread and profound, and occur over a variety of dimensions and variables. As these effects cannot be prevented or delayed under current circumstances, a practical response will be to identify key areas and key species and habitats that are vulnerable to irreversible change and develop policy and planning to mitigate effects on these vulnerable entities.

Global warming will be a particular challenge for endangered, threatened, and other "at risk" species. It is difficult to estimate, with any degree of precision, which species will be affected by climate change or exactly how they will be affected. However, as it relates to nesting sea turtles, if predictions about global warming are realized, increased storms and rising sea levels could damage or destroy nests and nesting habitat, and temperature changes could skew sex ratios. In regard to piping plovers, increased storms and rising sea levels could damage, destroy, or otherwise alter foraging and roosting habitat. Consequently, the Service will use Strategic Habitat Conservation planning, an adaptive science-driven process that begins with explicit trust resource population objectives, as the framework for adjusting our management strategies in response to climate change (Service 2006).

Status of the species/critical habitat within the action area

Sea Turtles

In 2008, Miami-Dade County beaches supported approximately 5 percent of the overall sea turtle nesting along the east coast of Florida (FWC 2009b). In total, 333 loggerhead, green, and leatherback sea turtle nests were recorded in 2008, along the 23.5 miles of County beaches included in the FWC's Florida Statewide Nesting Beach Survey (Table 1). The distribution of nests among species in 2008 included 323 loggerhead sea turtles, 0 green sea turtles, and 10 leatherback sea turtles (Table 1). From 2003 to 2008, there was an average of 333 loggerhead, 6 green, and 6 leatherback sea turtle nests laid within the County annually (Table 1).

In Miami-Dade County, 13.7 and 14.2 sea turtle nests were laid per mile in 2007 and 2008, respectively (Table 1). The nesting density extending from DEP reference monument R-37 to R-45, and R-50 to R-70, was 5.2 and 5.7 nests per mile in 2007 and 2008, respectively (Table 2).

Loggerhead Sea Turtle

Of the counties along the east coast of Florida, Miami-Dade County supported the eighth highest nesting of loggerhead sea turtles with 323 nests or 13.7 nests per mile in 2008 (FWC 2009b; Table 1). In 2008, loggerhead sea turtles laid 29 nests or 5.5 nests per mile long the shoreline extending from DEP reference monument R-37 to R-45, and R-50 to R-70 (Table 2). In 2008, loggerhead sea turtles made 302 false crawls in Miami-Dade County (FWC 2009b; Table 1). Along the shoreline extending from DEP reference monument R-37 to R-45, and R-50 to R-70, loggerhead turtles made 15 false crawls in 2008 (Table 2).

Green Sea Turtle

In 2008, no green sea turtle nests or false crawls were documented along Miami-Dade County (FWC 2009b; Tables 1 and 2).

Leatherback Sea Turtle

In 2008, Miami-Dade County had a leatherback sea turtle nesting density of 0.42 nest per mile (FWC 2009b; Table 1). In 2008, one leatherback nest was documented along the shoreline extending from DEP reference monument R-37 to R-45, and R-50 to R-70 (Table 2). In Miami-Dade County, two false crawls were documented in 2008 (FWC 2009b; Table 1).

Hawksbill Sea Turtle

No occurrences of hawksbill nesting have been documented in Miami-Dade County. The majority of nesting surveys conducted in Florida occur during the morning hours and are based on interpretation of the tracks left by the turtles as they ascend and descend the beach; the turtles themselves are rarely observed. Because hawksbill turtle tracks are difficult to discern from loggerhead tracks, it is likely that nesting by hawksbill turtles is underreported (Meylan et al. 1995).

Kemp's Ridley Sea Turtle

No nesting has been reported in Miami-Dade County for Kemp's ridley turtles. The majority of nesting surveys conducted in Florida occur during the morning hours and are based on interpretation of the tracks left by the turtles as they ascend and descend the beach; the turtles themselves are rarely observed. Because Kemp's ridley turtle tracks are difficult to discern from loggerhead tracks, it is likely that nesting by Kemp's ridley turtles is underreported (Meylan et al. 1995).

Factors affecting the species habitat within the action area

Of four designated hot spots in need of immediate nourishment to protect infrastructure along Dade County Beach Erosion Project, the 32nd and 63rd fill templates have the highest priority. The 63rd Street site was originally nourished in 1974 with additional nourishment projects conducted in 1985, 1998, and 2001. Originally nourished in 1974, the 32nd Street site has undergone nine additional nourishment projects between 1985 and 2006. Since initiation of beach nourishment activities at both sites in the mid 1970s, postconstruction documents have concluded that the placed sand has been lost due to tropical storms and hurricanes. In many instances these conditions become worse than those evidenced and documented prior to the sand placement event. The only section of shoreline that is highly accretional is a segment of beach located at Lummus Park (DEP reference monument R-64 to R-70) as sand is impounded north of the Government Cut jetty.

Beach Maintenance And Pollution

Regular beach maintenance in the form of tractor tilling may disrupt or impact deposited nests and nesting sea turtles. Plastics, styrofoam, and fishing line are pollutants that may negatively impact nesting success and nearshore foraging.

Lighting

A primary anthropogenic threat to sea turtles along nesting shorelines includes sea turtle hatchling disorientation as a result of artificial lighting along the beach. Typically, sea turtle hatchlings will emerge from the nest and orient themselves towards the brighter, open horizon of the ocean (Salmon et al. 1992). If artificial lights are visible from the beach, sea turtle hatchlings tend to travel toward the artificial lights instead of the ocean. Disorientation events often result in hatchling mortality as a result of dehydration, predation, and in some cases, motor vehicle strikes.

The proposed action is subject to the City of Miami Beach Turtle Nesting Protection Ordinance, which includes measures to reduce impacts of coastal lighting on nesting sea turtles and hatchlings.

Predation

Depredation of sea turtle eggs and hatchlings by natural and introduced species occurs on almost all nesting beaches. Depredation by a variety of predators can considerably decrease sea turtle nest hatching success. The most common predators in the southeastern U.S. are ghost crabs (*Ocypode quadrata*), raccoons (*Procyon lotor*), feral hogs (*Sus scrofa*), foxes (*Urocyon cinereoargenteus* and *Vulpes vulpes*), coyotes (*Canis latrans*), armadillos (*Dasypus novemcinctus*), cats (*Felis catus)*, dogs (*Canis lupus familiaris*), and fire ants (*Solenopsis* spp.) (Dodd 1988; Stancyk 1995; Indian River County 2008). Raccoons are particularly destructive on the Atlantic coast and may take up to 96 percent of all nests deposited on a beach (Davis and Whiting 1977; Hopkins and Murphy 1980; Stancyk et al. 1980; Talbert et al. 1980; Schroeder 1981; Labisky et al. 1986).

Shoreline Equilibration

As restored beaches equilibrate to a more natural profile, steep vertical escarpments often form along the seaward edge of the constructed beach berm and this presents a physical barrier to nesting turtles. Additionally, as beach profiles equilibrate, losses of nests laid in the seaward portions of the renourished beach due to erosion may be high. Steinitz et al. (1998) following long-term studies at Jupiter Island indicated that at 2 years postrenourishment, nesting success was considerably higher than prerenourishment levels and similar to densities found on nearby noneroded beaches. However, the nesting success declined as the renourished beach eroded and narrowed until the next renourishment event.

EFFECTS OF THE ACTION

The analysis of the direct and indirect effects of the proposed action on sea turtles and the interrelated and interdependent activities of those effects was based on beneficial and detrimental factors.

Factors to be considered

The proposed action has the potential to adversely affect nesting sea turtles and their nests, and hatchlings within the proposed action area during the construction activities associated with sand placement along Miami Beach, Miami-Dade County, Florida. The effects of the proposed action on sea turtles will be considered further in the remaining sections of this biological opinion.

Potential effects include destruction or damage to sea turtle nests, developing embryos, and hatchlings within the boundaries of the proposed project, harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities, behavior modification of nesting sea turtles that could result in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs, reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site, disorientation of female and hatchling sea turtles on beaches in and adjacent to the construction area as a result of coastal lighting that becomes visible on the wider beach, and the loss of nesting habitat.

Analyses for effects of the action

Beneficial effects

The placement of sand on a beach with reduced dry foredune habitat may increase sea turtle nesting habitat if the placed sand is highly compatible (*e.g.,* grain size, shape, color) with naturally occurring beach sediments in the area, and compaction and escarpment remediation measures are incorporated into the project. In addition, a nourished beach that is designed and constructed to mimic a natural beach system may be more stable than the eroding one it replaces, thereby benefiting sea turtles.

Direct effects

Sand Placement

Placement of approximately 692,000 cy of sand along 2.14 miles of beach in and of itself may not provide suitable nesting habitat for sea turtles. Although placement of beach compatible material may increase the potential nesting area, significant negative impacts to sea turtles may result if protective measures are not incorporated during project construction. Sand placement during the nesting season, particularly on or near high density nesting beaches, can cause increased loss of eggs and hatchlings and along with other mortality sources, may impact the long-term survival of the species. For example, projects conducted during the nesting and hatching season could result in the loss of sea turtles through disruption of adult nesting activity and by burial or crushing of nests or hatchlings. Potential adverse effects during the project construction phase include disturbance of existing nests, which may have been missed, disturbance of females attempting to nest, and disorientation of emerging hatchlings. In addition, heavy equipment will be required to distribute the sand to the design fill template. This equipment will have to traverse the action area, which could result in harm to nesting sea turtles, their nests, and emerging hatchlings.

Nest relocation

Besides the risk of missing nests during a nest relocation program, there is a potential for eggs to be damaged by their movement, particularly if eggs are not relocated within 12 hours of deposition (Limpus et al. 1979). Nest relocation can have adverse impacts on incubation temperature (and hence sex ratios), gas exchange parameters, hydric environment of nests, hatching success, and hatchling emergence (Limpus et al. 1979; Ackerman 1980; Parmenter 1980; Spotila et al. 1983; McGehee 1990). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. Nest moisture content is known to influence the incubation environment of the embryos and hatchlings of turtles with flexible-shelled eggs, which has been shown to affect nitrogen excretion (Packard et al. 1984), mobilization of calcium (Packard and Packard 1986), mobilization of yolk nutrients (Packard et al. 1985), hatchling size (Packard et al. 1981; McGehee 1990), energy reserves in the yolk at hatching (Packard et al. 1988), and locomotory ability of hatchlings (Miller et al. 1987). In a 1994 Florida study comparing loggerhead hatching and emergence success of relocated nests with *in situ* nests, Moody (1998) found hatching success was lower in relocated nests at 9 of 12 beaches evaluated and emergence success was lower in relocated nests at 10 of 12 beaches surveyed in 1993 and 1994.

Missed nests

Although a nesting survey and nest marking program would reduce the potential for sea turtle nests to be impacted by construction activities, nests may be inadvertently missed (when crawls are obscured by rainfall, wind, or tides) or misidentified as false crawls during daily patrols. Even under the best of conditions, about 7 percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder 1994).

Equipment

The placement of construction materials, as well as the use of heavy machinery or equipment on the beach during a construction project, may have adverse effects on sea turtles. They can create barriers to nesting sea turtles emerging from the surf and crawling up the beach, causing a higher incidence of false crawls and unnecessary energy expenditure. The equipment can also create impediments to hatchling sea turtles as they crawl to the ocean.

Indirect effects

Many of the direct effects of sand placement may persist over time and become indirect impacts. These indirect effects include increased susceptibility of relocated nests to catastrophic events during the construction period, the consequences of potential increased beachfront development, changes in the physical characteristics of the beach, and the formation of escarpments.

Increased susceptibility to catastrophic events

Relocation of sea turtle nests may concentrate eggs in an area making them more susceptible to catastrophic events. Hatchlings released from concentrated areas may also be subject to greater predation rates from both land and marine predators, because the predators learn where to concentrate their efforts (Glenn 1998; Wyneken et al. 1998).

Increased beachfront development

Pilkey and Dixon (1996) state that beach replenishment frequently leads to more development in greater density within shorefront communities that are then left with a future of further replenishment or more drastic stabilization measures. Dean (1999) also notes that the very existence of a sand placement project can encourage more development in coastal areas. Following completion of a sand placement project in Miami during 1982, investment in new and updated facilities substantially increased tourism in the area (National Research Council 1995).

Increased building density immediately adjacent to the beach often resulted as older buildings were replaced by much larger ones that accommodated more beach users. Overall, shoreline management creates an upward spiral of initial protective measures resulting in more expensive development which leads to the need for more and larger protective measures. Increased shoreline development may adversely affect sea turtle nesting success. Greater development may support larger populations of mammalian predators, such as foxes and raccoons, than undeveloped areas (National Research Council 1990), and can also result in greater adverse effects due to artificial lighting, as discussed above.

Changes in the physical environment

Sand placement activities may result in changes in sand density (compaction), beach shear resistance (hardness), beach moisture content, beach slope, sand color, sand grain size, sand grain shape, and sand grain mineral content if the placed sand is dissimilar from the original beach sand (Nelson and Dickerson 1988a). These changes could result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings (Nelson and Dickerson 1987; Nelson 1988).

Beach compaction and unnatural beach profiles that may result from sand placement activities could negatively impact sea turtles regardless of project timing. Very fine sand or the use of heavy machinery can cause sand compaction on nourished beaches (Nelson et al. 1987; Nelson and Dickerson 1988a). Significant reductions in nesting success (*e.g.,* increase in false crawls) have been documented on severely compacted nourished beaches (Fletemeyer 1980; Raymond 1984; Nelson and Dickerson 1987; Nelson et al. 1987), and increased false crawls may result in increased physiological stress to nesting females. Sand compaction may increase the length of time required for female sea turtles to excavate nests and also cause increased physiological stress to the animals (Nelson and Dickerson 1988b). Nelson and Dickerson (1988c) concluded that, in general, beaches nourished from offshore borrow sites are harder than natural beaches, and while some may soften over time through erosion and accretion of sand, others may remain hard for 10 years or more.

These impacts can be minimized by using suitable sand and tilling compacted sand after project completion. The level of compaction of a beach can be assessed by measuring sand compaction using a cone penetrometer (Nelson 1987). Tilling of a nourished beach with a root rake may reduce the sand compaction to levels comparable to unnourished beaches. However, a pilot study by Nelson and Dickerson (1988b) showed that a tilled nourished beach will remain uncompacted for up to 1 year. Therefore, the Service requires multiyear beach compaction monitoring and, if necessary, tilling to ensure project impacts on sea turtles are minimized.

A change in sediment color on a beach could change the natural incubation temperatures of nests in an area, which, in turn, could alter natural sex ratios. To provide the most suitable sediment for nesting sea turtles, the color of the nourished sediments must resemble the natural beach sand in the area. Tilling, natural reworking of sediments, and bleaching from exposure to the sun would help to lighten dark nourishment sediments; however, the timeframe for sediment mixing and bleaching to occur could be critical to a successful sea turtle nesting season.

Escarpment formation

On nourished beaches, steep escarpments may develop along their waterline interface as they adjust from an unnatural construction profile to a more natural beach profile (Coastal Engineering Research Center 1984; Nelson et al. 1987). These escarpments can hamper or prevent access to nesting sites (Nelson and Blihovde 1998). Researchers have shown that female turtles coming ashore to nest can be discouraged by the formation of an escarpment, leading to situations where they choose marginal or unsuitable nesting areas to deposit eggs (*e.g.,* in front of escarpments, which often results in failure of nests due to prolonged tidal inundation). This impact can be minimized by leveling any escarpments prior to the nesting season.

Species' response to a proposed action

Ernest and Martin (1999) conducted a comprehensive study to assess the effects of sand placement on loggerhead nesting and reproductive success. The following findings illustrate sea turtle responses to and recovery from a nourishment project. A significantly larger proportion of turtles emerging on nourished beaches abandoned their nesting attempts than turtles emerging on control or prenourished beaches. This reduction in nesting success was most pronounced during the first year following project construction and is most likely the result of changes in physical beach characteristics associated with the nourishment project (*e.g.,* beach profile, sediment grain size, beach compaction, and frequency and extent of escarpments). During the first postconstruction year, the time required for turtles to excavate an egg chamber on the untilled, hard packed sands of one treatment area increased significantly relative to control and background conditions. However, in another treatment area, tilling was effective in reducing sediment compaction to levels that did not significantly prolong digging times. As natural processes reduced compaction levels on nourished beaches during the second postconstruction year, digging times returned to background levels.

During the first postconstruction year, nests on the nourished beaches were deposited significantly farther from both the dune toe and the tide line than nests on control beaches. Furthermore, nests were distributed throughout all available habitat and were not clustered near the dune toe as they were in the control area. As the width of nourished beaches decreased during the second year, among treatment differences in nest placement diminished. More nests were washed out on the wide, flat beaches of the nourished treatments than on the narrower steeply sloped beaches of the control beach. This phenomenon persisted through the second postconstruction year monitoring and resulted from the placement of nests near the seaward edge of the beach berm where dramatic profile changes, caused by erosion and scarping, occurred as the beach equilibrated to a more natural contour.

As with other sand placement projects, Ernest and Martin (1999) found the principal effect of nourishment on sea turtle reproduction was a reduction in nesting success during the first year following project construction. Although most studies have attributed this phenomenon to an increase in beach compaction and escarpment formation, Ernest and Martin (1999) indicate changes in beach profile may be more important. Regardless, as a nourished beach is reworked by natural processes in subsequent years and adjusts from an unnatural construction profile to a more natural beach profile, beach compaction and the frequency of escarpment formation decline, and nesting and nesting success return to levels found on natural beaches.

Similar short-term effects to listed sea turtle species and their habitat are anticipated to occur as a result of sand placement activities related to the proposed project. Generally, these adverse effects are limited to the first year after construction. Nonetheless, an increase in sandy beach may not necessarily equate to an increase in suitable sea turtle nesting habitat.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The Corps does not anticipate conducting additional activities in the action area other than the sand placement action outlined in this biological opinion.

CONCLUSION

It is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles. This conclusion is based on the following:

1. The proposed sand placement event will directly impact 2.14 miles of shoreline. This represents 0.15 percent of the approximately 1,400 miles of available sea turtle nesting habitat in the southeastern United States.
2. Research has shown that the principal effect of sand placement on sea turtle reproduction is a reduction in nesting success, and this reduction is most often limited to the first year following the initial nourishment and subsequent renourishment events.
3. Research has shown that the impacts of a nourishment project on sea turtle nesting habitat are typically short-term because a nourished beach will be reworked by natural processes in subsequent years, and beach compaction and the frequency of escarpment formation will decline.
4. Take of sea turtles will be minimized by implementation of the Reasonable and Prudent Measures, and Terms and Conditions outline below. These measures have been shown to help minimize adverse impacts to sea turtles.
5. The Service's review of the current status of sea turtles, the environmental baseline for the action area, the effects of the proposed sand placement, and the cumulative effects.
6. No critical habitat has been designated for the loggerhead, green, leatherback, Kemp's Ridley, and hawksbill sea turtles in the continental U.S.; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be implemented by the Corps so they become binding conditions of any permit issued to the Corps, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the Terms and Conditions or, (2) fails to adhere to the Terms and Conditions of the incidental take statement through enforceable terms that are added to the permit, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impacts on the species to the Service as specified in the incidental take statement [50 Code of Federal Register §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Sea Turtles

The Service anticipates approximately 2.14 miles of nesting beach habitat could be taken as a result of the proposed action; however, incidental take of sea turtles will be difficult to detect for the following reasons:

1. Turtles nest primarily at night and all nests are not located because
   1a. Natural factors, such as rainfall, wind, and tides may obscure crawls; and
   1b. Human-induced factors, such as pedestrian and vehicular traffic, may obscure crawls, and result in nests being destroyed because they were missed during a nesting survey and egg relocation program.
2. The total number of hatchlings per undiscovered nest is unknown.
3. The reduction in percent hatching and emerging success per relocated nest over the natural nest site is unknown.
4. An unknown number of females may avoid the project beach and be forced to nest in a less than optimal area.

5. Escarpments may form and obstruct an unknown number of females from accessing a suitable nesting site.
6. The number of nests lost due to erosion of the nourished beach template is unknown.

However, the level of take of these species can be anticipated by the disturbance and nourishment of suitable turtle nesting beach habitat because of the following:

1. Turtles nest within the project area.
2. Project construction may occur during a portion of the nesting season.
3. Sand placement will modify the incubation substrate, beach slope, and sand compaction.

Take is expected to be in the form of:

1. Destruction of all sea turtle nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the proposed project.
2. Destruction of all sea turtle nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project.
3. Reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site.
4. Harassment in the form of disturbing or interfering with sea turtles attempting to nest within the project area or on adjacent beaches as a result of construction activities.
5. Behavior modification of nesting sea turtles due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs.
6. Destruction of nests from escarpment leveling within a nesting season when such leveling has been approved by the Service.
7. Misdirection of nesting sea turtles or hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of lights from beachfront development that reach the elevated berm postconstruction.

The amount or extent of incidental take for sea turtles will be considered exceeded if the frequency of sand placement events over the course of the 10-year DEP permit exceeds more than one every 2 years along the 2.14 miles of beach identified for sand placement. Expiration of this incidental take statement will coincide with the expiration of the DEP10-year permit. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

EFFECT OF THE TAKE

Sea Turtles

In this accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the loggerhead, green, leatherback, hawksbill, or Kemp's ridley sea turtles. Critical habitat has not been designated in the action area; therefore, the project will not result in destruction or adverse modification of critical habitat for any of the sea turtle species.

Incidental take of nesting and hatchling sea turtles is anticipated to occur during project construction and during the life of the project. Take will occur on nesting habitat along 4.7 miles of beach within the action area.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles in the proposed action area.

1. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence must be used on the project site.

2. If sand placement activities are conducted during the period from March 1 through November 30, surveys for nesting sea turtles must be conducted. If nests are constructed in the action area, the eggs must be relocated.

3. Immediately after completion of the project and prior to the next three nesting seasons, beach compaction must be monitored and tilling must be conducted as required by March 1 to reduce the likelihood of impacting sea turtle nesting and hatching activities. The March 1 deadline is required to reduce impacts to leatherbacks that nest in greater frequency along the South Atlantic coast of Florida than elsewhere in the continental U.S.

4. Immediately after completion of the project and prior to the next three nesting seasons starting March 1, monitoring must be conducted to determine if escarpments are present and escarpments must be leveled as required to reduce the likelihood of impacting sea turtle nesting and hatching activities.

5. The Corps must ensure that contractors performing the sand placement work fully understand the sea turtle protection measures detailed in this incidental take statement.

6. During the nesting season (March 1 through November 30) construction equipment and supplies must be stored in a manner that will minimize impacts to sea turtles to the maximum extent possible.

7. Lighting surveys along the project area will be conducted.

8. The sea turtle permit holder must be notified immediately upon excavation of a sea turtle nest.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above, and outline required reporting and monitoring requirements. These terms and conditions are nondiscretionary.

Protection of sea turtles

1. In accordance with the 2001 rule change under FAC subsection 62B-41.007, all fill material placed on the beach must be analogous to that which naturally occurs within the project location or vicinity in quartz to carbonate ratio, color, median grain size, and median sorting. Specifically, such material shall be predominately of carbonate, quartz, or similar material with a particle size distribution ranging between 0.062 mm and 4.76 mm (classified as sand by either the Unified Soil Classification System or the Wentworth classification). The material shall be similar in color, grain size distribution (sand grain frequency, mean and median grain size, and sorting coefficient) to the material in the existing coastal system at the nourishment site and shall not contain:

   1a. Greater than 5 percent, by weight, silt, clay, or colloids passing the #230 sieve.
   1b. Greater than 5 percent, by weight, fine gravel retained on the #4 sieve.
   1c. Coarse gravel, cobbles, or other material retained on the 0.75-inch sieve in a percentage size greater than found on the native beach.
   1d. Construction debris, toxic material or other foreign matter; and not result in contamination or cementation of the beach.

   These standards must not be exceeded in any 10,000 square foot section, extending through the depth of the nourished beach. If the natural beach exceeds any of the limiting parameters listed, then the fill material must not exceed the naturally occurring level for that parameter.

2. Daily early morning surveys for sea turtles will be required if any portion of the sand placement construction occurs during the nesting season (March 1 through November 30). Nesting surveys must be initiated 65 days prior to construction activities, or by March 1, whichever is later. Nesting surveys must continue through the end of the project or through September 30, whichever is earlier. If nests are constructed in areas where they may be affected by sand placement activities, eggs must be relocated per the following requirements:

2a. Nesting surveys and egg relocations will only be conducted by personnel with prior experience and training in nesting survey and egg relocation procedures. Surveyors must have a valid FWC Permit. Nesting surveys must be conducted daily between sunrise and 9 a.m. The contractor must not initiate work until daily notice has been received from the sea turtle permit holder that the morning survey has been completed. Surveys must be performed in such a manner so as to ensure that sand placement activities do not occur in any location prior to completion of the necessary sea turtle protection measures.

2b. Only those nests that may be affected by sand placement activities will be relocated. Nests requiring relocation must 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. Nest relocations in association with sand placement activities must cease when these activities no longer threaten nests.

2c. Nests deposited within areas where construction activities have ceased or will not occur for 65 days must be marked and left in *in situ* unless other factors threaten the success of the nest. The sea turtle permit holder must install an on-beach marker at the nest site and a secondary marker at a point landward as possible to assure the future location of the nest will be possible should the on-beach marker be lost. A series of stakes and highly visible survey ribbon or string must be installed to establish a 10-foot radius around the nest. No activity will occur within this area nor will any activity occur which could result in impacts to the nest. Nest sites must be inspected daily to assure nest markers remain in place and that the nest has not been disturbed by the sand placement activity.

3. Immediately after completion of sand placement and prior to March 1 for 3 consecutive years, sand compaction must be monitored in the area of sand placement. The requirement for compaction monitoring can be eliminated if the decision is made to till regardless of postconstruction compaction levels. In addition, out-year compaction monitoring and remediation are not required if the Corps can demonstrate that placed sand no longer remains above MHW. If required, the area must be tilled to a depth of 36 inches, and all tilling activity must be completed prior to March 1. Each pass of the tilling equipment must be overlapped to allow more thorough and even tilling. Compaction monitoring should at a minimum include:

3a. Compaction sampling stations must be located at 500-foot intervals along the project area. One station must be at the dune toe (when material is placed in this area), and one station must be midway between the dune toe and the high water line (normal wrack line).

3b. At each station, the cone penetrometer will be pushed to a depth of 6, 12, and 18 inches three times (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 will be located as close to each other as possible, without interacting with the previous hole or disturbed sediments. The three replicate compaction values for each depth will be averaged to produce final values for each depth at each station. Reports will include all 18 values for each transect line, and the final six averaged compaction values.

3c. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area must be tilled prior to March 1. 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 consultation with the Service will be required 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.

4. Visual surveys for escarpments along the project area must be made immediately after completion of the project and prior to March 1 for 3 consecutive years. All escarpments shall be leveled, or the beach profile shall be reconfigured, to minimize escarpment formation. In addition, weekly surveys of the project area shall be conducted during the three consecutive nesting seasons following completion of sand placement as follows:

4a. The number of escarpments and their location relative to DEP reference R-monuments shall be recorded during each weekly survey and reported relative to the length of the beach survey (*e.g.,* 50 percent escarpments). Notations on the height of these escarpments shall be included (0 to 2 feet, 2 to 4, and 4 feet or higher) as well as the maximum height of all escarpment; and

4b. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet must be leveled to the natural beach contour by March 1. An escarpment removal shall be reported relative to DEP reference R-monument locations. The Service and FWC must be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs and persist for more than one week during the peak nesting and hatching season (May 1 to October 31) to determine the appropriate action to be taken. If it is determined escarpment leveling is required during the nesting season, the Service and FWC will provide written authorization that describes methods to be used to reduce the likelihood of impacting existing nests.

5. The Corps must arrange a meeting between representatives of the contractor, the Service, the FWC, and the sea turtle permit holder responsible for egg relocation at least 30 days prior to the commencement of work on this project. At least 10 days advance notice must be provided prior to conducting this meeting. This will provide an opportunity for explanation or clarification of the sea turtle protection measures.

6. During the nesting season (March 1 through November 30), staging areas for construction equipment must be located off the beach to the maximum extent possible. Nighttime storage of construction equipment not in use must be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes placed on the beach must be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system. Temporary storage of pipes must be off the beach to the maximum extent possible. Temporary storage of pipes on the beach must be in such a manner so as to impact the least amount of nesting habitat and must likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline is recommended as the method of storage).

7. A preconstruction lighting survey shall be conducted followed by a lighting survey 30 days post-construction to ensure no lights or light sources are visible from the project area. Additional lighting surveys shall be conducted annually prior to March 1 in perpetuity.

8. In the event a sea turtle nest is excavated during construction activities, the sea turtle permit holder responsible for egg relocation for the project must be notified so the eggs can be moved to a designated relocation site.

Reporting

9. A report describing the actions taken to implement the terms and conditions of this incidental take statement must be submitted to the FWC, Imperiled Species Management Section, Tallahassee office and the Service's South Florida Ecological Services Office, Vero Beach, Florida within 60 days postconstruction. This report will include the dates of actual construction activities, names and qualifications of personnel involved in nest surveys and relocation activities, descriptions and locations of self-release beach sites, nest survey and relocation results, hatching success of nests, preconstruction lighting survey results, postconstruction escarpment and sand compaction survey results, tilling activity, and both the presconstruction and 30-day postconstruction lighting survey results.

   Additionally, a monitoring report will be submitted for three consecutive nesting seasons postconstruction by December 31, that will include sand compaction survey or tilling activities, and escarpment survey results. Also, a report summarizing all lights visible, using standard survey techniques for such surveys, shall be submitted by March 1 documenting compliance with the Miami-Dade County beach lighting ordinance and enforcement action.

   All reports will be submitted electronically to the Corps, FWC, and the Service on standard electronic media (*e.g.,* CD).

10. Upon locating a dead, injured, or sick endangered or threatened sea turtle specimen, initial notification must be made to the Service's Office of Law Enforcement (10426 NW 31st Terrace, Miami, Florida 33172; 305-526-2610). Additional notification must be made to FWC at 1-888-404-3922 and the Service's South Florida Ecological Services Office (1339 20th Street, Vero Beach, Florida 32960-3559; 772-562-3909). Care should be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure evidence intrinsic to the specimen is not unnecessarily disturbed.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Surveys for nesting success of sea turtles should be continued for a minimum of 3 years following sand placement to determine whether sea turtle nesting and hatchling success has been adversely impacted.

2. To increase public awareness about sea turtles, informational signs should be placed at beach access points where appropriate. The signs should explain the importance of the beach to sea turtles and the life history of sea turtle species that nest in the area.

3. Appropriate native salt-resistant dune vegetation should be established on restored dunes. The DEP, Office of Beaches and Coastal Systems, can provide technical assistance on the specifications for design and implementation.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action 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 is exceeded.
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.
4. A new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Should you have additional questions or require clarification, please contact Jeff Howe at 772-562-3909, extension 283.

Sincerely yours,

for Paul Souza
Field Supervisor
South Florida Ecological Services Office

cc: electronic copy only
Corps, Jacksonville, Florida (Patrick Griffin)
DEP, Tallahassee, Florida (Merrie Beth Neely)
EPA, West Palm Beach, Florida (Richard Harvey)
FWC, Imperiled Species Management Section, Tallahassee, Florida (Robbin Trindell)
NOAA Fisheries, West Palm Beach, Florida (Jocelyn Karazsia)
Service, St. Petersburg, Florida (Anne Marie Lauritsen)
Service, Atlanta, Georgia (Franklin Arnold)
USGS, Florida Integrated Science Center, Gainesville, Florida (Susan Walls)

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Table 1. Summary of sea turtle nesting data along Miami-Dade County, Florida (23.5 miles survey length) from 2003 to 2008 (FWC 2009b).

Year	Loggerhead Nests	Loggerhead False Crawls	Green Nests	Green False Crawls	Leatherback Nests	Leatherback False Crawls
2003	489	617	0	0	3	6
2004	289	490	2	0	1	0
2005	301	302	15	15	9	4
2006	302	410	0	0	3	1
2007	295	386	20	26	8	12
2008	323	302	0	0	10	2
Mean	**333**	**418**	**6**	**7**	**6**	**4**

Table 2. Summary of sea turtle nesting data from 2003 to 2008, for the area extending from DEP reference monument R-37 to R-45, and R-50 to R-70, Miami-Dade County, Florida. This approximate 5.3-mile section of shoreline encompasses the 32nd and 63rd sand placement fill template, and the Lummus Park excavation area.

Year	Loggerhead Nests	Loggerhead False Crawls	Green Nests	Green False Crawls	Leatherback Nests	Leatherback False Crawls
2003	59	68	0	0	1	0
2004	24	16	0	0	0	0
2005	25	18	0	0	1	1
2006	27	28	0	0	1	0
2007	26	28	0	0	2	1
2008	29	15	0	0	1	0
Mean	**32**	**29**	**0**	**0**	**1**	**0.3**

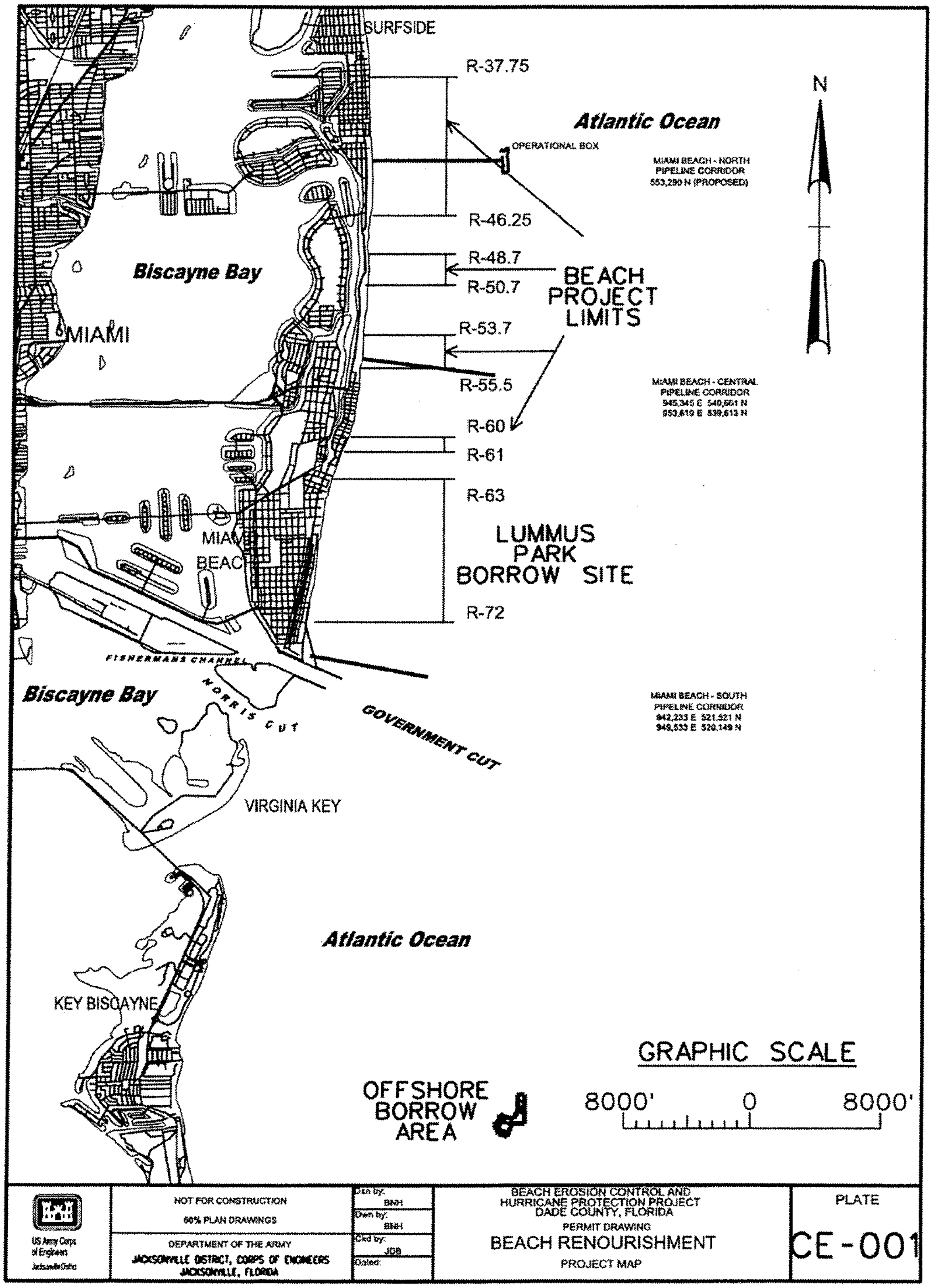

Figure 1. Location of the proposed 2.14-mile sand fill template, Lummus Park excavation site, offshore South of Government Cut – Extension borrow area, and offshore pipeline corridor, Miami-Dade County, Florida.

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

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

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

MAR 0 6 2009

Mr. David Bernhart
NOAA Fisheries Service
Southeast Regional Office
263 13th Avenue South
Saint Petersburg, Florida 33701

Dear Mr. Bernhart:

Pursuant to Section 7(a) of the Endangered Species Act, please find enclosed the Biological Assessment (BA) for the Dade County Beach Erosion Control Project, Contract "E", addressing the concerns of the threatened and endangered species under the purview of the National Marine Fisheries Service (NMFS). Listed species which may occur in the vicinity of the proposed work and are under the jurisdiction of the NMFS are: green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), Kemp's ridley turtle (*Lepidochelys kempii*), Hawksbill sea turtle (*Eretmochelys imbricata*), leatherback turtle (*Dermochelys coriacea*), smalltooth sawfish (*Pristis pectinata*), elkhorn coral (*Acropora palmata*) and staghorn coral (*Acropora cervicornis*). Based on the enclosed BA, the U.S. Army Corps of Engineers (Corps) has determined that the proposed action may affect, but is not likely to adversely affect the species identified in the BA. The Corps requests your written concurrence on this determination.

If you have any questions or need further information, please contact Ms. Terri Jordan at 904-232-1701 or by email: Terri.L.Jordan@usace.army.mil.

Sincerely,

Kenneth R. Dugger

for Eric P. Summa
Chief, Environmental Branch

Enclosure

BIOLOGICAL ASSESSMENT TO THE NATIONAL MARINE FISHERIES SERVICE FOR DADE COUNTY BEACH EROSION CONTROL PROJECT – CONTRACT E – EMERGENCY NOURISHMENT

The Corps has initiated an Environmental Assessment (EA) for the emergency placement of approximately 700,000 cubic yards of sand dredged from two borrow areas in Miami-Dade county for placement on priority hot-spots of high rates of erosion along the Miami-Dade County shoreline. This EA looks to combine data from an EIS, an EA a Department of Army permit and two Florida Department of Environmental Protection permits into one project and evaluate those actions under one NEPA umbrella. The preferred alternative of the EA is the dredging of sand from an offshore borrow area located in federal waters (greater than three miles offshore) referred to as “South of Government Cut – Extension” (SGC-Ext) and an onshore borrow site located at Lumus Park on Miami Beach. The proposed placement areas and the Lumus Park borrow areas are previously permitted by the Department of the Army, and those permits remain current, and have been previously consulted on by NMFS as recently as August of 2008. The remaining portion of the project that has not undergone recent undergone ESA consultation with NMFS is the borrow area located three-miles offshore “SGC-Ext”. The original consultation for this borrow area was conducted as part of the Supplemental EIS for the nourishment of Sunny Isles, where SCG-Ext was identified as a borrow area. This is the area that this consultation will cover. Due to placement of this borrow area in Federal waters, the Mineral Management Service-Department of the Interior will serve as a co-consulter on this consultation, with the Corps serving as the lead agency as dictated under Section 7(a)(2) of the ESA.

Project Location

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

There are four areas along the Dade County Beach Erosion Control Project (BEC) that are designated as erosional hot spots in need of immediate nourishment to protect structures. Due to the scarcity of beach quality sand in Dade County – the County is working with the Corps on longer term plans to completely renourish the entire project in the future, however until that can be completed – these hot spots must be addressed. The two highest priority sites are (Figure #1):

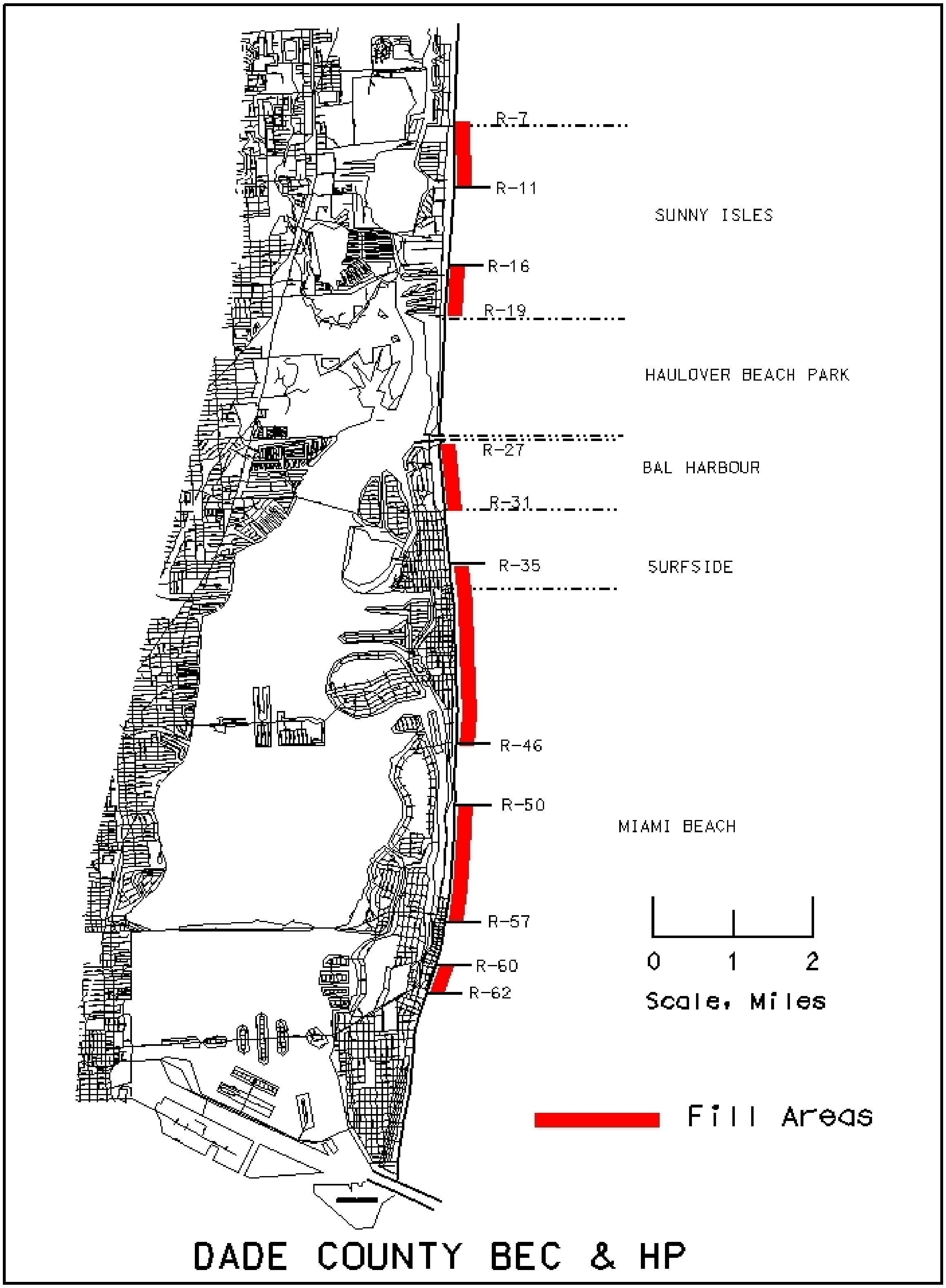

Figure 1 - Dade County BEC Priority Fill Areas

Priority Area #1 (northern Miami Beach - 63rd St): State R-Monuments 37.75 through 46.25 consisting of approximately 8,500 feet of beach. Permit current through 2010. This area has undergone four nourishment events starting with the original project nourishment in 1974 with subsequent renourishment events listed in the table below. NMFS has also previously reviewed activities proposed for this priority area under Department of the Army Permit #SAJ-1999-3761 issued on 08/04/2006 and modified on 09/06/2007 as well as Florida Department of Environmental Protection Permit #0233882-004-JC issued on 09/22/2006 and expires on 09/22/2011.

Date	Cubic Yardage Placed	R-Monument Boundaries
1975-1982	Original Nourishment	
1985	50,000	R57-R60
1994	122,096	R55-R56
1994	30,000	R54-R59
1996	8,000	R54-R60
1997	30,000	R57-R59
1997	478,938	R53-R58
2001	125,000	
2005	35,000	
2006	35,000	R48.7-R61
2008	70,000	R60-R70

* Source: Dade County Beach Erosion Control Master Plan

Figure 2 - R-Monument 45 Looking North in February 2009

Figure 3 - R-Monument 45 Looking South in February 2009

Priority Area #2 (Miami Beach - 32nd St) from R53.7 to R55.5 consisting of approximately 1,800 feet and R60 to R61 approx 1,000 feet. This area is also referred to as the “Test Beach” area and has been the subject of an Environmental Assessment completed by the Corps with a FONSI determination on 17 September 2002. In addition to review of the EA for the Test Beach, NMFS has also previously reviewed activities proposed for this priority area under well as Florida Department of Environmental Protection Permit #0126527-JC issued on 11/20/2000. This permit expires on August 30, 2010.

This area has undergone numerous nourishment events starting with the original project nourishment in 1974 with subsequent renourishment events listed in the table below.

Date	**Cubic Yardage Placed**	**R-Monument Boundaries**
1975-1982	Original nourishment	
1985	110,000	R42-R46
1998	18,000	R44-R45
2001	192,000	

* Source: Dade County Beach Erosion Control Master Plan

These two areas combined are referred to as “Contract E” in the long-term management plan for the Dade County BEC. All estimates of required placement volumes were developed based on January 2009 surveys conducted by the County.

<u>EA Preferred Alternative</u> – Placement of approximately 474,000 cubic yards of beach quality sand in Priority placement area #1 and approximately 218,000 cubic yards of beach quality sand into placement area #2.

Material for placement at area #1 would be dredged from the SGC-Ext borrow area (Figure 4) and material for placement areas #2 would be dredged from accretion areas to the south, on the beach itself and pumped north to the site using a “dredge on land” as was used previously in Dade County in 2008 at Lumus park (Figure 5). SCG-Ext borrow area is expected to provide approximately 500,000 CYs of beach quality sand based on geotechnical investigations conducted for this study. The Corps has previously provided these findings to NMFS and other resource agencies during interagency coordination meetings.

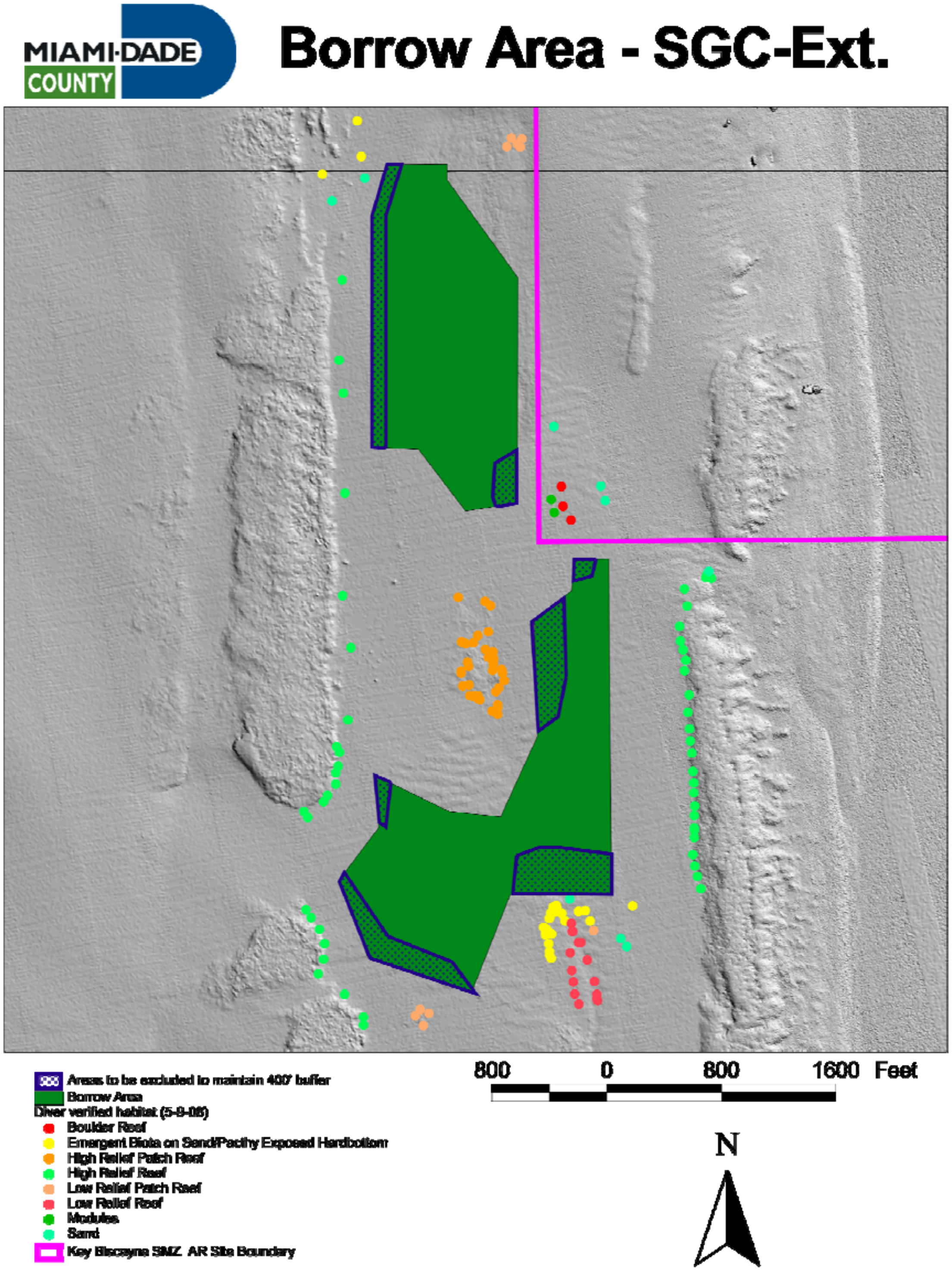

Figure 4 - SGC-Ext Borrow Area showing buffer areas

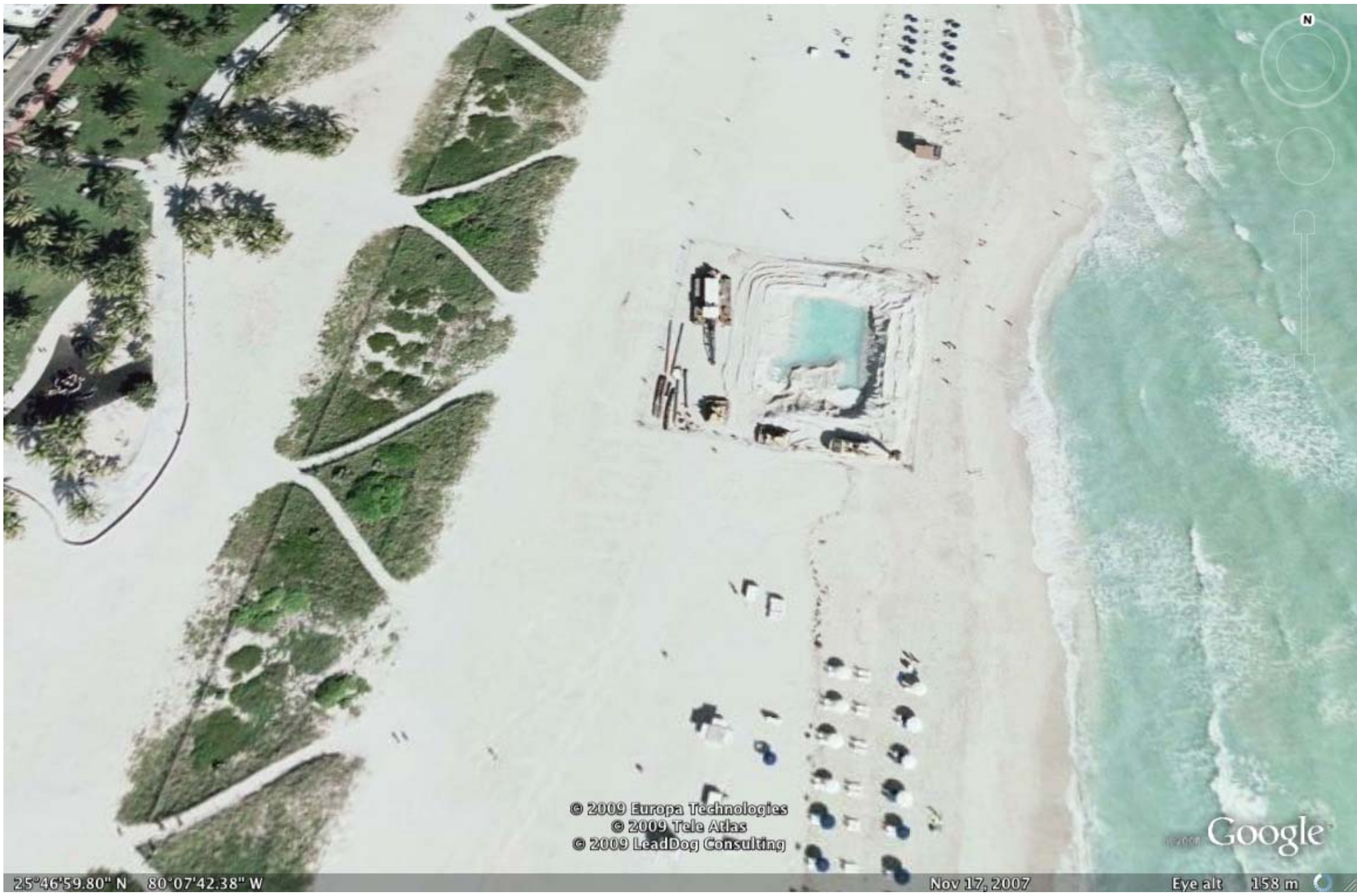

Figure 5 - Dredge on the Beach at Lumus Park

Figure 6 - Dredge on the Beach in Back-passing program at Lumus Park

Protected Species Under NMFS Jurisdiction Included in this Assessment

Of the listed and protected species under NMFS jurisdiction occurring in the action area, the Corps believes that the green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), Kemp's ridley turtle (*Lepidochelys kempii*), Hawksbill sea turtle (*Eretmochelys imbricata*), leatherback turtle (*Dermochelys coriacea*), smalltooth sawfish (*Pristis pectinata*), elkhorn coral (*Acropora palmata*) and staghorn coral (*Acropora cervicornis*) may be affected by the implementation of the proposed action. Critical Habitat for Acroporid corals is located offshore of Miami-Dade county, however all of the placement areas lack the exposed rock or hardbottom necessary to find that the placement areas contain the Primary Constituent Elements for Acroporid coral critical habitat as detailed in the final rule designating Acroporid corals critical habitat and as such, the shallow waters immediately offshore of the placement areas are not critical habitat (NMFS, 2008b).

The Corps has reviewed the biological, status, threats and distribution information available through recovery plans, status reviews, previous biological assessments and biological opinions and believes that the following species will be in or near the action area and thus may be affected by the proposed project: the five sea turtle species; smalltooth sawfish and the Acroporid corals. Details of the life history and status of these species will not be repeated here. A list of references reviewed is in the literature cited.

Smalltooth Sawfish

Smalltooth Sawfish, *Pristis pectinata* were once common in Florida as detailed by the final Smallthooth sawfish recovery plan (NMFS, 2009) and are very rarely reported in southeast Florida. The logic set forth about hopper dredges in the 2003 (as amended in 2005 and 2007) Gulf Regional Biological opinion (GRBO) for sawfish and hopper dredges in the Gulf of Mexico, where sawfish are known to be much more prolific, it should hold true in Dade county where sawfish are believed to be much rarer. As stated in the GRBO, “Smalltooth sawfish (Pristis pectinata) are tropical marine and estuarine fish that have the northwestern terminus of their Atlantic range in the waters of the eastern U.S. Currently, their distribution has contracted to peninsular Florida and, within that area, they can only be found with any regularity off the extreme southern portion of the state. The current distribution is centered in the Everglades National Park, including Florida Bay. They have been historically caught as bycatch in commercial and recreational fisheries throughout their historic range; however, such bycatch is now rare due to population declines and population extirpations. Between 1990 and 1999, only four documented takes of smalltooth sawfish occurred in shrimp trawls in Florida (Simpendorfer, 2000). 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 (C. Slay, Coastwise Consulting, pers. comm. August 18, 2003) 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.” The Corps completely agrees with this determination and incorporates it into our effects determination.

Sea Turtles

The impacts of dredging operations on sea turtles have been previously assessed by the National Marine Fisheries Service (NMFS, 1991; NMFS 1995; NMFS 1997; NMFS 2003) in the various versions of the South Atlantic Regional Biological Opinion (SARBO) and the 2003 (revised in 2005 and 2007) Gulf Regional Biological Opinion. The life history of the five sea turtle species commonly found in South Florida, and the four most likely to be affected by in-water construction activities is found in GRBO as well as the species individual recovery plans are incorporated by reference (NMFS, 2003; NMFS and FWS, 1991; NMFS and FWS, 1991a; NMFS and FWS, 1992; NMFS and FWS, 1992a; NMFS and FWS, 1993; NMFS and FWS, 1995). Construction of the contract E nourishment areas will likely be completed with a hopper dredge for removal of sand from the SGC1-Ext borrow area due to the distance from shore of the borrow area, there will be no effect of the dredging of the Lumus park area on sea turtles under NMFS' jurisdiction as the operations will all take place above the mean high tide line. Only those dredging operations taking place in the SGC-Ext borrow area have any potential to affect listed sea turtles under NMFS' jurisdiction. The effects of those activities have previously been evaluated by NMFS under the 1991, 1995, and 1997 SARBOs. The Corps and MMS are currently undergoing reintiation of consultation with NMFS for dredging activities associated with sand mining operations under the SARBO. Per the October 25, 2007 letter from Dr. Roy Crabtree, Assistant Administrator for Fisheries to General Joseph Schrodel, Commander, South Atlantic Division, USACE; the Corps and MMS will "continue their hopper dredging activities under the auspices of the 1997 SARBO. So long as the COE follows the reasonable and prudent measures, and implementing terms and conditions outlined in the SARBO, and continues to ensure that its actions will not jeopardize the continued existence of any listed species or result in destruction of adverse modification of designated critical habitat, the protective coverage of the biological opinion and the Endangered Species Act (ESA) will not lapse. Section 7(o)(2) of the ESA specifically states that "any taking that is in compliance with the terms and conditions specified in a written statement provided under subsection (b)(4)(iv) shall not be considered to be prohibited taking of the species concerned." As with all hopper dredging projects in the southeastern US, the Corps and MMS as co-consulters, incorporate the terms and conditions of the 1997 SARBO as standard operating conditions in our plans and specifications and will do so for this project as well. As such, the Corps has determined that the effects of the proposed dredging on sea turtles have already been consulted on under the 1997 SARBO and no new consultation actions are required for sea turtles for this sand mining project.

Elkhorn and staghorn coral (Acroporid corals)

Life History and Distribution

Elkhorn and staghorn corals are two of the major reef-building corals in the wider Caribbean. Staghorn coral is characterized by staghorn-antler-like colonies, with cylindrical, straight, or slightly curved branches. Elkhorn colonies are flattened to near-round, with frond-like branches that typically radiate outward from a central trunk that is firmly attached to the sea floor. Historically, both acroporid species formed dense thickets at shallow (<5 m) and intermediate (10 to 15 m) depths in many reef systems, including some locations in the Florida Keys, western Caribbean (e.g., Jamaica, Cayman Islands, Caribbean Mexico, Belize), and eastern Caribbean. Early descriptions of Florida Keys reefs referred to reef zones, of which the staghorn zone was described for many shallow-water reefs (Figure 7) (Jaap 1984, Dustan 1985, Dustan and Halas 1987). As summarized in Bruckner (2002), however, the structural and ecological roles of Atlantic *Acropora* spp. in the wider Caribbean are unique and cannot be filled by other reef-building corals in terms of accretion rates and the formation of structurally complex reefs.

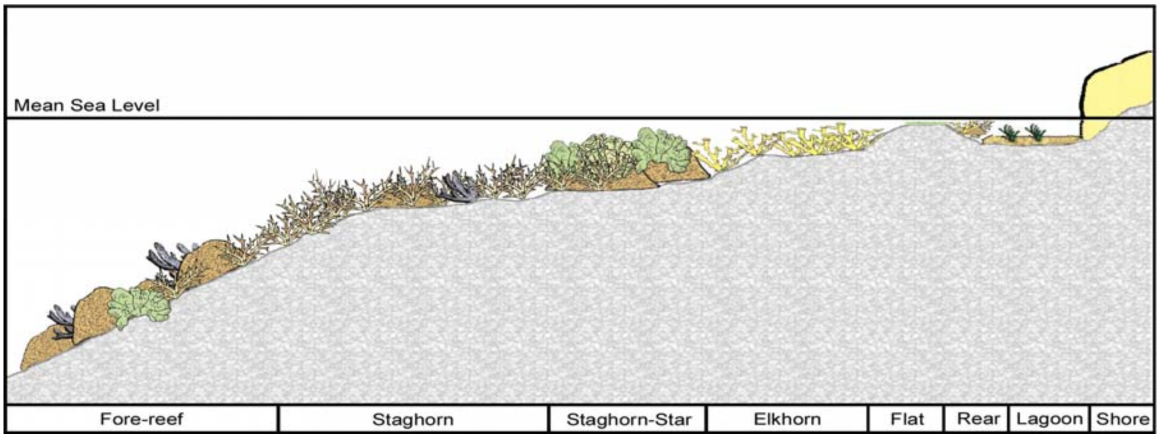

Figure 7: Reef zonation schematic example modified from several reef zonation-descriptive studies (Goreau, 1959; Kinzie, 1973; Bak, 1977).

Life History

Historically, staghorn coral was reported from depths ranging from <1 to 60 m (Goreau and Goreau, 1973). It is suspected that 60 m is an extreme situation and that the coral is relatively rare below 20 m depth. The common depth range is currently observed at 5 to 15 m. In southeastern Florida, this species historically occurred on the outer reef platform (16 to 20 m) (Goldberg, 1973), on spur and groove bank reefs and transitional reefs (Jaap, 1984; Wheaton and Jaap, 1988), and on octocoral-dominated hard-bottom (Davis, 1982). Colonies have been common in back- and patch-reef habitats (Gilmore and Hall, 1976; Cairns 1982). Although staghorn coral colonies are sometimes found interspersed among colonies of elkhorn coral, they are generally in deeper water or seaward of the elkhorn zone and, hence, more protected from waves. Historically, staghorn coral was also the primary constructor of mid-depth (10 to 15 m) reef terraces in the western Caribbean, including Jamaica, the Cayman Islands, Belize, and some reefs along the eastern Yucatan peninsula (Adey, 1978).

The maximum range in depth reported for elkhorn coral is <1 m to 30 m, but the optimal depth range for this coral is considered to be 1 to 5 m depth (Goreau and Wells; 1967). Currently, the deepest known colonies of elkhorn coral occur at 21 m in the Flower Garden Banks National Marine Sanctuary (Hickerson pers. comm.) and at Navassa National Wildlife Refuge (Miller pers. comm.). The preferred habitat of elkhorn coral is the seaward face of a reef (turbulent shallow water), including the reef crest, and shallow spur and groove zone (Shinn, 1966; Cairns, 1982; Rogers *et al*. 1982). At low tide, colonies are sometimes exposed. Colonies of elkhorn coral often grow in nearly mono-specific, dense stands and form interlocking frameworks known as thickets in fringing and barrier reefs (Jaap, 1984, Tomascik and Sander, 1987, Wheaton and Jaap, 1988). Storm-generated fragments are often found occupying back reef areas immediately landward of the reef flat/reef crest, while colonies are rare on lagoonal patch reefs (Dunne, 1979). Elkhorn coral formed extensive barrier-reef structures in Belize (Cairns, 1982); the greater and lesser Corn Islands, Nicaragua (Gladfelter, 1982, Lighty *et al.,* 1982); and Roatan, Honduras, and built extensive fringing reef structures throughout much of the Caribbean (Adey, 1978). Colonies generally do not form a thicket below 5 m depth; with maximum water depths of framework construction ranging from 3 to 12 m (Lighty *et al.*, 1982).

All Atlantic *Acropora* spp. are considered to be environmentally sensitive, requiring relatively clear, well-circulated water (Jaap *et al*., 1989). Atlantic *Acropora* spp. are almost entirely dependent upon sunlight for nourishment compared to massive, boulder-shaped species in the region (Porter, 1976, Lewis, 1977), with these latter types of corals more dependent on zooplankton. Thus, Atlantic *Acropora* spp. are much more susceptible to increases in water turbidity than some other coral species. Reductions in long-term water clarity can also reduce the coral photosynthetic to respiration ratio (P/R ratio). Therefore, *Acropora* spp. may not be able to compensate with an alternate food source, such as zooplankton and suspended particulate matter, like other corals.

Optimal water temperatures for staghorn coral range from 25° to 29°C, although colonies in the U.S.V.I. have been known to tolerate short-term temperatures around 30°C without obvious bleaching (loss of zooxanthellae). All Atlantic acroporids are susceptible to bleaching due to adverse environmental conditions (Ghiold and Smith, 1990, Williams and Bunkley-Williams, 1990). Jaap (1979) and Roberts *et al*. (1982) note an upper temperature tolerance of 35.8°C for staghorn coral. Additionally, major mortality of elkhorn and staghorn corals occurred in the Dry Tortugas, Florida, in 1977 due to a winter cold front that depressed surface water temperatures to 14° to 16°C. Some reduction in growth rates of staghorn coral was reported in Florida when temperatures dropped to less than 26°C (Shinn, 1966).

Atlantic *Acropora* spp., like many stony coral species, employs both sexual and asexual reproductive propagation. Atlantic *Acropora* spp. reproduce sexually by broadcast spawning, meaning that coral larvae develop externally to the parental colonies (Szmant, 1986) and both species are simultaneous hermaphrodites, meaning that a given colony will contain both female and male reproductive parts during the spawning season. Gametes (eggs and sperm) are located in different layers of the same polyp (Soong, 1991). The spawning season for elkhorn and staghorn corals is relatively short, with gametes released only a few nights during July, August, and/or September. In some populations, spawning is synchronous after the full moon during any of these three months. Annual egg production in elkhorn and staghorn populations studied in Puerto Rico was estimated to be 600 to 800 eggs per cm^2 of living coral tissue (Szmant, 1986).

In *Acropora* spp., fertilization and development are exclusively external. Embryonic development culminates with the development of planktonic larvae called planulae. Little is known concerning larval settlement patterns (Bak *et al*., 1977; Sammarco, 1980; Rylaarsdam, 1983). In general, upon proper stimulation, coral larvae, whether released from parental colonies or developed in the water column external to the parental colonies, settle and metamorphose on appropriate substrates, in this case preferably coralline algae. Initial calcification ensues with the forming of the basal plate. Buds that form on the initial corallite develop into daughter corallites.

Studies of elkhorn and staghorn corals on the Caribbean coast of Panama indicated that larger colonies of both species (as measured by surface area of the live colony) have higher fertility rates (Soong and Lang, 1992). Only colonies of staghorn coral with a branch length larger than 9 cm were fertile and over 80% of colonies with branches longer than 17 cm (n=18) were fertile. The estimated size at puberty for staghorn coral was 17 cm in branch length and the smallest reproductive colony observed was 9 cm in branch length (Soong and Lang, 1992).

The growth rate for staghorn coral has been reported to range from 3 to 11.5 cm/yr. This growth rate is relatively fast compared to other corals and historically enabled the species to construct significant reefs in several locations throughout the wider Caribbean (Adey, 1978). Growth in staghorn coral is also expressed in expansion, occurring as a result of fragmenting and forming new centers of growth (Bak and Criens, 1982; Tunnicliffe 1981). A broken off branch may be carried by waves and currents to a distant location or may land in close proximity to the original colony. If the location is favorable, branches grow into a new colony, expanding and occupying additional area. Fragmenting and expansion, coupled with a relatively fast growth rate, facilitates potential spatial competitive superiority for staghorn coral relative to other corals and other benthic organisms (Shinn, 1976; Jaap *et al.* 1989).

Distribution

Historically, throughout much of the wider Caribbean, staghorn coral so dominated the reef within the 7 to 15 m depth that the area became known as the staghorn zone. It was documented in several reef systems such as the north coast of Jamaica (Goreau, 1959) and the leeward coast of Bonaire (Scatteryday, 1974). In many other reef systems in the wider Caribbean, most notably the western Caribbean areas of Jamaica, Cayman Islands, Belize, and eastern Yucatan (Adey, 1977), staghorn coral was a major mid-depth (10 to 25 m) reef-builder. Principally due to wind conditions and rough seas, staghorn coral has not been known to build extensive reef structures in the Lesser Antilles and southwestern Caribbean.

Throughout much of the wider Caribbean, *A. palmata* historically comprised the elkhorn zone at 1 to 8 m depth (reef flat, wave zone, reef crest) in areas diverse as Jamaica (Goreau 1959), Alacran Reef, Yucatan peninsula (Kornicker and Boyd, 1962), Abaco Island, Bahamas (Storr, 1964), the southwestern Gulf of Mexico, Bonaire (Scatterday 1974), and the Florida Keys (Jaap 1984; Dustan and Halas, 1987). The predominance of *A. palmata* in shallow reef zones is related to the degree of wave energy; in areas with strong wave energy conditions only isolated colonies may occur, while thickets may develop at intermediate wave energy conditions (Geister, 1977). Although considered a turbulent water species, *A. palmata* is sensitive to breakage by wave action, and is thus replaced by coralline algae in heavy surf zones throughout the province (Adey, 1977).

Studies of historical distribution and abundance patterns focus on percent coverage, density, and relative size of the corals during three periods: pre-1980, the 1980 – 1990 decades, and recent (since 2000). Few data are present before the 1980 baseline, likely due in part to researchers' tendencies to neglect careful measurement of abundance of species that are ubiquitous.

Population Dynamics and Status

Staghorn and elkhorn corals were listed as threatened under the ESA on May 9, 2006, based on a status review initiated in 2004 (Federal Register / Vol. 71, No. 89 / Tuesday, May 9, 2006 / Rules and Regulations; [Docket No. 050304058–6116–03; I.D. No.060204C]; RIN No. 0648–XB29). The Atlantic *Acropora* Status Review presents a summary of published literature and other currently available scientific information regarding the biology and status of both elkhorn and staghorn corals (*Acropora* Biological Review Team, 2005).

Both acroporid species underwent precipitous declines in the early 1980s throughout their ranges and this decline has continued, albeit at a much slower rate. Although quantitative data on former distribution and abundance are scarce, in the few locations where quantitative data are available (e.g., Florida Keys, Dry Tortugas, Belize, Jamaica, and the U.S.V.I.), declines in abundance (coverage and colony numbers) are estimated at >97%. Although this decline has been documented as continuing in the late 1990s, and even in the past five years in some locations, local extirpations (i.e., at the island or country scale) have not been rigorously documented.

Figure 8 summarizes the abundance trends of specific locations throughout the wider Caribbean where quantitative data exist illustrating the overall trends of decline of elkhorn and staghorn corals since the 1980s. It is important to note that the data are from the same geographic area, not repeated measures at an exact reef/site that would indicate more general trends. The overall regional trend depicted is a >97% loss of coverage (area of substrate the species occupy).

Threats

Staghorn and elkhorn corals are facing a myriad of threats that are in some cases acting synergistically. Diseases, temperature-induced bleaching, and physical damage from hurricanes are deemed to be the greatest threat. The threat from disease, though clearly severe, is poorly understood in terms of etiology and possible links to anthropogenic stressors. Threats from anthropogenic physical damage (e.g., vessel groundings, anchors, divers/snorkelers), coastal development, competition, and predation are deemed to be moderate. Table 3 summarizes the factors affecting the status of staghorn and elkhorn coral and the identified sources of those threats.

Many factors, including both intrinsic life history characteristics, as well as external threats, are important to consider in assessing the status and vulnerability of staghorn coral. Recovery of staghorn coral from its current level of decreased abundance depends upon rates of recruitment and growth outpacing rates of mortality. This species has a rapid growth rate and high potential for propagation via fragmentation. However, while fragmentation is an excellent life history strategy for recovery from physical disturbance, it is not as effective when fragment sources (i.e., large extant colonies) are scarce.

Thus, it is anticipated that successful sexual reproduction will need to play a major role in Atlantic *Acropora* spp. recovery (Bruckner, 2002). Meanwhile, there is substantial evidence to suggest that sexual recruitment of staghorn and elkhorn corals is currently compromised. Reduced colony density in this broadcast-spawning, self-incompatible species, compounded in some geographic areas with low genotypic diversity, suggests that fertilization success and consequently, larval availability, has been reduced. In addition, appropriate substrate available for fragments to attach to is likely reduced due to changes in benthic community structure on many Caribbean reefs. Coupled with impacts from coastal development (i.e., dominance by macroalgal, turf, and/or sediment-coated substrates), these factors are expected to further reduce successful larval recruitment below an appropriate scale that can compensate for observed rates of ongoing mortality.

Species at reduced abundance are at a greater risk of extinction due to stochastic environmental and demographic factors (e.g., episodic recruitment factors). Both acroporids have persisted at extremely reduced abundance levels (in most areas with quantitative data available, less than 3% of prior abundance) for at least two decades.

Although the major threats (e.g., disease, elevated sea surface temperature, and hurricanes) to staghorn and elkhorn coral's persistence are severe, unpredictable, likely to increase in the foreseeable future, and, at current levels of knowledge, unmanageable, managing some of the stressors identified as less severe (e.g., nutrients, sedimentation) may assist in decreasing the rate of elkhorn and staghorn corals' decline by enhancing coral condition and decreasing synergistic stress effects.

The impacts on staghorn and elkhorn coral from all of the above mentioned threats could be exacerbated by reduced genetic diversity, which often results when species undergo rapid decline like staghorn and elkhorn corals have in recent decades. This expectation is heightened when the decline is due to a potentially selective factor such as disease, in contrast to a less selective factor such as hurricane damage, which will likely cause disturbance independent of genotype. If the species remains at low densities for prolonged periods of time, genetic diversity may be significantly reduced. Thus, given the current dominance of asexual reproduction, the rapid decline (largely from a selective factor), and the lack of rapid recovery of elkhorn and staghorn corals, it is plausible that these populations have suffered a loss of genetic diversity that could compromise their ability to adapt to future changes in environmental conditions. No quantitative information is available regarding genetic diversity for either species.

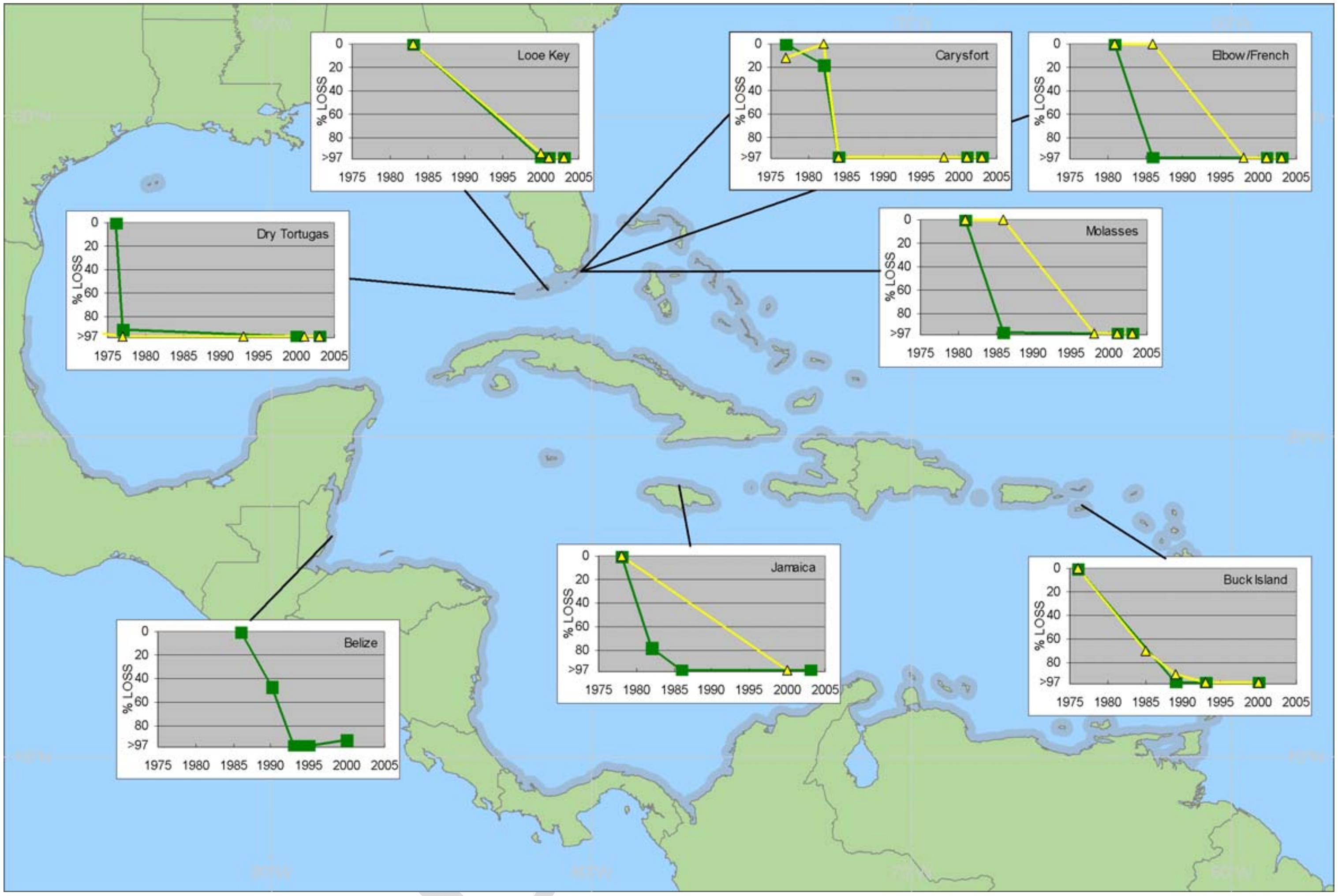

Figure 8. Percent loss of staghorn coral (green squares) and elkhorn coral (yellow triangles) throughout the Caribbean for all locations (n=8) where quantitative trend data exist. Shaded areas on map illustrate the general range of elkhorn and staghorn corals (Acropora BRT, 2005).

Table 3. Factors affecting the species.

Natural abrasion and breakage Source: storm events	**Disease** Source: undetermined/understudied
Sedimentation Source: land development/run-off dredging/disposal sea level rise major storm events	**Anthropogenic abrasion and breakage** Source: divers vessel groundings anchor impact fishing debris
Temperature Source: hypothermal events global climate change power plant effluents ENSO* events	**Predation** Source: overfishing natural trophic reef interactions
	Loss of genetic diversity Source: population decline/bottleneck
Nutrients Source: point-source non-point-source	**Contaminants** Source: point-source non-point-source
Competition Source: overfishing	**CO_2** Source: fossil fuel consumption
Sea level rise Source: multiple	**Sponge boring** Source: undetermined/understudied

El Niño-Southern Oscillation

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4D Rule

On 9 May 2006, staghorn and elkhorn corals were listed as “threatened” under the ESA. Under the ESA, when a species is listed as threatened, the prohibitions on take are not automatically in place, as would be the case with an “endangered” designation. The listing agency (i.e. NMFS) must propose and publish a rule under section 4(d) of the act, referred to as a 4(d) rule, to issue protective regulations and exemptions in order to provide for the conservation of threatened species. NMFS published a final “4D” rule for these *Acropora* species on October 29, 2008 (73 FR 64264) providing a list of activities that would result in “take” as defined by the ESA.

Critical Habitat

On November 26, 2008, NMFS published a final rule in the Federal Register to designate critical habitat for elkhorn and staghorn corals. Four specific areas are proposed for designation, which include: the Florida unit (approximately 1,329 square miles of marine habitat); the Puerto Rico unit (approximately 1,383 square miles of marine habitat); the St. John/St. Thomas unit (approximately 121 square miles of marine habitat); and the St. Croix unit (approximately 126 square miles of marine habitat).

Designated critical habitat includes one specific area of the Atlantic-Ocean offshore of Palm Beach, Broward, Miami-Dade, and Monroe counties, Florida.

Generally, the seaward boundary is the 30-m depth contour and the shoreward boundary is the line of mean high water. Within these boundaries, discrete areas of water deeper than 30 m are not included. Within these water depths, NMFS requires that, ‘‘substrate of suitable quality and availability’’ meant consolidated hardbottom or dead coral skeleton that is free from fleshy macroalgae cover and sediment cover. (NMFS, 2008b).

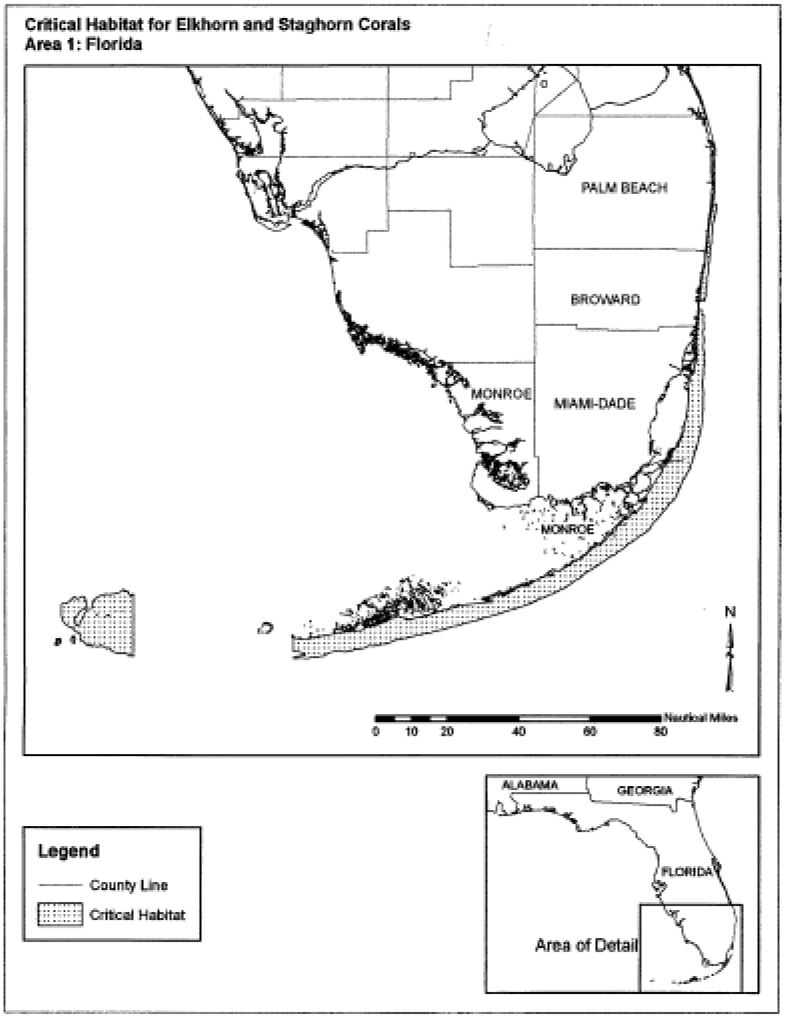

Figure 9. Designated critical habitat for elkhorn and staghorn corals in the Florida Area 1.

The Corps requested that Miami Dade Department of Environmental Resources Management (DERM) review all of their coral survey records (surveys conducted since 1985 3-4 days a week throughout the entire County), including any recent surveys to determine if either Acroporid coral had been documented in the vicinity of either of the placement areas or the permitted pipeline corridors. In addition, DERM completed a survey for Acroporid corals using the “Recommended Survey Protocol for *Acropora* spp. In Support of Section 7 Consultation (revised October 2007)” approved by the National Marine Fisheries

Service. The surveys were conducted between September 16th and 29th, 2008. A copy of that report is included with this Biological Assessment. In summary, DERM determined that after surveying the Miami Beach – North (Test Beach) Pipeline corridor and the hard bottom adjacent to the SGC-Ext. Borrow Area for the presence of both *Acropora cervicornis* and *Acropora palmata*. *Acropora palmata* was not observed in either area. *A.cervicornis* was documented near the pipeline corridor and near the borrow area. Details are included in the survey report attached this is assessment.

Dredging Methods and Associated Impacts

Direct Impacts

No direct impacts (breakage, removal or direct burial of *Acropora sp.* are anticipated from dredging activities associated with the sand mining activities in SGC1-Ext borrow area as it will be mining unconsolidated sediments for placement on beaches as part of a shore protection project or with the placement areas as no *Acropora sp*. are not known to colonize on unconsolidated sediments and no exposed hardbottom has been documented in the nearshore waters adjacent to the proposed nourishment areas. No adverse modification r destruction of designated critical habitat is expected since the sandy bottoms adjacent to the proposed nourishment areas lack the required exposed hardbottom and clean uncolonized rock necessary as a PCE.

Indirect impacts

Turbidity and Sedimentation

Although there is published literature concerning the effects of sedimentation and turbidity on coral reefs throughout the world, there is a paucity of peer reviewed published data from many recent dredging events that have taken place in southeast Florida associated with dredging for sand mining associated with shore protection projects. The Corps reviewed four monitoring reports and one peer reviewed study which is currently in press from recent projects in documented *Acropora* habitat between 1980 – 2007 where sedimentation and turbidity data were collected not only at sites adjacent to the channels or borrow sites, but also from background sites so that potential indirect impacts associated with dredging can be detected outside of background impacts from natural events. Some of this data will be published in peer-reviewed publications in the near future.

The four projects that were reviewed were: (1) Port Everglades entrance channel widening and deepening project conducted in 1980-1981; (2) Broward County Shore Protection Project conducted in 2005; (3) Key West Harbor O&M dredging 2004-2006 and (4) Key West Harbor O&M dredging 2007 (Gilliam *et al*. 2007; Fisher *et al., In Press*; CSA, 2006; CSA, 2007 and CSA, 1981). These projects utilized cutterhead, hopper, and clamshell dredges (or a combination thereof) for their operations.

From a turbidity and/or sedimentation standpoint, a hopper dredge has the highest likelihood of adverse effect due to the overflow of water being returned

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from the hopper to the surrounding environment. With this overflow, “fines” (usually clays or silts which are light enough not to have settled out in the hopper) are returned to the water during dredging operations. The clamshell or bucket dredge ranks second since the material may or may not be enclosed in a bucket, and if it is not enclosed, material may escape that bucket into the surrounding environment. The dredging method with the lowest level of associated sedimentation or turbidity is the cutterhead dredge. This dredge has suction that removes the sediment, transports it to the surface where it is either pumped onto the receiving beach, or placed in a scow for transport to either a beach or disposal site. The Key West O&M projects in 2004-2006 and 2007 utilized both a clamshell dredge and a hopper dredge. The Broward County Shore Protection Project utilized a hopper dredge and the Port Everglades expansion project in 1980 utilized a cutterhead dredge. Understanding which types of equipment were utilized allows for a comparision across projects of results regarding turbidity and/or sedimentation monitoring.

A review of these four projects found that using Best Management Practices (BMPs) for turbidity and sedimentation control are protective of the coral and hardground environments surrounding south Florida borrow sites and navigation channels. Impacts associated with storms can have sedimentation rates in excess of 400 times those seen with a dredging project. The following information is provided from CSA International, Inc. (2006):

> *“Average daily sedimentation rates at the monitoring sites fluctuated based on weather conditions and ambient suspended sediment load in the surrounding waters. This was especially evident during periods of winter cold-front activity during November 2005 and January 2006, with associated rough seas and high turbidity. During these periods, average daily sedimentation rates were more than twice as high as during the previous November and January, and up to 25 times above levels observed during June 2004 at several sites. The passage of hurricanes during August and September of 2004 and July, September, and October of 2005 provided the most dramatic increase in levels of sediment re-suspension (Figures 3.23 to 3.25). Average daily sedimentation rates at several of the Hawk Channel seagrass sites and the bank reef sites were up to 400 times higher than levels noted during June 2004. Following Hurricane Dennis in July 2005, nearly every sediment trap site had at least a ten-fold increase in the average daily sedimentation rate compared to the previous month.*

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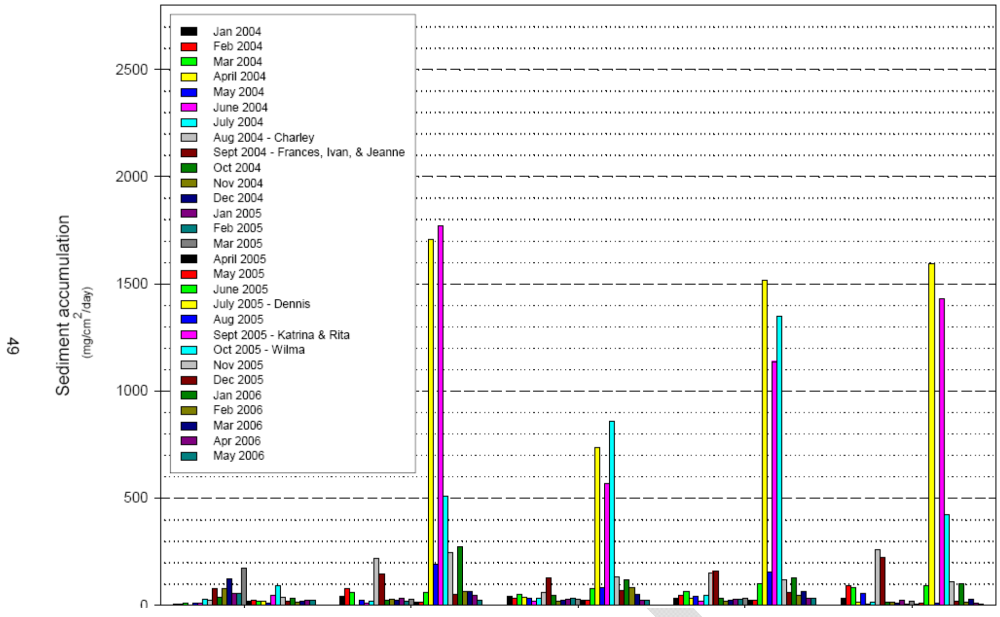

Figure 3.23 - Key West RHSM Sites SP-1 to HR-17 sediment trap data for January 2004 through May 2006.

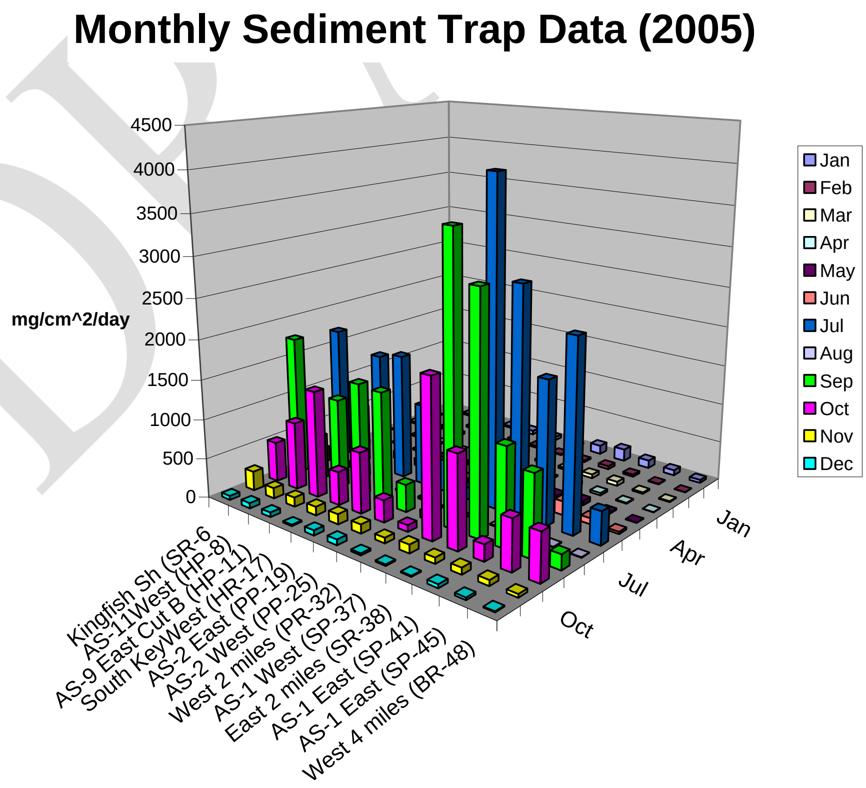

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Figure 3.25 – Key West RSHM Monthly Sediment Trap data – 2005.

> *Site BP-41, a bank reef monitoring site adjacent to the Main Ship Channel, had an average daily sediment deposition rate of 18 mg/cm^2/day for August 2005, while in the following month when Hurricanes Katrina and Rita impacted the area, the average daily sediment deposition rate recorded in the traps increased to 1,219 mg/cm^2/day, 67 times the previous month’s level. For Site SP-37, a seagrass site located adjacent to the Main Ship Channel, there was an increase in average daily sediment deposition rate during this same period from 14.4 mg/cm^2/day up to 3,529.7 mg/cm^2/day, 245 times the August levels.*

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Additionally, Gilliam *et al.* 2007 found there to be no detectable impacts to corals living on the hardgrounds adjacent to the borrow areas utilized for the Broward County shore protect project. A review of the monitoring from the Port Everglades channel widening and deepening from 1980-1981 continues this trend in showing little to no effect of dredging operations on corals adjacent to dredging areas (CSA, 1981).

The examples of the adverse effects of turbidity or sedimentation on coral species often cited by resource managers are commonly projects in third world countries without the strict water quality protections in place in the US. These water quality protections are required under the Clean Water Act and while protecting water quality by limiting turbidity, are also protective of coral species, including *Acropora* and its designated critical habitat, located near dredging operations where material is being removed from the bottom by a dredge. Dredging projects take place in a spatially and temporally finite area and thus impacts associated with them, if present, should be detectable within this same finite footprint. A review of these four projects, three of them in very recent past, demonstrates that no adverse effects of dredging were detectable (or in the case of Broward county is detectable as monitoring continues) (Gilliam *et al*, 2007; Fisher *et al.,* In Press; CSA, 2006; CSA, 2007; CSA, 1981).

Of the four projects, only the Key West O&M project documented any Acroporid corals adjacent to dredging areas, which may be attributable the lack of focus on *Acropora* above all other coral species located near dredging areas. Between the two dredging projects in Key West, *A. cervicornis* was documented along the east side of the Key West entrance channel near station BP-41. The 2007 dredging event took approximately four months between May and August. These colonies did not show any impacts different than control corals (CSA, 2007) and none of the recorded changes were attributed to the dredging.

To protect hardgrounds in project areas including those that support *A. cervicornis*, the Corps requires turbidity monitoring with all of its projects. It is normal for the Corps to monitor sedimentation associated with sand mining in areas that support hardground habitat. Additionally, for the Dade Contract E work – a 400-ft protective buffer from all hardgrounds will be required in the project specifications. Vessel location monitoring via the Silent Inspector program will also be utilized to confirm the dredge actions in relation to the required 400 ft buffer. Fisher, *et al.* documented that a 400 ft buffer is sufficient to protect coral resources downstream of hopper dredging operations associated with the Broward County Shore Protection Project and the Corps proposes to use the same 400-ft protective buffer for this project.

Current protective measures being employed by USACE-SAJ to protect hardground habitats (including those that support *Acropora sp*. and designated critical habitat):

1. Maintain a 400-ft buffer from all mapped hardgrounds.

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2. Monitor turbidity associated with dredging operations and meet requirements put worth in the Section 401 water quality certificates issued by the State of Florida.

Effects Determination

Based on the information presented here, the Corps determines that the dredging of sand from the SGC-Ext borrow area off Miami-Dade County and subsequent placement on the Priority #1 and #2 placement sites may affect but is not likely to adversely affect smalltooth sawfish and *Acropora palmata* and *A.cervicornis* and will not destroy or adversely modify the designated critical habitat surrounding the borrow area and adjacent to the pipeline corridors and request that NMFS concur with this determination.

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DRAFT

Presence, density and proximity of *Acropora cervicornis* and *A. palmata* in the project areas for the Miami-Dade Test Beach Nourishment- Contract E Project

Introduction:

The South Government Cut Extension Borrow Area (SGC Ext.) and the Miami Beach – North or Test Beach Pipeline utilization is proposed for the Miami-Dade Test Beach Nourishment- Contract E Project. Therefore, the hard bottom resources in the two project areas were surveyed for the presence of the threatened stony coral species *Acropora cervicornis* and *Acropora palmata.* The location of the borrow area and pipeline are shown in Figure 1.

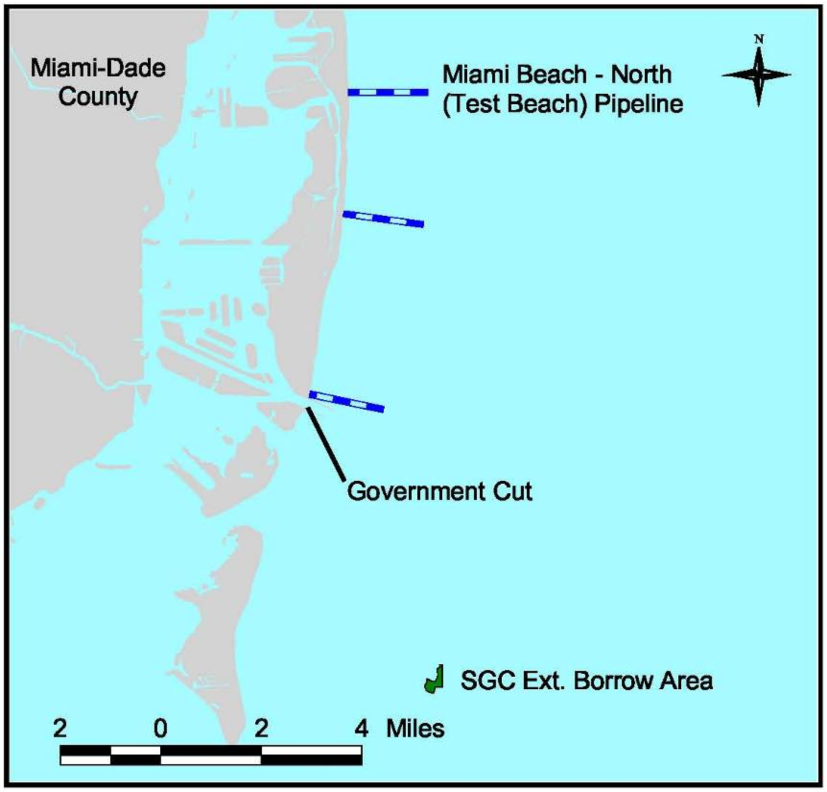

Figure 1. Location of SGC Ext. Borrow Area and Miami Beach-North (Test Beach) Pipeline.

Methods:

The survey methods were based on the "Recommended Survey Protocol for *Acropora* spp. In Support of Section 7 Consultation (revised October 2007)" approved by the National Marine Fisheries Service. The surveys were conducted between September 16th and 29th, 2008.

Pipeline Corridor—The total project area for the pipeline corridor is approximately 38,550m^2 (15.24m x 2,530m) of which approximately 17,560m^2 falls on hard bottom resources. Preliminary reconnaissance or a 'tier one' survey was conducted by divers due to the width—over 1.5 miles—and the large depth profile found within the project corridor—18’ in the west to 55’ in the east. During the reconnaissance surveys, divers swam from the eastern end of the hard bottom resources to the western end. GPS coordinates and general site description were recorded when *Acropora* colonies were observed. Belt transects or ‘tier two’ surveys were established in the general area where *Acropora* spp. were present. Transects were set up east to west (opposed to using random degree headings) due to the narrow width of the pipeline (15.24m) north to south. Each transect was 50m x 4m. The length, width, and height of each colony were recorded along with general comments about health and percent live tissue. The colony dimensions were based on the entire colony skeleton and measurements were not limited to the live tissue.

<u>Hard Bottom Adjacent to Borrow Area</u>— Surveys were conducted on hard bottom resources within 450’ to the east and west and within 1000’ to the north and south of the borrow area. The survey area was extended to the north and south due to prevailing current directions and susceptibility of these areas to turbidity plums from dredging in the borrow area. Based on these buffers, the total project area is approximately 926,900m^2. The borrow area is centered in this project area and covers approximately 232,300m^2. Hard bottom resources cover approximately 114,400m^2 of the project area and are comprised of patch reef areas and the eastern edge of the second reef tract. The third reef tract was over 450’ east of the borrow area and excluded from the surveys. Due to the varying sizes and discontinuous nature of the hard bottom resources within the project area, preliminary reconnaissance surveys or ‘tier one’ surveys were conducted. These ‘tier one’ surveys involved a structured swim over each hard bottom area generally in a north-south direction. With the exception of two areas, the ‘tier one’ swims were traced with a Garmin GPS unit. The two areas not traced included a small area in the northeast portion of the project area that contained artificial reef material (limerock boulders and prefabricated modules) and a centrally located patch reef. At these two locations, the boundaries of the resources (artificial material and natural hard bottom) were well defined (i.e. completely within project area) and divers could confidently cover the entire area during the reconnaissance surveys. During the ‘tier one’ surveys GPS coordinates and general site description were recorded when *Acropora* colonies were observed. If more than five *Acropora* colonies were present, the ‘tier two’ surveys were conducted in that area. The ‘tier two’ surveys involved three belt transects at random degree headings from a referenced center point. Each transect was 50m x 4m. The length, width, and height of each colony were recorded along with general comments about health and percent live tissue. The colony dimensions were based on the entire colony skeleton and measurements were not limited to the live tissue.

Results:

The Miami Beach – North (Test Beach) Pipeline and the hard bottom adjacent to the SGC-Ext. Borrow Area were surveyed for the presence of both *Acropora cervicornis* and *Acropora palmata*. *Acropora palmata* was not observed in either area. Therefore, the results below describe the presence, density and proximity of *Acropora cervicornis* to the project areas.

<u>Pipeline Corridor</u>—Figure 2 shows the Miami Beach-North (Test Beach) pipeline project area. *Acropora* spp. were not observed in the eastern portion of the pipeline corridor where the depth ranged from 30’ to 55’. *Acropora cervicornis* was first observed approximately 230’ west of the eastern edge of the first reef tract in about 25’ of water at approximately 25 51.212° N and 80 06.149° W. The observed range of *A. cervicornis* extended to the western edge of first reef, approximately 25 51.212°N and 80 06.625° W, with varying densities. Four belt transects (P1, P2, P3, and P4b) were conducted in the areas where

more than five colonies were observed. On the ‘tier one’ reconnaissance surveys for the hardbottom area between transect P4b and P1, only three Acropora cervicornis colonies were observed. Therefore, the ‘tier two’ belt transects were not conducted in this region. In Transect P2 and P4b, *A. cervicornis* colonies were not observed. However, at both locations several colonies were observed outside of the belt transects (see Figure 3). In Transects P1 and P3, the densities of *A. cervicornis* colonies were 0.125/m^2 and 0.095/m^2 respectively as summarized in Table 1. Overall the four ‘tier two’ belt transects on the first reef tract had an average density of 0.055 colonies per m^2. In both P1 and P3 transects, numerous colonies exhibited tissue loss—both old and recent. Appendix A provides the detailed information on the dimensions and apparent health of each individual colony.

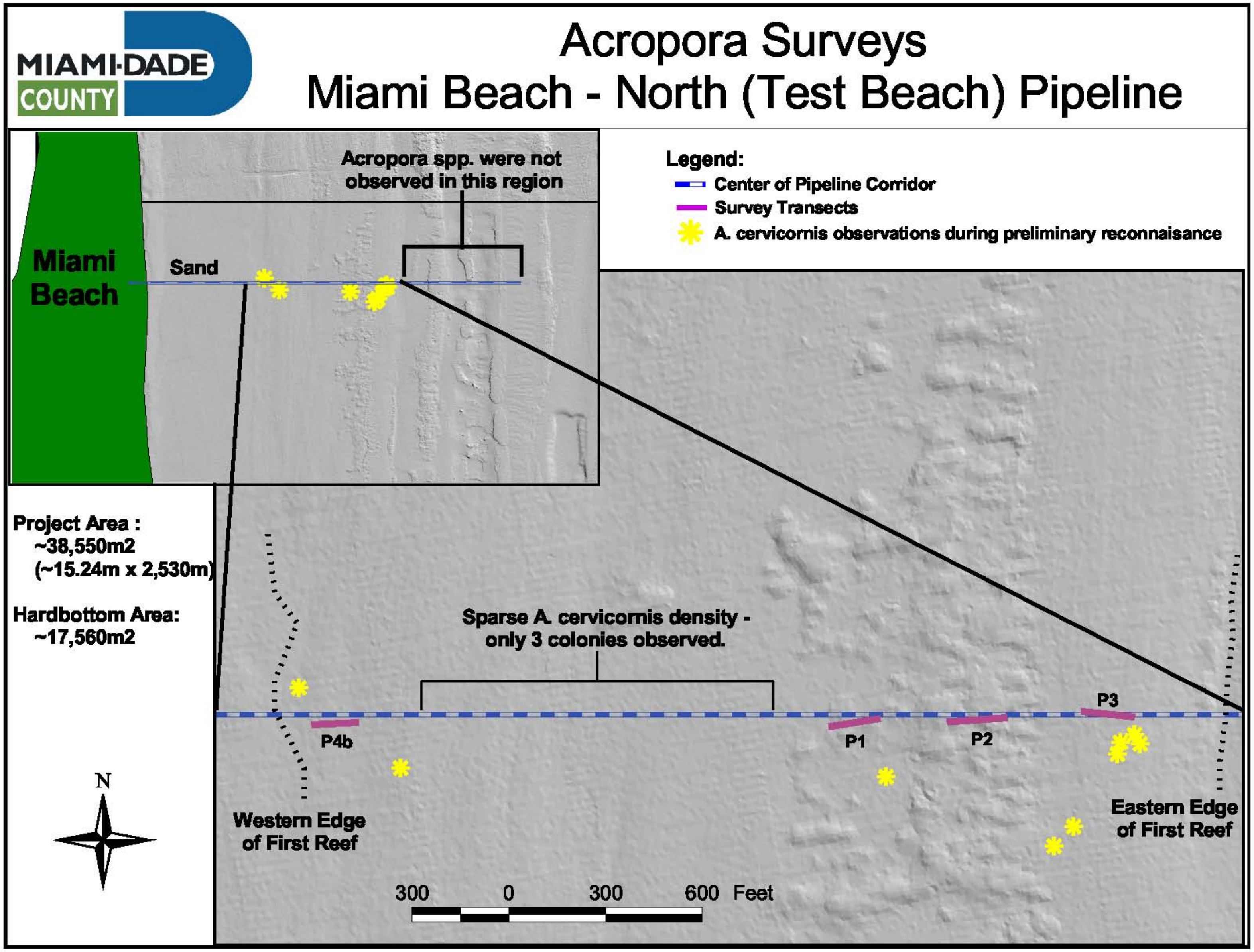

Figure 2. Hard bottom resources surveyed along the Miami Beach – North (Test Beach) Pipeline.

Table 1. Summary of 'tier 2' belt transect surveys on the Miami Beach – North (Test Beach) Pipeline Corridor.

Transect	# Colonies/ Transect	Density (Ind./m^2)	Average Largest Dimension (cm)
P1	25	0.125	18.7
P2	0	0	
P3	19	0.095	21.1
P4b	0	0	
Average	11	0.055	19.7

Figure 3. *Acropora cervicornis* approximately 100' south of Transect P4b.

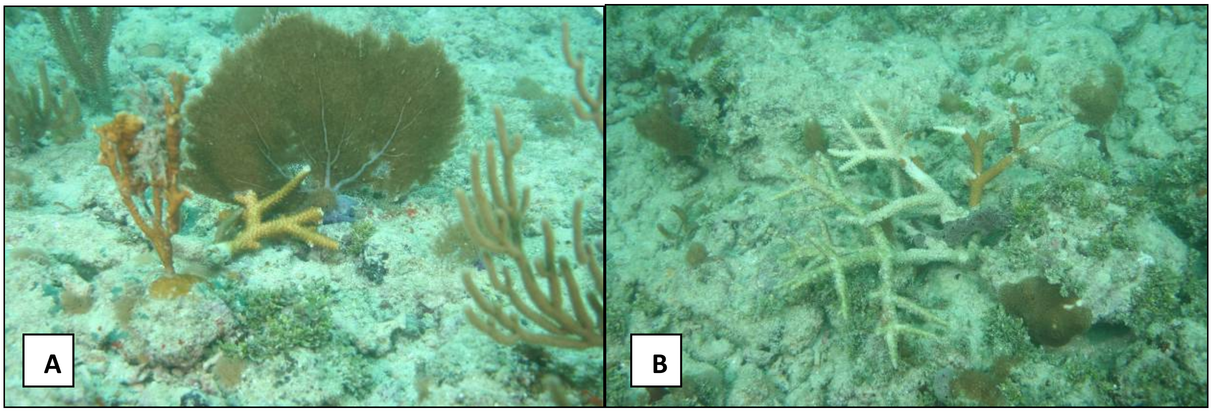

Figure 4 A). *Acropora cervicornis* colony on P1. B.) *Acropora cervicornis* colony on P1 exhibiting recent and old death.

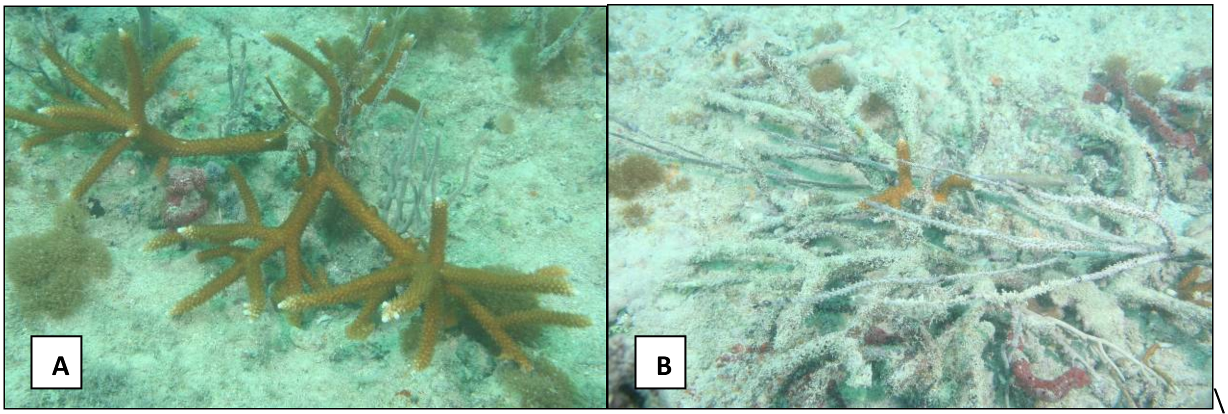

Figure 5A). *Acropora cervicornis* colony on P3. B.) *Acropora cervicorn*is colony on P3 with majority of colony exhibiting old death.

<u>Hard Bottom Adjacent to Borrow Area</u>—Figure 6 shows the hard bottom adjacent to the borrow area and the results of the 'tier one' reconnaissance surveys. *Acropora* spp. were not observed on the artificial reef material located in the northeast section of the figure, the central patch reef, or the southern significant habitat and patch reef areas. As shown in Figure 6 and in more detail in Figure 7, *Acropora cervicornis* was observed on the second reef tract to the southwest and west of the borrow area. Three colonies were documented on the second reef tract approximately 485' to the southwest of the borrow area (Figure 8) in about 20-25' of water. Multiple colonies were documented on the eastern portion of the second reef tract directly west of the borrow area in water 20' to 33' deep. Three belt transects centered at 25 41.155° N and 80 05.793° W were conducted in the area with more than five *A. cervicornis* colony observations. This area with the high *A. cervicornis* abundance is within 725' of the borrow area. In Transects 1 and 2, the densities of *A. cervicornis* colonies were 0.115/m^2 and 0.040/m^2 respectively as summarized in Table 2. Photographs of *A. cervicornis* colonies observed in Transect 1 are shown in Figure 9. *Acropora cervicornis* colonies were not observed in the Transect 3. Appendix B provides the information for each individual colony observed in the 'tier two' belt transects.

Table 2. Summary of 'tier 2' belt transect surveys on the 2nd Reef Tract east of the SGC-Ext. Borrow Area.

Transect	# Colonies	Density (Ind./m^2)	Average Largest Dimension (cm)
1	23	0.115	24.7
2	8	0.040	36.5
3	0	0	N/A
Average	10.33	0.052	27.7

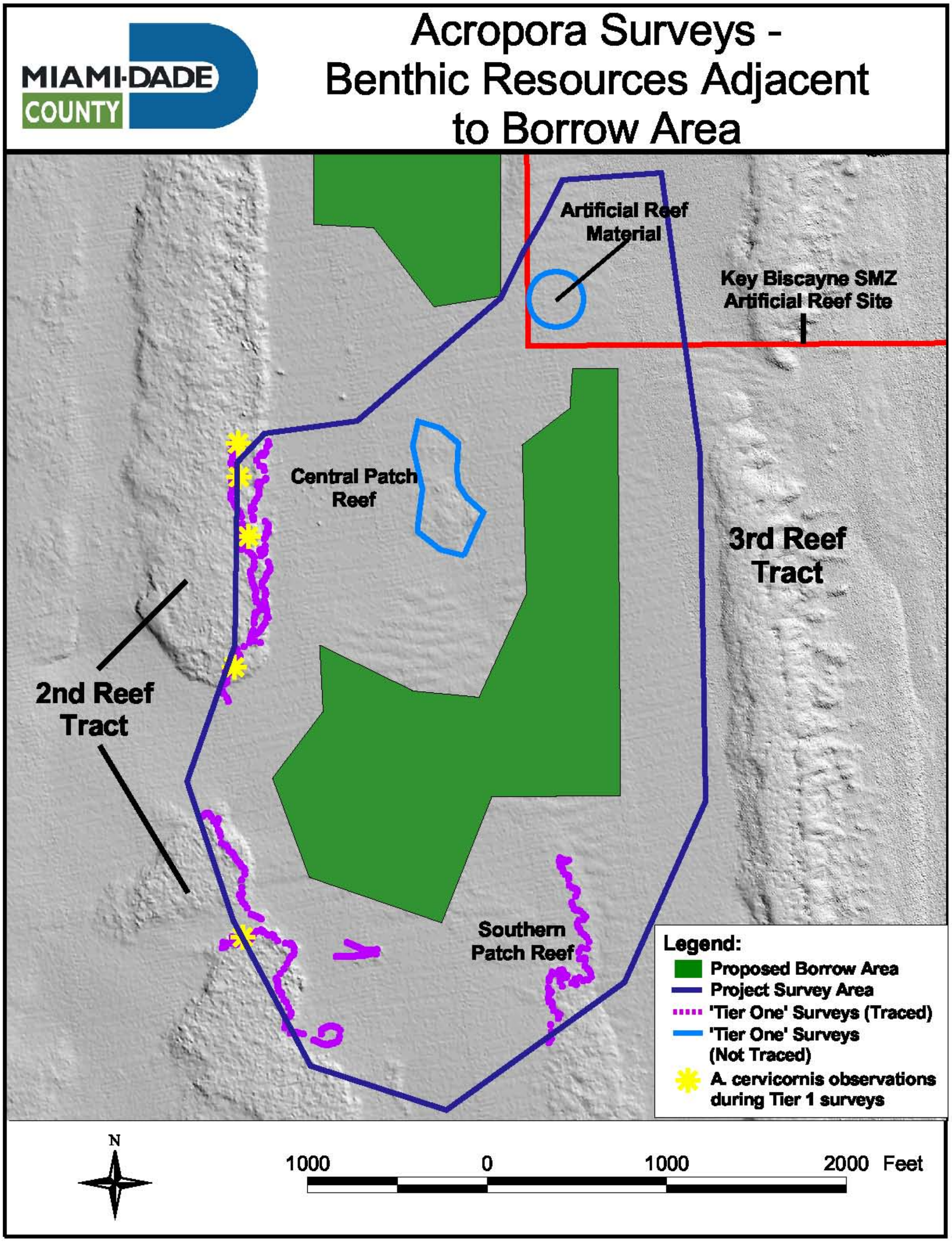

Figure 6. Hard bottom resources assessed during the 'tier one' reconnaissance surveys near the SGC-Ext. Borrow Area.

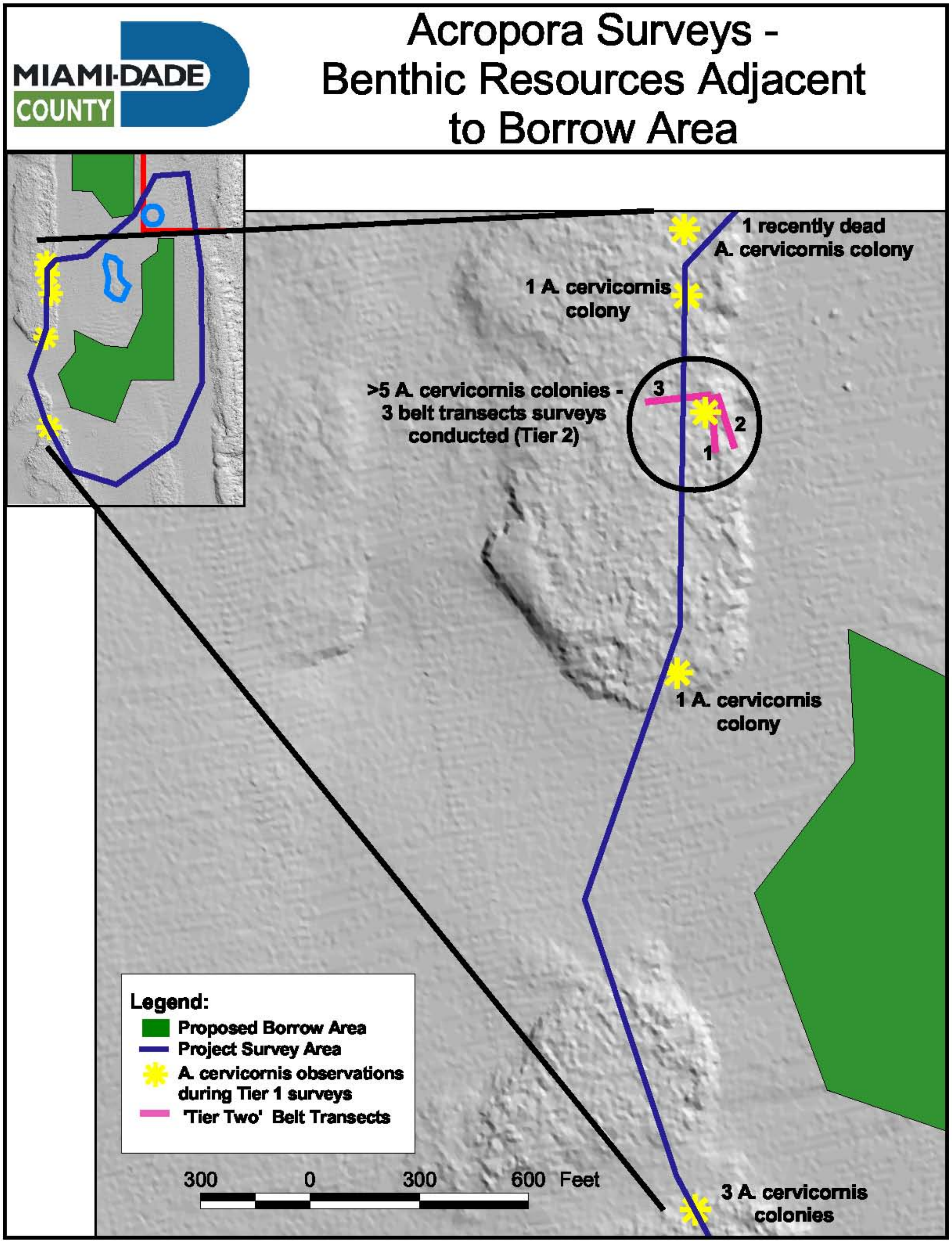

Figure 7. Eastern hard bottom area where *Acropora cervicornis* colonies were observed during ‘tier one’ surveys and where the ‘tier two’ belt transect surveys were conducted near the SGC-Ext. Borrow Area.

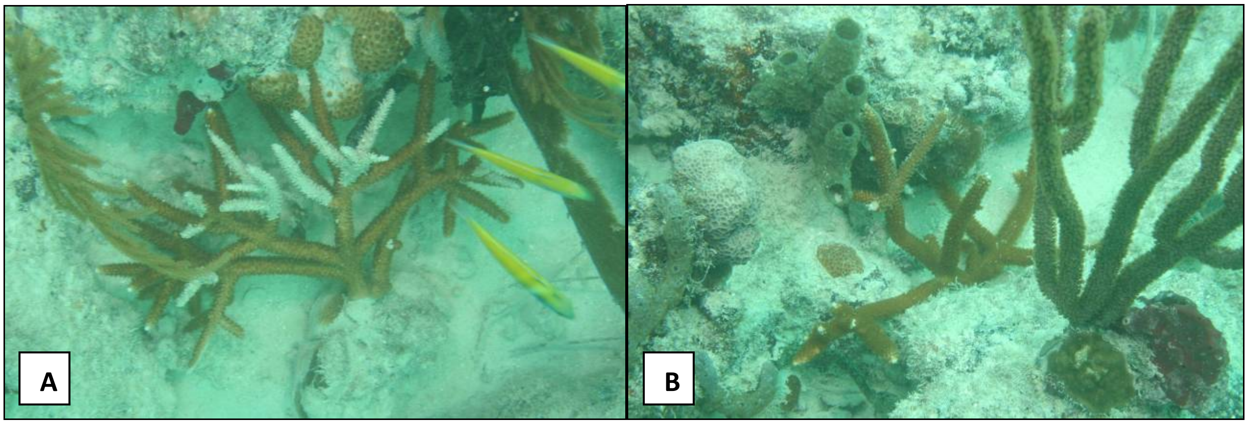

Figure 8. Two of three *Acropora cervicornis* colonies observed at the hard bottom reef area southwest of borrow area.

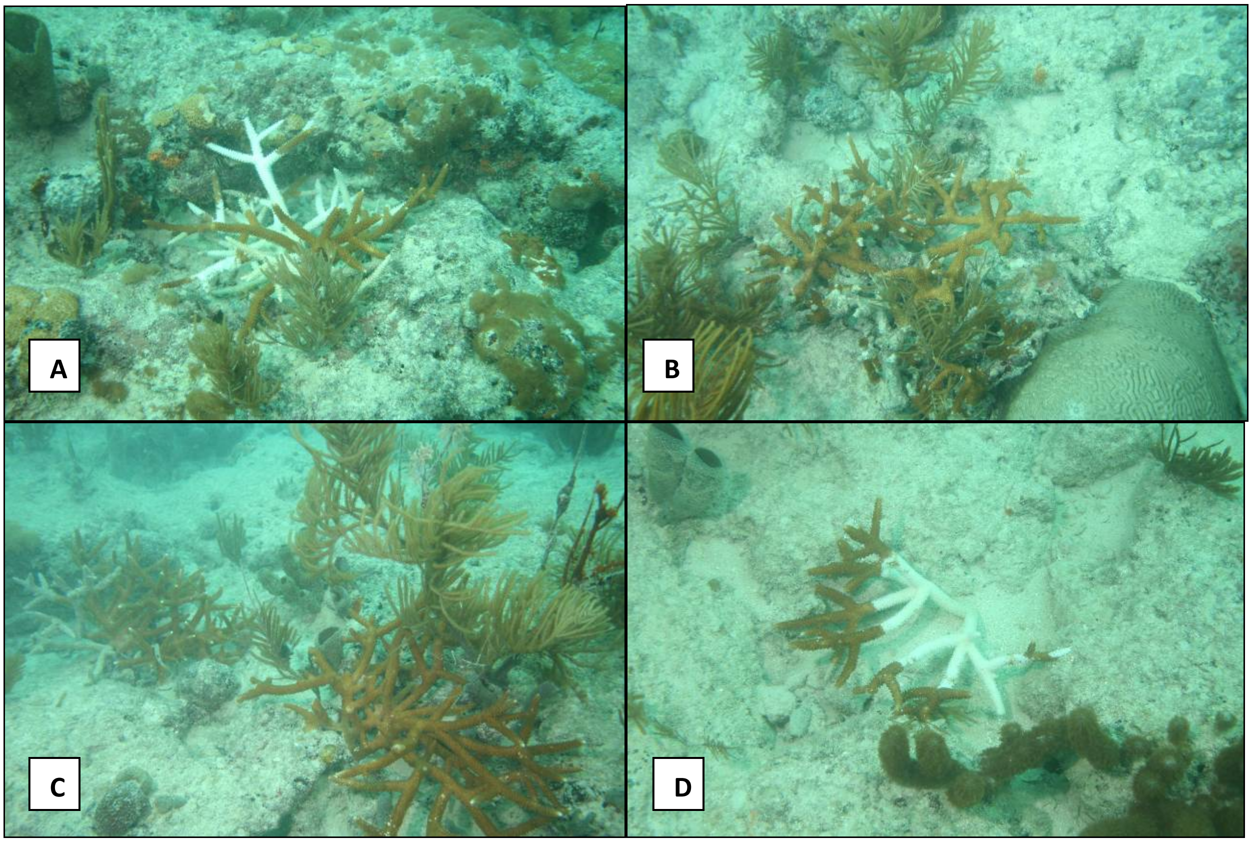

Figure 9. Acropora cervicornis colonies found on Transect 1 of the 'tier two' belt transect surveys. Photographs A and D exhibit recent death. Old death can be seen on the colony to the left in Photograph C.

Summary:

Acropora palamata was not found in either project area. However, *Acropora cervicornis* was documented in surveys of the hardbottom resources in both the Miami Beach-North (Test Beach) pipeline corridor and in the area surrounding the proposed SGC-Ext. borrow area. In the pipeline corridor, *A. cervicornis* colonies were restricted to the shallow (20' – 25') first reef tract area. On the hard bottom resources surrounding the borrow area, *A. cervicornis* colonies were only found on the western second reef tract in depths ranging from 20’ to 33’. In both areas, *Acropora cervicornis* exhibited varying densities from small areas with numerous colonies to sparse coverage with only a few colonies observed for hundreds of meters.

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

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

REPLY TO
ATTENTION OF

NOV 19 2009

Planning Division
Environmental Branch

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

Dear Mr. Bernhart:

We have received the recently completed Biological Opinion for the Dade County Beach Erosion Control Project; Contract E dated October 24, 2009. We have reviewed the document and determined that with one exception, the Corps can accept the Biological Opinion and subsequent Terms and Conditions.

However, Term and Condition #4 causes some confusion and concern. The T&C states "COE must use rock anchors to ensure the deployed pipeline does not move after deployment". Based on the discussions with your staff, it was determined that your staff assumed that the Corps would anchor the pipeline to the substrate in the pipeline corridor.

The pipe for the Dade project is made of steel, in 40 foot long segments, with a 30 inch diameter weighing 2.5 tons (5,000 lbs) per 40 ft segment and will be placed in designated pipeline corridors. The total length of pipeline to be deployed for this project from the pump-out site to the beach is approximately 3,000 feet, which equals approximately 75-40 ft long pipe segments for a total pipeline weight of 187.5 tons (375,000 lbs). Due to the weight of this steel pipe and based on discussions with our field engineers that steel pipes placed on the bottom do not move once deployed. Which was demonstrated during the Broward County Shore Protection Project in 2004 and 2005 when two hurricanes passed over the project area and the pipe did not move from the deployment site (Lou Fisher of Broward County's Environmental Protection Department 4/8/09 email to Andy Hendron, NMFS-PRD), we believe that we are already meeting the intent of T&C #4 because it is highly unlikely that the pipeline will move once it is deployed, which is the goal of the T&C.

In addition to already meeting the intent of T&C #4 with the project as currently proposed, T&C #7 requires biweekly surveys of the pipeline to be conducted by divers to "monitor for leaks and irregular conditions". Per the pipeline monitoring criteria attached to the biop as Appendix B, one of the conditions that are required to be monitored is the location of the pipeline, "If any leakage or substantial movement is noted..." If the surveys determine that the pipeline has moved from the original deployment footprint, the Corps must and will reinitiate consultation with NMFS.

We would like to request that NMFS provide a letter acknowledging that the intent of T&C #4 is being met by the project as currently proposed and that “rock anchors” are not required for this project, thus T&C #4 is null and void. This will remove any confusion with other resource agencies as we move forward in the permitting process when T&C’s from biological opinions tend to be incorporated verbatim as permit conditions.

Lastly, I would like to commend Mr. Andrew Herndon, for his efforts in completing the consultation on Dade County Beach Erosion Control Project, Contract E in such a professional and timely manner. My staff tells me that working with Andy was very efficient and satisfying.

Thank you very much for your assistance in this matter. If you have any questions, please contact Ms. Terri Jordan at 904-232-1817 or email terri.l.jordan@usace.army.mil.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Jordan/CESAJ-PD-EC/1817
KM Dugger/CESAJ-PD-EC
CS Stevens/CESAJ-DP-C
Summa/CESAJ-PD-E

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5505
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http://sero.nmfs.noaa.gov

F/SER3:AH

OCT 21 2009

Mr. Eric Summa
Environmental Branch Chief
Jacksonville District Corps of Engineers
PO Box 4970
Jacksonville, FL 32232-0019

Re: Dade County Beach Erosion Control Project, Contract "E"

Dear Mr. Summa:

This constitutes the National Marine Fisheries Service's (NMFS) biological opinion based on our review of the U.S. Army Corps of Engineers Jacksonville District's (COE) beach renourishment project Dade County Beach Erosion Control Project, Contract "E." The biological opinion analyzes the project's effects on staghorn coral (*Acropora cervicornis*) in accordance with section 7 of the Endangered Species Act (ESA) of 1973. The effects analysis is based on information provided in your biological assessment dated March 9, 2009, and subsequent information received during extensive e-mail correspondence between NMFS and COE from March 27 through June 19, 2009. It is NMFS' biological opinion that the action, as proposed, is likely to adversely affect *Acropora cervicornis*, but is not likely to jeopardize its continued existence.

We look forward to further cooperation with you on other COE projects to ensure the conservation and recovery of our threatened and endangered marine species. If you have any questions regarding this consultation, please contact Andy Herndon, fishery biologist, at the number listed above, or by e-mail at Andrew.herndon@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

File: 1514-22.F.1 FL
Ref: F/SER/2009/00879

Endangered Species Act – Section 7 Consultation Biological Opinion

Action Agency: United States Army Corps of Engineers (COE),
Jacksonville District and Minerals Management Service (MMS)

Activity: Dade County Beach Erosion Control Project, Contract "E,"
located in Dade County, Florida
(Consultation Number F/SER/2009/00879)

Consulting Agency: National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), Southeast Regional Office, Protected Resources Division, St. Petersburg, Florida

Approved By:

Roy E. Crabtree, Ph.D., Regional Administrator

Date Issued:

10/24/09

INTRODUCTION

Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 *et seq*.), requires that each federal agency shall ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species; section 7(a)(2) requires federal agencies to consult with the appropriate Secretary on any such action. The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) share responsibilities for administering the ESA.

Consultation is required when a federal action agency determines that a proposed action "may affect" listed species or designated critical habitat. Consultation is concluded after NMFS determines that the action is not likely to adversely affect listed species or critical habitat or issues a biological opinion (opinion) that identifies whether a proposed action is likely to jeopardize the continued existence of a listed species, or destroy or adversely modify critical habitat. The opinion states the amount or extent of incidental take of the listed species that may occur, develops measures (i.e., reasonable and prudent measures - RPMs) to reduce the effect of take, and recommends conservation measures to further conserve the species. Notably, no incidental destruction or adverse modification of critical habitat can be authorized, and thus there are no reasonable and prudent measures, only reasonable and prudent alternatives that must avoid destruction or adverse modification.

This document represents NMFS' opinion based on our review of impacts associated with the proposed U.S. Army Corps of Engineers Jacksonville District's (COE) beach renourishment project: Dade County Beach Erosion Control Project, Contract "E." This opinion analyzes project effects on five species of sea turtle (green, hawksbill, Kemp's ridley, leatherback, and loggerhead), smalltooth sawfish, elkhorn and staghorn coral (*Acropora cervicornis*), and *Acropora* critical habitat in accordance with section 7 of the ESA. Information was also obtained from the biological assessment (BA) prepared by COE, published and unpublished literature cited herein, and other sources of information.

1.0 CONSULTATION HISTORY

On March 9, 2009, NMFS received a biological assessment (BA) for the Miami-Dade County Beach Erosion Control Project, Contract "E" from the COE; Miami-Dade County was identified as the applicant. The BA described the proposed action as a beach renourishment project requiring sand mining from onshore and offshore borrow areas and the placement of those sediments on two beaches in Miami-Dade County, Florida. The BA stated five species of sea turtle (green, hawksbill, Kemp's ridley, leatherback, and loggerhead), smalltooth sawfish, *Acropora cervicornis*, *A. palmata*, and *Acropora* critical habitat may occur in the action area. The BA stated the proposed action may affect but was not likely to adversely affect *Acropora* critical habitat, *Acropora cervicornis*, *A. palmata,* or smalltooth sawfish. The BA concluded that adverse effects to sea turtles had been consulted on in the 1997 South Atlantic Regional Biological Opinion (NMFS 1997) and that the proposed action fell within the scope of that opinion; thus, no new consultation for sea turtles was required for this action. Because the proposed offshore borrow site is located in federal waters, the Mineral Management Service (MMS) is a co-consulter for this project; the COE is serving as the lead action agency.

From March 27, 2009, through April 2, 2009, extensive e-mail correspondence was maintained between NMFS and COE to fulfill requests for additional information. Those requests included, among other things, additional information on proposed project designs, project timing, and clarification on an effects determination for *Acropora palmata* since it was not found in the action area.

On April 8, 2009, following a phone conversation with staff from the Broward County Environmental Protection and Growth Management Department, NMFS informed the COE, via email, that we disagreed with their initial determination that the proposed action may affect but was not likely to adversely affect *A. cervicornis*. NMFS concluded a formal consultation was required because the deployment/retrieval of a temporary pipeline used to pump sediment onto the beach could result in take of *A. cervicornis.* The COE responded in an e-mail the same day that they concurred with NMFS' determination.

From April 15, 2009, through June 19, 2009, e-mail correspondence regarding requests for additional information continued between NMFS and COE. Information requested included, among other things, additional information regarding geographic coordinates of the offshore borrow site, clarifications on the boundaries of the action area, clarification on the definition of "beach quality sand," and information on similarities between the proposed action and analogous but unrelated renourishment projects nearby. After reviewing all of the available information, including all the information provided by COE in response to requests for additional information, consultation was initiated on June 19, 2009.

2.0 DESCRIPTION OF THE PROPOSED ACTION

2.1 Proposed Action

The COE proposes to renourish approximately 2.1 miles of shoreline along the Atlantic Ocean within Miami-Dade County. The proposed project would dredge approximately 700,000 cubic yards (cys) of sand from two borrow sites, one onshore and one offshore, and place it on two priority hot-spots with high rates of erosion along the Miami-Dade County shoreline to protect structures. The two priority renourishment areas, Area #1 and Area #2, are located between northern Miami Beach to 63rd St (State R-Monuments 37.75-46.25), and Miami Beach to 32nd Street (State R-Monuments 48.7-50.7, 53.7-55.5, and 60-61), respectively (Figure 1.1).

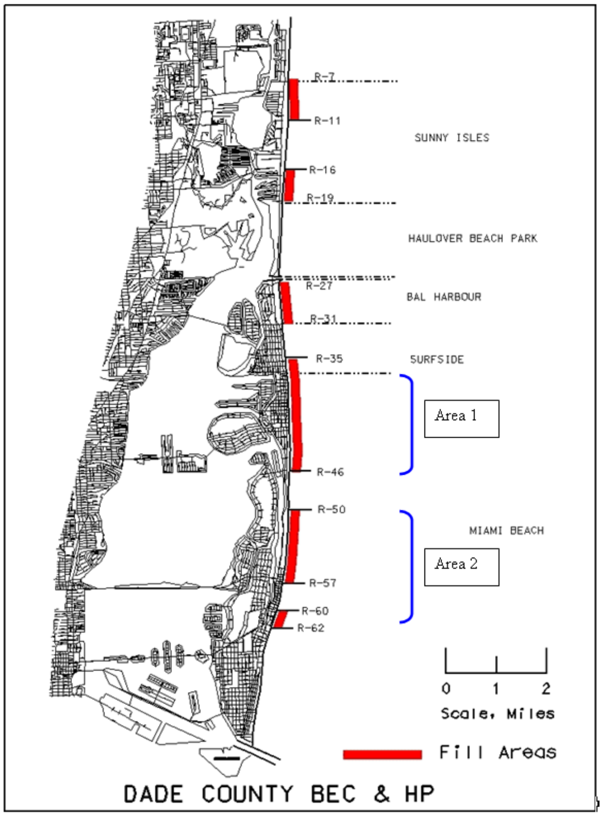

Figure 1.1 Approximate Locations of Renourishment Area #1 and Area #2
(Source: COE 2009)

To renourish Area #2, the applicant proposes to use a cutterhead suction dredge to obtain approximately 218,000 cys of sand from an onshore borrow site located in the uplands at Lumus Park (Figures 1.2 and 1.3). All dredged material will be transported from this dredge site to the placement area via the uplands. Bulldozers will be used to distribute transported sediment at the placement site.

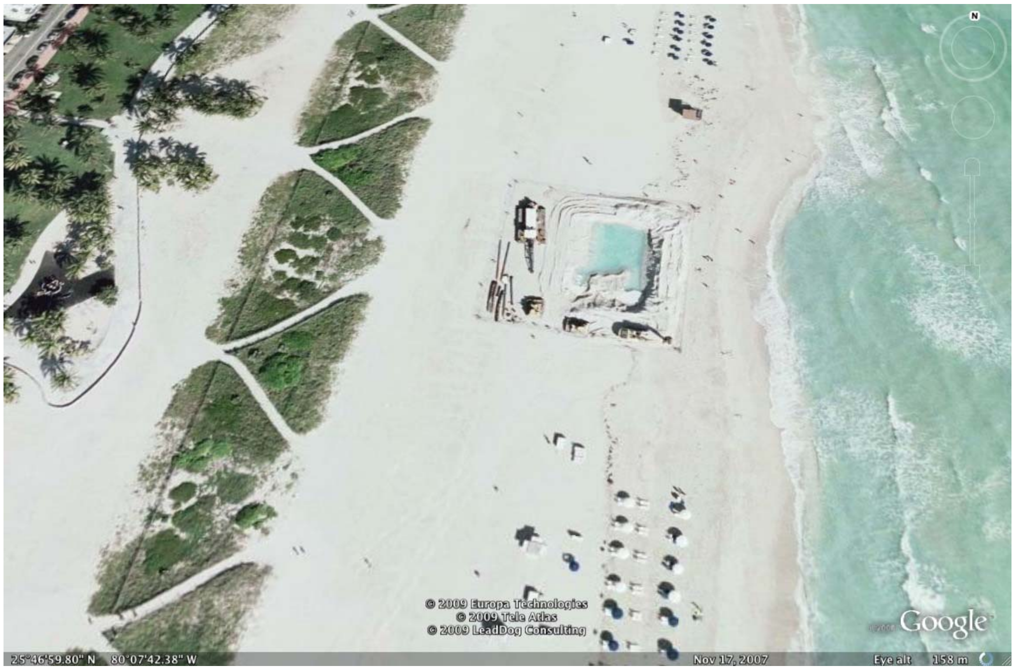

Figure 1.2 Example of Beach Dredging at Lumus Park
(Source: COE 2009)

Figure 1.3 Example of Cutterhead Suction Dredge at Lumus Park
(Source: COE 2009)

Approximately 474,000 cys of sand from an offshore borrow site will be used to renourish Area #1, covering approximately 8,500 linear ft. The 762,000-sq-ft "South Government Cut-Extension" borrow site, is located approximately 11 miles SSE from the placement area in federal waters at a depth of 33 ft. Due to the distance of the borrow site from shore, a hopper dredge is the most likely type of equipment to be used for offshore sand mining and sediment placement at the renourishment site (COE 2009). The following description of the proposed action and effects analysis will work under the assumption that this project will use a hopper dredge.

Hopper dredges are self-propelled seagoing ships of from 180 to 550 ft in length. The materials excavated by hopper dredges cover a wide range of types, but hopper dredges are most efficient in excavating loose, unconsolidated materials (e.g., sand). Dredged material is raised by suction pipes (drag arms) hinged on each side of the vessel with the intake (draghead) extending downward toward the stern of the vessel. During dredging operations, hopper dredges travel at a ground speed of from 2 to 3 mph and can dredge in depths from about 10 to over 80 ft. The dredged material is sucked up the drag arm and deposited and stored in the hoppers of the vessel. Once fully loaded, hopper dredges move to the disposal site to unload before resuming dredging (COE 1983). The Silent Inspector system, a geospatial referencing technology, will be used during dredging activities to ensure the dredge does not stray outside of the proposed borrow area (COE 2009).

Unloading sediment from a hopper dredge is accomplished either by opening doors in the bottoms of the hoppers and allowing the dredged material to sink to the open-water disposal site or by pumping the dredged material to upland disposal sites (COE 1983). For the proposed action, mined sediments will be offloaded from the dredge using a temporary discharge pipeline. Approximately 8,300 ft of temporary pipeline will be laid in the previously identified pipeline corridor. Pipeline diameters range from 24-36 inches, with an average of 30 inches (T. Jordan, COE, pers. comm. 2009). The proposed pipeline corridor is approximately 415,000 sq ft. The pipeline is assembled in sections on board vessel and then floated into place over the identified pipeline corridor. For safety reasons, the pipeline cannot be set in place by divers; instead, it must be sunk (T. Jordan, COE, pers. comm. 2009). The pipeline is retrieved by welding the ends shut and filling it with compressed air until the entire length of the pipeline floats straight to the surface. The pipeline is then towed off site for disassembly (T. Jordan, COE, pers. comm. 2009). The offshore end of the pipeline is hooked to a buoy, allowing it to be connected to the dredge as it pulls alongside. A properly assembled and operating pipeline releases very little sediment, if any, meaning sedimentation of the habitat surrounding the pipeline is likely to be undetectable above the natural background level.

Much of the sand placement on the renourishment areas will take place above the water level. The bottom areas below mean high water that will be covered by the initial placement and later equilibration consist of sediments similar to those on the beach, with no hardbottom habitat, corals, or seagrasses. No seagrasses or worm-rock reef habitats were identified in the nearshore portion of the action area (i.e., landward of the first reef tract). Only bare rubble and rubble with some algae were identified in the nearshore portion of the project (DERM 2009). The habitat near the proposed offshore borrow site consists of reef habitat of variable relief. The contract for this project will be awarded in June 2010, construction is anticipated to commence within 30 to 45 days of award, and should take approximately six months to complete (T. Jordan, COE, pers. comm. 2009).

The applicant has put forth the following conservation measures:

1) Borrow areas are designed to have a minimum of a 400-foot buffer between nearshore hardbottom habitat and the edge of the borrow site in order to avoid sedimentation and/or excess turbidity from affecting nearby benthic resources. In addition, the pipeline that will transport excavated sand from the borrow areas to the shoreline will be placed in pre-selected corridors that have been inspected for the presence of marine resources. The Silent Inspector system will be used to ensure this 400-ft buffer is maintained.
2) Monitor turbidity associated with dredging operations and meet requirements put forth in the Section 401 water quality certificates issued by the State of Florida. Since Section 401 water quality certificates are not issued before an ESA section 7 consultation has been completed on a proposed project, the turbidity monitoring requirements are unknown. Past certificates have required the following:

   > Construction at the project site shall be monitored closely by an independent third party (not associated with the dredging contractor) to assure that turbidity levels do not exceed the compliance standards established in this permit. Accordingly, an individual familiar with beach construction techniques and turbidity monitoring shall be present frequently enough between sampling events to detect and avert potential turbidity exceedances when fill material is discharged on the beach. This individual shall report non-compliance results to the Corps's Contracting Officer in order to alter construction techniques or shut down the dredging or beach construction operations if turbidity levels exceed the compliance standards established in this permit. All such reports shall also be provided to the JCP Compliance Officer. The names and qualifications of those individuals performing these functions along with 24-hour contact information shall be submitted for approval.

3) The COE will comply with NMFS' March 23, 2006, Sea Turtle and Smalltooth Sawfish Construction Conditions.
4) The COE will comply with the Terms and Conditions established under the 1997 South Atlantic Regional Biological Opinion on hopper dredging.

2.2 Action Area

The action area for a biological opinion is defined as all the areas affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). To account for potential transportation of sediment and turbidity plumes by prevailing currents, the Miami-Dade County Department of Environmental Resources Management (DERM) conducted *Acropora* resource surveys at hardbottom areas within 450 ft to the east and west and 1,000 ft to the north and south of the proposed borrow area. To address these potential effects, we will expand the action area to include the boundaries as delineated by DERM. Based on these buffers, the borrow site portion of the action area is approximately 3,040,232 sq ft; the actual borrow area is approximately 762,000 sq ft, and the hardbottom areas are approximately 375,000 sq ft. Thus, the action area for this activity includes renourishment Area #1 – northern Miami Beach to 63rd Street (FDEP reference monuments R-37.75 through R-46.25); the expanded offshore borrow site, and proposed pipeline corridor.

3.0 STATUS OF SPECIES AND CRITICAL HABITAT

Sea Turtles

Green sea turtle (*Chelonia mydas*)	Endangered/Threatened*
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Loggerhead sea turtle (*Caretta caretta*)	Threatened

Invertebrates

Elkhorn coral (*Acropora palmata*)	Threatened
Staghorn coral (*Acropora cervicornis*)	Threatened

Fish

Smalltooth sawfish (*Pristis pectinata*)	Endangered**

**Green sea turtles in U.S. waters are listed as threatened except for the Florida breeding population, which is listed as endangered.*
***The U.S. distinct population segment (DPS).*

Critical Habitat

Acropora critical habitat has been designated in the action area. The Florida area contains three sub-areas: (1) The shoreward boundary for Florida sub-area A begins at the 6-ft (1.8 m) contour at the south side of Boynton Inlet, Palm Beach County at 26° 32' 42.5" N; then runs due east to the point of intersection with the 98-ft (30 m) contour; then follows the 98-ft (30 m) contour to the point of intersection with latitude 25° 45' 55" N, Government Cut, Miami-Dade County; then runs due west to the point of intersection with the 6-ft (1.8 m) contour, then follows the 6-ft (1.8 m) contour to the beginning point; (2) The shoreward boundary of Florida sub-area B begins at the MLW line at 25° 45' 55" N, Government Cut, Miami-Dade County; then runs due east to the point of intersection with the 98-ft (30 m) contour; then follows the 98-ft (30 m) contour to the point of intersection with longitude 82° W; then runs due north to the point of intersection with the South Atlantic Fishery Management Council (SAFMC) boundary at 24° 31' 35.75" N; then follows the SAFMC boundary to a point of intersection with the MLW line at Key West, Monroe County; then follows the MLW line, the SAFMC boundary (see 50 CFR 600.105(c)), and the COLREGS line (see 33 CFR 80.727. 730, 735, and 740) to the beginning point; and (3) The seaward boundary of Florida sub-area C (the Dry Tortugas) begins at the northern intersection of the 98-ft (30 m) contour and longitude 82° 45' W; then follows the 98-ft (30 m) contour west around the Dry Tortugas, to the southern point of intersection with longitude 82° 45' W; then runs due north to the beginning point.

We have determined that the proposed action being considered in this opinion is not likely to adversely affect the following species or critical habitat listed under the ESA: smalltooth sawfish; green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles; *Acropora palmata*, and *Acropora* critical habitat**.** These species and critical habitat are therefore excluded from further analysis and consideration in this opinion.

The following discussion summarizes our rationale for these determinations and conclusions.

3.1 Species and Critical Habitat Not Likely to Be Adversely Affected

3.1.1 Sea Turtles

NMFS has analyzed the routes of potential effects on five species of sea turtles (green, hawksbill, loggerhead, Kemp's ridley, and leatherback) from the proposed action and, based on our analysis, determined that potential adverse effects are limited to the following: injury from potential interactions with construction equipment (e.g., the hopper dredge), temporary avoidance of the area during construction operations, and impacts on nearshore foraging and resting habitat. Effects related to failure to nest and/or loss of nests and nesting habitat are under USFWS' purview and will not be discussed in this biological opinion.

Potential impacts to all five species of sea turtles from the hopper-dredging portion of the project are covered by the incidental take statement of the regional biological opinion on hopper dredging along the South Atlantic Coast, dated September 25, 1997. The reasonable and prudent measures and terms and conditions of that opinion must be complied with during hopper dredging for this action. In addition, the applicant will be required to follow NMFS' March 23, 2006, Sea Turtle and Smalltooth Sawfish Construction Conditions, which will further reduce the potential for interactions with sea turtles from the proposed project.

All five species of sea turtles may choose to avoid the offshore borrow area and beach placement site due to construction related noise. However, identical habitat exists immediately adjacent to both of these areas, and all of these areas will become immediately available once dredge operations cease. Therefore, we believe any adverse affect from project area avoidance will be temporary and insignificant.

The proposed action is also not likely to adversely affect sea turtle foraging and resting habitat. Because each species has different preferred resting/foraging habitats, the following sections discuss the rationale behind this determination for each species. Since leatherbacks tend to be a pelagic species and do not commonly forage in shallow nearshore waters, we do not believe their foraging habitat will be affected by the proposed action; thus, they are not discussed below.

Green Sea Turtles
Green sea turtles are relatively common in the waters of Miami-Dade County. Nearshore reef habitats (e.g., worm-rock reef) close to the action area (i.e., Broward County, Florida, to the north) are known to serve as developmental foraging and resting habitat for juvenile green turtles. No nearshore reef habitat (i.e., landward of the first reef tract) was identified in the action area. Resting/foraging habitat does exist adjacent to the offshore borrow area. However, the 400-ft buffer requirement makes the likelihood of physical interactions between these habitats and dredge equipment so low, that any

adverse affects are extremely unlikely to occur and are therefore, discountable.

Gilliam et al. (2006) documented increases in sedimentation rates at locations immediately adjacent to an offshore borrow site before and after a hopper-dredging beach renourishment project located near the action area. Sedimentation rates at the borrow sites during sand mining activities were higher than rates recorded at the same sites during the same period the previous year. However, the increased sedimentation rates remained within the range observed naturally in the years pre-construction.[1] In other words, the project clearly increased sedimentation rates at adjacent sites, but those increases were not outside of what was observed naturally.

Potential adverse affects to these resting/foraging habitats from sedimentation occurring during sand mining at the offshore borrow area will be insignificant. Sedimentation rates may increase at reef habitat utilized by green sea turtles for foraging and resting occurring near the offshore borrow site because of the proposed action, but those rates are unlikely to increase beyond what is naturally occurring in these reef environments. Additionally, the 400-ft buffer requirement is the accepted standard distance between a borrow site and hardbottom habitat (NMFS 2003, Goldeberg 1989 in PBS&J 2008), and that separation is anticipated to further reduce any adverse affects from sedimentation. Therefore, we believe sand mining will not adversely affect habitat utilized by green sea turtles and any effects from this portion of the proposed action will be insignificant.

Hawksbill and Loggerhead Sea Turtles

Hawksbill sea turtles are also relatively rare in the nearshore waters of Miami-Dade County. NMFS analyzed the Sea Turtle Stranding and Salvage Network (STSSN) data from Miami-Dade County for the years 1997-2007. During this period, 43 hawksbill sea turtles were reported stranded out of 554 total sea turtle strandings. Based on a review of various in-water studies conducted in southeast Florida, researchers have suggested that hawksbill sea turtles (as well as juvenile green sea turtles) utilize nearshore hardbottom habitat as nighttime resting areas. Wershoven and Wershoven (1992) captured 187 green turtles and 4 hawksbill turtles while diving on a 1.5-km stretch of reef in nearby Broward County (just north of the action area). Lawrence Wood has surveyed reef habitats in Palm Beach County for the presence of hawksbill sea turtles. Wood reports that habitats in which hawksbill sea turtles have been observed can be characterized as "steep ledges with undercuts that include artificial reef wrecks, thick octocoral/a.k.a. gorgonian pastures, and sparse sandy patch reefs" (Wood 2006). No habitat with these features was identified near the beach renourishment site.

Loggerhead sea turtles are known to utilize reefs and hardbottom habitat along the east coast of Florida. However, this species tends to utilize somewhat deeper waters than those found in the dynamic, high-energy nearshore habitats where mined sand will be placed. In 2003, 2004, and 2005 surveys in the project area by Dynamac Corporation, a

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[1] For example, at one site the sedimentation rate increased from approximately 2 mg/cm^2/day prior to sand mining activities, to approximately 38 mg/cm^2/day during sand mining operations. However, naturally occurring sedimentation rates at this site during four years of monitoring ranged from 0 to approximately 210 mg/cm^2/day (Gilliam et al. 2006).

total of 163 turtles were sighted during visual transect surveys, only one of which was a loggerhead, and the rest were green turtles. Net-capture studies over that same period yielded 29 captures, all of them green turtles (Dynamac Corporation 2005). Since loggerheads are most commonly found in reef habitat in somewhat deeper water, placement of sand on the renourishment site is extremely unlikely to have any measurable effect on their foraging on these reef habitats.

Reef habitats used by both hawksbill and loggerhead sea turtle do occur adjacent to the offshore borrow site, but the proposed action is not likely to adversely affect these habitats. The 400-ft buffer requirement makes the likelihood of physical interactions between these habitats and dredge equipment so low, that any adverse affects are extremely unlikely to occur and are therefore, discountable.

Potential adverse effects from sedimentation resulting from sand mining at the offshore borrow area will be insignificant. As noted above, an increase in sedimentation rate may occur during sand mining activities, but those increases are unlikely to be greater than the natural fluctuations in sedimentation rates. Additionally, the 400-ft buffer requirement is the accepted standard distance between a borrow site and hardbottom habitat (Goldeberg 1989 in PBS&J 2008), and that separation is anticipated to further reduce any adverse affects from sedimentation. Therefore, we believe sand mining will not adversely affect habitat utilized by these species and any effects from this portion of the proposed action will be discountable or insignificant.

Kemp's Ridley Sea Turtles

Kemp's ridley sea turtles rarely occur in the waters of Miami-Dade County. NMFS analyzed the Sea Turtle Stranding and Salvage Network (STSSN) data from Miami-Dade County for the years 1997-2007. During this period, only 8 Kemp's ridley turtles were reported stranded out of 554 total sea turtle strandings (1.4 precent). Adult Kemp's ridley sea turtles primarily occupy neritic habitats. Neritic zones typically contain muddy or sandy bottoms where prey can be found. Kemp's ridleys are opportunistic feeders (Shaver 1991, Werner 1994, Witzell and Schmid 2005) feeding on prey ranging from crabs, gastropods, and bivalves to fish, insects, and even birds (Witzell and Schmid 2005). A dietary study of Kemp's ridleys off southwestern Florida found tunicates to be the most commonly occuring prey items followed by spider crabs (*Libinia spp.*). Both species are very common in the region surrounding and encompassing the action area (Ruppert and Fox 1988, Johnson and Allen 2005).

The placement of sand at the renourishment sites is unlikely to have any effect on these prey species. Due to current and tidal action, sand sloughing into the nearshore marine environment immediately offshore from these renourishment sites is not likely to accumulate fast enough or remain long enough to cause a reduction or redistribution in prey species. Sand mining at the offshore borrow site may kill or remove these prey species and affect the potential foraging habitat inside the borrow site. Habitat assessments of the areas surrounding the offshore borrow site (i.e., DERM 2008 and 2009) show identical potential foraging habitat immediately adjacent to borrow site. Likewise, these prey species are very common in and around the action area. Therefore, we believe sand mining activities associated with the proposed action will not isolate Kemp's ridleys from other potential foraging habitat and prey species will remain available. Thus, any adverse effects from sand mining are anticipated to insignificant.

3.1.2 Smalltooth Sawfish

The action area is not within areas proposed as designated critical habitat for smalltooth sawfish or areas identified as nursery habitat for this species. Smalltooth sawfish entrainment in a hopper dredge is extremely unlikely. Smalltooth sawfish are tropical marine and estuarine fish that have the northwestern terminus of their Atlantic range in the waters of the eastern United States. Currently, their distribution has contracted to peninsular Florida and, within that area, they can only be found with any regularity off the southern portion of the state. The current distribution is centered in the Everglades National Park, including Florida Bay. Along the entire Atlantic coast of Miami-Dade County, there have been only six reported smalltooth sawfish sightings between 1997-2008 (Florida Museum of Natural History database). No smalltooth sawfish takes by a hopper dredge have ever been recorded. We believe such take is extremely unlikely to ever occur because of smalltooth sawfishes' affinity for shallow, estuarine systems. Therefore, we believe any adverse effects from entrainment are discountable.

If a smalltooth sawfish occurred in the action area, it could also be affected by being temporarily unable to use the site due to potential avoidance of construction activities and related noise. However, disturbance from construction activities (e.g., sand mining and pumping) and related noise will be intermittent and only occur during the day for part of the construction period. In addition, the applicant will be required to follow NMFS' March 23, 2006, Sea Turtle and Smalltooth Sawfish Construction Conditions, which will further reduce the potential for interactions with smalltooth sawfish from the proposed project. Therefore, the effects of the proposed action on smalltooth sawfish will be insignificant or discountable, and smalltooth sawfish will not be considered further in this opinion.

3.1.3 Elkhorn Coral (*Acropora palmata*) and *Acropora* Critical Habitat

Acropora palmata
Miami-Dade County DERM (2008) surveyed the hardbottom areas occurring in and around the proposed offshore borrow site and the proposed pipeline corridor for *Acropora* using the NMFS-approved survey protocols for *Acropora* (NMFS 2007). No *Acropora palmata* was identified during the surveys. Since this species does not occur in the action area, it will not be considered further in this opinion.

Acropora Critical Habitat
The physical or biological feature of *Acropora* critical habitat essential to their conservation (typically referred to as the primary constituent element, PCE) is consolidated hardbottom or dead coral skeleton that is free from fleshy macroalgae cover and sediment cover, occurring in water depths from the mean high water (MHW) line to 30 meters (98 feet). This feature has been identified in four areas within the jurisdiction

of the United States: Florida, Puerto Rico, St. Thomas/St. John, and St. Croix. The action area falls within the Florida area of *Acropora* critical habitat. The Florida area contains three sub-areas: (1) The shoreward boundary for Florida sub-area A begins at the 6-ft (1.8 m) contour at the south side of Boynton Inlet, Palm Beach County at 26° 32' 42.5" N; then runs due east to the point of intersection with the 98-ft (30 m) contour; then follows the 98-ft (30 m) contour to the point of intersection with latitude 25° 45' 55" N, Government Cut, Miami-Dade County; then runs due west to the point of intersection with the 6-ft (1.8 m) contour, then follows the 6-ft (1.8 m) contour to the beginning point; (2) The shoreward boundary of Florida sub-area B begins at the MLW line at 25° 45' 55" N, Government Cut, Miami-Dade County; then runs due east to the point of intersection with the 98-ft (30 m) contour; then follows the 98-ft (30 m) contour to the point of intersection with longitude 82° W; then runs due north to the point of intersection with the South Atlantic Fishery Management Council (SAFMC) boundary at 24° 31’ 35.75” N; then follows the SAFMC boundary to a point of intersection with the MLW line at Key West, Monroe County; then follows the MLW line, the SAFMC boundary (see 50 CFR 600.105(c)), and the COLREGS line (see 33 CFR 80.727. 730, 735, and 740) to the beginning point; and (3) The seaward boundary of Florida sub-area C (the Dry Tortugas) begins at the northern intersection of the 98-ft (30 m) contour and longitude 82° 45’ W; then follows the 98-ft (30 m) contour west around the Dry Tortugas, to the southern point of intersection with longitude 82° 45’ W; then runs due north to the beginning point (Figure 3.1)(73 FR 72210; November 26, 2008).

Potential adverse effects to *Acropora* critical habitat from sedimentation are discountable. No nearshore hardbottom areas containing the PCE exist near the proposed beach renourishment sites (COE 2009, DERM 2009), thus adverse sedimentation effects during renourishment are not likely to occur. Hardbottom areas with the PCE may exist adjacent to the offshore borrow site. However, Gilliam et al. (2006) documented increased sedimentation rates no higher than background levels. Additionally, the requirement to maintain a 400-ft buffer zone will further reduce the risks of sedimentation. Therefore, we believe no measurable sedimentation impacts will occur to *Acropora* critical habitat, thus any adverse effect from sedimentation will be insignificant.

Sand mining will occur in areas of unconsolidated sediment lacking the PCE of critical habitat. Thus, this portion of the project will have no effect of *Acropora* critical habitat. The installation of a temporary sand pumping pipeline may affect *Acropora* critical habitat, but any affects will be temporary and insignificant. This pipeline would sit atop approximately 11,400 sq ft[2] of consolidated hardbottom, but will not measurably alter the physical or biological features essential for conservation. The pipeline will not measurably cause consolidated hardbottom to become unconsolidated, nor will it cause growth of macroalgae or cause sedimentation in a way that can be meaningfully measured. For these reasons, we do not expect cumulative effects from the temporary deployment of a pipeline. Therefore, we believe any adverse effects on *Acropora* critical habitat from the temporary deployment of a pipeline will be discountable.

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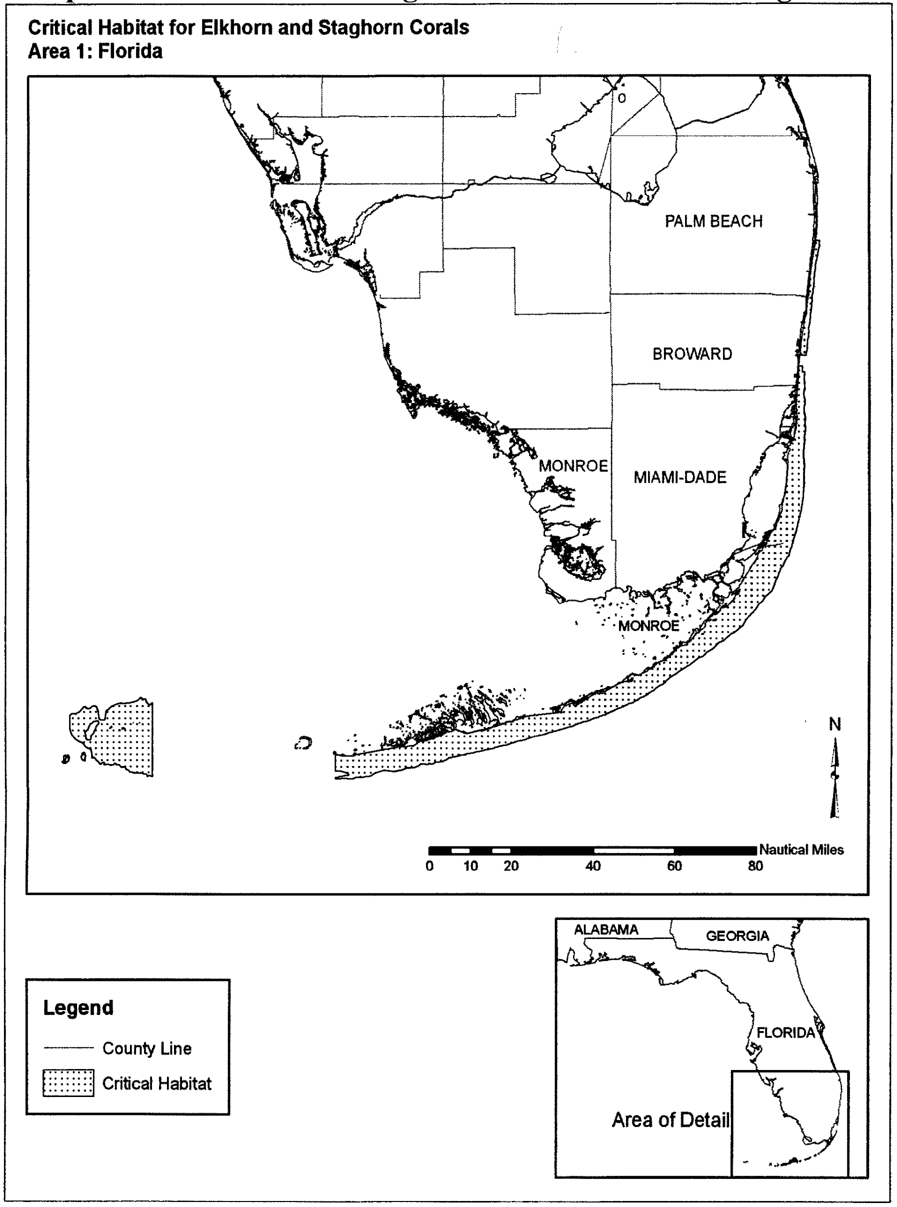
[2] (The approximate length of the pipeline corridor on hardbottom habitat [3,800 ft]) x (Maximum diameter of pipeline used to offload sediment [3 ft]) (COE 2009, T. Jordan, COE, pers. comm. 2009).

Figure 3.1 Map of the Elkhorn and Staghorn Critical Habitat Designated in Florida



3.2 Status of Species Likely to be Adversely Affected

NMFS believes the proposed action is likely to adversely affect staghorn corals (*Acropora cervicornis*). The following subsections are synopses of the best available information on the life history, distribution, population trends, and current status of the *Acropora cervicornis*. Information on life history and threats to *Acropora* corals comes primarily for the *Acropora* status review document (*Acropora* BRT 2005).

3.2.1 Staghorn coral (*Acropora cervicornis*)

Staghorn coral (*Acropora cervicornis*) was listed as threatened under the ESA on May 9, 2006, based on a status review initiated in 2004. The Atlantic *Acropora* Status Review presents a summary of published literature and other currently available scientific information regarding the biology and status of *Acropora cervicornis*. The following discussion summarizes those findings relevant to *Acropora cervicornis* and our evaluation of the proposed action.

Acropora cervicornis is one of the major reef-building corals in the wider Caribbean. *Acropora cervicornis* is characterized by staghorn-antler-like colonies, with cylindrical, straight, or slightly curved branches. Historically, this species formed dense thickets at shallow (<5 m) and intermediate (10 to 15 m) depths in many reef systems, including some locations in the Florida Keys, western Caribbean (e.g., Jamaica, Cayman Islands, Caribbean Mexico, Belize), and eastern Caribbean. Early descriptions of Florida Keys reefs referred to reef zones, of which the staghorn zone was described for many shallow-water reefs (Figure 3.2) (Jaap 1984, Dustan 1985, Dustan and Halas 1987). As summarized in Bruckner (2002), however, the structural and ecological roles of Atlantic *Acropora cervicornis* in the wider Caribbean are unique and cannot be filled by other reef-building corals in terms of accretion rates and the formation of structurally complex reefs.

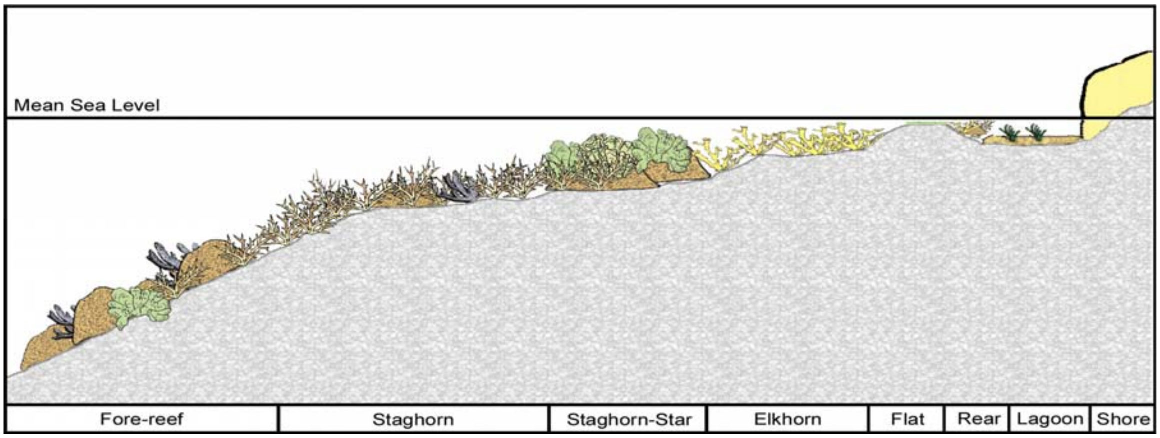


Figure 3.2: Reef zonation schematic example modified from several reef zonation-descriptive studies (Goreau 1959; Kinzie 1973; Bak 1977)

Life History
Historically, *Acropora cervicornis* was reported from depths ranging from <1 to 60 m (Goreau and Goreau 1973). It is suspected that 60 m is an extreme situation and that the coral is relatively rare below 20 m depth. The common depth range is currently observed at 5 to 15 m. In southeastern Florida, this species historically occurred on the outer reef platform (16 to 20 m) (Goldberg 1973), on spur-and-groove bank reefs and transitional reefs (Jaap 1984, Wheaton and Jaap 1988), and on octocoral-dominated hardbottom (Davis 1982). Colonies have been common in back- and patch-reef habitats (Gilmore and Hall 1976, Cairns 1982). Although *Acropora cervicornis* colonies are sometimes found interspersed among colonies of elkhorn coral, they are generally in deeper water or seaward of the elkhorn zone and, hence, more protected from waves. Historically, *Acropora cervicornis* was also the primary constructor of mid-depth (10 to 15 m) reef terraces in the western Caribbean, including Jamaica, the Cayman Islands, Belize, and some reefs along the eastern Yucatan peninsula (Adey 1978).

All Atlantic *Acropora* spp. (including *Acropora cervicornis*) are considered to be environmentally sensitive, requiring relatively clear, well-circulated water (Jaap et al. 1989). *Acropora cervicornis* are almost entirely dependent upon sunlight for nourishment compared to the massive, boulder-shaped species in the region (Porter 1976, Lewis 1977) that are more dependent on zooplankton. Thus, *Acropora cervicornis* are much more susceptible to increases in water turbidity than some other coral species. Reductions in long-term water clarity can also reduce the coral photosynthetic to respiration ratio (P/R ratio). Therefore, *Acropora cervicornis* may not be able to compensate with an alternate food source, such as zooplankton and suspended particulate matter, like other corals.

Optimal water temperatures for *Acropora cervicornis* range from 25° to 29°C, although colonies in the U.S.V.I. have been known to tolerate short-term temperatures around 30°C without obvious bleaching.[3] All Atlantic acroporids are susceptible to bleaching due to adverse environmental conditions (Ghiold and Smith 1990, Williams and Bunkley-Williams 1990). Jaap (1979) and Roberts et al. (1982) note an upper temperature tolerance of 35.8°C for *Acropora cervicornis*. Major mortality of *Acropora cervicornis* occurred in the Dry Tortugas, Florida, in 1977 due to a winter cold front that depressed surface water temperatures to 14° to 16°C. Some reduction in growth rates of *Acropora cervicornis* was reported in Florida when temperatures dropped to less than 26°C (Shinn 1966).

Acropora cervicornis, like many stony coral species, employ both sexual and asexual reproductive propagation. *Acropora cervicornis* reproduces sexually by broadcast spawning. During these spawning events coral larvae develop externally to the parental colonies (Szmant 1986).[4] The spawning season for *Acropora cervicornis* is relatively short; with gametes released only during a few nights in July, August, and/or September. In some populations, spawning is synchronous after the full moon during any of these three months. Annual egg production by *Acropora cervicornis* populations studied in Puerto Rico was estimated to be 600 to 800 eggs/cm^2 of living coral tissue (Szmant 1986).

Fertilization and development of *Acropora cervicornis* are exclusively external. Embryonic development culminates with the development of planktonic larvae called planulae. Little is known concerning larval settlement patterns (Bak et al. 1977, Sammarco 1980, Rylaarsdam 1983). In general, upon proper stimulation, coral larvae, whether released from parental colonies or developed in the water column external to the parental colonies, settle and metamorphose on appropriate substrates, in this case preferably coralline algae. Initial calcification ensues with the forming of the basal plate. Buds that form on the initial corallite develop into daughter corallites.

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[3] Bleaching refers to the loss of zooxanthellae.

[4] During the spawning season these colonies are simultaneously hermaphroditic meaning they contain both female and male reproductive parts. Gametes (eggs and sperm) of these colonies are located in different mesenteries of the same polyp (Soong 1991).

Studies of *Acropora cervicornis* on the Caribbean coast of Panama indicated that larger colonies of both species[5] have higher fertility rates (Soong and Lang 1992). Only colonies of *Acropora cervicornis* with a branch length greater than 9 cm were fertile and over 80 percent of colonies with branches longer than 17 cm (n=18) were fertile. The estimated size at puberty for *Acropora cervicornis* was 17 cm in branch length and the smallest reproductive colony observed was 9 cm in branch length (Soong and Lang 1992).

The growth rate for *Acropora cervicornis* has been reported to range from 3 to 11.5 cm/yr. This growth rate is relatively fast compared to other corals and historically enabled the species to construct significant reefs in several locations throughout the wider Caribbean (Adey 1978). Growth in *Acropora cervicornis* is also expressed in expansion, occurring as a result of fragmenting and forming new centers of growth (Bak and Criens 1982, Tunnicliffe 1981). A broken off branch may be carried by waves and currents to a distant location or may land in close proximity to the original colony. If the location is favorable, branches grow into a new colony, expanding and occupying additional area. Fragmenting and expansion, coupled with a relatively fast growth rate, facilitates potential spatial competitive superiority for *Acropora cervicornis* relative to other corals and other benthic organisms (Shinn 1976, Neigel and Avise 1983, Jaap et al. 1989).

Status and Distribution

Historically, throughout much of the wider Caribbean, *Acropora cervicornis* so dominated the reef within the 7 to 15 m depth that the area became known as the staghorn zone (Figure 3.2). It was documented in several reef systems such as the north coast of Jamaica (Goreau 1959) and the leeward coast of Bonaire (Scatteryday 1974). In many other reef systems in the wider Caribbean, most notably the western Caribbean areas of Jamaica, Cayman Islands, Belize, and eastern Yucatan (Adey 1977), *Acropora cervicornis* was a major mid-depth (10 to 25 m) reef-builder. Principally due to wind conditions and rough seas, *Acropora cervicornis* has not been known to build extensive reef structures in the Lesser Antilles and southwestern Caribbean.

Studies of historical distribution and abundance patterns focus on percent coverage, density, and relative size of the corals during three periods: pre-1980, the 1980 – 1990 decades, and recent (since 2000). Few data are present before the 1980 baseline, likely due in part to researchers' tendencies to neglect careful measurement of abundance for ubiquitous species.

Acropora cervicornis underwent a precipitous decline in the early 1980s throughout its range and this decline has continued, albeit at a much slower rate. Although quantitative data on former distribution and abundance are scarce, in the few locations where quantitative data are available (e.g., Florida Keys, Dry Tortugas, Belize, Jamaica, and the U.S.V.I.), declines in abundance (coverage and colony numbers) are estimated at >97 percent. Although this decline has been documented as continuing in the late 1990s, and even in the past five years in some locations, local extirpations (i.e., at the island or country scale) have not been rigorously documented.

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[5] As measured by surface area of the live colony.

Figure 3.3 summarizes the abundance trends of specific locations throughout the wider Caribbean where quantitative data exist illustrating the overall trends of decline of elkhorn and staghorn corals since the 1980s. It is important to note that the data are from the same geographic area, not repeated measures at an exact reef/site that would indicate more general trends. The overall regional trend depicted is a >97 percent loss of coverage (area of substrate the species occupy).

Threats

Acropora cervicornis is facing a myriad of threats that are in some cases acting synergistically. Diseases, temperature-induced bleaching, and physical damage from hurricanes are deemed to be the greatest threats to *Acropora cervicornis*. The threat from disease, though clearly severe, is poorly understood in terms of etiology and possible links to anthropogenic stressors. Threats from anthropogenic physical damage (e.g., vessel groundings, anchors, divers/snorkelers), coastal development, competition, and predation are deemed to be moderate. Table 3.1 summarizes the factors affecting the status of *Acropora cervicornis* and the identified sources of those threats.

Summary of *Acropora cervicornis* Status

Many factors, including both intrinsic life history characteristics, as well as external threats, are important to consider in assessing the status and vulnerability of staghorn coral. Recovery of staghorn coral from its current level of decreased abundance depends upon rates of recruitment and growth outpacing rates of mortality. This species has a rapid growth rate and high potential for propagation via fragmentation. However, while fragmentation is an excellent life history strategy for recovery from physical disturbance, it is not as effective when fragment sources (i.e., large extant colonies) are scarce.

Thus, it is anticipated that successful sexual reproduction will need to play a major role in *Acropora cervicornis* recovery (Bruckner 2002). Meanwhile, there is substantial evidence to suggest that sexual recruitment of *Acropora cervicornis* is currently compromised. Reduced colony density in this broadcast-spawning, self-incompatible species,[6] compounded in some geographic areas with low genotypic diversity, suggests that fertilization success and consequently, larval availability, have been reduced. In addition, appropriate substrate available for fragments to attach to is likely reduced due to changes in benthic community structure on many Caribbean reefs. Coupled with impacts from coastal development (i.e., dominance by macroalgal, turf, and/or sediment-coated substrates), these factors are expected to further reduce successful larval recruitment below an appropriate scale that can compensate for observed rates of ongoing mortality.

Species at reduced abundance are at a greater risk of extinction due to stochastic environmental and demographic factors (e.g., episodic recruitment factors). Both acroporids have persisted at extremely reduced abundance levels (i.e., less than 3 percent of prior abundance) for at least two decades.

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[6] While staghorn coral can be simultaneously hermaphroditic, gametes from the same colony cannot combine to produce viable recruits.

Although the major threats (e.g., disease, elevated sea surface temperature, and hurricanes) to *Acropora cervicornis*' persistence are severe, unpredictable, likely to increase in the foreseeable future, and, at current levels of knowledge, unmanageable, managing some of the stressors identified as less severe (e.g., nutrients, sedimentation) may assist in decreasing the rate of *Acropora cervicornis'* decline by enhancing coral condition and decreasing synergistic stress effects.

The impacts on *Acropora cervicornis* from all of the above-mentioned threats could be exacerbated by reduced genetic diversity, which often results when species undergo rapid decline like *Acropora cervicornis* has in recent decades. This expectation is heightened when the decline is due to a potentially selective factor such as disease, in contrast to a less selective factor such as hurricane damage, which will likely cause disturbance independent of genotype. If the species remains at low densities for prolonged periods of time, genetic diversity may be significantly reduced. Thus, given the current dominance of asexual reproduction, the rapid decline (largely from a selective factor), and the lack of rapid recovery of *Acropora cervicornis*, it is plausible that these populations have suffered a loss of genetic diversity that could compromise their ability to adapt to future changes in environmental conditions. No quantitative information is available regarding genetic diversity for either species.

Table 3.1 Factors Affecting the Species

Natural abrasion and breakage Source: storm events	**Disease** Source: undetermined/understudied
Sedimentation Source: land development/run-off dredging/disposal sea level rise major storm events	**Anthropogenic abrasion and breakage** Source: divers vessel groundings anchoring impacts fishing debris
Temperature Source: hypothermal events global climate change power plant effluents ENSO* events	**Predation** Source: overfishing natural trophic reef interactions
	Loss of genetic diversity Source: population decline/bottleneck
Nutrients Source: point-source non-point-source	**Contaminants** Source: point-source non-point-source
Competition Source: overfishing	**CO_2** Source: fossil fuel consumption
Sea level rise Source: global climate change	**Sponge boring** Source: undetermined/understudied

* El Niño-Southern Oscillation

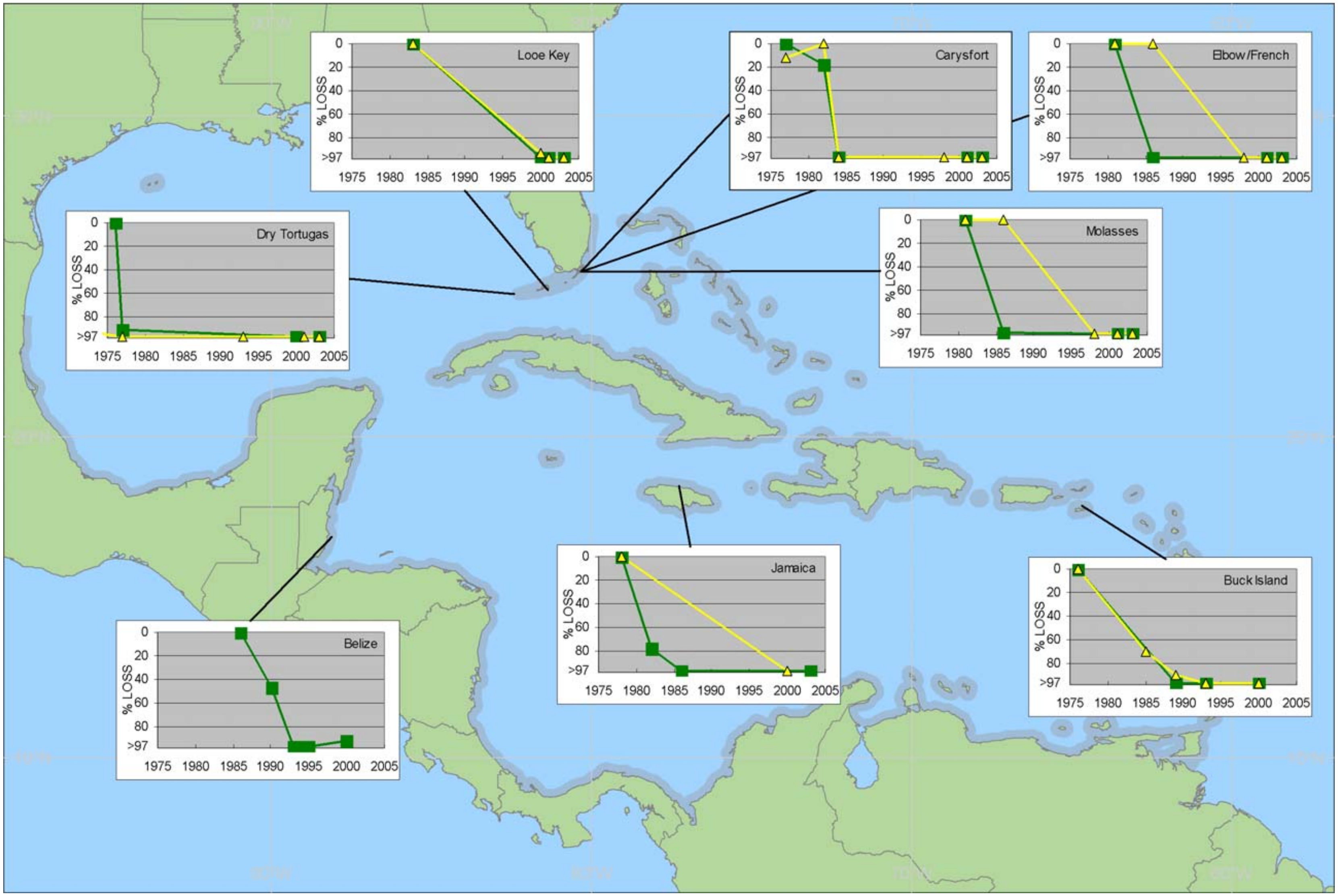

Figure 3.3 Percent loss of staghorn coral (green squares) and elkhorn coral (yellow triangles) throughout the Caribbean for all locations where quantitative trend data exist. Shaded areas illustrate the range of staghorn corals (Acropora BRT 2005).

4.0 ENVIRONMENTAL BASELINE

This section contains a description of the effects of past and ongoing human activities leading to the current status of the species, its habitat, and the ecosystem, within the action area. The environmental baseline is a snapshot of the factors affecting the species and includes federal, state, tribal, local, and private actions already affecting the action area, or that will occur contemporaneously with the consultation in progress. Unrelated, future federal actions affecting the same species in the action area that have completed formal or informal consultation are also part of the environmental baseline, as are implemented and ongoing federal and other actions within the action area that may benefit listed species.

The environmental baseline for this opinion includes the effects of several activities that affect the survival and recovery of *Acropora cervicornis* in the action area that may be affected by the proposed action.

4.1 Status of *Acropora cervicornis* within the Action Area

In Section 3.2.1, we described the range-wide status of *Acropora cervicornis*. Within the action area, *Acropora cervicornis* occurs on reef tracts to the east of the proposed borrow site, and within portions of the proposed pipeline corridor. DERM belt transects conducted in the proposed pipeline corridor found *A. cervicornis* densities ranged from 0 to 0.125 colonies per square meter. Belt transects conducted on the reef tract within 1,000 ft of the offshore borrow site found *A. cervicornis* densities ranging from 0 to 0.115 colonies per square meter.

4.2. Factors Affecting *Acropora cervicornis* within the Action Area

Acropora cervicornis colonies are non-motile and susceptible to relatively localized adverse effects as a result. Localized adverse effects to *Acropora cervicornis* in the action area are likely from many of the same stressors affecting *Acropora cervicornis* throughout its range, namely anthropogenic breakage, disease, and intense weather events (i.e., hurricanes and extreme cold water disturbances). Below is a list of actions.

4.2.1 Federal Actions

Federal actions with potential to adversely affect *Acropora cervicornis* in the action area include:

- Commercial and recreational fisheries authorized by the National Marine Fisheries Service. Given the morphology and distribution of *Acropora cervicornis*, certain types of fishing gear (e.g., hook-and-line, trap gear) may adversely affect this species. NMFS recently completed a biological opinion evaluating the impacts of Gulf of Mexico/South Atlantic spiny lobster fishery on *A. cervicornis*. The opinion concluded trap gear used in the fishery may adversely affect *A. cervicornis* corals via fragmentation/breakage and abrasion (primarily from storm mobilized trap gear), but those effects were not likely to jeopardize the species continued existence. NMFS is continuing to collect data to analyze the impacts of federal fisheries and will conduct section 7 consultations as appropriate.

- The COE permits discharges to surface waters. Shoreline and riparian disturbances (whether in the riverine, estuarine, marine, or floodplain environment) resulting in discharges may retard or prevent the reproduction, settlement, reattachment, and development of listed corals (e.g., land development and run-off, and dredging and disposal activities, result in direct deposition of sediment on corals, shading, and lost substrate for fragment reattachment or larval settlement).
- The COE also permits dredge-and-fill activities. These activities can directly affect *A. cervicornis* via fragmentation/breakage or abrasion. They can also affect the species by physically altering or removing benthic habitat suitable for *A. cervicornis* colonization. Dredge-and-fill activities may also cause increases in sedimentation that may cause shading, deposition of sediment on *A. cervicornis*, and/or loss of substrate for fragment reattachment or larval settlement.
- The U.S. Environmental Protection Agency (EPA) regulates the discharge of pollutants, such as oil, toxic chemicals, radioactivity, carcinogens, mutagens, teratogens, or organic nutrient-laden water, including sewage water, into the waters of the United States. Elevated discharge levels may cause direct mortality, reduced fitness, or habitat destruction/modification.
- The National Marine Sanctuary Program and the National Park Service regulate activities within their boundaries that are conducted in shallow water coral reef areas including collection of coral, alteration of the seabed, discharges, boating, anchoring, fishing, recreational scuba diving and snorkeling, and scientific research.

4.2.2 Other Non-Federal Actions Affecting *Acropora cervicornis*

Poor boating and anchoring practices, poor snorkeling and diving techniques, and destructive fishing practices cause abrasion and breakage of *Acropora cervicornis*. Nutrients, contaminants, and sediment from point and non-point sources cause direct mortality and the breakdown of normal physiological processes. Additionally, these stressors create an unfavorable environment for reproduction and growth.

Diseases have been identified as the major cause of *Acropora cervicornis* decline. Although the most severe mortality resulted from an outbreak in the early 1980s, diseases (i.e., white band disease) are still present in *Acropora cervicornis* populations and continue to cause mortality.

Hurricanes and large coastal storms could also significantly harm *Acropora cervicornis*. Due to its branching morphology, it is especially susceptible to breakage from extreme wave action and storm surges. Historically, large storms potentially resulted in an asexual reproductive event, if the fragments encountered suitable substrate, attached, and grew into a new colony. However, in the recent past, the amount of suitable substrate is significantly reduced; therefore, many fragments created by storms die.

4.2.3 Conservation and Recovery Actions

NMFS has prohibited take pursuant to section 4(d) of the ESA to protect *Acropora* (73 FR 64264; October 29, 2008). Such regulations may prohibit many actions pertaining to *Acropora*, including but not limited to: importing or exporting these species from or into the United States; taking of these species from U.S. waters, its territorial sea, or the high seas; or possessing or selling these species.

NMFS assembled the *Acropora* Recovery Team (ART) in September 2006. The ART includes coral scientists and management experts from state, territorial, and federal government agencies and the non-governmental sector. The ART is developing a recovery plan for both listed *Acropora* species. The recovery plan will guide the implementation of actions required to recover listed *Acropora* species to the point at which they are self-sustainable in the wild and can be safely removed from the list of endangered and threatened species. A draft plan will be available for public comment before finalization.

Other federal, state, and local regulatory mechanisms and conservation initiatives have focused on addressing physical impacts, including damage from fishing gear, anchoring, and vessel groundings. The Coral Reef Conservation Act and the two coral and coral reef fishery management plans require the protection of corals and prohibit the collection of hard corals. Depending on the specifics of zoning plans and regulations, marine protected areas (MPAs) can help prevent damage from collection, fishing gear, groundings, and anchoring.

4.3 Summary and Synthesis of Environmental Baseline

In summary, several factors are presently adversely affecting *Acropora cervicornis* in the action area. These factors, which are detail below, are ongoing and are expected to occur contemporaneously with the proposed action:

- Disease outbreaks
- Major storm events
- Upland and coastal activities will continue to degrade water quality and decrease water clarity necessary for coral growth
- Dredge-and-fill activities
- Interaction with fishing gear
- Vessel traffic will continue to result in abrasion and breakage due to accidental groundings and poor anchoring techniques
- Poor diving and snorkeling techniques will continue to abrade and break corals

These activities are expected to combine to adversely affect the recovery of *Acropora cervicornis* throughout its range, and in the action area.

5.0 EFFECTS OF THE ACTION

As described below, NMFS believes that the proposed project may adversely affect *Acropora cervicornis* coral, which is listed as a threatened species under the ESA. The analysis in this section forms the foundation for our jeopardy analysis in section 7. A jeopardy determination is reached if we would reasonably expect the proposed action to cause, either directly or indirectly, reductions in numbers, reproduction, or distribution that would appreciably reduce a listed species' likelihood of surviving and recovering in the wild. The ESA defines an endangered species as "...in danger of extinction throughout all or a significant portion of its range..." and a threatened species as "...likely to become an endangered species within the foreseeable future..." *Acropora cervicornis* is listed because of its status throughout its range. A jeopardy determination for *A. cervicornis* must find the proposed action will appreciably reduce the likelihood of survival and recovery for the species throughout its entire range.

The analyses in this section are based upon the best available data on *A. cervicornis* biology and the effects of the proposed action. Data pertaining to effects from the proposed action relative to interactions with *A. cervicornis* are limited, so we are often forced to make assumptions to overcome the limits in our knowledge. Frequently, different analytical approaches may be applied to the same data sets. In those cases, in keeping with the direction from the U.S. Congress to resolve uncertainty by providing the "benefit of the doubt" to threatened and endangered species [House of Representatives Conference Report No. 697, 96th Congress, Second Session, 12 (1979)], we will generally select the value yielding the most conservative outcome (i.e., would lead to conclusions of higher, rather than lower, risk to endangered or threatened species).

The portion of the proposed action that may affect *A. cervicornis* essentially comprises two elements: (1) sand mining from the offshore borrow site and (2) placement of mined sand on the renourishment areas, including deployment and retrieval of a temporary pipeline. Section 2 discusses each component in more detail. In reviewing the project, the surrounding benthic habitat, and the known occurrence of *A. cervicornis*, we determined only the deployment/retrieval of a temporary pipeline for pumping sand may adversely affect *A. cervicornis*. In the following sections, we describe our rationale for this determination.

5.1. Effects of Sand Placement on Beaches

Potential adverse effects to *Acropora cervicornis* from sand sloughing off upland beach renourishment sites are discountable. No *A. cervicornis* colonies were identified in the nearshore environment adjacent to the renourishment sites. Likewise, no nearshore hardbottom areas suitable for sustaining *A. cervicornis* exist near the proposed beach renourishment sites (COE 2009, DERM 2009), thus any adverse effects from sand sloughing off the beach are extremely unlikely to occur and are discountable.

5.2 Effects from Sand Mining at the Offshore Borrow Site

Physical Contact with Acropora cervicornis

We believe the operation of the dredge during sand mining operations is unlikely to adversely affect *A. cervicornis*, due to the extremely low likelihood of contact between the dredge (i.e., drag arm) and *A. cervicornis* colonies. The nearest identified colony is approximately 450 ft from the proposed borrow area (DERM 2008). All dredge operations must maintain a 400-ft buffer between the dredge and hardbottom resources at all times. The Silent Inspector system will be used during the proposed action to ensure the buffer is maintained. For this reason, we believe adverse effects from physical contact between *A. cervicornis* and the dredge are extremely unlikely to occur and discountable.

Sedimentation

We believe adverse effects to *A. cervicornis* from sedimentation caused by sand mining from the offshore borrow site will be insignificant. Since no data on sedimentation impacts exist for the action area, we used an analogous project as a proxy for evaluating impacts. In February 2005, Broward County, Florida, began a beach renourishment project that involved using a hopper dredge to mine beach quality sand from offshore borrow sites (Broward Renourishment Project [BRP]). The BRP shares many similarities with proposed action; Table 5.1 summarizes the similarities between these two projects.

Table 5.1 Similarities Between Proposed Action and BRP

Project Characteristics	**Proposed Action**	**BRP**
Location	Between 2nd & 3rd reef lines	Between 2nd & 3rd reef lines
Sand type	"Beach Quality" as defined by Florida Administrative Code	"Beach Quality" as defined by Florida Administrative Code
Currents in the area	Dominated by Gulf Stream from south to north	Dominated by Gulf Stream from south to north
Current speed	0.5-2.5 knots (Gulf Stream – NOAA AOML data)	1.0 ft per second (COE 1996) (1 ft/sec = 0.59 knots)
Type of dredge	Hopper dredge	Hopper dredge

Gilliam et al. (2006) monitored multiple sites, pre- and post-construction, to document any effects from the project on corals, sponges, reef fish communities, and water quality (e.g., turbidity and sedimentation). Six of the monitoring sites were immediately adjacent to the offshore borrow sites. Of those six sites, three (identified as DB2, HB2, and POMP 6 in Gilliam et al. [2006]) are analogous to our project. These three sites are in relatively the same position as the *A. cervicornis* colonies identified in the action area with respect to the boundaries of offshore borrow sites. All three monitored sites showed increases in sedimentation pre- and post-construction. However, sedimentation rates at all three sites remained within the bounds of the sedimentation rates occurring naturally. Table 5.2 below summarizes the approximate distance of each site from the borrow area and the recorded pre- and post-construction sedimentation rates at each site.

Table 5.2 Pre- and Post-Mining Sedimentation Rates for Three Monitoring Sites

Monitored Site (As identified in Gilliam et al [2006])	**Approximate Distance from Borrow Site (ft)**	**Pre-Construction Sedimentation Rate ($mg/cm^2/day$)**	**Post-Construction Sedimentation Rate ($mg/cm^2/day$)**	**Naturally Occurring Sedimentation levels ($mg/cm^2/day$)**
DB2	515	0	38	0-205
HB2	650	5	60	<10-259
POMP 6	940	2.5	38	0-132

Adapted from: Adapted from Gilliam et al (2006)

Additionally, Rogers (1983) tested sedimentation rates on *A. cervicornis*, among other coral species, and determined that daily doses of sediment at a rate of 200 $mg/cm^2/day$ had no effect (Rogers 1990). The 400-ft buffer zone will also greatly reduce the likelihood of sedimentation effects. Given the strong similarities between the proposed action and the BRP, we believe it is reasonable to assume the impacts documented at the BRP sites will be similar to those likely to occur during the proposed action. Adverse affects from sedimentation are also less likely to occur in the presence of strong oceanographic currents (Rogers 1990) because sediments are swept off corals. The influence of the relatively strong Gulf Stream in the action area is also likely to reduce any adverse affects from sedimentation. Since the rates of sedimentation observed during the BRP monitoring were within the bounds of sedimentation documented to be occurring naturally, and those were far less than this 200 mg/cm^2/day threshold, and because a 400-ft buffer zone will be implemented, we believe adverse effects to *A. cervicornis* from increased sedimentation will be insignificant.

5.3 Effects from Pipeline Deployment

We believe the pipeline may physically contact *Acropora cervicornis* during deployment/retrieval as it sinks to or is retrieved from the seafloor, causing adverse effects via fragmentation or abrasion. Because deployed pipelines move very little once they have been deployed and properly set in place (L. Fisher, Broward County, Natural Resources Planning & Management Division, pers. comm. 2009), we believe adverse effects are only likely during pipeline deployment/retrieval.

5.3.1 Estimating *Acropora cervicornis* Take from Pipeline Deployment

Per NMFS' recommended survey protocols for *Acropora* species, DERM (2008) conducted four transects to identify any *A. cervicornis* colonies occurring in the pipeline corridor. Colonies were not found in the eastern portion of the pipeline corridor. Colonies were identified in two out of four transects. On transects where *A. cervicornis* was present, the number of colonies ranged from 19 to 25. Branch lengths ranged from 5 to 70 centimeters; 43 percent of identified colonies were longer than 17 centimeters, 25 percent were shorter than 10 centimeters. Colonial density ranged from 0.095 to 0.125 individuals per square meter, an average of 0.055 individuals per square meter for all four transects (DERM 2008)

DERM (2008) estimated that the total area of the pipeline corridor is approximately 415,000 sq ft (50 ft by 8,300 ft); approximately 189,000 sq ft occur on hardbottom habitat. Pipeline diameters range from 24-36 inches, with an average of 30 inches (T. Jordan, COE, pers. comm. 2009). To estimate the number of *A. cervicornis* colonies that may be taken by being broken, abraded, or dislodged during the deployment/retrieval of the pipeline, we multiplied the average *A. cervicornis* density by the footprint of the pipeline on hardbottom habitat, using the largest anticipated pipeline diameter.[7] This yielded an estimate of 58 *A. cervicornis* colonies likely to be taken during pipeline deployment/retrieval. Since it is difficult to tell if the adverse effects resulting from contact with the pipeline would be lethal or sub-lethal, we will err on the side of the species and assume these interactions would result in the death of the colony.

5.3.2 Effects of *Acropora cervicornis* Transplantation

Though not included by the COE as an integral part of the proposed action, this Opinion will require transplantation of *Acropora cervicornis* colonies out of the pipeline corridor to nearby suitable reef sites as a reasonable and prudent measure (RPM) to reduce the effect of the

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[7] *Acropora cervicornis* density (0.055 colonies/m^2) x pipeline area (1,054 m^2) = 58 (57.97) colonies. Pipeline area = 0.914-m width x 1,153-m length.

anticipated take. Collection of small *A. cervicornis* fragments (i.e., approximately 3-cm fragments) will also be required to help achieve recovery goals for the species. Fragments will be grown in nurseries, increasing population sizes and protecting genetic diversity. These fragments will be collected via careful breaking of the branch tips of the coral colonies using pliers or other small hand tools, or will be fragments of opportunity created during transplantation. The collections will be made by coral experts and trained professionals. Even though these actions involve directed take of *A. cervicornis*, they constitute a legitimate RPM because it reduces the level of almost certain lethal take of *A. cervicornis* during the pipeline deployment/retrieval, and allows the colonies to be collected and relocated out of the pipeline corridor where they will have a high likelihood of continued survival. The Consultation Handbook (USFWS and NMFS 1998) expressly authorizes such directed take as an RPM (see page 4-53). Therefore, NMFS will evaluate the expected level of *A. cervicornis* take through relocation, so that these levels can be included in the evaluation of whether the proposed action will jeopardize the continued existence of the species.

NMFS believes that the collection of small tissue samples from *A. cervicornis* colonies will result in temporary effects on coral colonies. The collection of approximately 3-cm-long branch tip tissue samples from single staghorn coral colonies will result in a small reduction of coral colony biomass; however, this effect is expected to be temporary with recovery through tissue replacement and/or coral colony growth. *Acropora cervicornis*' dominant mode of reproduction is through asexual fragmentation (see Section 3.2 for further discussion). In the congener *Acropora palmata*, lesions at the point of fragment detachment have been shown to begin regeneration within two weeks (Lirman 2000) of fragmentation, with regeneration rates being positively correlated with decreasing size of lesion and proximity to growing tip. The size of the lesion created in this project will be a function of the diameter of the branch being clipped. The diameter of staghorn coral branches ranges from 0.25 to 1.5 cm. Lirman (2000) showed that a 3-cm^2 lesion regenerated completely within 100 days. Given that the rate of recovery is an exponential decay, it is expected that lesions 0.25 to 1.5 cm in diameter (less than 2.25 cm^2) will recover much faster than in Lirman's experiment.

Furthermore, the proposed collection of tissue samples from *A. cervicornis* colonies will occur at the outermost portion of the branch tip of the coral colony. Soong and Lang (1992) observed that, in *A. cervicornis*, large polyps and basal tissues located 1.0 to 4.5 cm from the colony base were infertile, and larger eggs were located in the mid-region of colony branches. Gonads located within 2 to 6 cm of the colony's branch tips always had smaller eggs than those in the mid-region (Soong and Lang 1992). Larger colonies (as measured by surface area of the live colony) have higher fertility rates (Soong and Lang 1992). Thus, the effect of this activity on coral colony reproduction is insignificant. Given that the collected tissue samples are small in size (~3 cm) relative to coral colony size, that the effects of collecting such fragments are temporary, that fragmentation is a natural reproductive mode, and that these fragments will be collected from the outermost portion of the coral branch tip where smaller eggs are found, it is not likely that survival or reproductive output of staghorn coral colonies will be measurably reduced by the proposed action.

Coral transplantation can successfully relocate colonies that would likely suffer injury or morality if not moved. Provided that colonies are handled with skill, are reattached properly, and the environmental factors at the reattachment site are conducive to their growth (e.g. water quality, substrate type, etc.), many different species of coral have been shown to survive transplantation well (Maragos 1974, Birkeland et al. 1979, Harriott and Fisk 1988, Hudson and Diaz 1988, Guzman 1991, Kaly 1995, Berker and Mueller 1999, Tomlinson and Pratt 1999, Hudson 2000, Lindahl 2003, NCRI 2004). Herlan and Lirman (2008) documented a 17.3 percent mortality rate in *Acropora* coral fragments after transplantation to a coral nursery in Biscayne National Park. The authors stated the mortality rate might have been increased due to stress caused by relatively high water temperatures during fragmentation not necessarily the process itself. This observation has been supported by other nursery managers who report post-relocation coral fragment mortality rates closer to 1 percent (K. Nedimeyer, pers. comm. 2009).

Transplantation of coral colonies less than 10 cm in size is not feasible because detaching such small colonies would likely result in breakage. Survivability of transplanted coral colonies less than 10 cm in size is also very low due to injury and the decrease in the overall surface area of living tissue, which reduces the colony's resilience to stress.

Twenty-five (25) percent of the colonies observed in the pipeline corridor were less than 10 cm in length (DERM, unpublished data). As noted in Section 3.2.1, the estimated size at puberty for *A. cervicornis* is 17 cm in branch length (Soong and Lang 1992). Therefore, *A. cervicornis* colonies less than 10 cm in size are not likely to produce sexual recruits. Of the colonies 10 cm or greater in length, 55 percent were sexually mature (i.e., a branch length of 17 cm or greater) (DERM, unpublished data).

We estimated up to 58 colonies could be lethally taken during deployment/retrieval of the pipeline if not relocated. We believe coral transplantation will be highly successful and relocating these corals outside the pipeline corridor is appropriate to minimize the impact of this take. Since colonies less than 10 cm in size cannot be transplanted, 15 colonies[8] located in the proposed pipeline corridor will likely be too small for relocation and will likely suffer mortality. Given their size, these colonies are not likely to be sexually mature. The remaining 43 colonies are of suitable size for relocation. Similar habitat, influenced by the same environmental conditions currently affecting these colonies, exists nearby the proposed pipeline corridor. Because suitable transplantation habitat is nearby and proper handling techniques are available and will be required (see Appendix A), we have confidence that transplantation survival rates similar to those noted elsewhere will be likely in this case. We believe a 17 percent coral fragment morality rate may be artificially high, brought on more by unusual environmental conditions than actual transplantation. To be conservative, we use a 17 percent morality rate in our estimates, but believe actual mortality may be lower. Therefore, we anticipate 100 percent success in reattachment and an 83 percent survival rate of transplanted colonies.

In summary, we believe up to 15 colonies, less than 10 cm will be too small for relocation and will suffer mortality. The remaining 43 colonies will be relocated, with fragments collected from each relocated colony for genotyping. Of the colonies transplanted, up to 7 will suffer mortality after relocation and result in lethal takes; the remaining 36 colonies will survive. Table 5.3 summarizes the amount and type of take anticipated under the proposed action and proposed action as modified by the reasonable and prudent measures of this Opinion.

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[8] Twenty-five percent of the estimated 58 colonies likely taken.

Table 5.3 Summary of Anticipated Take

Takes Under Proposed Action			
	Lethal	Non-Lethal	Total
Non-Transplanted Colonies	58	0	58
Takes Under Modified Proposed Action			
	Lethal	Non-Lethal	Total
Non-Transplanted Colonies	15	0	15
Transplanted Colonies	7	36	43
Total	22	36	58

6.0 CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, or local private actions that are reasonably certain to occur in the action area considered in this opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

No categories of effects beyond those already described in Sections 4.2 and 5.0 are expected in the action area. Activities affecting *A. cervicornis* are highly regulated federally; therefore, any future activities within the action area will likely require ESA section 7 consultation.

7.0 JEOPARDY ANALYSIS

This section considers the likelihood that the proposed action will jeopardize the continued existence of *A. cervicornis* in the wild. To jeopardize the continued existence of is defined as “to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02). We interpret the *appreciable* to mean *considerable* (USFWS and NMFS 1998). Therefore, an action would jeopardize the continued existence of a species if it considerably reduced the likelihood of that species’ survival and recovery in the wild.

The final listing rule for *Acropora cervicornis* (71 FR 26852; May 9, 2006) provides the following rationale for listing the species as threatened and not endangered: (1) The species geographic range remains intact, (2) there are believed to be a high number of colonies still in existence throughout its range, and (3) asexual reproduction provides a source for new colonies that can buffer natural demographic and environmental variability. These criteria were determined to be good metrics of the species status. Thus, an action that causes an adverse change in one or more of these criteria would likely be appreciably reducing the likelihood of *A. cervicornis*’ survival and recovery in the wild.

We estimate the proposed action may cause up to 36 non-lethal takes. The non-lethal take of up to 36 *A. cervicornis* colonies is not expected to have any measurable impact on the reproduction, numbers, or distribution of the species. Those colonies are expected to fully recover such that no reductions in reproduction or numbers of this species are anticipated. Since relocated colonies will remain in the same area, no change in species distribution is anticipated.

The lethal take of up to 22 *A. cervicornis* colonies would reduce the population by that amount, compared to the number that would have been present in the absence of the proposed action, assuming all other variables remained the same. Four sexually mature colonies are anticipated to be lethally taken. Those takes could reduce future reproduction, assuming the colonies would have survived to reproduce in the future. Therefore, the action will result in a reduction in *A. cervicornis* reproduction.

Whether the reductions in numbers and reproduction attributed to the proposed action would appreciably reduce the likelihood of *A. cervicornis* survival depends on the probable effect those changes would have relative to the three status metrics identified above.

The proposed action will not affect the species' current geographic range. The anticipated mortalities would result in a reduction in *A. cervicornis* distribution in the immediate action area. However, the species is found throughout the wider-Caribbean region.[9] In Florida, *A. cervicornis* is generally found from Palm Beach County through Monroe County. The action area for this project is located in the middle of this range. The potential mortality of up to 22 colonies would cause no noticeable change or fragmentation in the distribution of the species, either in Florida or the wider-Caribbean. Additionally, the RPMs for this action require the COE to relocate 36 mature colonies from out of the path of potential mortality from the pipeline, to appropriate reef habitat nearby. This RPM further minimizes the potential of species range fragmentation.

There are also believed to be a high number of colonies still in existence through the species' range. Surveys currently underway within Miami-Dade County at Biscayne National Park identified 112 *A. cervicornis* colonies on four patch reefs. The project will eventually sample 5,000 patch reefs (D. Corsett, Biscayne National Park, pers. comm. 2009). If this current rate of occurrence holds, as many as 140,000 *A. cervicornis* colonies may exist inside the park alone. Even if this number is off by half, there may still be as many as 70,000 colonies occurring within just a portion of Miami-Dade County. Miller et al. (2008) estimate over 13 million *A. cervicornis* colonies likely exist currently in the Florida Keys, and while the absolute number of *Acropora* colonies is unknown, it is estimated that as many as a billion individual colonies may exist range wide (71 FR 26852; May 9, 2006). The loss of up to 22 colonies is unlikely to have any measurably effect on the other colonies. Thus, the proposed action will not result in the loss of high numbers of *A. cervicornis* colonies anywhere in its range.

The loss of up to 22 colonies is not anticipated to have any effect on the asexual reproduction of the remaining colonies. Asexual reproduction by the 36 colonies that will be relocated is not anticipated to be effected by the proposed action. Asexual reproduction by these colonies will continue to provide a source for new colonies of the same genotype. Therefore, the proposed action is extremely unlikely to have any measurable effect on the capacity of asexual reproduction to buffer the impacts of demographic and environmental variability.

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[9] The wider-Caribbean region includes the countries/territories: the United States, Puerto Rico, U.S. Virgin Islands, Navassa, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Honduras, Jamaica, Martinique, Mexico, Netherlands Antilles, Nicaragua, Panama, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and Venezuela.

Although no change in *A. cervicornis* distribution was anticipated, we concluded lethal takes would result in a reduction in absolute population numbers that may also reduce reproduction. We believe these reductions are unlikely to appreciably reduce the likelihood of survival of the species in the wild, because the action will not negatively affect critical metrics of the status of the species. The following analysis considers the effects of the anticipated loss of 22 colonies (4 sexually mature) on the likelihood of recovery in the wild.

Although a recovery plan has not been drafted at this time, we consider the recovery vision statement from the *Acropora* Recovery Outline (available at http://sero.nmfs.noaa.gov/pr/protres.htm) relevant to analyze the effects on recovery:

> *"…[S]taghorn populations should be large enough so that reproducing individuals comprise numerous populations across their historical geographic range (wider Caribbean) and also should be large enough to protect the species' genetic diversity. Threats to the species and habitat loss and degradation will be sufficiently abated to ensure a high probability of survival into the future*."

The above analysis on the effects of the action on the likelihood of this species' survival in the wild considered the current status of the species and effects of the amount of take anticipated for the species. Twenty-two lethal takes are anticipated. The removal of Twenty-two colonies, four of which will be sexually mature, is extremely unlikely to reduce *A. cervicornis* populations or historical range. The removal of four sexually mature colonies is also extremely unlikely to have any measurable effect on the species' genetic diversity. The monitoring data derived from the proposed action will expand the amount of presence/absence data available for the species. In turn, these data can inform future recovery actions. Therefore, the proposed action will not appreciably reduce the likelihood of staghorn coral's recovery in the wild.

8.0 CONCLUSION

After reviewing the current status of *A. cervicornis*, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NMFS' biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of *Acropora cervicornis*.

9.0 INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and protective regulations issued pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Incidental take is defined as take that is incidental to, and the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the RPMs and terms and conditions of the incidental take statement (ITS).

9.1 Anticipated Amount or Extent of Incidental Take

Based on the above information and analysis, NMFS believes that the proposed action may have adverse effects on *A. cervicornis* colonies. Up to 58 *A. cervicornis* colonies will likely be taken during the deployment/retrieval of the temporary pipeline and coral relocation; 22 takes will ultimately be lethal, the remaining 36 will be non-lethal. Table 9.1 summarizes these results.

Table 9.1 Summary of Anticipated *Acropora cervicornis* Take

Takes Under Modified Proposed Action			
	Lethal	Non-Lethal	Total
Non-Transplanted Colonies	15	0	15
Transplanted Colonies	7	36	43
Total	22	36	58

9.2 Effect of the Take

NMFS has determined the anticipated incidental take specified in Section 9.1 is not likely to jeopardize the continued existence of *Acropora cervicornis*.

9.3 Reasonable and Prudent Measures (RPMs)

Section 7(b)(4) of the ESA required NMFS to issue a statement specifying the impact of any incidental take on listed species, which results from an agency action otherwise found to comply with section 7(a)(2) of the ESA. It also states that the RPMs necessary to minimize the impacts of take and the terms and conditions to implement those measures must be provided and must be followed to minimize those impacts. Only incidental taking by the federal agency or applicant that complies with the specified terms and conditions is authorized.

The RPMs and terms and conditions are specified as required by 50 CFR 402.12 (i)(1)(ii) and (iv) to document the incidental take by the proposed action and to minimize the impact of that take on *Acropora cervicornis*. These measures and terms and conditions are non-discretionary, and must be implemented by the COE/MMS or the applicant for the protection of section 7(o)(2) to apply. The COE/MMS has a continuing duty to regulate the activity covered by this ITS. If the COE/MMS or the applicant fails to adhere to the terms and conditions of the ITS through enforceable terms, and/or fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of the incidental take, the COE/MMS or the applicant must report the progress of the action and its impact on the species to NMFS as specified in the ITS [50 CFR 402.12(i)(3)].

NMFS has determined that the following RPMs are necessary and appropriate to minimize impacts of the incidental take of *A. cervicornis* colonies during the proposed action. The following RPMs and associated terms and conditions are established to implement these measures, and to document incidental takes. Only incidental takes that occur while these measures are in full implementation are authorized. These restrictions remain valid until reinitiation and conclusion of any subsequent section 7 consultation.

1. Relocation of *Acropora cervicornis* Outside the Proposed Pipeline Corridor:
   As noted in Section 5.3, the deployment/retrieval of the temporary pipeline may adversely affect *A. cervicornis* occurring in the pipeline corridor as the pipeline sinks toward or is floated off the seafloor. The best way to minimize or eliminate adverse effects is to remove *A. cervicornis* from the pipeline corridor. Since transplantation can be stressful and the natural environment is variable, we believe the best way to minimize stress and ensure the survival of all transplanted colonies is to follow the established protocols (see Appendix A). To minimize potential adverse genetic impacts, transplanted colonies should be re-established nearby, but outside the pipeline corridor, after the cessation of the proposed action. Therefore, COE must ensure the 43 *A. cervicornis* colonies occurring in the pipeline corridor are relocated outside the proposed pipeline corridor near their initial location.

2. Monitoring the Pipeline and Sedimentation Levels Near Offshore Borrow Site:
   Sedimentation from the offshore borrow site is not likely to adversely affect *A. cervicornis* colonies located nearby. We anticipate sedimentation to be wholly contained within the pipeline. Therefore, no sedimentation effects are anticipated during sediment offloading. However, if sedimentation rates increase beyond what is anticipated, or if the pipeline malfunctions, adverse effects may occur. Therefore, COE must ensure the pipeline is monitored so any malfunction is detected. COE must also ensure that monitoring and reporting are conducted on the health of all *A. cervicornis* colonies occurring near the offshore borrow site identified during in DERM (2008) and the sedimentation levels are monitored. The monitoring program must: (1) detect any adverse effects resulting from a pipeline malfunction; (2) detect any adverse effects resulting from increased sedimentation above background levels during offshore sand mining; (3) determine what type of adverse effects are occurring to *A. cervicornis* (e.g., bleaching, excess mucus production, etc.), and (4) how many colonies are being affected.

9.4 Terms and Conditions

To be exempt from take prohibitions established by section 9 of the ESA, COE must comply with the following terms and conditions, which implement the RPMs described above. These terms and conditions are non-discretionary.

The following terms and conditions implement RPM No. 1.

1. COE must ensure that *A. cervicornis* colonies, 10 cm or larger, occurring in the proposed pipeline corridor are transplanted. Qualified individuals following the protocols in Appendix A must conduct transplantation. The COE must ensure that all transplanted colonies are re-located to suitable habitat near their original location, but no closer than 400 ft from the pipeline corridor boundary and no further away than 2,500 ft. Best management practices recommend a minimum 400-ft buffer between dredges and hardbottom resources (PBS&J 2008); transplanting colonies no more than 2,500 ft from the pipeline corridor boundary is desirable to minimize any potential genetic impacts from relocation. For the purposes of this opinion, suitable habitat is considered: similar depth as origin (+/- 5ft), uncolonized hard substrate, appropriate water quality (based on water quality data and local knowledge), and

minimal chances of other disturbances (boat groundings, damage caused by curious divers/fisherman).

2. COE must ensure a 3-cm fragment is collected from each parent colony. The fragment must be collected from the axial tip of healthy branches (i.e., apparently free of disease, algae, or boring sponge infestation) using hand tools (e.g., clipper). Should colonies to be transplanted fragment during handling, all fragments smaller that 10 cm shall be collected in lieu of collecting an axial tip. Any fragments larger than 10 cm should be relocated according to transplantation protocols. All fragments must remain in seawater until transfer to the custody of the *Acropora* nursery within the sub-region. COE will coordinate with PRD to determine the appropriate nursery to receive the fragments.
3. COE must record the original location of each transplanted colony, as well as the location of each colony after transplantation. These data must be submitted to the central acroporid geodatabase maintained by the Florida Fish and Wildlife Conservation Commission (FFWCC). COE must contact David Palandro, Ph.D. of FFWCC at (727) 896-8626, ext. 3056, prior to transplantation to discuss data collection and reporting requirements.
4. COE must use rock anchors to ensure the deployed pipeline does not move after deployment.
5. COE must submit any changes to transplantation protocols and the qualifications of any persons conducting transplantation are submitted to NMFS, Protected Resources Division, Southeast Regional Office, Protected Resources Division, 263 13th Avenue South, St. Petersburg, Florida 33701.

The following terms and conditions implement RPM No. 2.

6. COE must ensure that only persons with an appropriate background conduct sedimentation and *Acropora cervicornis* colonial health monitoring.
7. COE must ensure the sedimentation and coral health monitoring programs included as Appendix B of this document are followed. Any changes to these protocols must be reviewed and approved by NMFS-PRD before they can be implemented.

10.0 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. NMFS strongly recommends that COE, in consultation with PRD, utilize its authority to carry out programs for the conservation of *Acropora* corals. Pursuant to ESA section 7(a)(1) COE should develop a program to donate a fragment of each acroporid colony directly impacted by all authorized or permitted activities to an appropriate coral nursery.

11.0 REINITIATION OF CONSULTATION

As provided in 50 CFR 402.16, reinitiation of formal consultation is required if 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 the taking specified in the incidental take statement is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat (when designated) in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, COE must immediately request reinitiation of formal consultation.

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Appendix A

Acropora cervicornis Transplantation Protocols for Miami-Dade County Beach Renourishment Project – Contract "E"

All *A. cervicornis* relocation field activities, data collection, analysis and reporting will be supervised by a marine biologist (M.S. in related field, minimum, or equivalent experience) with experience in coral transplantation and survival monitoring. The qualifications of any persons conducting transplantation work must be submitted to NMFS-Protected Resources Division, for review.

Prior to colony collection, a 3-cm fragment must be collected from each parent colony. The fragment must be collected from the axial tip of healthy branches using hand tools (e.g., clipper). Fragments must remain in seawater until transfer to the custody of the *Acropora* nursery within the sub-region. Samples must be submitted to a permitted *A. cervicornis* coral nursery within the same eco-region. The eco-region of this project is Miami-Dade County. Applicant would be responsible for all costs of transfer of the colonies to the nursery. COE must coordinate with the appropriate *Acropora* nursery prior to collecting these samples to ensure safe transfer.

The colonies will be collected carefully using a hammer and chisel. Upon collection, the colonies must be kept in bins and maintained in seawater at all times. During transportation to the transplant site, the corals must be covered. Transplantation should occur as soon as operationally feasible, and no more than 24 hours after the colony is removed from its original location. The collected colonies must be kept at the original depth until transplantation commences (i.e., cached on site).

The COE must ensure that all transplanted colonies are re-located to suitable habitat near their original location, but no closer than 400 ft from the pipeline corridor boundary and no further away than 2,500 ft. For the purposes of this opinion, suitable habitat is considered: similar depth as origin (+/- 5 ft), uncolonized hard substrate, appropriate water quality (based on water quality data and local knowledge), and minimal chances of other disturbances (boat groundings, damage caused by curious divers/fisherman).

The colonies must be transplanted no closer than 400 ft from the pipeline corridor boundary and no further away than 2,500 ft in an area of suitable habitat/substrate resembling that of the colonies original location as soon as operationally feasible. For the purposes of this opinion, suitable habitat is considered: similar depth as origin (+/- 5 ft); means consolidated hardbottom or dead coral skeleton that is free from fleshy macroalgae cover and sediment cover occurring in water depths from the mean high water (MHW) line to 30 meters (98 feet); appropriate water quality (based on water quality data and local knowledge), and minimal chances of other disturbances (boat groundings, damage caused by curious divers/fisherman). All efforts should be made to transplant the fragment to the same depth from which it was removed (i.e., +/- 5 ft). The material used to attach the colonies to suitable substrate must be equal portions of Portland Type II Cement and molding plaster. This combination should be taken dry in ziplock bags and mixed with seawater underwater to a heavy paste consistency. Before applying this mixture to the substrate, it must be cleaned of any sediment or algae. The cement/plaster mixture should then be taken out of the bag and pressed against the clean substrate. The transplanted colonies must then be pressed gently into the cement with proper care. Transplanted colonies must be no closer than 0.75 meters from one another.

To assist in monitoring efforts, a plastic identification tag must be attached adjacent to each transplanted colony. Finally, the collected location, length, width, depth and orientation of each colony to be transplanted will be recorded. The transplanted location and depth of each colony, as well as the species and identification number will be recorded.

Appendix B

Monitoring *Acropora cervicornis* Health and Sedimentation near the Offshore Borrow Area

(Adapted from CSA 2003 and Broward County Undated)

Since the effects analysis determined that sedimentation from the offshore borrow site would not affect the health of *A. cervicornis* colonies located nearby, monitoring is required to ensure that determination is correct. To verify that determination, the health of all identified *A. cervicornis* colonies located nearby the offshore borrow area must be monitored using the parameters identified below.

Monitoring *Acropora cervicornis* Health

Parameters for Evaluating Acropora cervicornis Colony Health

COE must ensure that each *Acropora cervicornis* colony is observed for indications of stress from sedimentation. *Acropora cervicornis* health shall be assessed based on the following parameters: bleaching, excess mucus production, polyp extension, and disease. Each colony must be assessed and assigned a health level of “0” to “3” for each parameter. All colonial health observations must be documented with approximately 15 seconds of video per individual colony. A level of 0 represents minimal to low stress and a level of 3 represents advanced to acute stress.[10] During laboratory experiments, Fisher et al. (2008) determined stress threshold values for each parameter for the corals near the BRP project. The threshold “stress value” developed in the laboratory was 1.5 on the 0 to 3 scale. A colony receiving a score of 1.5 or higher for two or more parameters shall be classified as stressed and in declining health.

Actions to be Taken if Coral Health is Declining

Should the health of any *A. cervicornis* colonies be declining (i.e., exhibiting scores of 1.5 or higher in at least two of the health parameters) NMFS-PRD must be notified immediately, and the dredge must move to a new location no less than 400 ft from the nearest *A. cervicornis* colony. Once any effected colonies have been determined to have recovered (i.e., health parameter scores of less than 1.5), the dredge may resume working in that area.

Coral Health Assessment Sampling Frequency

COE must ensure that *A. cervicornis* health assessments are conducted at least once per week starting four weeks before sand mining begins to establish a baseline, at least once per week during sand mining operations, and at least once per week for four weeks after sand mining has ceased.

Reporting of Acropora cervicornis Health

COE must ensure that observations and results from the *A. cervicornis* health surveys are compiled and presented in reports submitted to NMFS-PRD following the initial four-week monitoring period, weekly during dredge activities, and another report following the four-week follow-up monitoring. If any *A. cervicornis* colonies show signs of declining health, COE must

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[10] Scoring involved healthy = 0; moderately stressed = 1 (polyp swelling, increased mucus); markedly stressed = 2 (coloration changes, increased mucus secretion, tissue thinning); and severely stressed = 3 (severe swelling/thinning tissue erosion/necrosis) (Fisher et al 2008).

ensure NMFS-PRD is notified immediately. Any adjustments to the dredge location due to either declines in *A. cervicornis* colony health or excess sedimentation rates must also be reported.

Monitoring Sedimentation Levels

Since the effects analysis determined that sedimentation from the offshore borrow site would not affect the health of *A. cervicornis* colonies located nearby, monitoring is required to ensure that determination is correct. To verify that determination, sedimentation levels must also be monitored near the offshore borrow site. The following sections outline how sedimentation levels near the offshore borrow site must be monitored.

Sediment Trap Design and Location
Sediment traps and sediment accumulator plates must be used to monitor sedimentation. COE must ensure that a sediment trap is placed at each of four locations near the *A. cervicornis* colonies identified by the offshore borrow site. Figure B1 illustrates the general location the sediment traps must be placed. Four reference sites must also be established. Two sites must be located approximately 1,000 ft north of the northernmost identified *A. cervicornis* colonies and two sites must be located approximately 1,000 ft south of the southernmost identified colonies. All sediment trap arrays must be installed a minimum of nine weeks prior to the initiation of dredging. The sediment traps must be constructed of 1.5-inch inside diameter (ID) x 8-inch length polyvinyl chloride (PVC) pipe and a 500-ml nalgene collection jar. Both trap necks and jars must be coated with anti-fouling paint to minimize epibiotal growth. The PVC traps with the attached jar lids must be fastened to the steel sediment trap frame with hose clamps. The frame must be drilled and cemented into the bottom. Following completion of the monitoring program, all sediment traps, frames, and blocks must be removed.

COE must ensure the traps are positioned with the mouth of the trap no more than 18 inches above the bottom. When changing out sediment traps, the nalgene trap jars must be unscrewed from the PVC collars and the jars capped. New jars then must then be attached to the trap collars for the next collection interval. Sediment samples shall be transported to the laboratory where the water and sediment shall be filtered through labeled pre-weighed filters. The filters and sediments must be rinsed with fresh water to remove salts, and the filters containing the sediments must then be dried in an oven and weighed.

Sediment Accumulator Plate Design and Location
COE must ensure two sediment accumulator plates (Figure B2) are also installed at each sediment trap site (Figure B1). Accumulator plates must be stainless steel (or otherwise suitable material), mounted on a concrete building block, and cemented to the reef substrate. The orientation of the plate surface must be level and not follow the contour angle of the reef substrate. Eight accumulator plates must also be placed at the four reference sites noted above. Two plates as described above must be placed at the each reference site. During each visit, COE shall ensure the sediment depth in each plate is measured to the nearest 0.5 mm. The first plate must be cleaned off during each visit. The second plate must not be cleaned so a comparative measurement of net accumulated sediment depth can be made. Sediment depth will be measured and recorded as an average of four measurements at four locations on each of the plates.

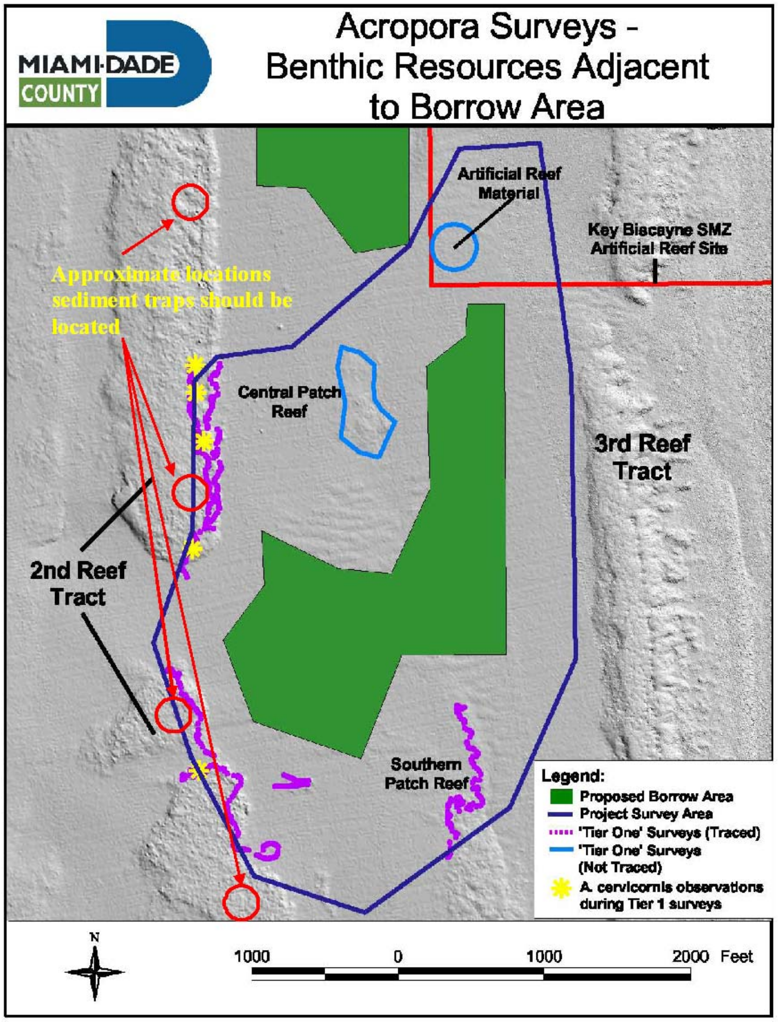

Figure B1. Approximate Locations Where Sediment Traps and Sediment Accumulator Plates Should be Placed. (Adapted from DERM 2008)

Figure B2. Example of a Sediment Accumulator Plate (Source: Broward County Undated)

Sedimentation Monitoring Sampling Frequency
COE must ensure an initial survey of all sediment trap and accumulator plate sites is conducted at all sites one week after completion of station setup to establish a baseline assessment of resources after possible station setup impacts have subsided. Following the initial survey, COE must ensure that all sediment traps are changed out just before the start of dredging, and all traps will be changed out at 28-day intervals during dredging operations. Following the completion of dredging, all sediment traps must be monitored for four weeks.

After the initial survey of sediment accumulation plates, monitoring must be conducted weekly for four weeks before sand mining begins. The first net sediment accumulation survey shall occur 3 days after initiation of dredging operations. Surveys shall continue at 3-day intervals for 9 days; and if sedimentation rates are less than 1.5 mm/day, subsequent surveys may be conducted at 7-day intervals. If monitoring indicates sediment accumulation levels are exceeding 1.5 mm/day relative to reference stations, the daily surveys may be required. Weekly monitoring must continue for four weeks after sand mining has ceased.

Actions to be Taken if Sedimentation Increases Beyond Threshold
Should sediment traps show a net accumulation rate of greater than 1.5 mm/day above any levels at any reference station, a survey of *A. cervicornis* health must be conducted. If colonial health is determined to be declining, the dredge must move to a new location no less than 400 ft from the nearest *A. cervicornis* colony. If the dredge is required to re-locate, it will be allowed to return to work at that location once average daily sedimentation rates return to less than 1.5 mm/day above reference station levels. If impacts are deemed excessive, an emergency response meeting may be initiated to discuss response or correction options.

Reporting Requirements
COE must ensure that observations and results from the sedimentation surveys are compiled and presented in reports submitted to NMFS-PRD following the initial four-week monitoring period, weekly during dredge activities, and another report following the four-week follow-up monitoring. Any adjustments to the dredge location due to either declines in *A. cervicornis* colony health or excess sedimentation rates must also be reported.

Pipeline Monitoring

(Adapted from PBS&J 2008 and Broward County Undated)

COE must ensure that the pipeline is inspected bi-weekly to check for leaks and irregular conditions. A diver must swim the entire length of the pipeline from the point furthest offshore to the nearshore hardbottom edge. To greatest extent possible, inspections should occur while the pipeline is in operation to enhance divers' ability to detect leaks. Every other inspection must be videotaped. The diver will record the location, the nature, and extent of any leaks or irregular conditions. The diver will immediately report the location(s) and description(s) of all leaks or irregular conditions to the on-scene project manager.

If any leakage or substantial movement is noted, use of the pipeline must cease and appropriate action must be taken to remedy the situation. If pumping is not occurring when the evidence of leakage is noted, then pumping shall not resume until repairs and/or remedial action has been taken. Upon completion of pipeline usage, the pipeline should be removed as soon as is feasible. If possible, pipelines should be removed before any major tropical storm or hurricane.

The pumpout terminus for the pipeline should be located in an operational box sited in a hardbottom resource-free area where the dredge can place a mooring anchor. The box should be big enough to ensure that the anchoring system is in sand and that the moored dredge does not swing over shallow reef areas.

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
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REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

DEC 28 2009

Mr. Pace Wilbur
National Marine Fisheries Service
Southeast Regional Office
Habitat Conservation Division
219 Fort Johnson Road
Charleston, South Carolina 29412-9110

Dear Mr. Wilbur:

Pursuant to the National Environmental Policy Act (NEPA), enclosed for your review and comment is a copy of the draft Environmental Assessment (EA) for the Contract E Beach Renourishment Project – Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. The United States Army Corps of Engineers (Corps) is the lead consulter on this action, with MMS as a co-consulter.

Included throughout the EA is information which constitutes the Essential Fish Habitat (EFH) Assessment as required by the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). Sections 2.1; 3.4; 3.5; 3.6; 4.4 and 4.6 of the enclosed NEPA document constitute our Essential Fish Habitat Assessment in accordance with procedures between our agencies as stated in the May 3, 1999 Statement of Findings. Based on analysis discussed in the EA, the Corps has determined that the renourishment of Priority placement areas #1 and #2 would not adversely affect the essential habitat of species managed under this Act.

We request your comments pursuant to NEPA and the MSFCMA by February 26, 2010. If you have any questions or need further information, please contact Ms. Terri Jordan at 904-232-1701 or by email: Terri.L.Jordan@usace.army.mil.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Enclosure

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

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February 26, 2010 F/SER4:JK/pw

(Sent via Electronic Mail)

Colonel Alfred Pantano
District Engineer, Jacksonville District
Department of the Army Corps of Engineers
Planning Division
PO Box 4970
Jacksonville, Florida 32232

Attention: Terri Jordan

Dear Colonel Pantano:

NOAA's National Marine Fisheries Service (NMFS) reviewed the U.S. Army Corps of Engineers, Jacksonville District's (COE) Draft Finding of No Significant Impact (FONSI) and Draft Environmental Assessment (EA), dated December 2009, titled *Beach Erosion Control and Hurricane Protection Project, Dade County Florida, Contract E Beach Renourishment Project*. The Draft EA describes a proposal to nourish two areas of Miami Beach.

- Area #1 is approximately 8,500 linear feet and located in northern Miami Beach from 63rd Street to 90th Street (Florida Department of Environmental Protection (FDEP) monuments R-37.75 to R-46.25). This beach would be filled with 474,000 cubic yards (cy) of dredged material obtained from the South of Government Cut Extension (SGC-1-Extension) borrow area located 3.3 miles offshore in federal waters. Approximately 8,300 linear feet of pipeline would be placed on the seafloor to transfer dredged material to the beach, and approximately 4.3 acres of hardbottom within the pipeline corridor could be adversely affected. The Draft EA does not quantify the potential impacts to coral, coral reef, or hardbottom from the toe-of-fill at Area #1.
- Area #2 is composed of two segments, including 1,800 feet of shoreline located between 45th Street and 57th Street (FDEP monuments R-53.7 to R-55.5) and 1,000 feet of shoreline between 26th Street to 29th Street (FDEP monuments R-60 to R-61). Collectively, this area would receive 218,000 cy of material excavated from the Lummus Park upland beach borrow area. The Draft EA indicates that the excavated material would likely be transported from Lummus Park to Area #2 via a floating pipeline. As an alternative in the case of adverse weather, 50-foot sections of pipe would be trucked to the site and joined into 1,000-foot lengths that would be buried below grade

approximately 5 feet seaward of the existing dune. The Draft EA does not quantify the potential impacts to hardbottom located off the Lummus Park borrow area or to coral, coral reef, or hardbottom from the toe-of-fill at Area #2.

The Jacksonville District's initial determination is that the proposed activity would not adversely affect essential fish habitat (EFH). 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 South Atlantic Fishery Management Council (SAFMC) designated corals, coral reefs, hardbottom, and unconsolidated sediments as EFH. Hardbottoms are EFH for coral, red grouper (*Epinephelus morio*), gag grouper (*Mycteroperca microlepis*), gray snapper (*Lutjanus griseus*), mutton snapper (*L. analis*), white grunt (*Haemulon plumieri*), and spiny lobster (*Panulirus argus*). Sand habitats are EFH for cobia (*Rachycentron canadum*), black seabass (*Centropristis striata*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*S. maculates*), spiny lobster, and pink shrimp (*Farfantepenaeus duorarum*). All demersal fish species under SAFMC management that associate with coral habitats are contained within the fishery management plan for snapper-grouper species and include some of the more commercially and recreationally valuable fish of the region. All of these species show an association with coral or hardbottom habitat during their life history. In groupers, the demersal life history of almost all *Epinephelus* species, several *Mycteroperca* species, and all *Centropristis* species, takes place in association with coral habitat (SAFMC 2009). Coral, coral reef, and hardbottom habitats benefit fishery resources by providing food or shelter (SAFMC 1983). SAFMC also designated corals, coral reefs, and hardbottoms as a Habitat Area of Particular Concern (HAPC), which is a subset of EFH that is either rare, particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally stressed area. In light of their designation as EFH-HAPC's and Executive Order 13089, NMFS applies greater scrutiny to projects affecting corals, coral reefs, and hardbottoms to ensure practicable measures to avoid and minimize adverse effects to these habitats are fully explored.

Impacts to Essential Fish Habitat

<u>SGC-1-Extension Borrow Area and the Pipeline Corridor to Area #1</u>: Results from a survey for *Acropora* spp. performed on September 16 and 29, 2008, by Miami-Dade Department of Environmental Resource Management (DERM) shows 44 colonies of *Acropora cervicornis* within or near the pipeline corridor and 31 colonies on the reef tract east of SGC-1-Extension borrow area. The Biological Opinion issued by the NMFS Protected Resources Division (NMFS PRD) on October 24, 2009, estimates that 58 colonies of *A. cervicornis* would be lethally taken through deployment and retrieval of the pipeline. As reasonable and prudent measures, NMFS PRD is requiring the Jacksonville District to relocate 43 colonies and to monitor *A. cervicornis* colonies along the pipeline corridor and adjacent to the SGC-1-Extension borrow area.

While the Draft EA references DERM's report of results for acroporid corals from the 2008 survey, the Draft EA does not fully incorporate the report's information about other coral species. Photos within DERM's report show coral species besides acroporids occur within or near the pipeline corridor, including *Diploria strigosa, Siderastrea* spp., *Gorgonia ventalina*, and *Pseudopterogorgia* spp. This finding is consistent unpublished data that DERM provided NMFS by email dated February 19, 2010, from surveys conducted in February and May 2000. Approximately 532 hard corals (approximately 15 species) and 2,637 soft corals (approximately 22 species) were identified in that effort. The Draft EA does not include this unpublished data, however it is NMFS' understanding that the data were recently provided to the Jacksonville District for inclusion in the Final EA.

<u>Lummus Park Borrow Area and the Pipeline Corridor to Area #2</u>: Limited detail is provided in the Draft EA regarding potential for effects to EFH from the transport of material from the Lummus Park borrow area to Area #2. Descriptions with corresponding figures are needed of where the pipeline would be floated as well as how the material would be slurried (since the material would be excavated from uplands). In the case that an in-water pipeline would adversely affect EFH, NMFS believes that trucking the material should be evaluated as a less damaging alternative. Further, aerial photographs show a hardbottom feature approximately 200 to 400 meters from the shoreline at Lummus Park. The Draft EA does not discuss the potential for impacts to this feature from sedimentation and turbidity generated by the excavation or from the pipeline to Area #2. NMFS requests the Final EA characterize this hardbottom area and how it might be affected by the project. Lastly, the description in the Draft EA of the pipeline burial alternative is not clear. A more complete description and map of the pipeline route is needed.

<u>Nourishment Toe-of-Fills at Area #1 and Area #2</u>: The Draft EA does not discuss potential impacts to coral or hardbottom habitat within or near the equilibrium toe-of-fill at Area #1 or Area #2. DERM conducted a survey during May 7 through June 9, 2009. Results of that survey show approximately 4.02 acres of unvegetated rubble and 2.06 acres of rubble colonized with algae between FDEP monuments R-41 to R-62, which encompasses a portion of the project area as well as areas outside of the proposed nourishment. Several federally managed fish species associate with rubble colonized by algae, including grunts (*Haemulon* spp.) and lane snapper (*Lutjanus synagris*). DERM's survey also shows worm reef (hardbottom colonized by *Phragmatopoma lapsidosa*), near FDEP monument R-49, which is between Area #1 and Area #2. The Draft EA briefly references these data, but does not fully incorporate them into the analysis. The Final EA should include a more detailed analysis of these data, especially between FDEP monuments R-41 to R-46 (which is within Area #1) and FDEP monuments R-54 to R-55 (which is within Area #2) and appear to have the most hardbottom habitat. The Final EA should characterize these habitats and evaluate effects to coral and hardbottom expected to be covered or affected by the equilibrium toes-of-fill.

<u>Summary</u>: Based on the information in the DERM reports, it is likely the Draft EA significantly underestimates the amount of coral, coral reef, and hardbottom along the pipeline corridors and near the Lummus Park and SGC-1-Extension borrow areas. Based on the reports from DERM, NMFS believes the coral, coral reef, and hardbottom within these areas are likely high in quality. While the rock rubble colonized with algae at Area #1 and Area #2 may be moderate to low quality EFH, it provides habitat for fishery resources (snappers and grunts). A comprehensive survey is needed to examine the presence of coral, coral reef, and hardbottom in the project areas.

Information Needs

NMFS believes the information provided in the Draft EA does not meet the intent of the National Environmental Policy Act (NEPA). The alternatives analysis is overly narrow. The alternatives presented in the Draft EA are the proposed action (as the preferred action) and the no action alternative. At a minimum, a complete alternatives analysis would evaluate a minimized project design and truck haul for Area #1, which would avoid the need to impact corals, coral reefs, and hardbottom near the SGC-1-Extension borrow area and the need to deploy and retrieve a pipeline that traverses coral and hardbottom habitats in order to reach this borrow area.

The NMFS believes the information provided in the Draft EA is not consistent with existing Council on Environmental Quality (CEQ) guidelines and Army regulations regarding mitigation and mitigation monitoring. Draft guidance recently released by CEQ regarding mitigation and monitoring (CEQ 2010) cites Army regulations which state that "consistent with existing CEQ guidelines, the Army's mitigation regulations place significant emphasis on the planning and implementation of mitigation measures throughout the environmental analysis process. The first step in mitigation is avoiding or minimizing harm" [40 CFR 1508.2]. In the absence of biological survey information that quantifies in the Draft EA the extent of potential damage to coral, coral reef, and hardbottom, NMFS is unable to determine that impacts to EFH have been avoided to the extent practicable. In addition, the guidance states that "when the analysis proceeds to an EA or Environmental Impact Statement (EIS), Army regulations require that any mitigation measures be 'clearly accessed and those selected for implementation will be identified in the FONSI or the ROD' [32 CFR 651.15(a)(5)(b)] and that 'Army regulations recognize that monitoring is an integral part of any mitigation system' [32 CFR 651.15(a)(5)(i)]." The Draft EA does not thoroughly discuss monitoring plans and implementation programs as required by these regulations.

NMFS believes the information provided in the Draft EA does not meet the requirements of the EFH provisions of the Magnuson-Stevens Act. The Jacksonville District chose to integrate the required components of an EFH Assessment in various parts of the Draft EA and, based on our review, NMFS does not agree that all components of an EFH Assessment are present or provided in sufficient detail (50 CFR 600.920(e)(2)) to adequately analyze the effects on EFH. Based on the nature of the proposed action and the potential adverse effects on EFH and EFH-HAPCs, NMFS provides the following assessment of the mandatory and additional information requirements found at 50 CFR 600.920(e)(3) and (4) that should be included in the Final EA:

<u>Mandatory Components of an EFH Assessment:</u>

1. <u>Description of the action</u>. The description of the work is incomplete, for example, there is limited discussion of how sand will be transported from Lummus Park to Area #2. Please provide a location map that depicts the location of the floating pipeline and its proximity to EFH.
2. <u>Analysis of the potential adverse effects of the action on EFH and the managed species</u>. This analysis is not included in the EA. Information describing the quantity and quality of EFH is needed for NMFS to make a determination regarding the level of effect to NOAA trust resources.
3. <u>Federal agency's conclusions regarding the effects of the action on EFH</u>. Provided.

4. Proposed mitigation, if applicable. NMFS believes compensatory mitigation is required, and there is no description of compensatory mitigation in the Draft EA.

Additional Information:

1. Results of an on-site inspection to evaluate the habitat and the site-specific effects of the project. The Draft EA does not include complete biological resource surveys. Deficiencies are noted above for both pipeline corridors, hardbottoms near the SGC-1-Extension borrow area, and the toe-of-fill at Area #1 and Area #2. Please provide a biological resource survey that maps and characterizes EFH within 1,000 feet of the SGC-1-Extension borrow area, along the pipeline corridor, hardbottom offshore of the Lummus Park borrow area, and within 1,000 feet from the toe-of-fill at Area #1 and Area #2. The survey report should identify survey dates and include full characterizations of each habitat depicted in the maps. These characterizations should focus on the following functional groups: stony corals, octocorals, sponges, macroalgae, and zooanthids. For stony corals, species, density, size distribution (colony diameter and height), and condition (bleaching and disease) should be documented. For octocorals, species, density, and size distribution (colony height) should be documented. In the absence of this information, NMFS is unable to determine that impacts to corals, coral reefs, and hardbottoms have been prevented to the maximum extent possible.
2. Views of recognized experts on the habitat or species that may be affected. This information is not included in the Draft EA.
3. Review of pertinent literature and related information. A complete review is not included in the Draft EA. References that can assist the Jacksonville District characterize EFH in the project area (e.g., Waddell and Clarke 2008; SAFMC 2009) and potential effects to EFH (e.g., Lindeman and Snyder 1999; Jordan et al. 2010) should be included in the Final EA.
4. An analysis of alternatives to the proposed action. Least environmentally damaging practical alternatives should be evaluated, including alternatives that eliminate the need to dredge offshore.

EFH Conservation Recommendations

Although additional information is needed to complete the EFH consultation, based on the information provided thus far NMFS concludes the project will likely adversely affect EFH. As proposed, the project could directly and permanently eliminate 4.3 acres or more of coral, coral reef, or hardbottom habitat. Significant indirect and cumulative adverse impacts are also likely in connection with construction activities and the subsequent loss of marine habitats and their associated functions. These indirect and cumulative impacts include increased turbidity, sedimentation from dredging and the placement of fill in the aquatic environment, and loss of food production and other functions that coral, coral reef, and hardbottom habitats contribute to fisheries. 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:

EFH Conservation Recommendations

No activities that may adversely impact coral, coral reef, or hardbottoms shall be authorized.

1. The NMFS provides the following additional EFH Conservation Recommendations; these recommendations may require re-evaluation following review of any additional information: A comprehensive mitigation plan shall be designed and coordinated with NMFS, to require:
    a. Best management practices to minimize degradation of water quality;
    b. A plan for monitoring the pipeline for leaks and response actions to any leaks detected.
    c. A plan for monitoring coral, coral reef, and hardbottom habitat within the area of the offshore borrow area SGC-1-Extension and pipeline corridors to include pre-construction, during, and post-construction biological monitoring of the coral resources within the direct and indirect impact areas
    d. A plan of corrective actions to be undertaken during dredging should monitoring indicate that coral areas are being impacted by sedimentation, burial, direct physical damage, or shading from construction activities.
    e. Recording and post-construction evaluation of dredge anchor placement impacts on coral, coral reef, and hardbottom habitat;
    f. A compensatory mitigation plan that describes how unavoidable impacts to coral and hardbottom habitat shall be offset from construction activities and the equilibrium toe-of-fill.
    g. Objectives of the mitigation, performance standards, monitoring protocols and schedule, and a functional assessment that describes how mitigation amounts offset the resource impacts.
2. A plan to relocate all stony corals larger than 10 cm in diameter and any soft corals taller than 15 cm in height within areas affected by the project.A minimum 400-foot buffer shall be maintained between dredging activities and hardbottom and coral reef habitats.
3. For the Lummus Park borrow area, the Jacksonville District shall require the contractor to clearly mark the mean high water line (MHWL) and have an independent contractor on-site to continuously monitor and verify that no material is placed waterward of the MHWL in areas prohibited by the permitted construction template.
4. The Jacksonville District shall prohibit movement of dredge, tugs, or other work vessels over coral reef or hardbottom habitat.

Section 305(b)(4)(B) of the Magnuson-Stevens Act and its implementing regulation at 50 CFR 600.920(k) require the COE 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 NMFS' "findings" with the COE's Planning Functions Branch, an interim response should be provided to NMFS. A detailed response then must be provided prior to final approval of the action. The COE's detailed response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If the COE's response is inconsistent with these EFH Conservation Recommendations, the COE must provide a substantive discussion justifying the reasons for not following the recommendation.

Please note that the EFH regulation, 50 CFR 600.920 (k)(2), states that if a Federal agency decision is inconsistent with a NMFS EFH Conservation Recommendation, the Assistant Administrator for Fisheries may request a meeting with the head of the Federal agency, as well as with any other agencies involved, to discuss the action and opportunities for resolving any disagreements. Should the concerns of NMFS not be addressed satisfactorily at the field level, the Southeast Region may consider this action for referral and review in accordance with the EFH regulation.

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,

Miles M Croom

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc:

FWS, Jeffrey_Howe@fws.gov
FWCC, Lisa.Gregg@MyFWC.com
FWCC, Ron.Mezich@MyFWC.com
FDEP, Merrie.Neely@dep.state.fl.us
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DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

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

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

NOV 0 5 2010

Mr. Miles Croom
Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, FL 33701-5505

Dear Mr. Croom:

We have received your Essential Fish Habitat Recommendations provided by letter dated February 26, 2010, regarding the Dade County Beach Erosion Control and Hurricane Protection Project, Contract E. A detailed response to the four EFH Conservation Recommendations is enclosed. Based on the enclosed responses, the U.S. Army Corps of Engineers (Jacksonville District) 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.

This completes the Jacksonville District's requirements for EFH consultation under the Magnuson Stevens Act. In accordance with the previously cited regulations and finding, no further action is required by the Jacksonville District. The Corps intends to sign a FONSI on or about 10 days after the date of this letter unless NMFS-HCD plans to elevate to the Department of Army Headquarters in accordance with 50 CFR 600.920(j)(2).

If you have any questions, please contact Pat Griffin at 904-232-2286.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Enclosure

1. A comprehensive mitigation plan shall be designed and coordinated with NMFS, to require

a. Best management practices to minimize degradation of water quality;

Response: The Corps will comply with the water quality criteria requirements as put forth in the State of Florida's water quality certification, when issued, and will abide by any BMPs required by that action. The Corps will also abide by BMP requirements set forth in the terms and conditions of the Oct 21, 2009 Biological Opinion issued by NMFS-PRD as provided to NMFS-HCD in the Draft EA, in Appendix D.

b. A plan for monitoring the pipeline for leaks and response actions to any leaks detected.

Response: The Corps will comply with the pipeline monitoring requirements set forth by the NMFS-PRD Oct 21, 2009 Biological Opinion's terms and conditions and provided to NMFS-HCD in the Draft EA, in appendix D and the as discussed in the "Physical and Biological Monitoring Program for Dade County Beach Sustainability Project", prepared by DERM (attached).

c. A plan for monitoring coral, coral reef, and hardbottom habitat within the area of the offshore borrow area SGC-1-Extension and pipeline corridors to include preconstruction, during, and post-construction biological monitoring of the coral resources within the direct and indirect impact areas.

Response: The Corps will comply with the borrow area monitoring requirements set forth by the NMFS-PRD Oct 21, 2009 Biological Opinion's terms and conditions as provided to NMFS-HCD in the Draft EA, Appendix D and the "Physical and Biological Monitoring Program for Dade County Beach Sustainability Project" prepared by DERM.

d. A plan of corrective actions to be undertaken during dredging should monitoring indicate that coral areas are being impacted by sedimentation, burial, direct physical damage, or shading from construction activities.

Response: Corps will comply with the requirements set forth by the NMFS-PRD Oct 21, 2009 Biological opinion's terms and conditions and provided to NMFS-HCD in the Draft EA, in Appendix D and the "Physical and Biological Monitoring Program for Dade County Beach Sustainability Project". Impacts to corals and subsequent mitigation considerations are outlined in the "Mitigation Plan for Placement of a Dredge Pipeline on Hardground Areas in Association with Construction of Contract E Beach Nourishment in Miami Beach, Florida" prepared by DERM (attached).

e. Recording and post-construction evaluation of dredge anchor placement impacts on coral, coral reef, and hardbottom habitat;

Response: There is no dredge anchoring proposed in the project to assess.

f. . A compensatory mitigation plan that describes how unavoidable impacts to coral and hardbottom habitat shall be offset from construction activities and the equilibrium toe-of-fill.

Response: The Corps will include a final mitigation plan as prepared by the local sponsor (DERM) in the final EA that addresses impacts to hardbottom and coral habitats.

g. Objectives of the mitigation, performance standards, monitoring protocols and schedule, and a functional assessment that describes how mitigation amounts offset the resource impacts.

Response: See 1f above.

2. A plan to relocate all stony corals larger than 10 cm in diameter and any soft corals taller than 15 cm in height within areas affected by the project. A minimum 400-foot buffer shall be maintained between dredging activities and hardbottom and coral reef habitats

Response: The Corps will relocate any Acroporid corals from the pipeline corridor as required by the NMFS-PRD Oct 21, 2009 Biological Opinion's terms and conditions and provided to NMFS-HCD in the Draft EA, in Appendix D. Impacts to corals within the established pipeline corridor and associated mitigation methods can be found in "Mitigation Plan for Placement of a Dredge Pipeline on Hardground Areas in Association with Construction of Contract E Beach Nourishment in Miami Beach, Florida" prepared by DERM.

3. For the Lummus Park borrow area, the Jacksonville District shall require the contractor to clearly mark the mean high water line (MHWL) and have an independent contractor on-site to continuously monitor and verify that no material is placed waterward of the MHWL in areas prohibited by the permitted construction template.

Response: The Corps does accept this recommendation for the following reasons:

a. All contractors hired by the Corps work at the direction of the contracting officer and are not "independent" of the Corps.

b. There are no hardbottom resources nearshore of the proposed Lummus Park borrow area as documented by the DERM nearshore surveys conducted March 2010 by DERM (report attached).

4. The Jacksonville District shall prohibit movement of dredge, tugs, or other work vessels over coral reef or hardbottom habitat.

Response: The Corps does not accept this recommendation since there is no feasible way for the dredge to mine sand in the SGC-Ext borrow area and transit to the pipeline corridor without crossing documented ridge, linear reef, spur and groove, patch reef habitats per FLDEP surveys and habitat maps (Walker, 2009).

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/

November 15, 2010 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: Patrick Griffin

Dear Colonel Pantano:

NOAA's National Marine Fisheries Service (NMFS) reviewed the Jacksonville District's letter dated November 5, 2010, regarding the Draft Finding of No Significant Impact (FONSI) and Draft Environmental Assessment (EA), dated December 2009, titled *Beach Erosion Control and Hurricane Protection Project, Dade County Florida, Contract E Beach Renourishment Project*. Your letter transmits the Jacksonville District's reply to the information requests and conservation recommendations that NMFS provided by letter dated February 26, 2010, to protect essential fish habitat (EFH).

Information Requests

With respect to the EFH regulations detail (50 CFR 600.920(e)(2)), NMFS noted several deficiencies in the District's EFH assessment. This information still has not been provided to NMFS, and the EFA assessment remains incomplete. The missing items include:
Mandatory Components of an EFH Assessment[1]

1. Description of the action. The description of the work is incomplete, for example, there is limited discussion of how sand will be transported from Lummus Park to Area #2. Please provide a location map that depicts the location of the floating pipeline and its proximity to EFH.
2. Analysis of the potential adverse effects of the action on EFH and the managed species. This analysis is not included in the Draft EA. Information describing the quantity and quality of EFH is needed for NMFS to make a determination regarding the level of effect to NOAA trust resources.

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[1] We note that the lead Federal agency's conclusions regarding the effects of the action on EFH is also a mandatory component of an EFH assessment and that was provided in the draft EA.

3. Proposed mitigation, if applicable. NMFS believes compensatory mitigation is required, and there is no description of compensatory mitigation in the Draft EA.

Additional Information

1. Results of an on-site inspection to evaluate the habitat and the site-specific effects of the project. The Draft EA does not include complete biological resource surveys. Deficiencies are noted above for both pipeline corridors, hardbottoms near the SGC-1-Extension borrow area, and the toe-of-fill at Area #1 and Area #2. Please provide a biological resource survey that maps and characterizes EFH within 1,000 feet of the SGC-1-Extension borrow area, along the pipeline corridor, hardbottom offshore of the Lummus Park borrow area, and within 1,000 feet from the toe-of-fill at Area #1 and Area #2. The survey report should identify survey dates and include full characterizations of each habitat depicted in the maps. These characterizations should focus on the following functional groups: stony corals, octocorals, sponges, macroalgae, and zooanthids. For stony corals, species, density, size distribution (colony diameter and height), and condition (bleaching and disease) should be documented. For octocorals, species, density, and size distribution (colony height) should be documented. In the absence of this information, NMFS is unable to determine that impacts to corals, coral reefs, and hardbottoms have been prevented to the maximum extent possible.
2. Views of recognized experts on the habitat or species that may be affected. This information is not included in the Draft EA.
3. Review of pertinent literature and related information. A complete review is not included in the Draft EA. References that can assist the Jacksonville District characterize EFH in the project area (e.g., Waddell and Clarke 2008; SAFMC 2009) and potential effects to EFH (e.g., Lindeman and Snyder 1999; Jordan et al. 2010) should be included in the Final EA.
4. An analysis of alternatives to the proposed action. Least environmentally damaging practical alternatives should be evaluated, including alternatives that eliminate the need to dredge offshore.

EFH Conservation Recommendations

NMFS provided four EFH conservation recommendations. Each recommendation is listed below followed by the Jacksonville District's response and our evaluation of the completeness of the response.

NMFS recommendation: A comprehensive mitigation plan shall be designed and coordinated with NMFS, to require 1(a): Best management practices to minimize degradation of water quality.

Jacksonville District response: The District indicates it will comply with the requirements put forth by the State of Florida in its water quality certification. The District also indicates it will abide by requirements set forth by the NMFS Protected Resources Division in its Biological Opinion dated October 21, 2009.

NMFS evaluation of completeness: The District has provided a complete response to this component of the EFH conservation recommendation.

NMFS recommendation 1(b) A plan for monitoring the pipeline for leaks and response actions to any leaks detected.

Jacksonville District response: The District indicates it will comply with the pipeline monitoring requirements set forth by the NMFS Protected Resources Division in its Biological Opinion dated October 21, 2009, as discussed in the "Physical and Biological Monitoring Program for Dade County Beach Sustainability Project," prepared by Miami-Dade County Department of Environmental Resources Management (DERM).
NMFS evaluation of completeness: Reasonable and prudent measure #2 of the Biological Opinion states that the District "must ensure the pipeline is monitored so any malfunction is detected." Visual surveys of habitats adjacent to the operational box and pipeline are described in "Physical and Biological Monitoring Program for Dade County Beach Sustainability Project" (page 6 of 23). Specifically, the plan describes how surveys will be conducted during construction to the greatest extent possible to enhance the chance of detecting leaks. NMFS concludes that this item is complete.

NMFS recommendation 1(c) A plan for monitoring coral, coral reef, and hardbottom habitat within the area of the offshore borrow area SGC-1-Extension and pipeline corridors to include pre-construction, during, and post-construction biological monitoring of the coral resources within the direct and indirect impact areas
Jacksonville District response: The District indicates it will comply with the borrow area monitoring requirements set forth by the NMFS Protected Resources Division in its Biological Opinion dated October 21, 2009, and the "Physical and Biological Monitoring Program for Dade County Beach Sustainability Project" prepared by DERM.
NMFS evaluation of completeness: NMFS reviewed the plan prepared by DERM, and we agree that the monitoring plan is sufficient. We request that the all biological monitoring reports be submitted to NMFS electronically at: nmfs.ser.monitoringreportshc@noaa.gov

NMFS recommendation 1(d) A plan of corrective actions to be undertaken during dredging should monitoring indicate that coral areas are being impacted by sedimentation, burial, direct physical damage, or shading from construction activities.
Jacksonville District response: The District indicates it will comply with the requirements set forth by the NMFS Protected Resources Division in its Biological Opinion dated October 21, 2009, and the "Physical and Biological Monitoring Program for Dade County Beach Sustainability Project" prepared by DERM. Impacts to corals and subsequent mitigation considerations are outlined in the "Mitigation Plan for Placement of a Dredge Pipeline on Hardground Areas in Association with Construction of Contract E Beach Nourishment in Miami Beach, Florida" prepared by DERM.
NMFS evaluation of completeness: Corrective actions are described for Acropoids and resources adjacent to the pipeline corridor. However, while notification procedures are described for when coral stress and sedimentation violations are detected near the Lummus Park Excavation Area and the SGC-Extension Borrow Area, corrective actions triggered by these violations are not identified. In addition, corrective actions have not been identified to address physical damage to corals or shading during dredging activities. NMFS cannot conclude that this item is complete.

NMFS recommendation 1(e) Recording and post-construction evaluation of dredge anchor placement impacts on coral, coral reef, and hardbottom habitat;
Jacksonville District response: No dredge anchoring is proposed.
NMFS evaluation of completeness: This item is complete.

NMFS recommendation 1(f) A compensatory mitigation plan that describes how unavoidable impacts to coral and hardbottom habitat shall be offset from construction activities and the equilibrium toe-of-fill.
Jacksonville District response: The District will include a final mitigation plan as prepared by DERM in the Final EA that addresses impacts to hardbottom and coral habitats.
NMFS evaluation of completeness: The mitigation plan states that in-kind mitigation will be completed and a list of conceptual mitigation options is described. The plan also described coral relocation outside the impact areas as mitigation, whereas NMFS considers this to be impact minimization. A mitigation plan has not been provided, however it appears that there may be a schedule for finalizing that plan at a later date. In the absence of the mitigation plan that reflects NMFS review and approval, NMFS cannot conclude that this item is complete.

NMFS recommendation 1(g) Objectives of the mitigation, performance standards, monitoring protocols and schedule, and a functional assessment that describes how mitigation amounts offset the resource impacts.
Jacksonville District response: The District indicates it will include a final mitigation plan as prepared by DERM in the Final EA that addresses impacts to hardbottom and coral habitats.
NMFS evaluation of completeness: The plan describes that a 1:1 ratio would be applied, whereas NMFS recommended application of a functional assessment. Performance standards, monitoring protocols, and a schedule have not provided. Because of these absences, NMFS cannot conclude that this item is complete.

NMFS recommendation 2: A plan to relocate all stony corals larger than 10 cm diameter and any soft corals taller than 15 cm in height within areas affected by the project. A minimum 400-foot buffer shall be maintained between dredging activities and hardbottom and coral reef habitats.
Jacksonville District response: The District indicates it will relocate any Acroporid corals from the pipeline corridor as required by the NMFS Protected Resources Division in its Biological Opinion dated October 21, 2009. Impacts to corals within the established pipeline corridor and associated mitigation methods can be found in “Mitigation Plan for Placement of a Dredge Pipeline on Hardground Areas in Association with Construction of Contract E Beach Nourishment in Miami Beach, Florida” prepared by DERM.
NMFS evaluation of completeness: The coral relocation activities are not described in the Mitigation Plan, they are described in the “Physical and Biological Monitoring Program for Dade County Beach Sustainability Project,” (page 3 of 23). Specifically for coral relocation, the plan provides that after the pipeline corridor is marked, and qualified biologists will survey the 15-meter (~50-foot) width of the corridor. The District indicates that hard (stony) corals within the corridor will be relocated prior to pipeline placement based on the criteria below.

a. *Acropora cervicornis* colonies greater than 10cm in diameter found within the corridor width will be relocated. *Acropora palmata* colonies were not observed in this area during previous survey efforts. However, if *A. palmata* is found, they will be relocated based on the same protocols as *A. cervicornis*. The transplantation protocols will follow those outlined in *Appendix A: Acropora cervicornis Transplantation Protocols for Miami-Dade County Beach Renourishment Project—Contract “E”* of the National Marine Fisheries Service’s (NMFS) biological opinion dated October 21, 2009, with the following modifications:

1) Colonies will be relocated a minimum of 50m (~150') from the pipeline corridor in a similar habitat and depth as shown in Figure 2.
2) If allowable, fragments from the relocated coral colonies will be transferred to *Acropora cervicornis* nurseries within Miami-Dade and/or Broward County. Otherwise, all fragments will be stabilized in locations adjacent to the corridor (as noted in B.1.a.1).

b. Non-Acropora colonies of hard corals will also be relocated if the colony diameter is greater than 25cm and if feasible without causing significant damage to the colony.
    1) Vertically oriented colonies and encrusting colonies greater than 25cm may be left *in-situ* if transplantation will cause excessive damage during the removal process.
    2) Colonies will be relocated a minimum of 50m (~150') from the pipeline corridor in a similar habitat and depth as shown in Figure 1.
    3) Colonies will be dislodged from original location carefully with the use of a hammer and chisel. The colonies will be reattached to a cleaned area of substrate (i.e., sediment and turf algae removed) at the transplant site using a Portland cement mixture.
    4) Colony description and locations will be recorded as specified in Section I.B.4 below.

NMFS concludes <u>this item is incomplete</u> because (1) NMFS recommended all hard corals as small as 10 cm in diameter be relocated (as opposed to 25 cm) and all soft corals taller than 15 cm be relocated (as opposed to no relocation of soft corals), (2) our recommendation for the 400-foot buffer was not addressed, and (3) the District did not provide a substantive response as to why our recommendation would not be met.

NMFS recommendation 3: For the Lummus Park borrow area, the Jacksonville District shall require the contractor to clearly mark the mean high water line (MHWL) and have an independent contractor on-site to continuously monitor and verify that no material is placed waterward of the MHWL in areas prohibited by the permitted construction template.
<u>Jacksonville District response:</u> The District does accept this recommendation because (a) all contractors hired by the Corps work at the direction of the contracting officer and are not "independent" of the Corps and (b) there are no hardbottom resources within 400 feet of the proposed Lummus Park borrow area as documented by the DERM nearshore surveys conducted during March 2010.
<u>NMFS evaluation of completeness:</u> Sediment can travel greater than 400 feet. In addition the district's Regulatory Division required (and the applicant's have agreed to implement) the MHWL staking and monitoring as a permit condition (e.g., Town of Palm Beach, SAJ-2000-00380). <u>NMFS cannot conclude that this item is complete</u>.

NMFS recommendation 4: The Jacksonville District shall prohibit movement of dredge, tugs, or other work vessels over coral reef or hardbottom habitat.
<u>Jacksonville District response:</u> The District does not accept this recommendation since there is no feasible way for the dredge to mine sand in the SGC-Ext borrow area and transit to the pipeline corridor without crossing documented ridge, linear reef, spur and groove, patch reef habitats show in surveys and habitat maps from the Florida Department of Environmental protection (Walker, 2009).

NMFS evaluation of completeness: The maps provided by Walker (2009) are to a 1-acre minimum mapping unit and not of an appropriate spatial scale to identify such corridors, further evaluation is needed. Accordingly, NMFS cannot conclude that this item is complete.

Summary

NMFS does not conclude that the goals of the Magnuson-Stevens Fishery Conservation and Management Act and the regulations for implementing the EFH requirements of the Act will be met for this project. Consistent with the findings between our offices and 50 CFR 600.920 (k)(2), we request the Jacksonville District withhold its final decision on this application until our offices can meet to discuss the action and opportunities for resolving this disagreement. NMFS has insufficient detail to adequately analyze the effects on EFH and our EFH conservation recommendations were not fully addressed. The EFH rules require that, in the case of a response that is inconsistent with NMFS conservation recommendations, the agency must explain its reasons for not following the recommendations, including the scientific rationale for any disagreements with NMFS over the anticipated effects of the proposed action and the measures needed to offset such effects.

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,

Pace Wilber

/ for

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc:

FWS, Jeffrey_Howe@fws.gov
FWCC, Lisa.Gregg@MyFWC.com, Ron.Mezich@MyFWC.com
FDEP, Merrie.Neely@dep.state.fl.us, Vladimir.Kosmynin@dep.state.fl.us
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F/SER4, David.Dale@noaa.gov, Jocelyn.Karazsia@noaa.gov

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

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

REPLY TO
ATTENTION OF

JAN 21 2011

Mr. Pace Wilbur
National Marine Fisheries Service
Southeast Regional Office
Habitat Conservation Division
219 Fort Johnson Road
Charleston, SC 29412-9110

Dear Mr. Wilbur,

This letter is in repsonse to the NMFS letter on Essential Fish Habitat (EFH) for Dade County Contract E dated November 15, 2010 which addressed the Corps response to EFH conservation recomendations. The U.S. Army Corps of Engineers is satisfied that our letter dated November 5, 2010 addressed the EFH recommendations provided by you on February 26, 2010. The Corps is providing the information below as a courtesy to NMFS and will consider this the final response to EFH issues for Contract E.

Responses to Mandatory Components of an EFH Assessment

1. Description of the action. The description of the work is incomplete, for example, there is limited discussion of how sand will be transported from Lummus Park to Area #2. Please provide a location map that depicts the location of the floating pipeline and its proximity to EFH.

Response: There is no discussion of a floating pipeline in the EA. There is mention of how the pipeline will be transferred to the project site, which includes floating sections up to the beach if weather permits. The adequate discussion on how sand will be transferred is discussed in section 2.1.2.1 on page 8 of the EA, which was provided to NMFS.

2. Analysis of the potential adverse effects of the action on EFH and the managed species. This analysis is not included in the Draft EA. Information describing the quantity and quality of EFH is needed for NMFS to make a determination regarding the level of effect to NOAA trust resources.

Response: EFH analysis is found in section 3.6 (page 25) and 4.6 (page 34) of the Environmental A which was provided to NMFS.

3. Proposed mitigation, if applicable. NMFS believes compensatory mitigation is required, and there is no description of compensatory mitigation in the Draft EA.

Response: The Corps stated in section 4.6 (page 34) of the EA that impacts would be minor and not pose long term impacts to EFH, therefore the Corps did not discuss compensatory mitigation. Florida DEP noted in their draft Joint Coastal Permit that "The project is expected to impact approximately 126 square meters (0.031 acre) of coral and hardbottom resources along the pipeline corridor. Mitigation for this quantity of impacts within this pipeline corridor was previously constructed under Permit No 0126527-002-JC. Large coral colonies at risk of impact from the current project will be transplanted prior to construction, so no additional up-front mitigation will be required."

Responses to Additional Information

1. Results of an on-site inspection to evaluate the habitat and the site-specific effects of the project. The Draft EA does not include complete biological resource surveys. Deficiencies are noted above for both pipeline corridors, hardbottom near the SGC-1-Extension borrow area, and the toe-of-fill at Area #1 and Area #2. Please provide a biological resource survey that maps and characterizes EFH within 1,000 feet of the SGC-1-Extension borrow area, along the pipeline corridor, hardbottom offshore of the Lummus Park borrow area, and within 1,000 feet from the toe-of-fill at Area #1 and Area #2. The survey report should identify survey dates and include full characterizations of each habitat depicted in the maps. These characterizations should focus on the following functional groups: stony corals, octocorals, sponges, macroalgae, and zooanthids. For stony corals, species, density, size distribution (colony diameter and height), and condition (bleaching and disease) should be documented. For octocorals, species, density, and size distribution (colony height) should be documented. In the absence of this information, NMFS is unable to determine that impacts to corals, coral reefs, and hardbottom have been prevented to the maximum extent possible.

Response: The nearshore and pipeline corridor surveys are attached. As for the SGC-1-Extension borrow area, the Corps will use a 400- foot buffer to all hardground as indicated in the Biological Opinion, page 34, from NMFS located in Appendix D.

2. Views of recognized experts on the habitat or species that may be affected. This information is not included in the Draft EA.

Response: The Corps does not interview experts as part of the NEPA process, but relies on accepted peer reviewed literature.

3. Review of pertinent literature and related information. A complete review is not included in the Draft EA. References that can assist the Jacksonville District characterize EFH in the project area (e.g., Waddell and Clarke 2008; SAFMC 2009) and potential effects to EFH (e.g., Lindeman and Snyder 1999; Jordan et al. 2010) should be included in the Final EA.

Response: The Corps will add these references to the Final EA, although it does not alter the Corps determination regarding EFH impacts.

4. An analysis of alternatives to the proposed action. Least environmentally damaging practical alternatives should be evaluated, including alternatives that eliminate the need to dredge offshore.

Response: The Corps analyzed the least environmentally damaging practicable alternative under the stipulation set by the memo from the Assistant Secretary of the Army that the Corps utilize all available offshore sand sources in the SGC-1 borrow area. Alternatives were anyalzed through the Section 404(b)1 process (Appendix A of the provided EA) to identify and minimize impacts of dredge material.

Responses to EFH Conservation Recommendations

NMFS recommendation 1(d) A plan of corrective actions to be undertaken during dredging should monitoring indicate that coral areas are being impacted by sedimentation, burial, direct physical damage, or shading from construction activities.

NMFS evaluation of completeness: Corrective actions are described for Acropoids and resources adjacent to the pipeline corridor. However, while notification procedures are described for when coral stress and sedimentation violations are detected near the Lummus Park Excavation Area and the SGC-Extension Borrow Area, corrective actions triggered by these violations are not identified. In addition, corrective actions have not been identified to address physical damage to corals or shading during dredging activities. NMFS cannot conclude that this item is complete.

Response: Nearshore surveys off Lummus Park borrow area (attached) show no hardbottom closer than 535 feet to the shoreline. Per the NMFS Biological Opinion, the Corps will maintain a 400 foot buffer between dredging activities and hardbottom, therefore the Corps does not expect coral stress or sedimentation to resources off of Lummus Park or located near SGC-1-Extension. Regarding corrective actions, page 7, paragraph d. of the draft Physical and Biological Monitoring Program for Dade County Beach Sustainability Project provided previously states that if stress is recorded, dredging operations must move to a new location or discontinue.

NMFS recommendation 1(f) A compensatory mitigation plan that describes how unavoidable impacts to coral and hardbottom habitat shall be offset from construction activities and the equilibrium toe-of-fill.

NMFS evaluation of completeness: The mitigation plan states that in-kind mitigation will be completed and a list of conceptual mitigation options is described. The plan also described coral relocation outside the impact areas as mitigation, whereas NMFS considers this to be impact minimization. A mitigation plan has not been provided, however it appears that there may be a schedule for finalizing that plan at a later date. In the absence of the mitigation plan that reflects NMFS review and approval, NMFS cannot conclude that this item is complete.

Response: The Corps has already provided the Mitigation Plan for placement the pipeline impacts. Again, as per the NMFS Biological Opinion, dredging operations shall maintain a 400 foot buffer from all hardbottom. As there are no hardbottom resources within 400 feet of the placement area, and buffers already in place for SGC-1-Extension, the Corps has determined that mitigation is not required other than the pipeline corridor.

NMFS recommendation 1(g) Objectives of the mitigation, performance standards, monitoring protocols and schedule, and a functional assessment that describes how mitigation amounts offset the resource impacts.
NMFS evaluation of completeness: The plan describes that a 1:1 ratio would be applied, whereas NMFS recommended application of a functional assessment. Performance standards, monitoring protocols, and a schedule have not provided. Because of these absences, NMFS cannot conclude that this item is complete.

Response: The Physical and Biological Monitoring Program for Dade County Beach Sustainability Project provided to NMFS describes monitoring protocols, standards and schedule of monitoring outlined for the expected impacts of the project. Per FDEP draft Joint Coastal Permit, "The project is expected to impact approximately 126 square meters (0.031 acre) of coral and hardbottom resources along the pipeline corridor. Mitigation for this quantity of impacts within this pipeline corridor was previously constructed under Permit No 0126527-002-JC. Large coral colonies at risk of impact from the current project will be transplanted prior to construction, so no additional up-front mitigation will be required."
The impacts will be surveyed after pipeline deployment and impacts will be identified and mitigation will be determined, if any is required.

NMFS recommendation 2: A plan to relocate all stony corals larger than 10 cm diameter and any soft corals taller than 15 cm in height within areas affected by the project. A minimum 400-foot buffer shall be maintained between dredging activities and hardbottom and coral reef habitats.

NMFS concludes this item is incomplete because (1) NMFS recommended all hard corals as small as 10 cm in diameter be relocated (as opposed to 25 cm) and all soft corals taller than 15 cm be relocated (as opposed to no relocation of soft corals), (2) our recommendation for the 400-foot buffer was not addressed, and (3) the District did not provide a substantive response as to why our recommendation would not be met.

Response: (1) The Corps has previously requested that NMFS provide peer reviewed documentation indicating that 10cm is the preferred hard coral size for relocation. The draft DERM Physical and Biological Monitoring Plan provided to NMFS states that corals 25cm and larger, or 20cm tall would be moved from within the pipeline corridor. A conference call between DERM, FDEP, NMFS and the Corps was held to discuss comments to the draft plan was held on November 23rd 2010.

Recommendations from that meeting included reducing the pipeline corridor from 50 feet wide to 25 feet wide, and placing the pipeline on risers to reduce the footprint. Regarding relocation of corals, it was determined that hard corals greater than 20cm high would be relocated from the 25 foot pipeline corridor, and all hard corals larger than 25cm would be relocated from high relief areas where clearance of the pipeline would possibly damage them. Soft corals will not be relocated prior to placement of the pipeline, but those directly damaged/shaded by the pipeline would be relocated or have clipping taken from them. (2) Again, as stated in the EA page 30 section 4.3.1.3 and per the previously provided NMFS Biological Opinion, all dredging activities other than the pipeline corridor, will maintain a 400 foot buffer from hardbottom. (3) The recommendation is not being met for relocation of 10cm corals as the Corps is not aware of any peer reviewed literature supporting this recommendation.

NMFS recommendation 3: For the Lummus Park borrow area, the Jacksonville District shall require the contractor to clearly mark the mean high water line (MHWL) and have an independent contractor on-site to continuously monitor and verify that no material is placed waterward of the MHWL in areas prohibited by the permitted construction template.
NMFS evaluation of completeness: Sediment can travel greater than 400 feet. In addition the district's Regulatory Division required (and the applicant's have agreed to implement) the MHWL staking and monitoring as a permit condition (e.g., Town of Palm Beach, SAJ-2000-00380). NMFS cannot conclude that this item is complete.

Response: The Dade Contract E Shore Protection Project is a standalone civil works project. The Corps stands by its original statement that all contractors hired by the Corps works at the direction of the contracting officer and are not "independent" of the Corps and cannot accept this conservation recommendation as prohibited by Federal Law and Federal Acquisition Regulations (FAR). All contractors must be under the direct supervision of the Corps Contracting Officer.

NMFS recommendation 4: The Jacksonville District shall prohibit movement of dredge, tugs, or other work vessels over coral reef or hardbottom habitat.
NMFS evaluation of completeness: The maps provided by Walker (2009) are to a 1-acre minimum mapping unit and not of an appropriate spatial scale to identify such corridors, further evaluation is needed. Accordingly, NMFS cannot conclude that this item is complete.

Response: The Walker maps were provided to demonstrate the expansiveness of hardbottom, coral habitat, and impracticability of this conservation recommendation. In order to access the borrow site and operational box, dredges must traverse over hardbottom habitat, but will not impact these habitats as no items are being dragged or dropped by the dredge.

This letter concludes the USACE coordination with NMFS concerning Essential Fish Habitat under the Magnuson Stevens Act. The Corps believes it has satisfied the requirements of the Act, and unless NMFS-HCD plans to elevate to the Department of Army Headquarters in accordance with 50 CFR 600.920(j)(2), we consider this consultation concluded.

Sincerely,

Jason Spinning
Chief, Coastal Section

Encl

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

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

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

JUN 25 2009

Barbara Mattick, Ph.D.
State Historic Preservation Officer
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Dr. Mattick:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects associated with the proposed development of off shore borrow areas to be used for Miami-Dade County shore protection re-nourishment projects. Previous consultations have determined that these beach placement activities have no potential to affect historic properties. The Corps and Miami-Dade County have identified the previously used "SGC-Extension" borrow area as a source for a 2010 re-nourishment project. This SGC-Extension borrow area was most recently used by Miami-Dade County in 2005. A small amount of beach quality sand remains in the southern part of the borrow area which is located in Federal waters managed by the Minerals Management Service. The SGC-Extension borrow area was originally surveyed for cultural resources by Gordon Watts of Tidewater Atlantic Research, Inc. (TAR) in 1996. Watts' survey, "*A Magnetometer and Side Scan Survey, Borrow Area Extension Dade County, Florida*" (Survey report #4504, DHR Project File # 960939) identified a barge sunk as an artificial reef and three magnetic/side scan sonar anomalies (KB-2, KB-3, and KB-4) that had signatures similar to potentially significant submerged cultural resources. The proposed 2010 borrow area is well south of these identified resources (see the enclosed map). While this is an older report and modern magnetometers and side-scan sonar's are more sensitive than the ones used in 1996; there is minimal potential that any new potentially significant magnetic or acoustic anomalies would be identified by a new survey. Current survey standards do call for sub-bottom profiling to identify landforms that may contain early prehistoric occupations. Extensive geo-technical investigations by the Corps show that the entire SGC borrow area is a narrow sand trap located between two north/south off shore live reefs. Review of this data by staff archeologist resulted in finding no evidence of relic land forms that would be associated with early prehistoric occupations. Even though the TAR report is old and not to current standards it is sufficient for the Corps to make a determination of no historic properties effected for the dredging of the last part of this existing, previously used borrow area. Based on reevaluation of the past survey report I have made a determination of no historic properties for removing the remaining sand in the SGC-extension borrow area.

I request your concurrence on my no historic properties determination. If there are any questions, please contact Mr. Grady Caulk at 904-232-1786 or e-mail at grady.h.caulk@usace.army.mil.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Enclosure

Copy Furnished:

Melanie J. Stright, Ph.D., Federal Preservation Officer, Minerals Management Service, 381 Elden Street, Herndon, Virginia 20170

RECEIVED
3 Aug 2009

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

July 28, 2009

Mr. Eric Summa
Planning Division, Environmental Branch
Jacksonville USACE
P.O. Box 4970
Jacksonville, Florida 32232-0019

Re: DHR Project File No. 2008-04219 / Received by DHR: June 29, 2009
Miami-Dade County Shore Protection Re-nourishment Project
SGC-Extension Borrow Area

Dear Mr. Summa:

Our office received and reviewed the above referenced undertaking in accordance with Section 106 of the National Historic Preservation and the National Environmental Policy Acts as amended, to assess possible adverse impacts to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places.

Based on the information provided and a review of the Florida Master Site File, the proposed SGC-Extension borrow area was subjected to a remote sensing survey in 1996 (*A Magnetometer and Side Scan Survey, Borrow Area Extension Dade County, Florida)*. No anomalies with signatures suggesting potential for significant cultural resources were encountered within the last part of the proposed borrow area. Our agency concurs with the determinations of the U.S. Army Corps of Engineers that no historic properties will be affected by the dredging in this portion of the existing borrow area.

If you have any questions concerning our comments, please contact Rudy Westerman, Historic Preservationist, by phone at (850) 245-6333, or by electronic mail at rjwesterman@dos.state.fl.us. Your continued interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

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

APPENDIX G – MAILING LIST

Federal Agencies

EPA, Region IV
NEPA Program Office
61 Forsyth Street, SW
Atlanta, Georgia 30303

Ron Meidema
EPA South Florida Office
400 N Congressional Ave
West Palm Beach, FL 33401

Field Supervisor
US Fish & Wildlife Service
1339 20th St
Vero Beach, FL 329603559

***NMFS* – SERO**
Office of the Regional Director
263 13th Avenue South
St. Petersburg, FL 33701

Miles Croom
Asst. Regional Administrator
NMFS-SERO-HCD
263 13th Avenue South
St. Petersburg, FL 33701

David Bernhart
Acting Asst. Regional Administrator
NMFS-SERO-PRB
263 13th Avenue South
St. Petersburg, FL 33701

Pace Wilbur
NMFS-HCD
219 Fort Johnson Rd
Charleston, SC 294129110

Jocelyn Karazsia
NMFS-HCD Miami Area Office
400 North Congress Avenue
West Palm Beach, FL 33401

Commander (OAN) Seventh Coast Guard District
909 SE 1st Ave
Miami, FL 331313050

State Agencies

Lauren Milligan
FLDEP State Clearinghouse
3900 Commonwealth Blvd
Tallahassee, FL 32399 3000

Director
FLDEP - Beaches & Coastal Systems
3900 Commonwealth Blvd
Tallahassee, FL 32399 3000

Joanna C. Walczak, M.S.
Florida Department of Environmental Protection
Biscayne Bay Environmental Center
1277 NE 79th Street Causeway
Miami, Florida 33138
Phone: 305-795-2111

Dr Janet Matthews
Div of Historical Resources - SHPO
500 South Bronough St
Tallahassee, FL 32399 0250

Brian Barnett
Director Florida Fish & Wildlife
Conservation Commission
620 S Meridian St
Tallahassee, FL 32399 1600

FLDEP - South Florida District
PO Box 15425
West Palm Beach, FL 33416 5425

City/County Agencies

Brian Flynn
Miami-Dade DERM
33 SW 2nd Ave
Miami, FL 331301540

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

Mayor, City of Key Biscayne
85 West Macintyre
Key Biscayne, FL 33149

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

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

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

Miami Beach
Environmental Resources Management Division
Public Works Department
1700 Convention Center Drive
Miami Beach, FL 22139

Private Groups or Individuals

Dr. Mark Kraus
Audubon of Florida
444 Brickell Ave
Miami, FL 33131

Caribbean Conservation Corp
PO Box 2866
Gainsville, FL 32602

Reefkeeper International
2809 Bird Ave
PMB 162
Miami, FL 33133

Director, Tropical Audubon Society
5530 Sunset Drive
Miami, FL 33143

APPENDIX H – COMMENTS ON THE DRAFT EA

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Washington, DC 20240

Mr. Eric Summa
U.S. Army Corps of Engineers, Jacksonville District
Planning Division, Environmental Branch
P.O. Box 4970
Jacksonville, Florida 32232-0019

MAR 0 1 2010

Dear Mr. Summa:

The Minerals Management Service (MMS) appreciates the opportunity to review and provide comments on the draft Environmental Assessment (EA) for the U.S. Army Corps of Engineers' Beach Erosion Control and Hurricane Protection Project, Contract E, Miami-Dade County, Florida. Please find our comments on the draft EA enclosed.

If you have any questions, please contact Geoffrey Wikel at (703) 787-1283 or by e-mail at Geoffrey.Wikel@mms.gov.

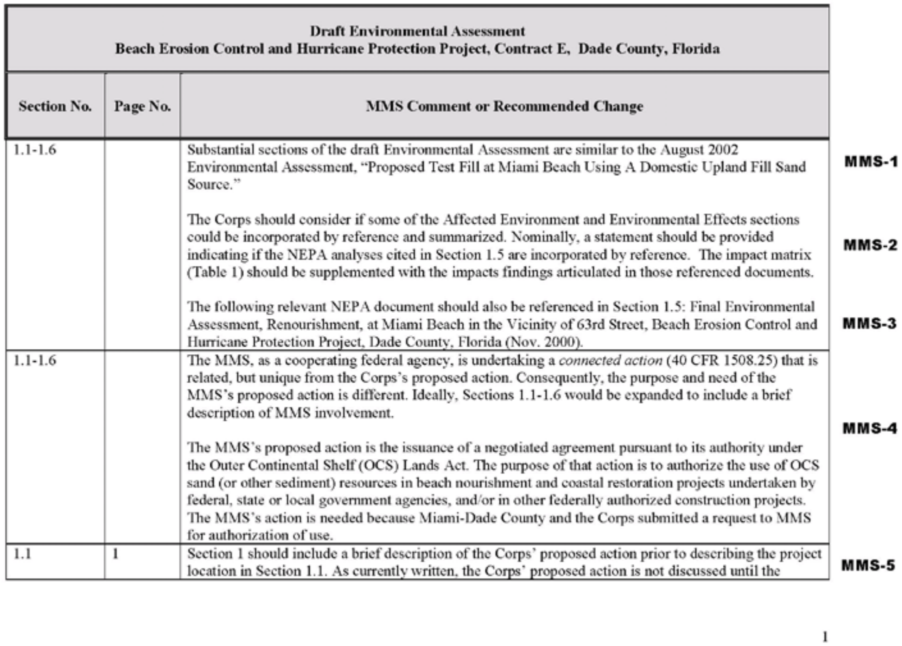
Sincerely,

James F. Bennett
Chief, Branch of Environmental Assessment

Enclosure

cc: Terri Jordan, Corps-SAJ
Patrick Griffin, Corps-SAJ

TAKE PRIDE IN AMERICA



Draft Environmental Assessment
Beach Erosion Control and Hurricane Protection Project, Contract E, Dade County, Florida

Section No.	Page No.	MMS Comment or Recommended Change	
1.1-1.6		Substantial sections of the draft Environmental Assessment are similar to the August 2002 Environmental Assessment, "Proposed Test Fill at Miami Beach Using A Domestic Upland Fill Sand Source." The Corps should consider if some of the Affected Environment and Environmental Effects sections could be incorporated by reference and summarized. Nominally, a statement should be provided indicating if the NEPA analyses cited in Section 1.5 are incorporated by reference. The impact matrix (Table 1) should be supplemented with the impacts findings articulated in those referenced documents. The following relevant NEPA document should also be referenced in Section 1.5: Final Environmental Assessment, Renourishment, at Miami Beach in the Vicinity of 63rd Street, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida (Nov. 2000).	**MMS-1** **MMS-2** **MMS-3**
1.1-1.6		The MMS, as a cooperating federal agency, is undertaking a *connected action* (40 CFR 1508.25) that is related, but unique from the Corps's proposed action. Consequently, the purpose and need of the MMS's proposed action is different. Ideally, Sections 1.1-1.6 would be expanded to include a brief description of MMS involvement. The MMS's proposed action is the issuance of a negotiated agreement pursuant to its authority under the Outer Continental Shelf (OCS) Lands Act. The purpose of that action is to authorize the use of OCS sand (or other sediment) resources in beach nourishment and coastal restoration projects undertaken by federal, state or local government agencies, and/or in other federally authorized construction projects. The MMS's action is needed because Miami-Dade County and the Corps submitted a request to MMS for authorization of use.	**MMS-4**
1.1	1	Section 1 should include a brief description of the Corps' proposed action prior to describing the project location in Section 1.1. As currently written, the Corps' proposed action is not discussed until the	**MMS-5**

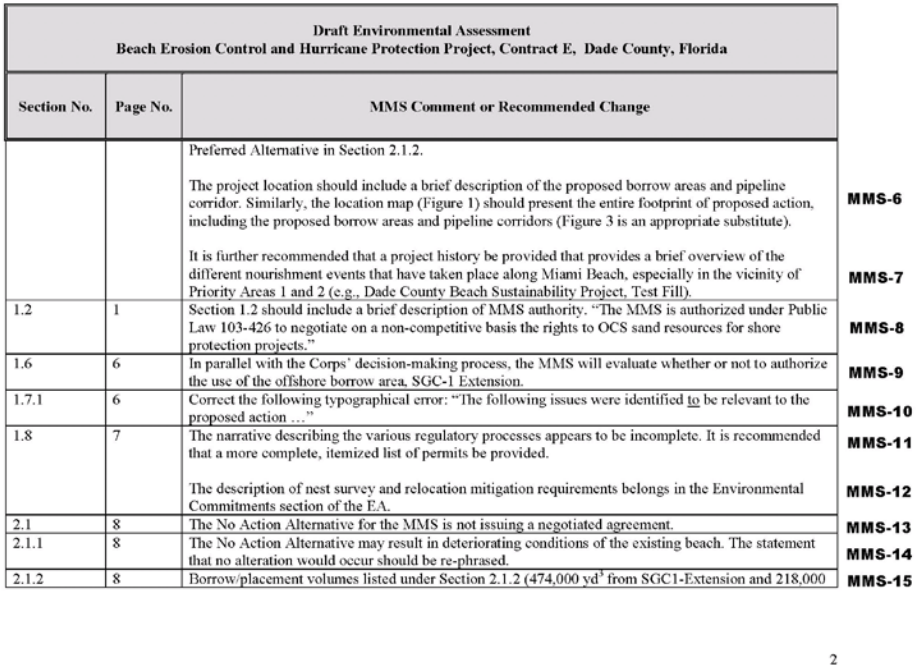
Response MMS-1
Comment noted.

Response MMS-2
The references cited in Section 1.5 of the 2002 EA was incorporated by reference. Any additional findings from these documents were added to Table 1, if appropriate.

Response MMS-3
The reference was added.

Response MMS-4
The text was added.

Response MMS-5
The document is consistent with the format used by the Jacksonville District, USACE.



Draft Environmental Assessment
Beach Erosion Control and Hurricane Protection Project, Contract E, Dade County, Florida

Section No.	Page No.	MMS Comment or Recommended Change	
		Preferred Alternative in Section 2.1.2. The project location should include a brief description of the proposed borrow areas and pipeline corridor. Similarly, the location map (Figure 1) should present the entire footprint of proposed action, including the proposed borrow areas and pipeline corridors (Figure 3 is an appropriate substitute). It is further recommended that a project history be provided that provides a brief overview of the different nourishment events that have taken place along Miami Beach, especially in the vicinity of Priority Areas 1 and 2 (e.g., Dade County Beach Sustainability Project, Test Fill).	**MMS-6** **MMS-7**
1.2	1	Section 1.2 should include a brief description of MMS authority. "The MMS is authorized under Public Law 103-426 to negotiate on a non-competitive basis the rights to OCS sand resources for shore protection projects."	**MMS-8**
1.6	6	In parallel with the Corps' decision-making process, the MMS will evaluate whether or not to authorize the use of the offshore borrow area, SGC-1 Extension.	**MMS-9**
1.7.1	6	Correct the following typographical error: "The following issues were identified <u>to</u> be relevant to the proposed action …"	**MMS-10**
1.8	7	The narrative describing the various regulatory processes appears to be incomplete. It is recommended that a more complete, itemized list of permits be provided. The description of nest survey and relocation mitigation requirements belongs in the Environmental Commitments section of the EA.	**MMS-11** **MMS-12**
2.1	8	The No Action Alternative for the MMS is not issuing a negotiated agreement.	**MMS-13**
2.1.1	8	The No Action Alternative may result in deteriorating conditions of the existing beach. The statement that no alteration would occur should be re-phrased.	**MMS-14**
2.1.2	8	Borrow/placement volumes listed under Section 2.1.2 (474,000 yd^3 from SGC1-Extension and 218,000	**MMS-15**

Response MMS-6
Additional text describing the borrow areas and pipeline were included and the pipeline corridor was included.

Response MMS-7
Text describing the history of nourishment was included in Section 1.3.

Response MMS-8
Section 1.2 should include a brief description of MMS authority. "The MMS is authorized under Public Law 103-426 to negotiate on a non-competitive basis the rights to OCS sand resources for shore protection projects."

Response MMS-9
The text was included.

Response MMS-10
The text was included.

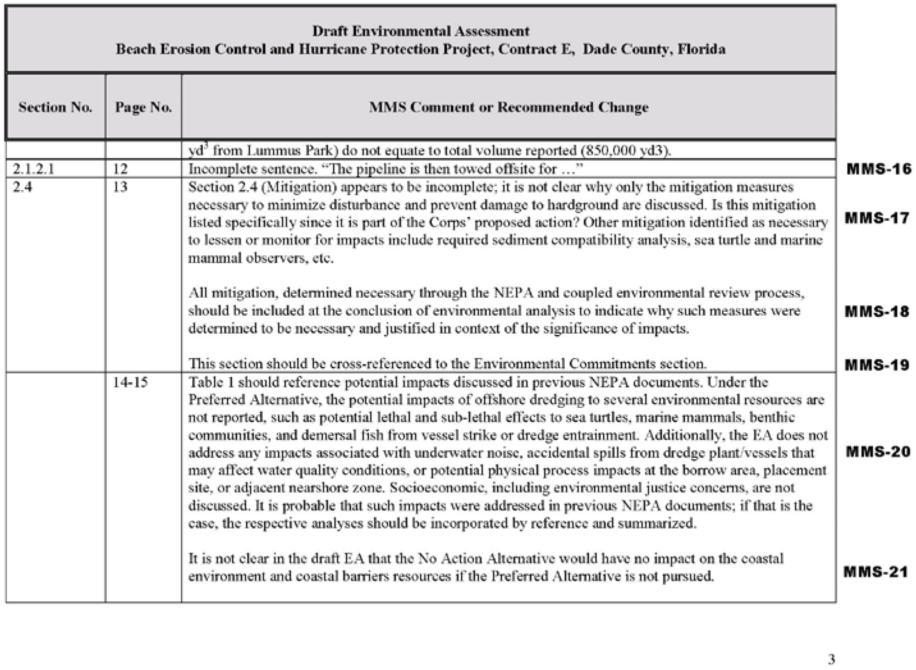
Response MMS-11
The information is complete as provided.

Response MMS-12
The information was added to the Environmental Commitments section, as well.

Response MMS-13
Changed the text. "Under the No Action Alternative, the Corps would not place any material on the beach to offset the shoreline erosion that has occurred in the area and MMS would not issue a negotiated agreement for use of sand from the offshore borrow area. The shoreline would continue to erode, threatening habitable structures, shoreline vegetation, and nesting habitat for sea turtles."

Response MMS-14
See above.
.

Response MMS-15
The numbers were adjusted accordingly.



Draft Environmental Assessment
Beach Erosion Control and Hurricane Protection Project, Contract E, Dade County, Florida

Section No.	Page No.	MMS Comment or Recommended Change	
		yd^3 from Lummus Park) do not equate to total volume reported (850,000 yd3).	
2.1.2.1	12	Incomplete sentence. "The pipeline is then towed offsite for …"	**MMS-16**
2.4	13	Section 2.4 (Mitigation) appears to be incomplete; it is not clear why only the mitigation measures necessary to minimize disturbance and prevent damage to hardground are discussed. Is this mitigation listed specifically since it is part of the Corps' proposed action? Other mitigation identified as necessary to lessen or monitor for impacts include required sediment compatibility analysis, sea turtle and marine mammal observers, etc. All mitigation, determined necessary through the NEPA and coupled environmental review process, should be included at the conclusion of environmental analysis to indicate why such measures were determined to be necessary and justified in context of the significance of impacts. This section should be cross-referenced to the Environmental Commitments section.	**MMS-17** **MMS-18** **MMS-19**
	14-15	Table 1 should reference potential impacts discussed in previous NEPA documents. Under the Preferred Alternative, the potential impacts of offshore dredging to several environmental resources are not reported, such as potential lethal and sub-lethal effects to sea turtles, marine mammals, benthic communities, and demersal fish from vessel strike or dredge entrainment. Additionally, the EA does not address any impacts associated with underwater noise, accidental spills from dredge plant/vessels that may affect water quality conditions, or potential physical process impacts at the borrow area, placement site, or adjacent nearshore zone. Socioeconomic, including environmental justice concerns, are not discussed. It is probable that such impacts were addressed in previous NEPA documents; if that is the case, the respective analyses should be incorporated by reference and summarized. It is not clear in the draft EA that the No Action Alternative would have no impact on the coastal environment and coastal barriers resources if the Preferred Alternative is not pursued.	**MMS-20** **MMS-21**

Response MMS-16
The sentence was corrected.

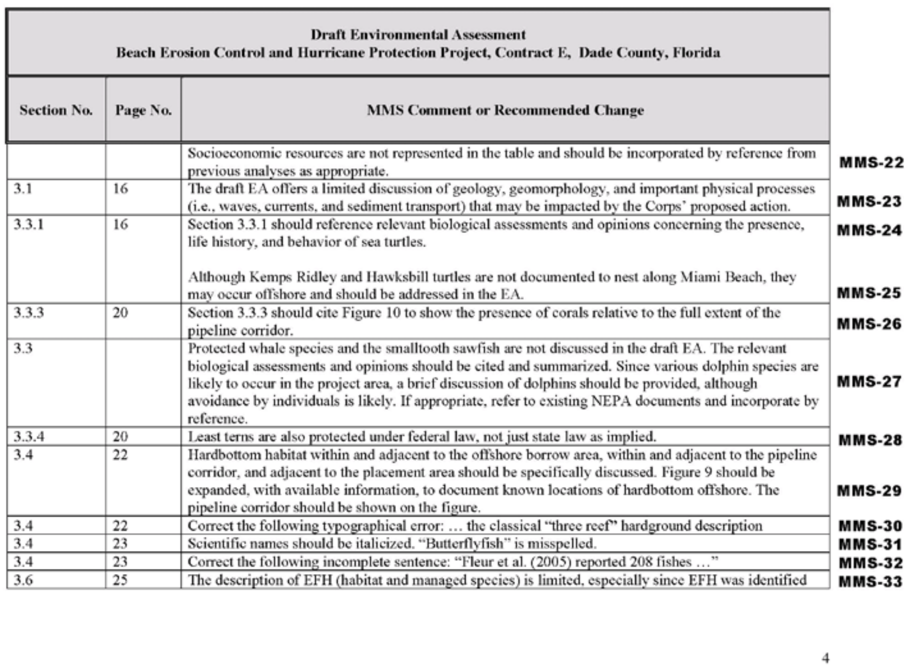
Response MMS-17
The mitigation was not available at the time the DEA was released. The full measures were added to text.

Response MMS-18
See above

Response MMS-19
Agreed.

Response MMS-20
Information regarding underwater noise impacts from dredging activities.

Response MMS-21
Text was added to show effects of No Action on coastal resources.



Draft Environmental Assessment
Beach Erosion Control and Hurricane Protection Project, Contract E, Dade County, Florida

Section No.	Page No.	MMS Comment or Recommended Change	
		Socioeconomic resources are not represented in the table and should be incorporated by reference from previous analyses as appropriate.	**MMS-22**
3.1	16	The draft EA offers a limited discussion of geology, geomorphology, and important physical processes (i.e., waves, currents, and sediment transport) that may be impacted by the Corps' proposed action.	**MMS-23**
3.3.1	16	Section 3.3.1 should reference relevant biological assessments and opinions concerning the presence, life history, and behavior of sea turtles. Although Kemps Ridley and Hawksbill turtles are not documented to nest along Miami Beach, they may occur offshore and should be addressed in the EA.	**MMS-24** **MMS-25**
3.3.3	20	Section 3.3.3 should cite Figure 10 to show the presence of corals relative to the full extent of the pipeline corridor.	**MMS-26**
3.3		Protected whale species and the smalltooth sawfish are not discussed in the draft EA. The relevant biological assessments and opinions should be cited and summarized. Since various dolphin species are likely to occur in the project area, a brief discussion of dolphins should be provided, although avoidance by individuals is likely. If appropriate, refer to existing NEPA documents and incorporate by reference.	**MMS-27**
3.3.4	20	Least terns are also protected under federal law, not just state law as implied.	**MMS-28**
3.4	22	Hardbottom habitat within and adjacent to the offshore borrow area, within and adjacent to the pipeline corridor, and adjacent to the placement area should be specifically discussed. Figure 9 should be expanded, with available information, to document known locations of hardbottom offshore. The pipeline corridor should be shown on the figure.	**MMS-29**
3.4	22	Correct the following typographical error: … the classical "three reef" hardground description	**MMS-30**
3.4	23	Scientific names should be italicized. "Butterflyfish" is misspelled.	**MMS-31**
3.4	23	Correct the following incomplete sentence: "Fleur et al. (2005) reported 208 fishes …"	**MMS-32**
3.6	25	The description of EFH (habitat and managed species) is limited, especially since EFH was identified	**MMS-33**

Response MMS-22
Socioeconomic resources were added to summary table.

Response MMS-23
This information was added to the text.

Response MMS-24
Additional referenceswere cited.

Response MMS-25
Appropriate information regarding Kemps Ridley and Hawksbill turtles is in the Final EA.

Response MMS-26
Figure was moved to this section and referenced.

Response MMS-27
Whale species, smalltooth sawfish, and dolphin species were added.

Response MMS-28
Comment noted and correction was made..

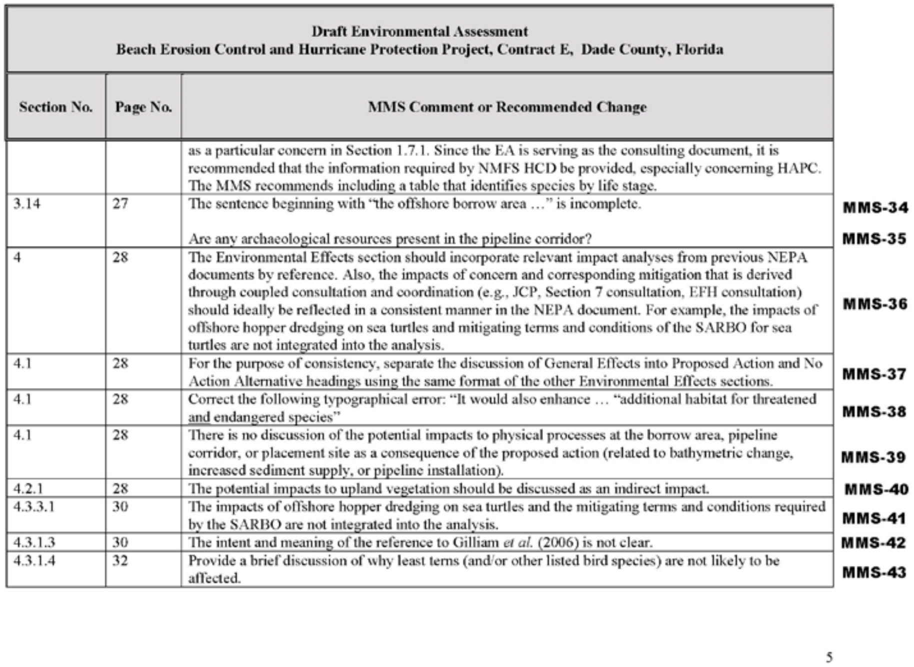
Response MMS-29
Discussed site specific hardbottom habitat. Figure 9 can not be expanded, and pipeline corridor can only be approximately placed on the figure. It would provide no real information.

Response MMS-30
Sentence was corrected.

Response MMS-31
Corrections were made.

Response MMS-32
Correction was made.

Response MMS-33
Included additional EFH information.



Draft Environmental Assessment
Beach Erosion Control and Hurricane Protection Project, Contract E, Dade County, Florida

Section No.	Page No.	MMS Comment or Recommended Change	
		as a particular concern in Section 1.7.1. Since the EA is serving as the consulting document, it is recommended that the information required by NMFS HCD be provided, especially concerning HAPC. The MMS recommends including a table that identifies species by life stage.	
3.14	27	The sentence beginning with "the offshore borrow area …" is incomplete. Are any archaeological resources present in the pipeline corridor?	**MMS-34** **MMS-35**
4	28	The Environmental Effects section should incorporate relevant impact analyses from previous NEPA documents by reference. Also, the impacts of concern and corresponding mitigation that is derived through coupled consultation and coordination (e.g., JCP, Section 7 consultation, EFH consultation) should ideally be reflected in a consistent manner in the NEPA document. For example, the impacts of offshore hopper dredging on sea turtles and mitigating terms and conditions of the SARBO for sea turtles are not integrated into the analysis.	**MMS-36**
4.1	28	For the purpose of consistency, separate the discussion of General Effects into Proposed Action and No Action Alternative headings using the same format of the other Environmental Effects sections.	**MMS-37**
4.1	28	Correct the following typographical error: "It would also enhance … "additional habitat for threatened and endangered species"	**MMS-38**
4.1	28	There is no discussion of the potential impacts to physical processes at the borrow area, pipeline corridor, or placement site as a consequence of the proposed action (related to bathymetric change, increased sediment supply, or pipeline installation).	**MMS-39**
4.2.1	28	The potential impacts to upland vegetation should be discussed as an indirect impact.	**MMS-40**
4.3.3.1	30	The impacts of offshore hopper dredging on sea turtles and the mitigating terms and conditions required by the SARBO are not integrated into the analysis.	**MMS-41**
4.3.1.3	30	The intent and meaning of the reference to Gilliam *et al.* (2006) is not clear.	**MMS-42**
4.3.1.4	32	Provide a brief discussion of why least terns (and/or other listed bird species) are not likely to be affected.	**MMS-43**

5

Response MMS-34
The sentence has been corrected.

Response MMS-35
The pipeline corridor has previously been used and has SHPO clearance.

Response MMS-36
Noted by reference SARBO for sea turtles.

Response MMS-37
Agreed.

Response MMS-38
Correction has been made.

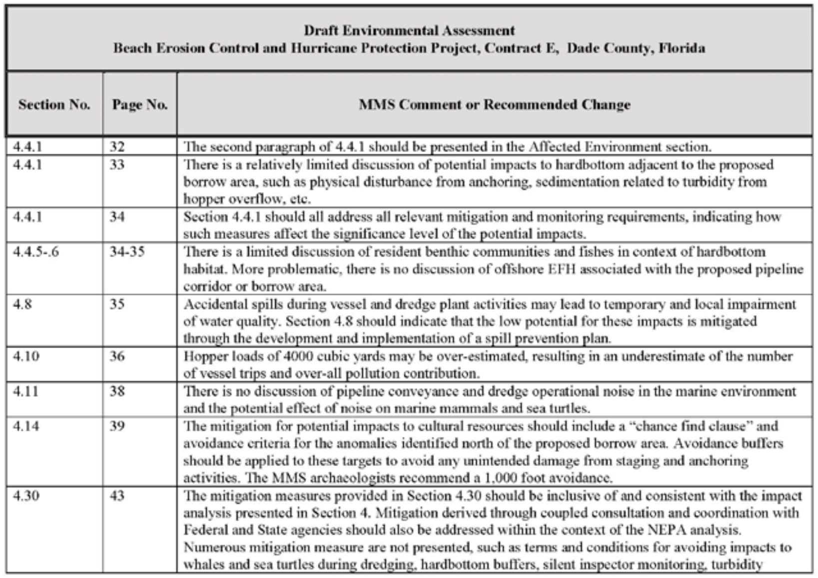
Response MMS-39
The discussion was added to the text.

Response MMS-40
The potential impacts to upland vegetation was referred to as an indirect impact.

Response MMS-41
The impacts of offshore hopper dredging on sea turtles and the mitigating terms and conditions required by the SARBO were integrated into the analysis.

Response MMS-42
The reference was clarified.

Response MMS-43
The discussion was added..



Draft Environmental Assessment
Beach Erosion Control and Hurricane Protection Project, Contract E, Dade County, Florida

Section No.	Page No.	MMS Comment or Recommended Change	
4.4.1	32	The second paragraph of 4.4.1 should be presented in the Affected Environment section.	**MMS-44**
4.4.1	33	There is a relatively limited discussion of potential impacts to hardbottom adjacent to the proposed borrow area, such as physical disturbance from anchoring, sedimentation related to turbidity from hopper overflow, etc.	**MMS-45**
4.4.1	34	Section 4.4.1 should all address all relevant mitigation and monitoring requirements, indicating how such measures affect the significance level of the potential impacts.	**MMS-46**
4.4.5-.6	34-35	There is a limited discussion of resident benthic communities and fishes in context of hardbottom habitat. More problematic, there is no discussion of offshore EFH associated with the proposed pipeline corridor or borrow area.	**MMS-47**
4.8	35	Accidental spills during vessel and dredge plant activities may lead to temporary and local impairment of water quality. Section 4.8 should indicate that the low potential for these impacts is mitigated through the development and implementation of a spill prevention plan.	**MMS-48**
4.10	36	Hopper loads of 4000 cubic yards may be over-estimated, resulting in an underestimate of the number of vessel trips and over-all pollution contribution.	**MMS-49**
4.11	38	There is no discussion of pipeline conveyance and dredge operational noise in the marine environment and the potential effect of noise on marine mammals and sea turtles.	**MMS-50**
4.14	39	The mitigation for potential impacts to cultural resources should include a "chance find clause" and avoidance criteria for the anomalies identified north of the proposed borrow area. Avoidance buffers should be applied to these targets to avoid any unintended damage from staging and anchoring activities. The MMS archaeologists recommend a 1,000 foot avoidance.	**MMS-51**
4.30	43	The mitigation measures provided in Section 4.30 should be inclusive of and consistent with the impact analysis presented in Section 4. Mitigation derived through coupled consultation and coordination with Federal and State agencies should also be addressed within the context of the NEPA analysis. Numerous mitigation measure are not presented, such as terms and conditions for avoiding impacts to whales and sea turtles during dredging, hardbottom buffers, silent inspector monitoring, turbidity	**MMS-52**

Response MMS-44Do not agree. Text was not changed.

Response MMS-45
Discussion is consistent with previous Corps documents.

Response MMS-46
Mitigation measures were included upon the receipt of the mitigation plan from the local sponsor.

Response MMS-47
Additional text was added.

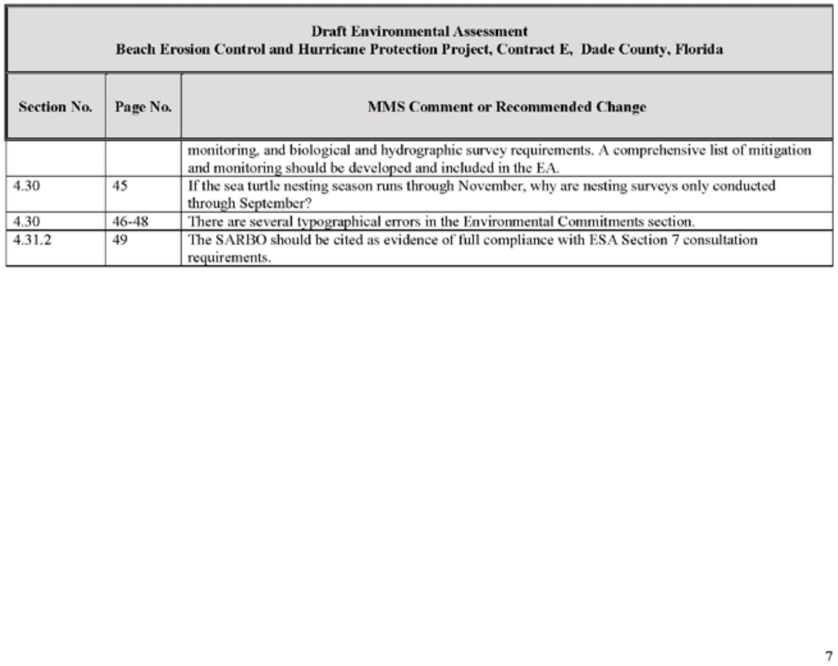
Response MMS-48
Accidental spills during vessel and dredge plant activities are addressed in the Corps' standard bid documents and was included in the text.

Response MMS-49
Disagree.

Response MMS-50
Added noise effects text.

Response MMS-51
The Corps has standard "unanticipated discovery" language in the plans and specifications that requires a contractor to cease all activities when an item is discovered. At that time, the Corps' archeological specialist, in consultation with the State SHPO and BOEM will determine the nature of the potential resource and set an appropriate buffer.

Response MMS-52
Mitigation measures were included upon the receipt of the mitigation plan from the local sponsor.



Draft Environmental Assessment
Beach Erosion Control and Hurricane Protection Project, Contract E, Dade County, Florida

Section No.	Page No.	MMS Comment or Recommended Change	
		monitoring, and biological and hydrographic survey requirements. A comprehensive list of mitigation and monitoring should be developed and included in the EA.	
4.30	45	If the sea turtle nesting season runs through November, why are nesting surveys only conducted through September?	**MMS-53**
4.30	46-48	There are several typographical errors in the Environmental Commitments section.	**MMS-54**
4.31.2	49	The SARBO should be cited as evidence of full compliance with ESA Section 7 consultation requirements.	**MMS-55**

Response MMS-53
Nesting surveys will be conducted according to resource agency requirements.

Response MMS-54
The text was corrected.

Response MMS- 55
The SARBO was cited as evidence of full compliance with ESA Section 7 consultation requirements.

COUNTY: MIAMI-DADE
SCH - CORPS - 106/NEPA

DATE: 12/29/2009
COMMENTS DUE DATE: 2/11/2010
CLEARANCE DUE DATE: 2/26/2010
SAI#: FL201001045076C

MESSAGE: 2010-232

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

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

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

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

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

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

Project Description:

DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - DRAFT ENVIRONMENTAL ASSESSMENT, BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT, DADE COUNTY CONTRACT E - MIAMI BEACH, MIAMI-DADE COUNTY, FLORIDA.

To: Florida State Clearinghouse

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

EO. 12372/NEPA

☑ No Comment
☐ Comment Attached
☐ Not Applicable

Federal Consistency

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

From:

Division/Bureau: Historical Resources

Reviewer: Michael Hart   Laura A. Kammerer
Deputy SHPO

Date: 2/4/10   2.4. 2010

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

January 7, 2010

Eric P. Summa, Chief
Planning Division - Environmental Branch
Jacksonville District
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Subject: **EPA's Review Comments on the Draft Environmental Assessment (EA) Beach Erosion Control and Hurricane Protection Project Dade County, FL Contract E: Beach Renourishment Project**

Dear Mr. Summa:

Pursuant to Section 309 of the Clean Air Act (CAA) and Section 102(2)(C) of the National Environmental Policy Act (NEPA), the U.S. Environmental Protection Agency (EPA) Region 4 has reviewed the U. S. Army Corps of Engineers' (Corps) Draft Environmental Assessment (EA) Beach Erosion Control and Hurricane Protection Project Dade County, FL, Contract E: Beach Renourishment Project.

This Draft EA notes that the Miami-Dade County shoreline extends along two long peninsular barrier island segments and three smaller islands, each of which is separated from the mainland by Biscayne Bay. Miami is located on the mainland, and a number of coastal communities are located along the barrier islands, which vary in width from about 0.2 to 1.5 miles. The Beach Erosion Control and Hurricane Protection (BEC) Project for Dade County, Florida was authorized by the Flood Control Act of 1968. Minerals Management Service (MMS), Department of the Interior (DOI) will reportedly serve as a cooperating agency under NEPA, with the Corps of Engineers as the lead agency due to the use of an offshore borrow area located in federal waters (greater than three miles offshore) referred to as "South of Government Cut – Extension" (SGC1-Extension).

The project has been proposed to restore two severely eroded "hotspots" (priority areas) along the Miami-Dade beaches. Priority Area #1 is located in northern Miami Beach, from 90th street to 63rd street, consisting of approximately 8,500 feet of beach. Priority Area #2 is located from approximately 57th street to 45th street, consisting of approximately 1,800 feet and from approximately 29th street to 26th street, approximately 1,000 feet.

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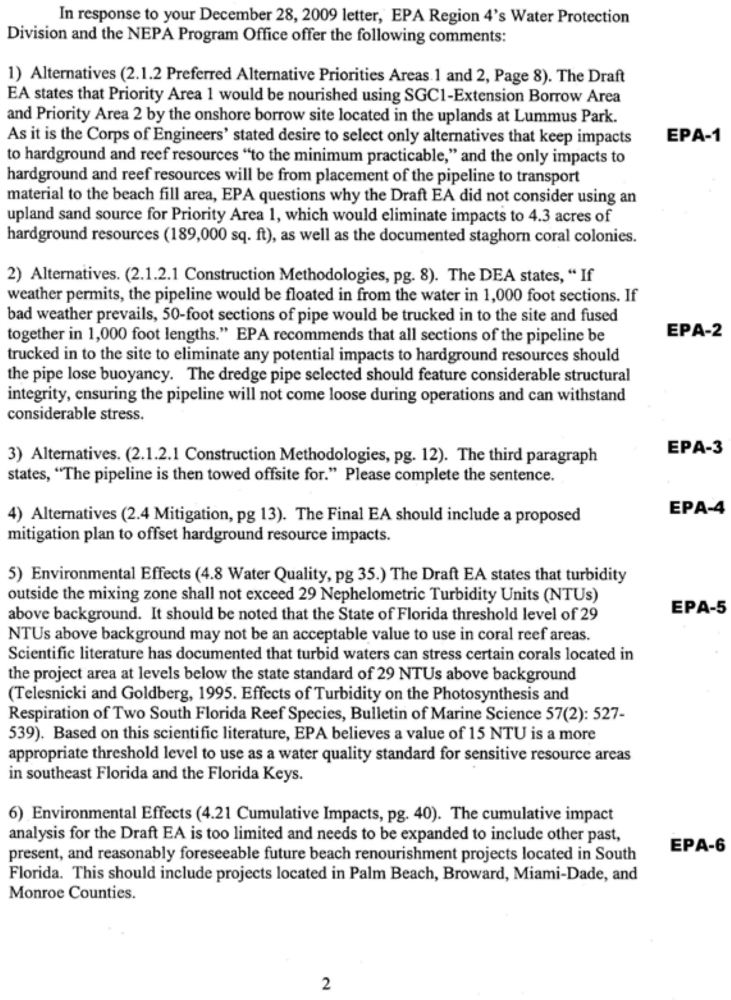


In response to your December 28, 2009 letter, EPA Region 4's Water Protection Division and the NEPA Program Office offer the following comments:

1) Alternatives (2.1.2 Preferred Alternative Priorities Areas 1 and 2, Page 8). The Draft EA states that Priority Area 1 would be nourished using SGC1-Extension Borrow Area and Priority Area 2 by the onshore borrow site located in the uplands at Lummus Park. As it is the Corps of Engineers' stated desire to select only alternatives that keep impacts to hardground and reef resources "to the minimum practicable," and the only impacts to hardground and reef resources will be from placement of the pipeline to transport material to the beach fill area, EPA questions why the Draft EA did not consider using an upland sand source for Priority Area 1, which would eliminate impacts to 4.3 acres of hardground resources (189,000 sq. ft), as well as the documented staghorn coral colonies.

EPA-1

2) Alternatives. (2.1.2.1 Construction Methodologies, pg. 8). The DEA states, " If weather permits, the pipeline would be floated in from the water in 1,000 foot sections. If bad weather prevails, 50-foot sections of pipe would be trucked in to the site and fused together in 1,000 foot lengths." EPA recommends that all sections of the pipeline be trucked in to the site to eliminate any potential impacts to hardground resources should the pipe lose buoyancy. The dredge pipe selected should feature considerable structural integrity, ensuring the pipeline will not come loose during operations and can withstand considerable stress.

EPA-2

3) Alternatives. (2.1.2.1 Construction Methodologies, pg. 12). The third paragraph states, "The pipeline is then towed offsite for." Please complete the sentence.

EPA-3

4) Alternatives (2.4 Mitigation, pg 13). The Final EA should include a proposed mitigation plan to offset hardground resource impacts.

EPA-4

5) Environmental Effects (4.8 Water Quality, pg 35.) The Draft EA states that turbidity outside the mixing zone shall not exceed 29 Nephelometric Turbidity Units (NTUs) above background. It should be noted that the State of Florida threshold level of 29 NTUs above background may not be an acceptable value to use in coral reef areas. Scientific literature has documented that turbid waters can stress certain corals located in the project area at levels below the state standard of 29 NTUs above background (Telesnicki and Goldberg, 1995. Effects of Turbidity on the Photosynthesis and Respiration of Two South Florida Reef Species, Bulletin of Marine Science 57(2): 527-539). Based on this scientific literature, EPA believes a value of 15 NTU is a more appropriate threshold level to use as a water quality standard for sensitive resource areas in southeast Florida and the Florida Keys.

EPA-5

6) Environmental Effects (4.21 Cumulative Impacts, pg. 40). The cumulative impact analysis for the Draft EA is too limited and needs to be expanded to include other past, present, and reasonably foreseeable future beach renourishment projects located in South Florida. This should include projects located in Palm Beach, Broward, Miami-Dade, and Monroe Counties.

EPA-6

Response EPA 1
Noted. Other alternatives that were considered but dismissed from further investigation will be added to the document.

Response EPA 2
Noted. The pipeline methodology will be clarified to avoid confusion. It will not be floated at Lummus Park.

Response EPA 3
Correction will be made.

Response EPA 4
Noted. The mitigation plan was not available at the time the DEA was released.

Response EPA 5
The Corps will comply with the conditions of the water quality certification regarding turbidity. Additionally, the paper cited by EPA used ground limestone marl as the substrate, the Corps will not be placing ground marl, but sand. Reviewing the NMFS Biological Opinion, as well as Fisher et al, 2008; and Rogers 1983 and 1990, the Corps has determined that the NTU standards set by the state, with associated monitoring conducted by DERM are sufficiently protective of hardbottom habitats, including threatened Acroporid corals and designated critical habitat.

Response EPA 6
Noted. The regional sediment management plan describes know information and will be cited.

7) EPA supports post-construction monitoring, and we recommend that any loss of material during construction should be thoroughly investigated and appropriate remedies enacted. The Corps of Engineers should also ensure that the sedimentation and coral health monitoring programs included as Appendix B of the BO are followed. Please inform EPA if there are any changes to these protocols as approved by NMFS- Protected Resources Division. **EPA-7**

8) EPA recommends that an intensive inspection program be employed to ensure that the 400-ft buffer between the nearshore hardbottom habitat and the edge of the borrow site is continually maintained. **EPA-8**

9) EPA supports close monitoring of construction operations at the project site by an independent third party (not associated with the dredging contractor) to verify that turbidity levels are not exceeding the compliance standards established in the permit. **EPA-9**

10) EPA supports the implementation of the NMFS' Sea Turtle and Smalltooth Sawfish Construction Conditions (dated March 23, 2006), as well as compliance with the Terms and Conditions established under the 1997 South Atlantic Regional Biological Opinion on hopper dredging. **EPA-10**

Thank you, again, for the opportunity to comment on this Draft EA. If you wish to discuss EPA's comments, please contact me at 404/562-9611 (mueller.heinz@epa.gov), Ron Miedema at 561/616-8741(miedema.ron@epa.gov) in our South Florida office, or Paul Gagliano, P.E., at 404/562-9373 (gagliano.paul@epa.gov)

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office

Response EPA 7
Noted. EPA will be notified of any changes.

Response EPA 8
The Corps will track barge positions and note location of load dumps.

Response EPA 9
The Corps has no mechanism to contract a third party to verify turbidity levels.

Response EPA 10
The Corps does accept this recommendation because all contractors hired by the Corps work at the direction of the contracting officer and are not "independent" of the Corps. The Contractor is required to provide water quality monitoring as part of the contract specifications and must monitor water quality at all times in compliance with the FLDEP permit and that data is provided to FLDEP and the Corps for permit compliance.
.

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

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

February 26, 2010

Mr. Eric P. Summa, Chief
Environmental Branch, Planning Division
U. S. Army Corps of Engineers
P. O. Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers – Draft Environmental Assessment, Beach Erosion Control and Hurricane Protection Project, Dade County Contract E – Miami Beach, Miami-Dade County, Florida. SAI # FL201001045076C

Dear Mr. Summa:

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

The Florida Department of Environmental Protection's (DEP) Coral Reef Conservation Program (CRCP) has reviewed the Draft EA and advises that an updated Biological Opinion from the National Marine Fisheries Service may be necessary for the project, as recent severe cold weather has adversely affected Florida's coral populations. CRCP staff has also provided a number of comments regarding: the proposed construction schedule and potential effects on spawning elkhorn and staghorn corals during summer months; turbidity monitoring; the recently enacted *Florida Coral Reef Protection Act* prohibiting grounding, anchoring on or other damage to coral reefs; mitigation for unavoidable impacts to hardbottom, coral and associated reef community resources within the pipeline corridor; and the placement of sediment traps around the borrow areas to provide accurate sediment data. Please see the enclosed CRCP memorandum for further details.

Staff in the DEP Bureau of Beaches and Coastal Systems (BBCS) is reviewing a Joint Coastal Permit application (File No. 0295427-001-JC) for the proposed project. The BBCS recommends that the EA include more project-specific information to assist the agency in assessing the project, rather than the general characterization of county-wide resources presented in the document. For example, the Draft EA states that "approximately 189,000 square feet (4.3 acres) of the proposed pipeline corridor occurs within hardground."

Florida State Clearinghouse

"More Protection, Less Process"

While a recent survey specific to *Acropora sp.* was provided in the appendix, no reference is made to the quantitative surveys performed by Dade County in 2000, which would provide a more comprehensive view of the type and density of benthic species along the pipeline corridor. Updates to the EA should also include: the requested sand placement between DEP monuments R-48.7 and R-50.7; results of recent benthic surveys near the proposed beach borrow area (Lummus Park); further details on the excavation at Lummus Park; complete sediment characteristic data and a Quality Assurance/Quality Control Plan; and modification of the offshore borrow area. In addition, a Local Sponsor agreement will also be necessary to insure that multi-year monitoring and tilling are conducted by the County. For further information and assistance, please refer to the enclosed BBCS memorandum and contact Ms. Roxane Dow at (850) 922-7852.

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

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

Yours sincerely,

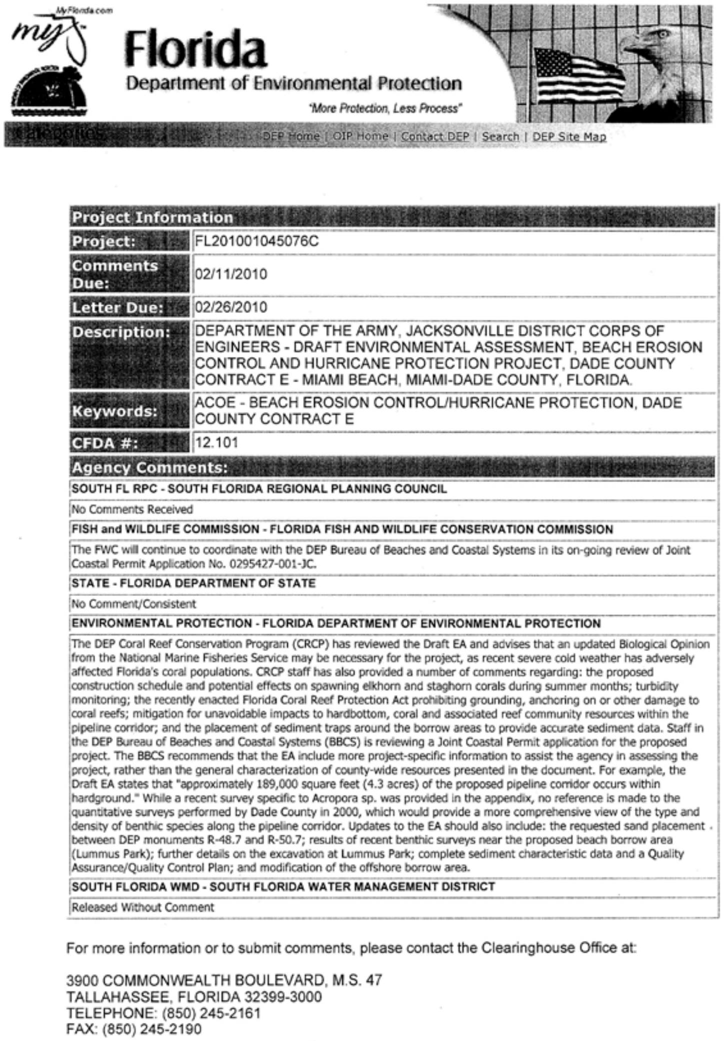
Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm
Enclosures

cc: Terri Jordan, USACE
Roxane Dow, DEP, BBCS
Penny Isom, DEP, CAMA
Chantal Collier, DEP, CAMA-CRCP

Florida State Clearinghouse



Project Information	
Project:	FL201001045076C
Comments Due:	02/11/2010
Letter Due:	02/26/2010
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - DRAFT ENVIRONMENTAL ASSESSMENT, BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT, DADE COUNTY CONTRACT E - MIAMI BEACH, MIAMI-DADE COUNTY, FLORIDA.
Keywords:	ACOE - BEACH EROSION CONTROL/HURRICANE PROTECTION, DADE COUNTY CONTRACT E
CFDA #:	12.101

Agency Comments:

SOUTH FL RPC - SOUTH FLORIDA REGIONAL PLANNING COUNCIL

No Comments Received

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

The FWC will continue to coordinate with the DEP Bureau of Beaches and Coastal Systems in its on-going review of Joint Coastal Permit Application No. 0295427-001-JC.

STATE - FLORIDA DEPARTMENT OF STATE

No Comment/Consistent

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

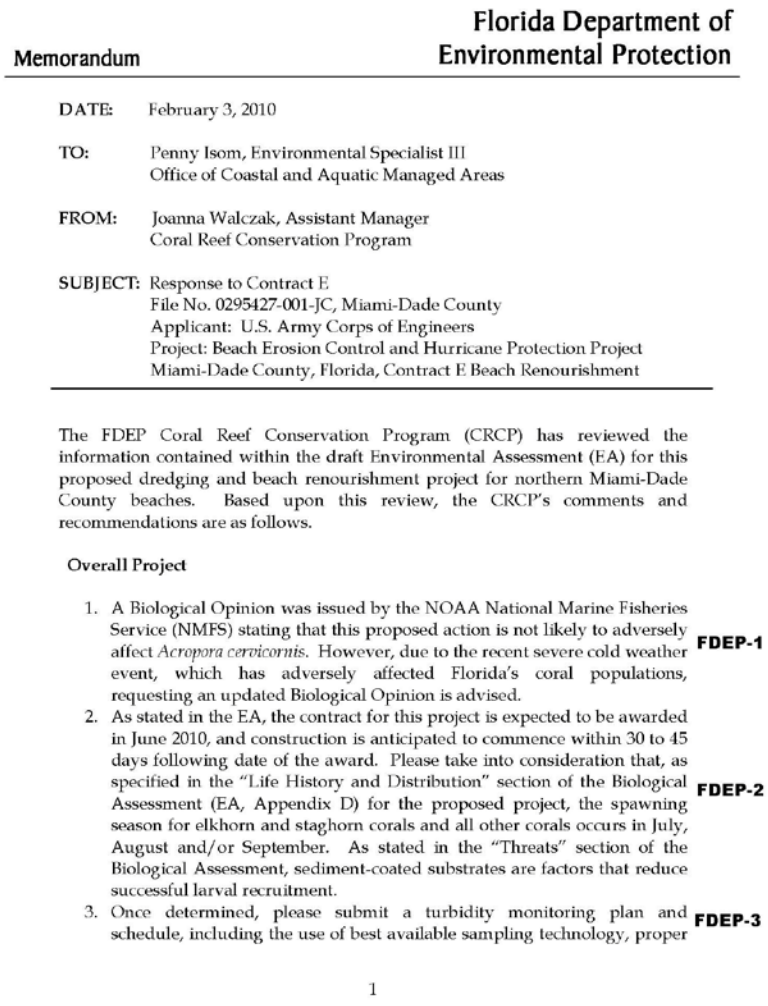
The DEP Coral Reef Conservation Program (CRCP) has reviewed the Draft EA and advises that an updated Biological Opinion from the National Marine Fisheries Service may be necessary for the project, as recent severe cold weather has adversely affected Florida's coral populations. CRCP staff has also provided a number of comments regarding: the proposed construction schedule and potential effects on spawning elkhorn and staghorn corals during summer months; turbidity monitoring; the recently enacted Florida Coral Reef Protection Act prohibiting grounding, anchoring on or other damage to coral reefs; mitigation for unavoidable impacts to hardbottom, coral and associated reef community resources within the pipeline corridor; and the placement of sediment traps around the borrow areas to provide accurate sediment data. Staff in the DEP Bureau of Beaches and Coastal Systems (BBCS) is reviewing a Joint Coastal Permit application for the proposed project. The BBCS recommends that the EA include more project-specific information to assist the agency in assessing the project, rather than the general characterization of county-wide resources presented in the document. For example, the Draft EA states that "approximately 189,000 square feet (4.3 acres) of the proposed pipeline corridor occurs within hardground." While a recent survey specific to Acropora sp. was provided in the appendix, no reference is made to the quantitative surveys performed by Dade County in 2000, which would provide a more comprehensive view of the type and density of benthic species along the pipeline corridor. Updates to the EA should also include: the requested sand placement between DEP monuments R-48.7 and R-50.7; results of recent benthic surveys near the proposed beach borrow area (Lummus Park); further details on the excavation at Lummus Park; complete sediment characteristic data and a Quality Assurance/Quality Control Plan; and modification of the offshore borrow area.

SOUTH FLORIDA WMD - SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Released Without Comment

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

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



Memorandum

Florida Department of Environmental Protection

DATE: February 3, 2010

TO: Penny Isom, Environmental Specialist III
Office of Coastal and Aquatic Managed Areas

FROM: Joanna Walczak, Assistant Manager
Coral Reef Conservation Program

SUBJECT: Response to Contract E
File No. 0295427-001-JC, Miami-Dade County
Applicant: U.S. Army Corps of Engineers
Project: Beach Erosion Control and Hurricane Protection Project
Miami-Dade County, Florida, Contract E Beach Renourishment

The FDEP Coral Reef Conservation Program (CRCP) has reviewed the information contained within the draft Environmental Assessment (EA) for this proposed dredging and beach renourishment project for northern Miami-Dade County beaches. Based upon this review, the CRCP's comments and recommendations are as follows.

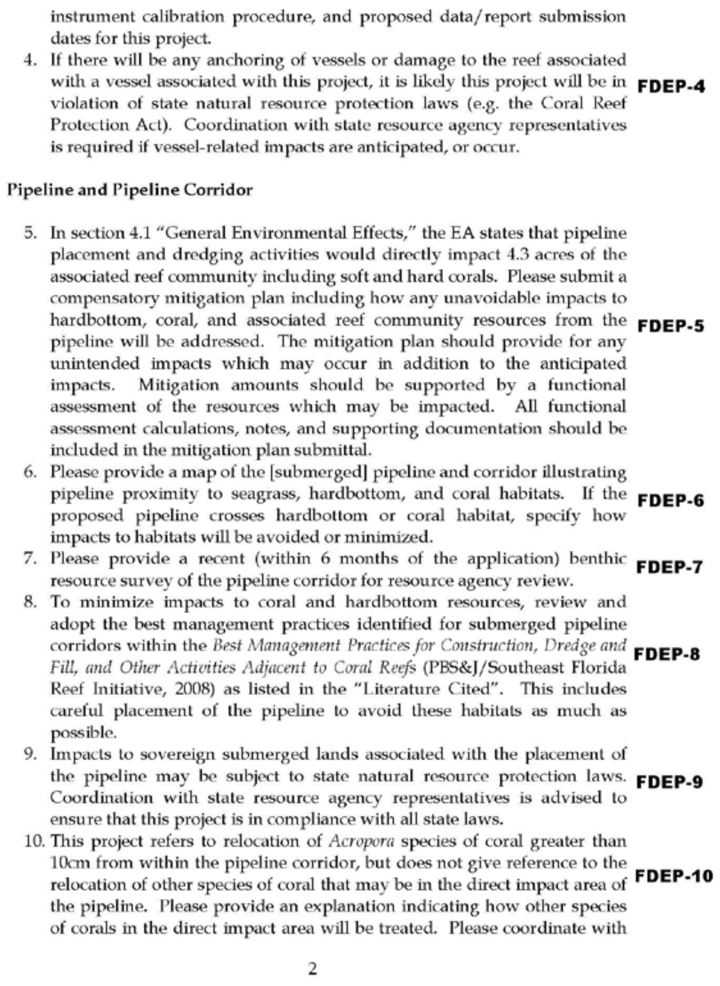
Overall Project

1. A Biological Opinion was issued by the NOAA National Marine Fisheries Service (NMFS) stating that this proposed action is not likely to adversely affect *Acropora cervicornis*. However, due to the recent severe cold weather event, which has adversely affected Florida's coral populations, requesting an updated Biological Opinion is advised. **FDEP-1**
2. As stated in the EA, the contract for this project is expected to be awarded in June 2010, and construction is anticipated to commence within 30 to 45 days following date of the award. Please take into consideration that, as specified in the "Life History and Distribution" section of the Biological Assessment (EA, Appendix D) for the proposed project, the spawning season for elkhorn and staghorn corals and all other corals occurs in July, August and/or September. As stated in the "Threats" section of the Biological Assessment, sediment-coated substrates are factors that reduce successful larval recruitment. **FDEP-2**
3. Once determined, please submit a turbidity monitoring plan and schedule, including the use of best available sampling technology, proper **FDEP-3**

Response FDEP 1
Disagree.

Response FDEP 2
Noted.

Response FDEP 3
Noted. This will be a requirement in State water quality certification.A pre-construction kick-off meeting will be held with the contractor and FDEP will be invited to attend.



instrument calibration procedure, and proposed data/report submission dates for this project.

4. If there will be any anchoring of vessels or damage to the reef associated with a vessel associated with this project, it is likely this project will be in violation of state natural resource protection laws (e.g. the Coral Reef Protection Act). Coordination with state resource agency representatives is required if vessel-related impacts are anticipated, or occur. **FDEP-4**

Pipeline and Pipeline Corridor

5. In section 4.1 "General Environmental Effects," the EA states that pipeline placement and dredging activities would directly impact 4.3 acres of the associated reef community including soft and hard corals. Please submit a compensatory mitigation plan including how any unavoidable impacts to hardbottom, coral, and associated reef community resources from the pipeline will be addressed. The mitigation plan should provide for any unintended impacts which may occur in addition to the anticipated impacts. Mitigation amounts should be supported by a functional assessment of the resources which may be impacted. All functional assessment calculations, notes, and supporting documentation should be included in the mitigation plan submittal. **FDEP-5**
6. Please provide a map of the [submerged] pipeline and corridor illustrating pipeline proximity to seagrass, hardbottom, and coral habitats. If the proposed pipeline crosses hardbottom or coral habitat, specify how impacts to habitats will be avoided or minimized. **FDEP-6**
7. Please provide a recent (within 6 months of the application) benthic resource survey of the pipeline corridor for resource agency review. **FDEP-7**
8. To minimize impacts to coral and hardbottom resources, review and adopt the best management practices identified for submerged pipeline corridors within the *Best Management Practices for Construction, Dredge and Fill, and Other Activities Adjacent to Coral Reefs* (PBS&J/Southeast Florida Reef Initiative, 2008) as listed in the "Literature Cited". This includes careful placement of the pipeline to avoid these habitats as much as possible. **FDEP-8**
9. Impacts to sovereign submerged lands associated with the placement of the pipeline may be subject to state natural resource protection laws. Coordination with state resource agency representatives is advised to ensure that this project is in compliance with all state laws. **FDEP-9**
10. This project refers to relocation of *Acropora* species of coral greater than 10cm from within the pipeline corridor, but does not give reference to the relocation of other species of coral that may be in the direct impact area of the pipeline. Please provide an explanation indicating how other species of corals in the direct impact area will be treated. Please coordinate with **FDEP-10**

Response FDEP 4
This does not apply to this project.

Response FDEP 5
A mitigation plan has been coordinated with the State and has been incorporated into the Final EA.

Response FDEP 6
Please see Figures 9 and 10 for hardbottom and coral resources. Section 4.3.1.3 and 4.4 describe potential impacts and avoidance. Section 4.30 Environmental Commitments describes additional mitigation measures.

Response FDEP 7
Please see Figures 9 and 10 for hardbottom and coral resources.

Response FDEP 8
Noted. Will comply with all practical measures.

Response FDEP 9
Noted.

Response FDEP 10
Noted. Corals not specifically designated for relocation would be lost. All appropriate coordination will occur.

state resource agency representatives to ensure that this project is in compliance with all state natural resource protection laws.

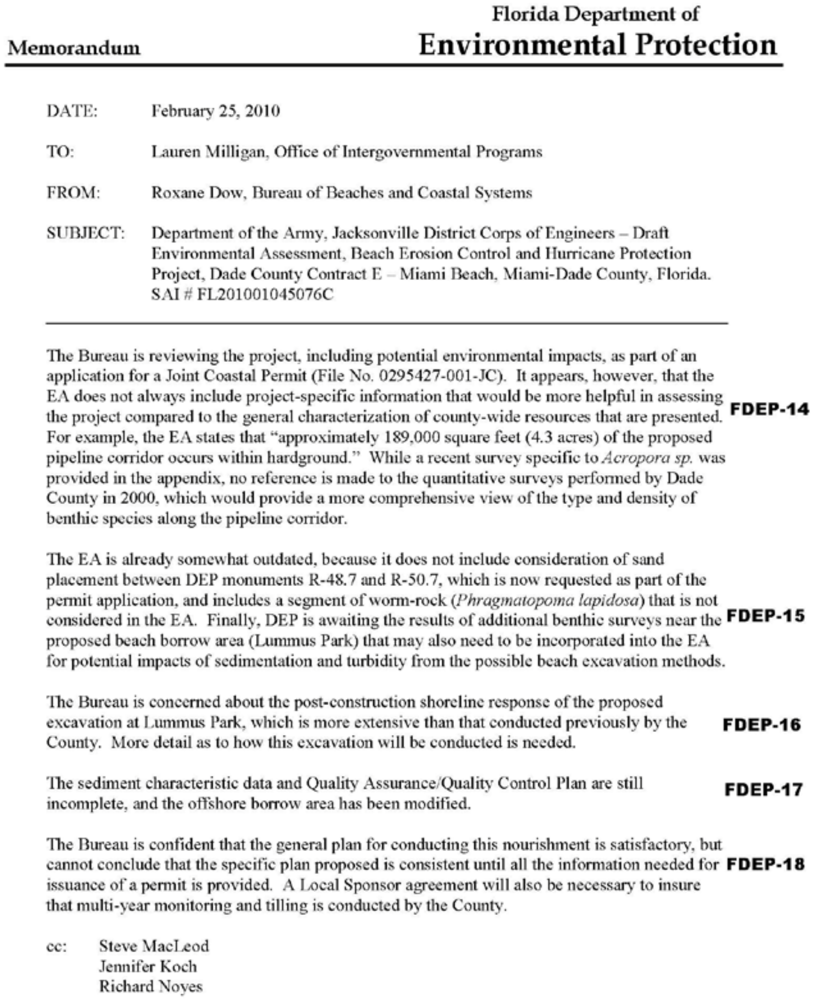
Borrow Areas:

11. The FDEP CRCP advises against the use of Sediment Accumulation Plates and recommends Sediment Traps be used instead. Our experience has found the design of sediment traps provides more accurate sediment data than accumulation plates. **FDEP-11**
12. The FDEP CRCP recommends the placement of additional sediment traps surrounding the borrow areas to account for impacts to non-Acroporid hardbottom areas and reef species. **FDEP-12**
13. In the Biological Assessment to the NMFS, dredging methods and associated impacts are discussed. Although no direct impacts to *Acropora* species are anticipated from dredging in the SGC1-Ext borrow area, large plumes of sediment are expected for extended periods, which may impact other reef species. Please specify what dredging methods will be used and what efforts will be implemented to limit turbidity and sediment load in the surrounding environment. **FDEP-13**

Response FDEP 11
Noted. This is a requirement of the NMFS.

Response FDEP 12
FDEP may place additional sediment traps at their convenience.

Response FDEP 13
The assertion that... large plumes of sediment are expected for extended periods….iis not in the BA Or the BO. The dredging method will be determined by the contractor



Florida Department of
Environmental Protection

Memorandum

DATE: February 25, 2010

TO: Lauren Milligan, Office of Intergovernmental Programs

FROM: Roxane Dow, Bureau of Beaches and Coastal Systems

SUBJECT: Department of the Army, Jacksonville District Corps of Engineers – Draft Environmental Assessment, Beach Erosion Control and Hurricane Protection Project, Dade County Contract E – Miami Beach, Miami-Dade County, Florida. SAI # FL201001045076C

The Bureau is reviewing the project, including potential environmental impacts, as part of an application for a Joint Coastal Permit (File No. 0295427-001-JC). It appears, however, that the EA does not always include project-specific information that would be more helpful in assessing the project compared to the general characterization of county-wide resources that are presented. For example, the EA states that "approximately 189,000 square feet (4.3 acres) of the proposed pipeline corridor occurs within hardground." While a recent survey specific to *Acropora sp.* was provided in the appendix, no reference is made to the quantitative surveys performed by Dade County in 2000, which would provide a more comprehensive view of the type and density of benthic species along the pipeline corridor. **FDEP-14**

The EA is already somewhat outdated, because it does not include consideration of sand placement between DEP monuments R-48.7 and R-50.7, which is now requested as part of the permit application, and includes a segment of worm-rock (*Phragmatopoma lapidosa*) that is not considered in the EA. Finally, DEP is awaiting the results of additional benthic surveys near the proposed beach borrow area (Lummus Park) that may also need to be incorporated into the EA for potential impacts of sedimentation and turbidity from the possible beach excavation methods. **FDEP-15**

The Bureau is concerned about the post-construction shoreline response of the proposed excavation at Lummus Park, which is more extensive than that conducted previously by the County. More detail as to how this excavation will be conducted is needed. **FDEP-16**

The sediment characteristic data and Quality Assurance/Quality Control Plan are still incomplete, and the offshore borrow area has been modified. **FDEP-17**

The Bureau is confident that the general plan for conducting this nourishment is satisfactory, but cannot conclude that the specific plan proposed is consistent until all the information needed for issuance of a permit is provided. A Local Sponsor agreement will also be necessary to insure that multi-year monitoring and tilling is conducted by the County. **FDEP-18**

cc: Steve MacLeod
Jennifer Koch
Richard Noyes

Response FDEP 14
We will include whatever new data are available from subsequent reports.

Response FDEP 15
The information in the EA will be consistent with the appropriate permit application.

Response FDEP 16
Noted. The information in the EA will be consistent with the appropriate permit application. Additional information regarding the Lummus Park excavation will be included.

Response FDEP 17
Noted. The information in the EA will be consistent with the appropriate permit application.

Response FDEP 18
Noted.

COUNTY: MIAMI-DADE

SCH - CORPS - 106/NEPA

DATE: 12/29/2009
COMMENTS DUE DATE: 2/11/2010
CLEARANCE DUE DATE: 2/26/2010
SAI#: FL201001045076C

MESSAGE: 2010-232

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

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

- _ **Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.**
- X **Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.**
- _ **Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.**
- _ **Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.**

Project Description:

DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - DRAFT ENVIRONMENTAL ASSESSMENT, BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT, DADE COUNTY CONTRACT E - MIAMI BEACH, MIAMI-DADE COUNTY, FLORIDA.

To: Florida State Clearinghouse

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

EO. 12372/NEPA

☑ No Comment
☐ Comment Attached
☐ Not Applicable

Federal Consistency

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

From:

Division/Bureau: Historical Resources

Reviewer: Michael Hart Laura A. Kammerer Deputy SHPO

Date: 2/4/10 2. 4. 2010

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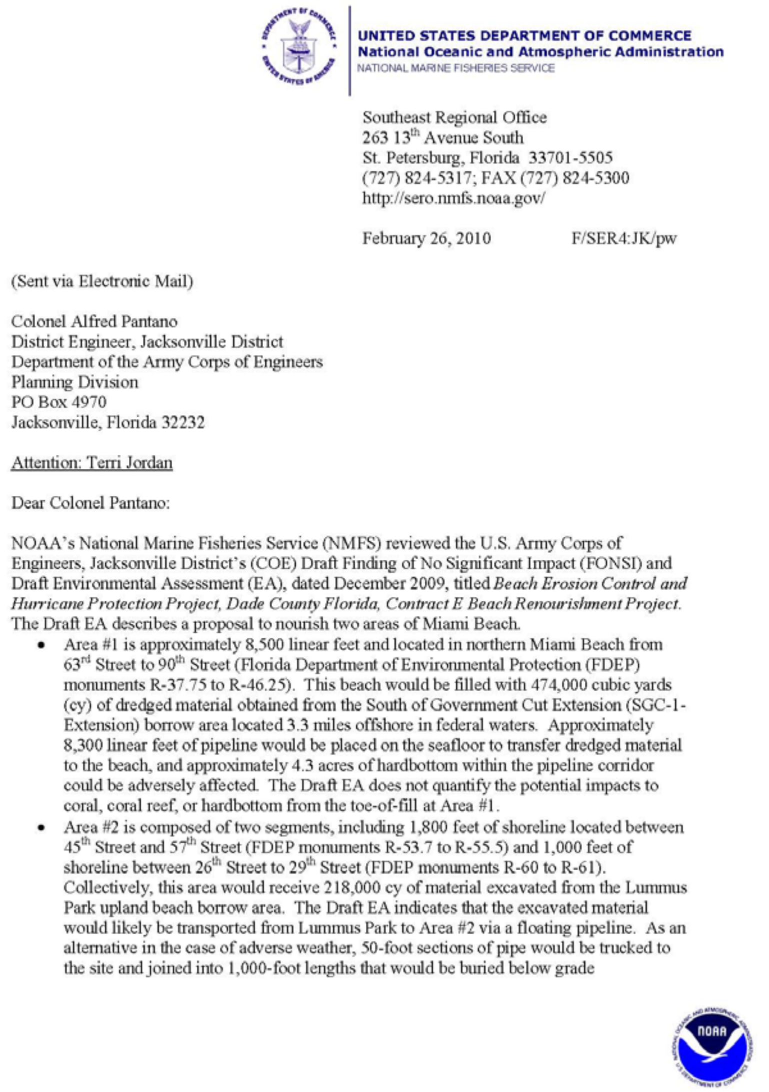


UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

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

February 26, 2010 F/SER4:JK/pw

(Sent via Electronic Mail)

Colonel Alfred Pantano
District Engineer, Jacksonville District
Department of the Army Corps of Engineers
Planning Division
PO Box 4970
Jacksonville, Florida 32232

Attention: Terri Jordan

Dear Colonel Pantano:

NOAA's National Marine Fisheries Service (NMFS) reviewed the U.S. Army Corps of Engineers, Jacksonville District's (COE) Draft Finding of No Significant Impact (FONSI) and Draft Environmental Assessment (EA), dated December 2009, titled *Beach Erosion Control and Hurricane Protection Project, Dade County Florida, Contract E Beach Renourishment Project.* The Draft EA describes a proposal to nourish two areas of Miami Beach.

- Area #1 is approximately 8,500 linear feet and located in northern Miami Beach from 63rd Street to 90th Street (Florida Department of Environmental Protection (FDEP) monuments R-37.75 to R-46.25). This beach would be filled with 474,000 cubic yards (cy) of dredged material obtained from the South of Government Cut Extension (SGC-1-Extension) borrow area located 3.3 miles offshore in federal waters. Approximately 8,300 linear feet of pipeline would be placed on the seafloor to transfer dredged material to the beach, and approximately 4.3 acres of hardbottom within the pipeline corridor could be adversely affected. The Draft EA does not quantify the potential impacts to coral, coral reef, or hardbottom from the toe-of-fill at Area #1.
- Area #2 is composed of two segments, including 1,800 feet of shoreline located between 45th Street and 57th Street (FDEP monuments R-53.7 to R-55.5) and 1,000 feet of shoreline between 26th Street to 29th Street (FDEP monuments R-60 to R-61). Collectively, this area would receive 218,000 cy of material excavated from the Lummus Park upland beach borrow area. The Draft EA indicates that the excavated material would likely be transported from Lummus Park to Area #2 via a floating pipeline. As an alternative in the case of adverse weather, 50-foot sections of pipe would be trucked to the site and joined into 1,000-foot lengths that would be buried below grade

approximately 5 feet seaward of the existing dune. The Draft EA does not quantify the potential impacts to hardbottom located off the Lummus Park borrow area or to coral, coral reef, or hardbottom from the toe-of-fill at Area #2.

The Jacksonville District's initial determination is that the proposed activity would not adversely affect essential fish habitat (EFH). 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 South Atlantic Fishery Management Council (SAFMC) designated corals, coral reefs, hardbottom, and unconsolidated sediments as EFH. Hardbottoms are EFH for coral, red grouper (*Epinephelus morio*), gag grouper (*Mycteroperca microlepis*), gray snapper (*Lutjanus griseus*), mutton snapper (*L. analis*), white grunt (*Haemulon plumieri*), and spiny lobster (*Panulirus argus*). Sand habitats are EFH for cobia (*Rachycentron canadum*), black seabass (*Centropristis striata*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*S. maculates*), spiny lobster, and pink shrimp (*Farfantepenaeus duorarum*). All demersal fish species under SAFMC management that associate with coral habitats are contained within the fishery management plan for snapper-grouper species and include some of the more commercially and recreationally valuable fish of the region. All of these species show an association with coral or hardbottom habitat during their life history. In groupers, the demersal life history of almost all *Epinephelus* species, several *Mycteroperca* species, and all *Centropristis* species, takes place in association with coral habitat (SAFMC 2009). Coral, coral reef, and hardbottom habitats benefit fishery resources by providing food or shelter (SAFMC 1983). SAFMC also designated corals, coral reefs, and hardbottoms as a Habitat Area of Particular Concern (HAPC), which is a subset of EFH that is either rare, particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally stressed area. In light of their designation as EFH-HAPC's and Executive Order 13089, NMFS applies greater scrutiny to projects affecting corals, coral reefs, and hardbottoms to ensure practicable measures to avoid and minimize adverse effects to these habitats are fully explored.

Impacts to Essential Fish Habitat

SGC-1-Extension Borrow Area and the Pipeline Corridor to Area #1: Results from a survey for *Acropora* spp. performed on September 16 and 29, 2008, by Miami-Dade Department of Environmental Resource Management (DERM) shows 44 colonies of *Acropora cervicornis* within or near the pipeline corridor and 31 colonies on the reef tract east of SGC-1-Extension borrow area. The Biological Opinion issued by the NMFS Protected Resources Division (NMFS PRD) on October 24, 2009, estimates that 58 colonies of *A. cervicornis* would be lethally taken through deployment and retrieval of the pipeline. As reasonable and prudent measures, NMFS PRD is requiring the Jacksonville District to relocate 43 colonies and to monitor *A. cervicornis* colonies along the pipeline corridor and adjacent to the SGC-1-Extension borrow area.

NMFS-1

While the Draft EA references DERM's report of results for acroporid corals from the 2008 survey, the Draft EA does not fully incorporate the report's information about other coral

Response NMFS 1
We will include whatever new data are available from subsequent reports.

species. Photos within DERM's report show coral species besides acroporids occur within or near the pipeline corridor, including *Diploria strigosa, Siderastrea* spp., *Gorgonia ventalina,* and *Pseudopterogorgia* spp. This finding is consistent unpublished data that DERM provided NMFS by email dated February 19, 2010, from surveys conducted in February and May 2000. Approximately 532 hard corals (approximately 15 species) and 2,637 soft corals (approximately 22 species) were identified in that effort. The Draft EA does not include this unpublished data, however it is NMFS' understanding that the data were recently provided to the Jacksonville District for inclusion in the Final EA. **NMFS-1 cont.**

Lummus Park Borrow Area and the Pipeline Corridor to Area #2: Limited detail is provided in the Draft EA regarding potential for effects to EFH from the transport of material from the Lummus Park borrow area to Area #2. Descriptions with corresponding figures are needed of where the pipeline would be floated as well as how the material would be slurried (since the material would be excavated from uplands). In the case that an in-water pipeline would adversely affect EFH, NMFS believes that trucking the material should be evaluated as a less damaging alternative. Further, aerial photographs show a hardbottom feature approximately 200 to 400 meters from the shoreline at Lummus Park. The Draft EA does not discuss the potential for impacts to this feature from sedimentation and turbidity generated by the excavation or from the pipeline to Area #2. NMFS requests the Final EA characterize this hardbottom area and how it might be affected by the project. Lastly, the description in the Draft EA of the pipeline burial alternative is not clear. A more complete description and map of the pipeline route is needed. **NMFS-2**

Nourishment Toe-of-Fills at Area #1 and Area #2: The Draft EA does not discuss potential impacts to coral or hardbottom habitat within or near the equilibrium toe-of-fill at Area #1 or Area #2. DERM conducted a survey during May 7 through June 9, 2009. Results of that survey show approximately 4.02 acres of unvegetated rubble and 2.06 acres of rubble colonized with algae between FDEP monuments R-41 to R-62, which encompasses a portion of the project area as well as areas outside of the proposed nourishment. Several federally managed fish species associate with rubble colonized by algae, including grunts (*Haemulon* spp.) and lane snapper (*Lutjanus synagris*). DERM's survey also shows worm reef (hardbottom colonized by *Phragmatopoma lapsidosa*), near FDEP monument R-49, which is between Area #1 and Area #2. The Draft EA briefly references these data, but does not fully incorporate them into the analysis. The Final EA should include a more detailed analysis of these data, especially between FDEP monuments R-41 to R-46 (which is within Area #1) and FDEP monuments R-54 to R-55 (which is within Area #2) and appear to have the most hardbottom habitat. The Final EA should characterize these habitats and evaluate effects to coral and hardbottom expected to be covered or affected by the equilibrium toes-of-fill. **NMFS-3**

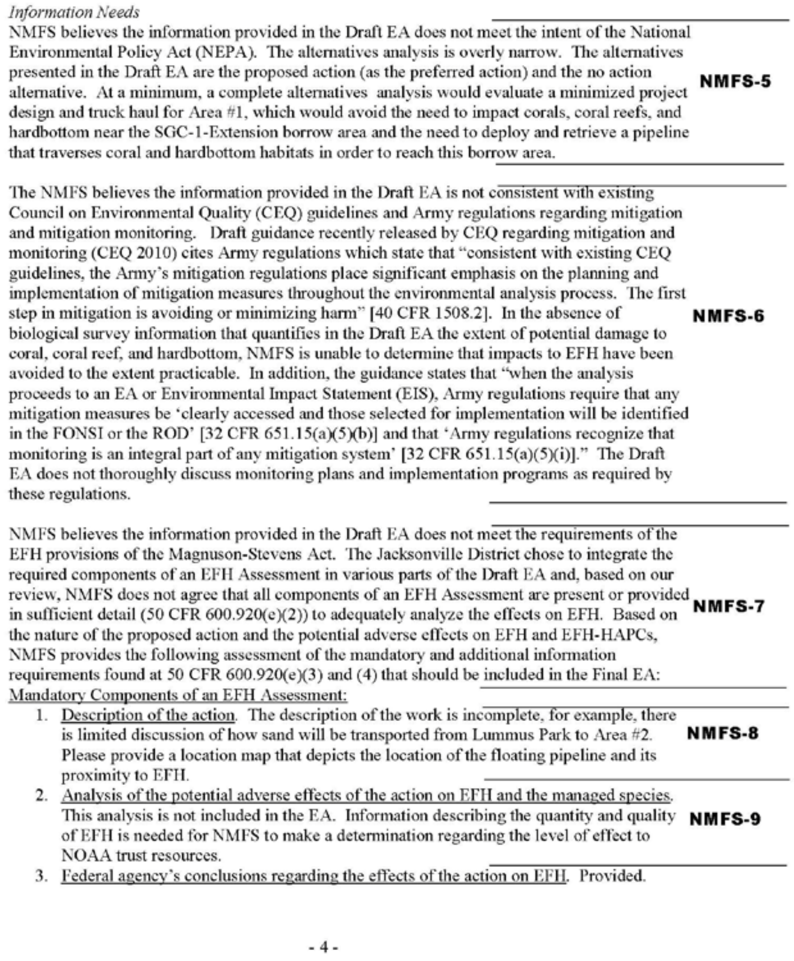
Summary: Based on the information in the DERM reports, it is likely the Draft EA significantly underestimates the amount of coral, coral reef, and hardbottom along the pipeline corridors and near the Lummus Park and SGC-1-Extension borrow areas. Based on the reports from DERM, NMFS believes the coral, coral reef, and hardbottom within these areas are likely high in quality. While the rock rubble colonized with algae at Area #1 and Area #2 may be moderate to low quality EFH, it provides habitat for fishery resources (snappers and grunts). A comprehensive survey is needed to examine the presence of coral, coral reef, and hardbottom in the project areas. **NMFS-4**

Response NMFS 1
We will include whatever new data are available from subsequent reports.

Response NMFS 2
Additional information regarding potential effects to EFH will be included. The details of the pipeline deployment will be clarified.

Response NMFS 3
There are no within or near the nourishment area that could be affected. The areas cited are over 1000 feet downdrift of the project area

Response NMFS 4
We disagree. DERM has conducted surveys to determine resources within the project area.



Information Needs

NMFS believes the information provided in the Draft EA does not meet the intent of the National Environmental Policy Act (NEPA). The alternatives analysis is overly narrow. The alternatives presented in the Draft EA are the proposed action (as the preferred action) and the no action alternative. At a minimum, a complete alternatives analysis would evaluate a minimized project design and truck haul for Area #1, which would avoid the need to impact corals, coral reefs, and hardbottom near the SGC-1-Extension borrow area and the need to deploy and retrieve a pipeline that traverses coral and hardbottom habitats in order to reach this borrow area.

NMFS-5

The NMFS believes the information provided in the Draft EA is not consistent with existing Council on Environmental Quality (CEQ) guidelines and Army regulations regarding mitigation and mitigation monitoring. Draft guidance recently released by CEQ regarding mitigation and monitoring (CEQ 2010) cites Army regulations which state that "consistent with existing CEQ guidelines, the Army's mitigation regulations place significant emphasis on the planning and implementation of mitigation measures throughout the environmental analysis process. The first step in mitigation is avoiding or minimizing harm" [40 CFR 1508.2]. In the absence of biological survey information that quantifies in the Draft EA the extent of potential damage to coral, coral reef, and hardbottom, NMFS is unable to determine that impacts to EFH have been avoided to the extent practicable. In addition, the guidance states that "when the analysis proceeds to an EA or Environmental Impact Statement (EIS), Army regulations require that any mitigation measures be 'clearly accessed and those selected for implementation will be identified in the FONSI or the ROD' [32 CFR 651.15(a)(5)(b)] and that 'Army regulations recognize that monitoring is an integral part of any mitigation system' [32 CFR 651.15(a)(5)(i)]." The Draft EA does not thoroughly discuss monitoring plans and implementation programs as required by these regulations.

NMFS-6

NMFS believes the information provided in the Draft EA does not meet the requirements of the EFH provisions of the Magnuson-Stevens Act. The Jacksonville District chose to integrate the required components of an EFH Assessment in various parts of the Draft EA and, based on our review, NMFS does not agree that all components of an EFH Assessment are present or provided in sufficient detail (50 CFR 600.920(e)(2)) to adequately analyze the effects on EFH. Based on the nature of the proposed action and the potential adverse effects on EFH and EFH-HAPCs, NMFS provides the following assessment of the mandatory and additional information requirements found at 50 CFR 600.920(e)(3) and (4) that should be included in the Final EA:

NMFS-7

Mandatory Components of an EFH Assessment:

1. Description of the action. The description of the work is incomplete, for example, there is limited discussion of how sand will be transported from Lummus Park to Area #2. Please provide a location map that depicts the location of the floating pipeline and its proximity to EFH. **NMFS-8**
2. Analysis of the potential adverse effects of the action on EFH and the managed species. This analysis is not included in the EA. Information describing the quantity and quality of EFH is needed for NMFS to make a determination regarding the level of effect to NOAA trust resources. **NMFS-9**
3. Federal agency's conclusions regarding the effects of the action on EFH. Provided.

- 4 -

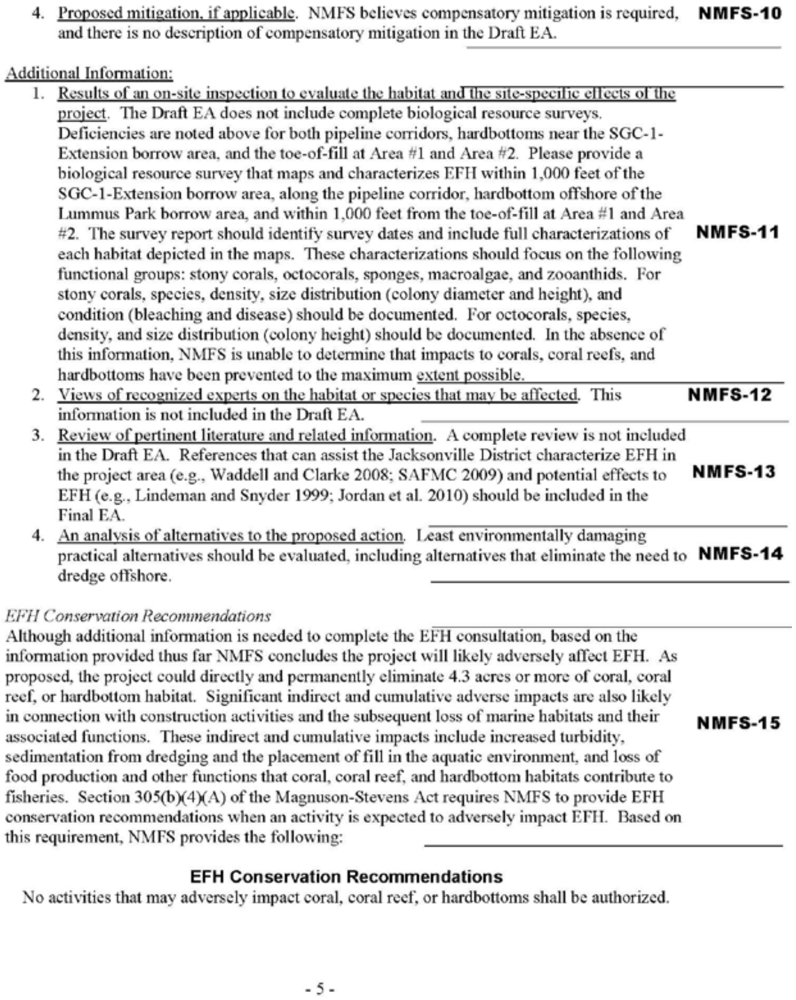
Response NMFS 5
Disagree. Other alternatives that were considered but dismissed from further investigation will be added to the document.

Response NMFS 6
The mitigation was not available at the time the DEA was released. The full measures will be added to text.

Response NMFS 7
Additional information was provided to NMFS by letter dated November 5, 2010 and January 21, 2011. The Corps has completed EFH Consultation. .

Response NMFS 8
We will clarify the pipeline methodology to avoid confusion.

Response NMFS 9
We will add the additional information and analysis regarding EFH.



4. Proposed mitigation, if applicable. NMFS believes compensatory mitigation is required, and there is no description of compensatory mitigation in the Draft EA. **NMFS-10**

Additional Information:

1. Results of an on-site inspection to evaluate the habitat and the site-specific effects of the project. The Draft EA does not include complete biological resource surveys. Deficiencies are noted above for both pipeline corridors, hardbottoms near the SGC-1-Extension borrow area, and the toe-of-fill at Area #1 and Area #2. Please provide a biological resource survey that maps and characterizes EFH within 1,000 feet of the SGC-1-Extension borrow area, along the pipeline corridor, hardbottom offshore of the Lummus Park borrow area, and within 1,000 feet from the toe-of-fill at Area #1 and Area #2. The survey report should identify survey dates and include full characterizations of each habitat depicted in the maps. These characterizations should focus on the following functional groups: stony corals, octocorals, sponges, macroalgae, and zooanthids. For stony corals, species, density, size distribution (colony diameter and height), and condition (bleaching and disease) should be documented. For octocorals, species, density, and size distribution (colony height) should be documented. In the absence of this information, NMFS is unable to determine that impacts to corals, coral reefs, and hardbottoms have been prevented to the maximum extent possible. **NMFS-11**
2. Views of recognized experts on the habitat or species that may be affected. This information is not included in the Draft EA. **NMFS-12**
3. Review of pertinent literature and related information. A complete review is not included in the Draft EA. References that can assist the Jacksonville District characterize EFH in the project area (e.g., Waddell and Clarke 2008; SAFMC 2009) and potential effects to EFH (e.g., Lindeman and Snyder 1999; Jordan et al. 2010) should be included in the Final EA. **NMFS-13**
4. An analysis of alternatives to the proposed action. Least environmentally damaging practical alternatives should be evaluated, including alternatives that eliminate the need to dredge offshore. **NMFS-14**

EFH Conservation Recommendations

Although additional information is needed to complete the EFH consultation, based on the information provided thus far NMFS concludes the project will likely adversely affect EFH. As proposed, the project could directly and permanently eliminate 4.3 acres or more of coral, coral reef, or hardbottom habitat. Significant indirect and cumulative adverse impacts are also likely in connection with construction activities and the subsequent loss of marine habitats and their associated functions. These indirect and cumulative impacts include increased turbidity, sedimentation from dredging and the placement of fill in the aquatic environment, and loss of food production and other functions that coral, coral reef, and hardbottom habitats contribute to fisheries. 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: **NMFS-15**

EFH Conservation Recommendations

No activities that may adversely impact coral, coral reef, or hardbottoms shall be authorized.

Response NMFS 10
The mitigation was not available at the time the DEA was released. The full measures will be added to text.

Response NMFS 11
We will include whatever new data are available from subsequent reports.

Response NMFS 12
Gilliam was cited in the document

Response NMFS 13
Additional references will be cited.

Response NMFS 14
Other alternatives that were considered but dismissed from further investigation will be added to the document.

Response NMFS 15
Noted.

1. The NMFS provides the following additional EFH Conservation Recommendations; these recommendations may require re-evaluation following review of any additional information: A comprehensive mitigation plan shall be designed and coordinated with NMFS, to require:
    a. Best management practices to minimize degradation of water quality;
    b. A plan for monitoring the pipeline for leaks and response actions to any leaks detected.
    c. A plan for monitoring coral, coral reef, and hardbottom habitat within the area of the offshore borrow area SGC-1-Extension and pipeline corridors to include pre-construction, during, and post-construction biological monitoring of the coral resources within the direct and indirect impact areas
    d. A plan of corrective actions to be undertaken during dredging should monitoring indicate that coral areas are being impacted by sedimentation, burial, direct physical damage, or shading from construction activities.
    e. Recording and post-construction evaluation of dredge anchor placement impacts on coral, coral reef, and hardbottom habitat;
    f. A compensatory mitigation plan that describes how unavoidable impacts to coral and hardbottom habitat shall be offset from construction activities and the equilibrium toe-of-fill.
    g. Objectives of the mitigation, performance standards, monitoring protocols and schedule, and a functional assessment that describes how mitigation amounts offset the resource impacts.
2. A plan to relocate all stony corals larger than 10 cm in diameter and any soft corals taller than 15 cm in height within areas affected by the project.A minimum 400-foot buffer shall be maintained between dredging activities and hardbottom and coral reef habitats.
3. For the Lummus Park borrow area, the Jacksonville District shall require the contractor to clearly mark the mean high water line (MHWL) and have an independent contractor on-site to continuously monitor and verify that no material is placed waterward of the MHWL in areas prohibited by the permitted construction template.
4. The Jacksonville District shall prohibit movement of dredge, tugs, or other work vessels over coral reef or hardbottom habitat.

Section 305(b)(4)(B) of the Magnuson-Stevens Act and its implementing regulation at 50 CFR 600.920(k) require the COE 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 NMFS' "findings" with the COE's Planning Functions Branch, an interim response should be provided to NMFS. A detailed response then must be provided prior to final approval of the action. The COE's detailed response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If the COE's response is inconsistent with these EFH Conservation Recommendations, the COE must provide a substantive discussion justifying the reasons for not following the recommendation.

Please note that the EFH regulation, 50 CFR 600.920 (k)(2), states that if a Federal agency decision is inconsistent with a NMFS EFH Conservation Recommendation, the Assistant Administrator for Fisheries may request a meeting with the head of the Federal agency, as well as with any other agencies involved, to discuss the action and opportunities for resolving any disagreements. Should the concerns of NMFS not be addressed satisfactorily at the field level, the Southeast Region may consider this action for referral and review in accordance with the EFH regulation.

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,

Miles M Croom

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc:

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INFORMATION SUPPLEMENTING THE FINAL ENVIRONMENTAL ASSESSMENT (Final EA, February 2011)

Contract E, Dade County (Florida) Beach Erosion Control and Hurricane Protection Project

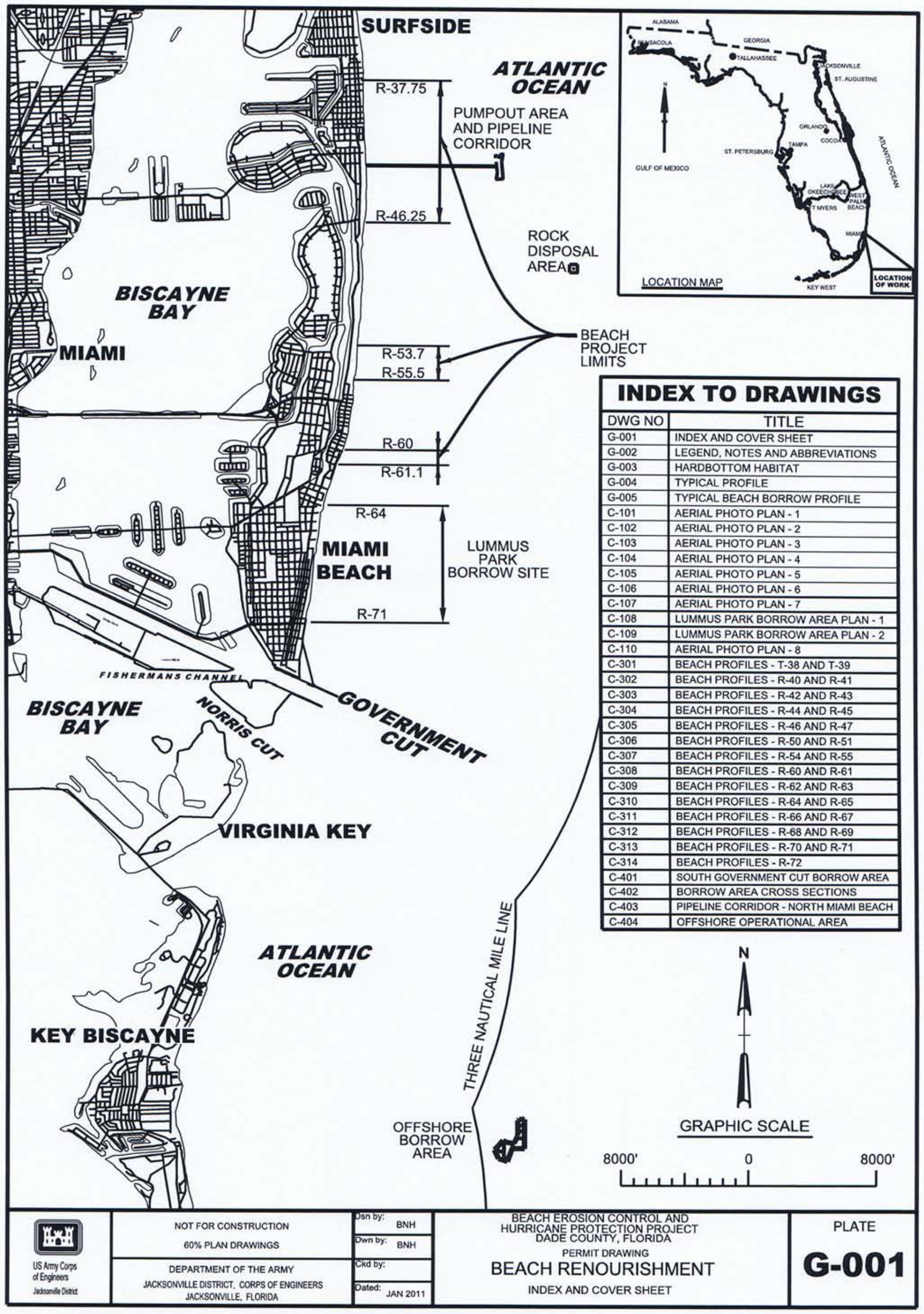
Pursuant to the National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500-1508), the U.S. Army Corps of Engineers (USACE) Jacksonville District, in coordination with the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), prepared an environmental assessment (EA) to determine whether authorizing use of Outer Continental Shelf (OCS) sand from the Southern Government Cut Extension (SGCE-1) borrow area in the Dade County Beach Erosion Control and Hurricane Protection Project would have a significant effect on the human environment. BOEMRE has independently reviewed the Final EA and all comments that BOEMRE provided on the Draft EA were adequately addressed. BOEMRE has determined that the EA is suitable for adoption. Consistent with 43 CFR 46.320(2)(b), the Final EA is being augmented to incorporate supplemental information that clarifies responses to other comments received on the Draft EA and addresses additional information that became available after the USACE finalized the EA. The supplemental information does not alter any conclusions of the Final EA regarding the nature of effects.

Rock Disposal Operations

During the dredging process at the SGCE-1 borrow area, any rock greater than 1 inch in diameter encountered will be screened and deposited at a designated rock disposal area as this material cannot be re-disposed of in the borrow area (due to Ocean Dumping Act limitations) or be placed on the beach (due to Florida state law). This aspect of the proposed action was not described or analyzed in the EA. The potential need for rock disposal operations was introduced during the final processing of the Florida Department of Environmental Protection’s (DEP) Joint Coastal Permit (JCP).

The maximum volume of rock is not expected to exceed 5,000 cubic yards. The U.S. Environmental Protection Agency (EPA), under the Marine Protection, Research and Sanctuaries Act (MPRSA), authorized disposal of inadvertently-dredged rock material in the Miami Ocean Dredged Material Disposal Site upon the condition that rock material was released in the zone specified in the 2008 Site Management and Monitoring Plan. The rock potentially dredged complies with U.S. EPA exclusionary criteria and is acceptable for ocean disposal without further testing. The USACE, Miami-Dade Department of Environmental Resources Management (DERM), and Florida DEP subsequently negotiated use of a different rock disposal area previously permitted to DERM. The 5.7-acre rock disposal area ultimately permitted is located approximately 2.25 miles offshore of Priority Area 1 and substantially closer to pump-out operations (Figures 1 and 2 below). The USACE, under their authority to authorize the creation of artificial reefs under the Clean Water Act and Rivers and Harbors Act has previously issued a permit for the creation of artificial reef in the rock disposal area (see USACE Permit 200304243 (IP-PK)). Rock disposal is authorized by the Florida DEP under JCP Final Order 0295427-001-JC. As a condition of the JCP Final Order, if rock is deposited in the disposal area, a bathymetric survey must be completed within 90 days of dredging. A report of this survey containing total volume of rock deposited must be submitted to Florida DEP within 90 days of the survey. There is a dispute between DERM, USACE, and Florida DEP regarding the classification of the proposed disposal operations and reef creation. The USACE and DERM consider the rock disposal operation to be the creation of additional artificial reef within the Pfluegler Reef (Figure 2). DERM's artificial reef program at Pfluegler Reef dates to 1969.; the bulk artificial reef material consists of abandoned steel ships, hulls, and barges. There is substantial evidence of deeper water benthic populations in this location. The Florida DEP contends that there cannot be sustainable creation of an artificial reef in the designated rock disposal area using small profile rock material. The USACE coordinated with U.S. EPA and determined that another MPRSA authorization from U.S. EPA was not needed for artificial reef creation.

The cut depths in the borrow area have been designed to avoid rock material, but it is possible to dredge rock material from underlying sedimentary rocks. If rock material is screened and placed in the rock disposal / reef area, possible impacts include disturbance of bottom habitat at the disposal location, alteration of bottom habitat from sandy to rocky substrate at the disposal location, relocation of algal species associated with the rocks, relocation of benthic species associated with the borrow area, and increased turbidity immediately following dredging and disposal. Due to the close proximity of borrow and disposal sites, there should be minimal impacts on species due to relocation. Since the nearby hardbottom habitat can be ephemerally covered with sand, this addition of rocky substrate could provide additional habitat for a variety of species if colonization is successful as in nearby locations with Pfluegler Reef.



INDEX TO DRAWINGS

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G-003	HARDBOTTOM HABITAT
G-004	TYPICAL PROFILE
G-005	TYPICAL BEACH BORROW PROFILE
C-101	AERIAL PHOTO PLAN - 1
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C-103	AERIAL PHOTO PLAN - 3
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C-404	OFFSHORE OPERATIONAL AREA

NOT FOR CONSTRUCTION
60% PLAN DRAWINGS

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

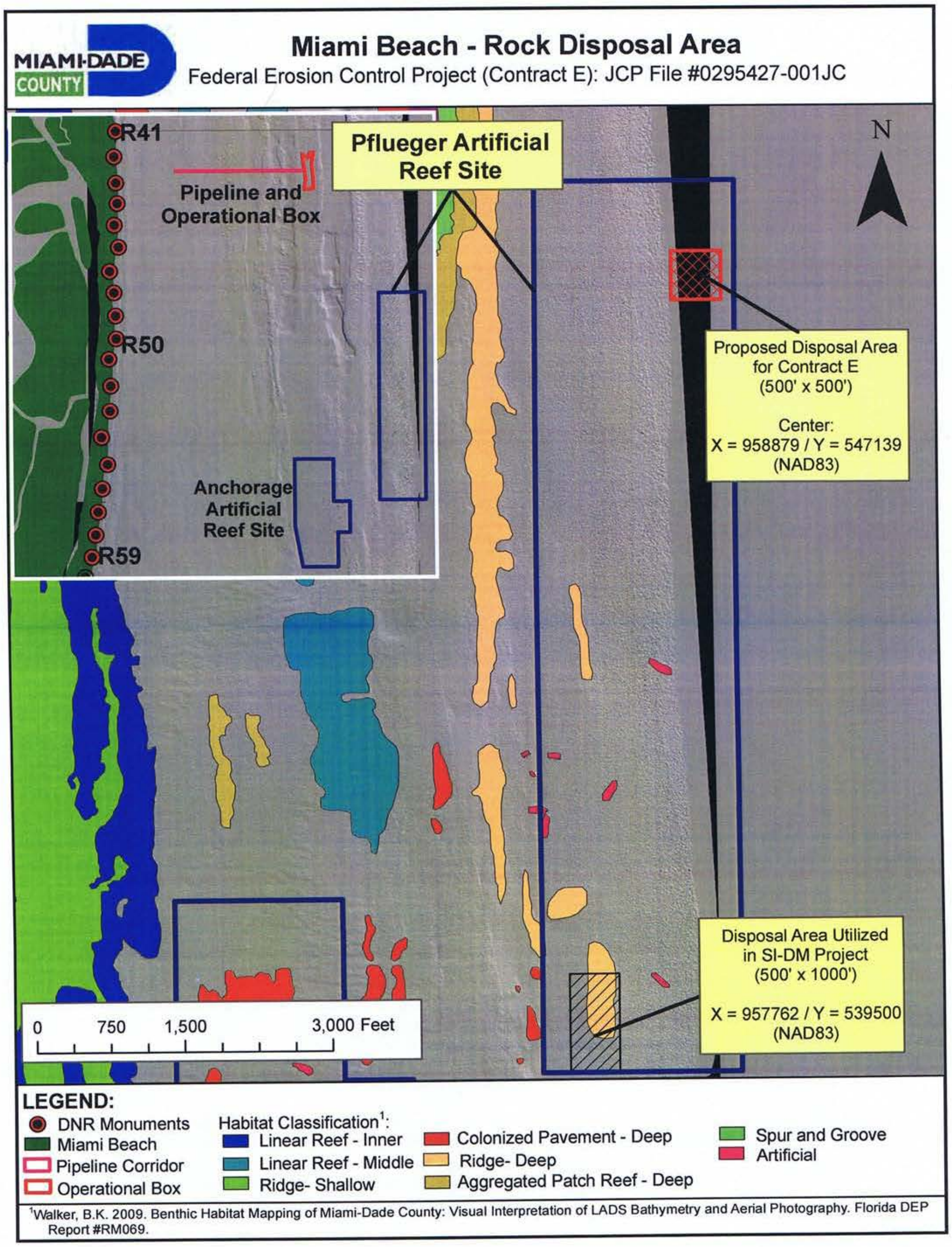
Dsn by: BNH
Dwn by: BNH
Ckd by:
Dated: JAN 2011

BEACH EROSION CONTROL AND
HURRICANE PROTECTION PROJECT
DADE COUNTY, FLORIDA
PERMIT DRAWING
BEACH RENOURISHMENT
INDEX AND COVER SHEET

PLATE
G-001

PERMIT # 295427001

Figure 1. SGCE-1 borrow area, beach placement area, and proposed rock disposal area.



PERMIT # 295427001

Figure 2. Illustration of proposed rock disposal area and nearby benthic habitats.

Joint Coastal Permit (JCP) Final Order No. 295427001: Mitigation and Monitoring

JCP Final Order No.: 0295427-001-JC was issued to the USACE by the Florida DEP after the Final EA was published. The permit issued authorizes the nourishment of Miami Beach priority areas using sand acquired from an offshore borrow area and Lummus Park beach, provided compliance with sand compatibility requirements. This state permitting process constitutes a finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act; and state water quality certification pursuant to Section 401 of the Clean Water Act. The USACE is also permitted under the same JCP Final Order to dispose of rock in a designated rock disposal area as described above.

The USACE is responsible for compliance with the specific conditions of the JCP Final Order, including implementation of turbidity monitoring and the Sediment Quality Assurance/Quality Control Plan described in the Final EA. DERM is responsible for compliance with certain monitoring and contingency mitigation requirements for the Project, including implementation of the requirements of the Final Physical and Biological Monitoring Plan and Contingency Mitigation Plan (Appendix E of the EA). These responsibilities will be memorialized in the negotiated agreement authorizing use of SGCE-1.

In reviewing the JCP Final Order, there was some additional mitigation required by Florida DEP that was not discussed in the Final EA:

- The hopper dredge dewatering/overflow should not occur within state waters and if occurring outside state waters, it should not result in degradation of resources or violate water quality standards within state waters.
- At the Lummus Park beach slurry pit, there should be warning signs advising the public of the construction hazards, any pipes over 8 inches in diameter used in construction activities should be grated at a spacing no greater than 8 inches, and the intake pipe should not lie within 50 feet of any hardbottom community.
- If ponding occurs on the beach cut areas [in the vicinity of Lummus Park], the area must be mechanically excavated in order to allow the ponding to drain. If the ponding occurs during turtle nesting season, the USACE must consult with Florida Fish and Wildlife Commission before proceeding with excavation.

These mitigation measures support existing and related measures to reduce adverse effects to water quality, nearshore hard bottom, and sea turtle nesting habitat.

Cumulative Effects

In comments submitted on the Draft EA, the U.S. EPA indicated that the cumulative effects analysis could be expanded to include past, present, and reasonably foreseeable future beach nourishment projects in South Florida. The USACE inadvertently finalized the EA without revising the EA to be consistent withtheir response to this comment (Appendix F).

In 2009, the USACE published the Southeast Atlantic Regional Sediment Management Plan for Florida, identifying all past, present and foreseeable beach nourishment projects in southeast Florida (available at http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DOCS/OnLine/Broward/USACE-SE-AtlanticRSM_FinalReport_July2009_Inc_Appendices.pdf). The Regional Sediment Management Plan study region includes St. Lucie, Martin, Palm Beach, Broward, and Miami-Dade counties and addresses11 active federal and 10 active non-federal beach nourishment projects (Tables 3.1 - 3.7, RSM Plan Final Report). Regional navigation and ODMDS projects are also discussed in the 1996 Coast of Florida Erosion and Storm Effects Study.

Cumulative effects summarized in the Final EA were also discussed in the NEPA documents incorporated by reference:

- Coast of Florida Erosion and Storm Effects Study, Region III, Feasibility Report with Final Environmental Impact Statement. U.S. Army USACE of Engineers, Jacksonville District, October 1996.
- Final Environmental Assessment, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Second Periodic Nourishment, Surfside and South Miami Beach Segments. U.S. Army USACE of Engineers, Jacksonville District, April 1997.
- Final Environmental Impact Statement, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Modifications at Sunny Isles, U.S. Army USACE of Engineers, Jacksonville District, July 1998.
- Final Environmental Assessment, Renourishment at Miami Beach in the vicinity of 63rd Street. Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. U.S. Army USACE of Engineers, Jacksonville District, November 2000.
- Final Environmental Assessment, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. Proposed Test Fill from a Domestic Upland Sand Source. U.S. Army USACE of Engineers, Jacksonville District, August 2002.

BOEMRE prepared Table 1 to summarize the potential effects of the cumulative actions identifying past, present, and reasonably foreseeable future conditions of the various resources and or impacts. Both beneficial and adverse cumulative effects may occur when the effects of the proposed action are considered in context. Because the relatively small footprint of effect and short-duration of or reversibility of effects attributable to dredging, pipeline conveyance, and placement operations, the proposed action contributes a small to negligible incremental effect to cumulative impacts when added to the impacts of other past, present, and reasonably foreseeable actions affecting the project area.

Table 1: Summary of Cumulative Effects

	Past	**Present**	**Future without Proposed Action**	**Future with Proposed Action**
Aesthetics	Coastal development has historically affected viewshed and open space. Channel maintenance and construction of jetties contributes to beach accretion.	Restored beach temporarily enhances aesthetics.	Eroding beach without nourishment increases potential for shoreline hardening and decreased beach width.	Nourished beach enhances shoreline aesthetics through increased beach width. Periodic nourishment and presence of associated equipment temporarily affects aesthetics during temporary construction period.
Air Quality	Emissions increased with increased vessel traffic given navigation improvements and channel maintenance. In attainment with air quality standards.	Emissions temporarily increase during channel maintenance and beneficial placement activities. In attainment with air quality standards.	Locally deteriorated air quality with ongoing maintenance of navigation channels, channel deepening, and potentially increased vessel traffic. In attainment with air quality standards.	Short-lived and localized incremental contribution to offshore emissions from periodic dredging operations. Air quality expected to be in attainment.
Archaeology/Cultural Resources	No historic properties affected by previous dredging activities or channel maintenance.	No known cultural resources in the project area. Undocumented cultural resources may be disturbed by commercial trawling, commercial and recreational vessel traffic, and ancillary activities supporting channel dredging and ODMDS placement.	Undocumented cultural resources may be disturbed by navigation channel dredging, commercial trawling, and commercial and recreational vessel traffic. Impacts from federal activities should be avoided through mitigation developed through consultation process.	Incremental impact from dredging should be avoided by implementing chance finds clause.
Wildlife Resources	Coastal development and storm erosion further reduces available habitat for wildlife.	Incremental loss of beach habitat for shore and migratory birds and other wildlife due to erosion. Temporary displacement effects associated with beach nourishment and beneficial use placement impact migratory birds and other wildlife with	Incremental loss of beach habitat for shore and migratory birds and other wildlife due to erosion.	Minimal incremental impact on shore and migratory birds with protective measures. Other wildlife temporarily and locally displaced during nourishment. Increased beach width provides additional habitat for nesting and foraging.

	Past	**Present**	**Future without Proposed Action**	**Future with Proposed Action**
		protective measures.		
Benthic Habitat and Communities; Fish and Essential Fish Habitat	Jetty construction and channel deepening altered sediment transport causing erosion and loss of nearshore habitat. Nourishment and beneficial use of dredged material temporarily and locally impacts benthic and fish habitat and species. Benthic habitat and communities recolonize the beach and borrow areas following dredging during past projects, but individual species recovered at different rates. Anchorage and natural events have resulted in damage to hard bottom and reef communities. Artificial reefs have been created to provide suitable habitat for re-colonization.	Nourishment temporarily and locally impact benthic organisms and fish in borrow area, but expected to recover between nourishment cycles. Anchorage and natural events may continue to damage to hard bottom and reef communities. Commercial trawling may contribute to benthic disturbance and declines in foraging fish because of reduced prey, bi-catch, and over-fishing	Potential adverse effect on inter-tidal and nearshore habitat through severe erosion and profile deepening. Anchorage and natural events may continue to damage to hard bottom and reef communities. Commercial trawling may contribute to benthic disturbance and declines in foraging fish because of reduced prey, bi-catch, and over-fishing	Locally, sand resources are diminished or depleted; productive benthic habitat and fisheries habitat is reduced. Anchorage and natural events may continue to damage to hard bottom and reef communities. Recurrent dredging may have a greater effect on the recovery of benthic populations, but benthic and fish communities should recovery following nourishment, especially if dredging occurs outside recruitment windows. Changes in faunal community structure may persist for more than 3 years, but should result in minimal loss of productivity following cessation of dredging.
Manatees/Whales	Construction of approach channel and jetties increased vessel traffic in vicinity of south Miami Beach and contribute o increased strike of protected whales and manatees.	Unintended strike from vessel traffic from commercial, recreational, and naval vessel traffic. Strike risk minimized with seasonal management and protection measures.	Unintended strike from vessel traffic from commercial, recreational, and naval vessel traffic. Strike risk minimized with seasonal management and protection measures.	Negligible incremental contribution because of limited duration and frequency of dredging operations and implementation of observer and speed restriction requirements.
Noise	No ongoing effect from past noise.	Temporary noise in the marine environment associated with shipping and vessel traffic, dredging and commercial activities may contribute to behavioral and sub-lethal injury	Temporary noise in the marine environment associated with shipping and vessel traffic, dredging and commercial activities may contribute to behavioral and sub-lethal injury	Additional dredging noise in the marine environment is incrementally small short-lived and localized. Not additive since source levels dissipate rapidly.

	Past	Present	Future without Proposed Action	Future with Proposed Action
		effects on marine mammals, fish, and sea turtle.	effects on marine mammals, fish, and sea turtle.	
Physical Environment	Decrease in sediment bypassing associated with construction of jetties continues to affect sediment transport, beach dynamics, and quality of intra-tidal and subtidal habitat.	Coastal erosion incrementally decreases subaerial beach, except where accreting at South Miami Beach.	Coastal erosion may result increasingly deteriorating quality of beach habitat.	Incremental removal of sediment resources. Minor changes in hydrodynamics far-field sediment dynamics and shoreline change. Local hydrodynamics in dredged areas may show small deviations from pre-existing conditions, but within range of naturally-occurring conditions.
Recreation Resources	Jetties improved navigational access and safety. Beach nourishment has increased temporarily recreational beach width.	Presence of dredging equipment, commercial fisheries, and other ship and vessel traffic temporarily disrupts recreational boat traffic. Nourishment enhances beach recreation opportunities.	Development, population growth, weather conditions/storm events, coastal erosion and degradation of water quality can adversely impact to recreational experience.	Nourishment increases beach recreation opportunities.
Sea turtles	Historical development reducing availability of nesting habitat. Nourishment and beneficial placement temporarily restored nesting habitat.	Beach erosion reduces sea turtle nesting habitat. Beach lighting and heavy human traffic on beaches during nesting season can also impact sea turtle nesting success. Sand bypassing and beach nourishment compensates for sand disruption. Suite of turtle mitigation minimizes take and extensive monitoring program tracks habitat availability and nesting success.	Potential loss of nesting habitat due to beach erosion. Potential take from commercial fisheries, channel maintenance and deepening, and vessel strike. Required mitigation for federal actions should minimize lethal injury.	Potential take of turtles from beach nourishment and dredging activities. Take during dredging minimized from use of draghead excluder, trawling, and observers. Temporary impact to nesting while profile equilibrates, but long term benefit through nesting habitat restoration. Subaerial impacts include nest destruction, reduced habitat for nesting, and reduced hatching success.
Water quality	Reduced water quality in estuaries associated with coastal	Water quality may continue to deteriorate due to	Some local, short-term turbidity impacts would be	Local, short-term impacts of turbidity and sedimentation will

	Past	Present	Future without Proposed Action	Future with Proposed Action
	development, pollutant, and poor land-use practices. Debris and hazardous and non-hazardous waste from recreational, commercial fishery, and naval vessels degraded water quality and contributed to seasonal eutrophication. Turbidity varies under natural conditions, especially during storm events and hurricanes.	anthropogenic sources of pollution such as stormwater and effluent runoff to nearshore coastal areas. Temporary increase in turbidity with nourishment and maintenance dredging activities, bottom trawling, and offshore dredged material disposal.	avoided. Natural sedimentation and turbidity rates would continue based upon storm activity, rainfall, currents, and other natural phenomena. Water quality may deteriorate due to unrelated anthropogenic Sources, maintenance dredging, and offshore disposal.	occur adjacent to the beach fill sites and offshore borrow area. Preventative measures and monitoring during construction should minimize impact.