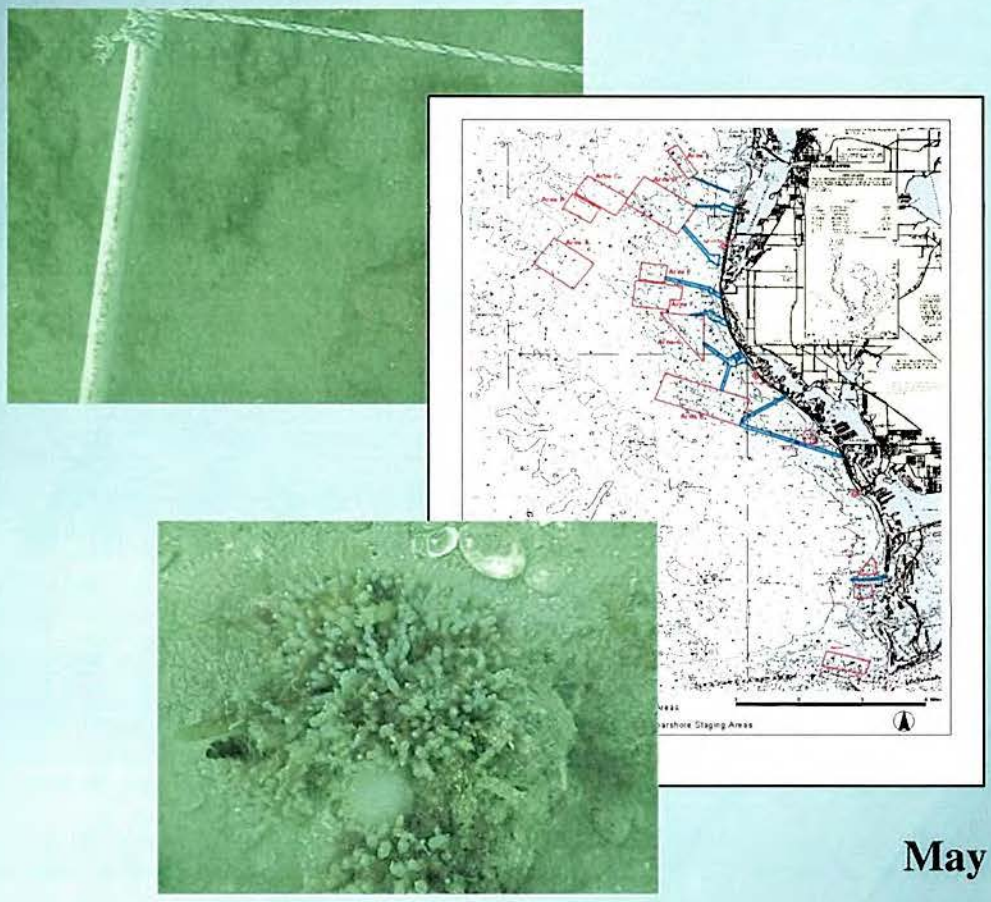
FINAL
ENVIRONMENTAL ASSESSMENT

Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project



May 16, 2003

Prepared for:
U.S. Army Corps of Engineers
Jacksonville District

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250

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

REPLY TO
ATTENTION OF

PINELLAS COUNTY BEACH EROSION CONTROL PROJECT
ALTERNATIVE SAND SOURCE UTILIZATION STUDY
PINELLAS COUNTY, FLORIDA

FINDING OF NO SIGNIFICANT IMPACT

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

1. The Alternative Sand Source Utilization Study investigated nine offshore areas and four ebb tidal shoals for potential borrow sites for future beach nourishment projects in Pinellas County. Marine habitats within these areas have been evaluated for occurrence and quality. Impacts to significant resources will be avoided or minimized.

2. The proposed action is in full compliance with the Endangered Species Act, the Coastal Barrier Resources Act, and the Fish and Wildlife Coordination Act. The proposed action would not jeopardize the continued existence of any threatened or endangered species or adversely impact any designated "critical habitat". Measures to prevent or minimize impacts to fish and wildlife in accordance with the Terms and Conditions of the Biological Opinions from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service will be implemented.

3. The proposed project will be consistent with the Florida Coastal Zone Management Program.

4. State water quality standards will be met.

5. Coordination with the State Historic Preservation Officer (SHPO) will determine the project's effect on historic properties. No known significant historic resources will be directly affected by this project.

6. Economic benefits will be accrued.

7. Measures to eliminate, reduce, or avoid potential impacts to fish and wildlife resources include the following: (1) Offshore hardbottom formations would be protected with a minimum 200-ft. buffer zone where no dredging would be permitted, (2) If nearshore

hardbottoms are impacted by pipeline placement, mitigation by creation of artificial reefs is proposed, (3) The standard manatee protection measures would be followed for all water based activities, (4) The Jacksonville District's Migratory Bird Protection Policy would be followed if any migratory birds are encountered.

9 June 2005
Date

James G. May
Colonel, U.S. Army
District Engineer

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Prepared for:
U.S. Army Corps of Engineers
Jacksonville District
701 San Marco Blvd.
Jacksonville, FL 32207

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250

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1.0 PROJECT PURPOSE AND NEED

Shoreline erosion and a lowered beach profile caused by storms, wave action, and currents have become a serious concern along Pinellas County barrier island beaches. As a means of controlling shoreline erosion and providing storm protection to these barrier islands, fill material has been placed along the shorelines. The Pinellas County Beach Erosion Control Project (Project) has historically obtained beach quality fill from inlet borrow areas and the Egmont Channel Shoal for nourishment of Pinellas County beaches. Offshore and ebb tidal shoal borrow areas have been identified for future use. This Environmental Assessment evaluates the alternatives that were proposed for this project.

1.1 Project Authority

The Rivers and Harbors Act of 1966 and the subsequent Water Resources Development Act of 1986 (Public Law 99-662) authorized the beach erosion control project for Pinellas County, Florida. This Environmental Assessment (EA) has been prepared to comply with the National Environmental Policy Act (NEPA).

1.1.1 Initial Authorization

The Pinellas County Beach Erosion Control Project was authorized by Section 101 of Public Law (PL) 89-789, Rivers and Harbors Act of 1966, passed November 1966. The authorized project is described in HD 519/89/2.

1.1.2 Supplemental Appropriation

Supplemental appropriation of the Pinellas County Beach Erosion Control Project has occurred many times in the past. The *Beach Erosion Control Project Review Study and Environmental Impact Statement for Pinellas County, Florida* (1984), with revisions in December 1984, was the first re-examination of the program since its inception and was prepared in compliance with resolutions adopted 4 March 1976 by the Committee on Public Works of the United States Senate and 23 September 1976 by the Committee on Public Works and Transportation of the House of Representatives, United States. A supplemental *Limited Reevaluation Report (LRR) to the Beach Erosion Control Project Review Study* (1984) was prepared in April 1994. This LRR summarizes the results of the authorized project. Federal cost sharing of the periodic nourishment of the Treasure Island segment of the project expired in 1985. Subsequently, the Water Resources Development Act of 1986 reauthorized the project for construction and periodic nourishment for the 50-year economic life. The final document filed for the project was the *Pinellas County, Florida Beach Erosion Control Project 1st Renourishment Sand Key Segment Design Memorandum With Environmental Assessment* dated November 1996, Revised March 1997.

1.2 Project Location

The project area is located in Pinellas County on the West coast of Florida, near the central portion of the Florida peninsula, approximately 25 miles west of Tampa. The sites evaluated in this document include the nearshore and offshore areas of Sand Key, Long Key, and Treasure Island (Figure 1).

1.3 Project Need or Opportunity

Shoreline erosion and a lowered beach profile caused by storms, wave action, and currents have become a serious concern along Pinellas County barrier island beaches. As a means of controlling shoreline erosion and providing storm protection to these barrier islands fill material has been placed along the shorelines. The Pinellas County Beach Erosion Control Project has historically obtained beach quality fill from inlet borrow areas and the Egmont Channel Shoal for nourishment of Pinellas County beaches. Nine offshore borrow areas have been identified for future use. Bathymetry and side-scan sonar of nearshore marine habitats have also been performed. Marine habitats within these nearshore areas have been evaluated for occurrence and quality to facilitate minimization of impacts to these resources through beach nourishment activities utilizing the offshore and ebb tidal shoal borrow areas.

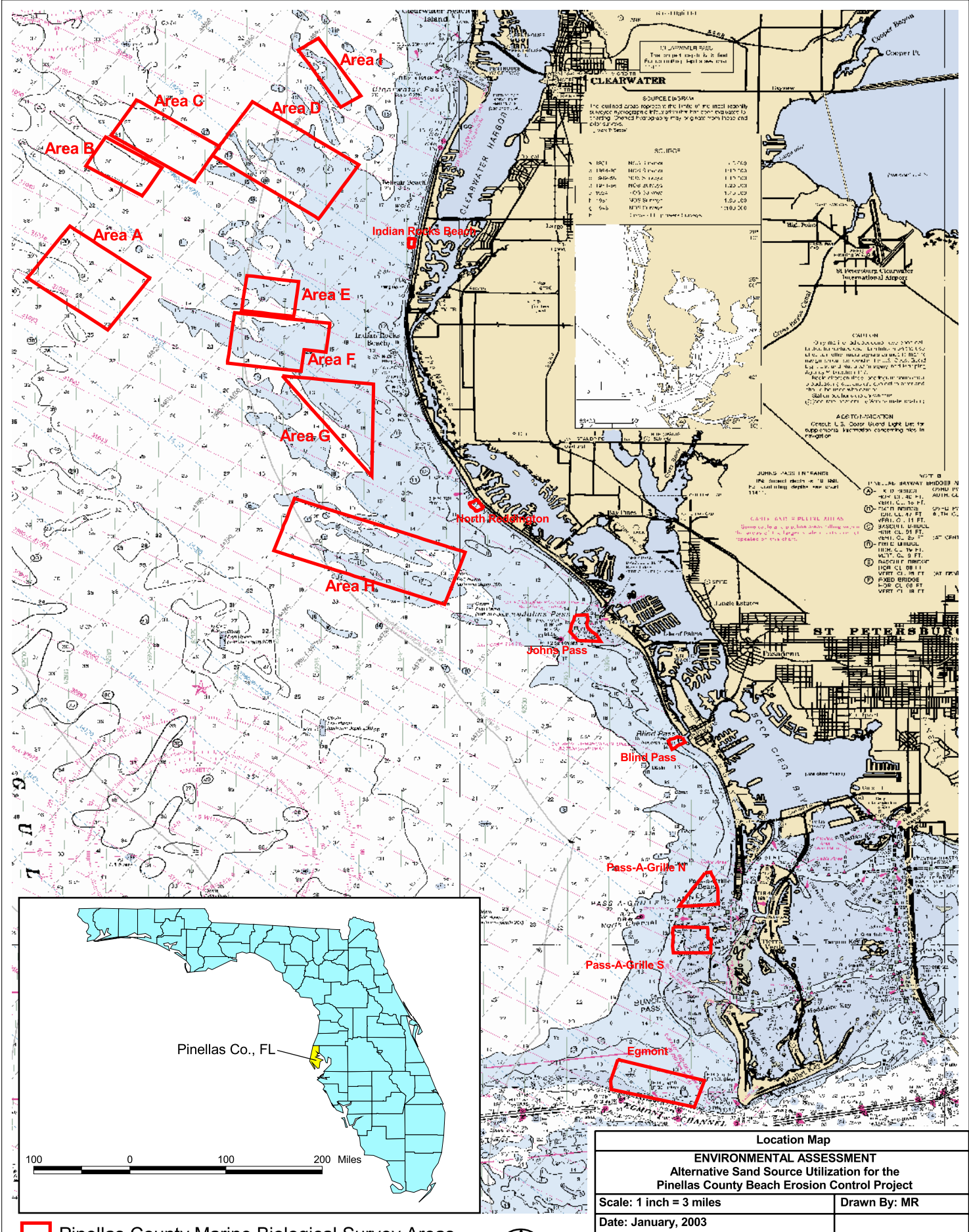
1.4 Agency Goal or Objective

1.4.1 Objective

The objective of the Preferred Alternative is to utilize sand sources closer to the project areas previously authorized for maintenance renourishment activity. The currently authorized borrow area of Egmont Channel Shoal is more than 20 miles away from the beaches authorized for renourishment. This is not always a cost effective alternative for small nourishment events. Borrow areas closer to the project areas, such as ebb tidal shoals, would significantly reduce the hauling distance, thus offering more cost effective construction options.

1.4.2 Preferred Alternative

The Preferred Alternative would allow the U.S. Army Corps of Engineers (Corps) to utilize the nine offshore areas and four ebb tidal shoals as potential borrow areas for future beach nourishment/renourishment activities. These borrow areas would be utilized in lieu of/in addition to the authorized Egmont Channel Shoal borrow area.



Location Map	
ENVIRONMENTAL ASSESSMENT Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project	
Scale: 1 inch = 3 miles	Drawn By: MR
Date: January, 2003	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J02-582
	Figure 1

1.5 Related Environmental Documents

The following is a list of related environmental documents:

a. *Beach Erosion Control Project Review Study and Environmental Impact Statement for Pinellas County, Florida*. USACE. July 1984 (Revised December 1984).

b. *Limited Re-evaluation Report and Environmental Summary for Pinellas County, Florida Beach Erosion Control Project*. USACE. April 1994 (Revised August 1994).

c. *Pinellas County, Florida Beach Erosion Control Project Feature Design Memorandum Northern Treasure Island*. USACE. April 1995.

d. *Pinellas County, Florida Beach Erosion Control Project 1st Renourishment Sand Key Segment Design Memorandum with Environmental Assessment*. USACE. November 1996 (Revised March 1997).

e. *Marine Biological Survey Pinellas County Shore Protection Project Comprehensive Borrow Area Survey*. Dial Cordy and Associates. February 2002. (Appendix A)

f. *Pinellas County Shore Protection Project Comprehensive Borrow Area Study Borrow Area Resource Identification and Impact Assessment*. Dial Cordy and Associates. May 2002. (Appendix A)

g. *Pinellas County Treasure Island and Long Key Segment Side Scan Sonar Hardbottom Mapping Survey St. Petersburg, Florida Survey No. 01-247.* Sea Systems Corporation. July 2002.

h. *Pinellas County Sand Key Segment, Side Scan Sonar Hardbottom Mapping Survey, St. Petersburg Beach, Florida, Survey Number 01-149.* Sea Systems Corporation, August 2001. (Appendix A)

1.6 Decisions to be Made

This EA evaluates the use of the offshore areas and ebb tidal shoals to be utilized as borrow areas for the Pinellas County Beach Erosion Control Project. Included in this EA is an evaluation of alternatives associated with use of these borrow areas as compared to the currently authorized borrow area of Egmont Channel Shoal.

1.7 Scoping and Issues

1.7.1 Issues Evaluated in Detail

The following issues were identified during scoping and determined by the preparers of this EA to be relevant to the Preferred Alternative and appropriate for detailed evaluation:

a) Functions and values of nearshore and offshore hardbottom resources.
b) Primary, secondary, and cumulative impacts of the Preferred Alternative on hardbottom resources.
c) Potential impacts of the Project on Essential Fish Habitat.
d) Turbidity and sedimentation impacts to hardbottom and reef communities in the vicinity of the borrow areas.
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 Preferred Alternative and No-Action Alternative.

1.7.2.1 Hardbottom Impacts

Alternatives will be evaluated on the basis of the potential impacts on hardbottom and reef resources in the Project area. Based on extensive experience with beach nourishment and use of offshore borrow areas in Pinellas County and other Florida beaches, impacts to hardbottom can be reasonably predicted based on proximity, currents, nature of borrow material, buffer zones, and other factors.

1.7.2.2 Sea Turtles

Alternatives are also evaluated based upon the extent to which the alternative accomplishes the Project purpose of restoring and maintaining sea turtle nesting habitat and the potential detrimental impacts of that alternative in reducing nesting habitat or interfering with nesting success.

1.7.2.3 Other Impacts

The basis for impact measurement and comparison including coastal barrier resources, offshore borrow area resources, water quality, and air quality are stated more specifically in Section 4.0, Environmental Consequences, and other sections of this document and its appendices.

2.0 ALTERNATIVES

In this section, the analysis will evaluate the Preferred Alternative and the No-Action Alternative. This section, in combination with others, is intended to provide a clear basis for choice among options available. This section provides substantial detail for the two alternatives considered so that reviewers may evaluate the comparative merits of both alternatives.

2.1 Description of Alternatives

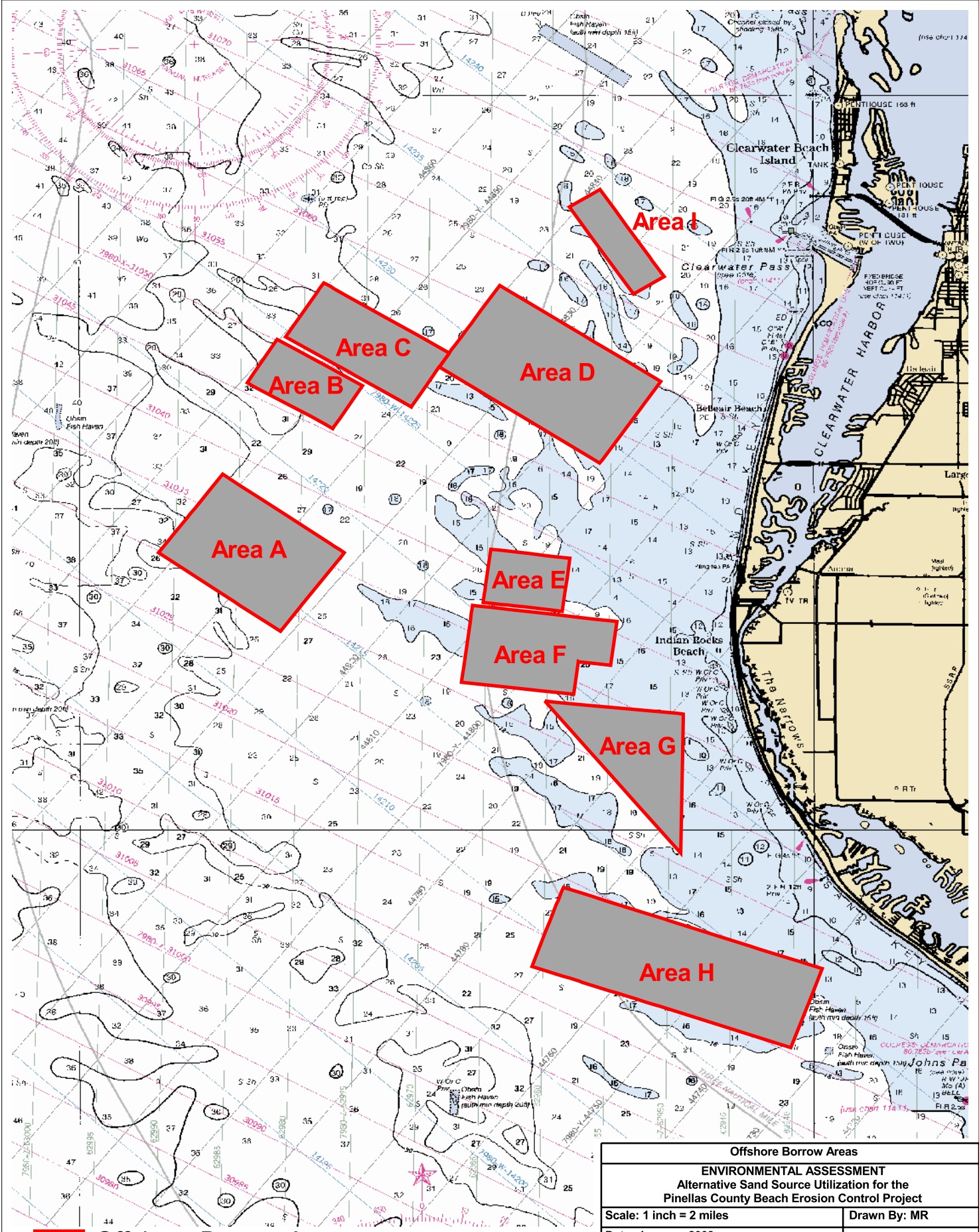
This section describes the two alternatives evaluated in this document.

2.1.1 Use of New Offshore Sand Borrow Areas (Preferred Alternative)

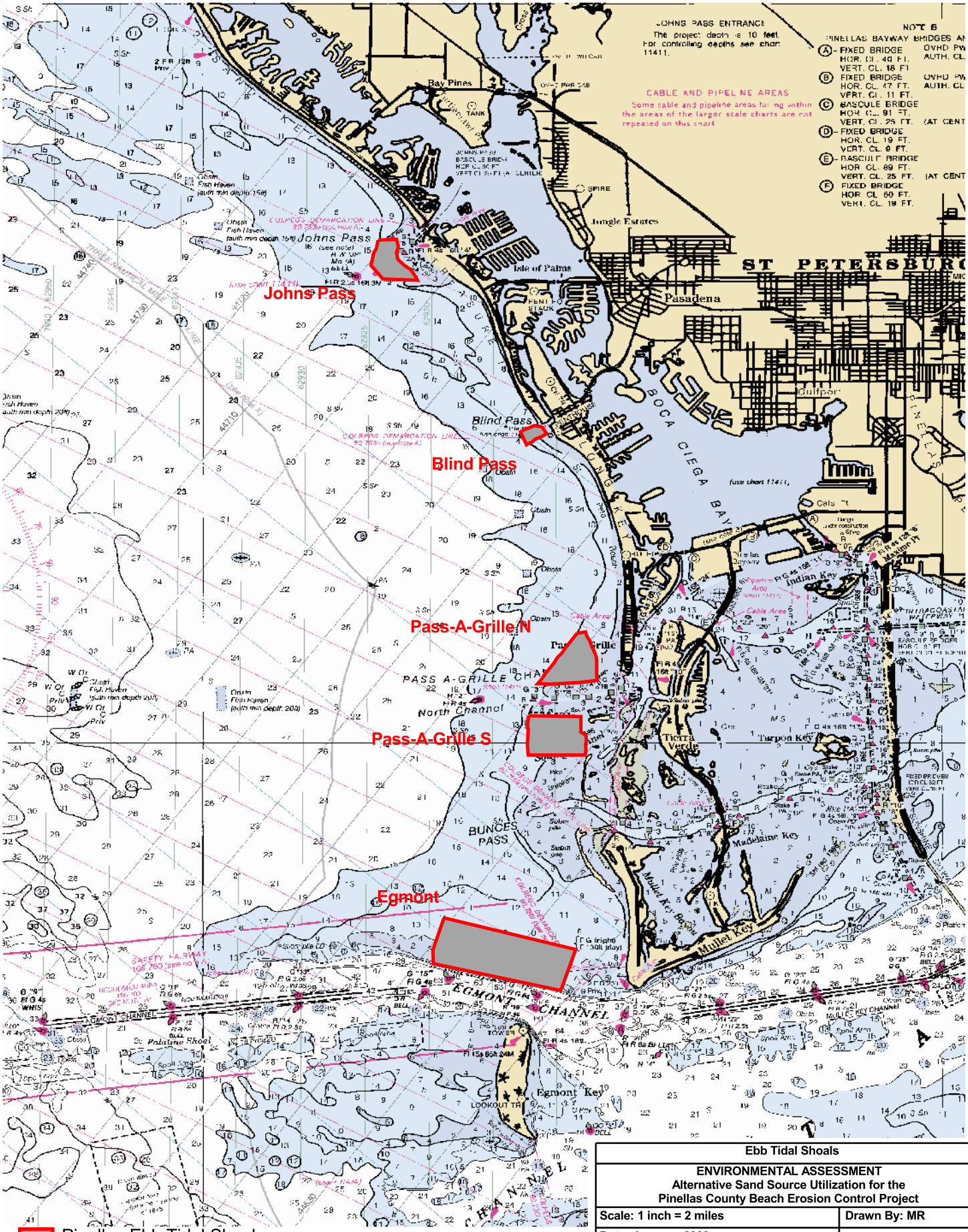
The Preferred Alternative would involve the use of nine offshore borrow areas and four ebb tidal shoals (Figures 2 and 3) as a supply of material for renourishment activities along the shoreline of Pinellas County. The utilization of these offshore borrow areas would allow for sand sources closer to the project areas located on Sand Key, Treasure Island, and Long Key. This would make nourishment and renourishment activities associated with the Pinellas County Beach Erosion Control Project more cost effective by shortening the distance material is moved prior to beach placement and allowing for a variety of dredging methods to be employed. The Pass-a-Grille channel area has also been mapped and beach quality sand from the channel or ebb tidal shoals may also be utilized (Figure 4). Environmental surveys and preliminary impact analysis of the offshore borrow areas, ebb tidal shoals, and nearshore pipeline corridors and staging areas are located in Appendix A.

2.1.2 No-Action Alternative (Status Quo - Continued Use of Egmont Channel Shoal)

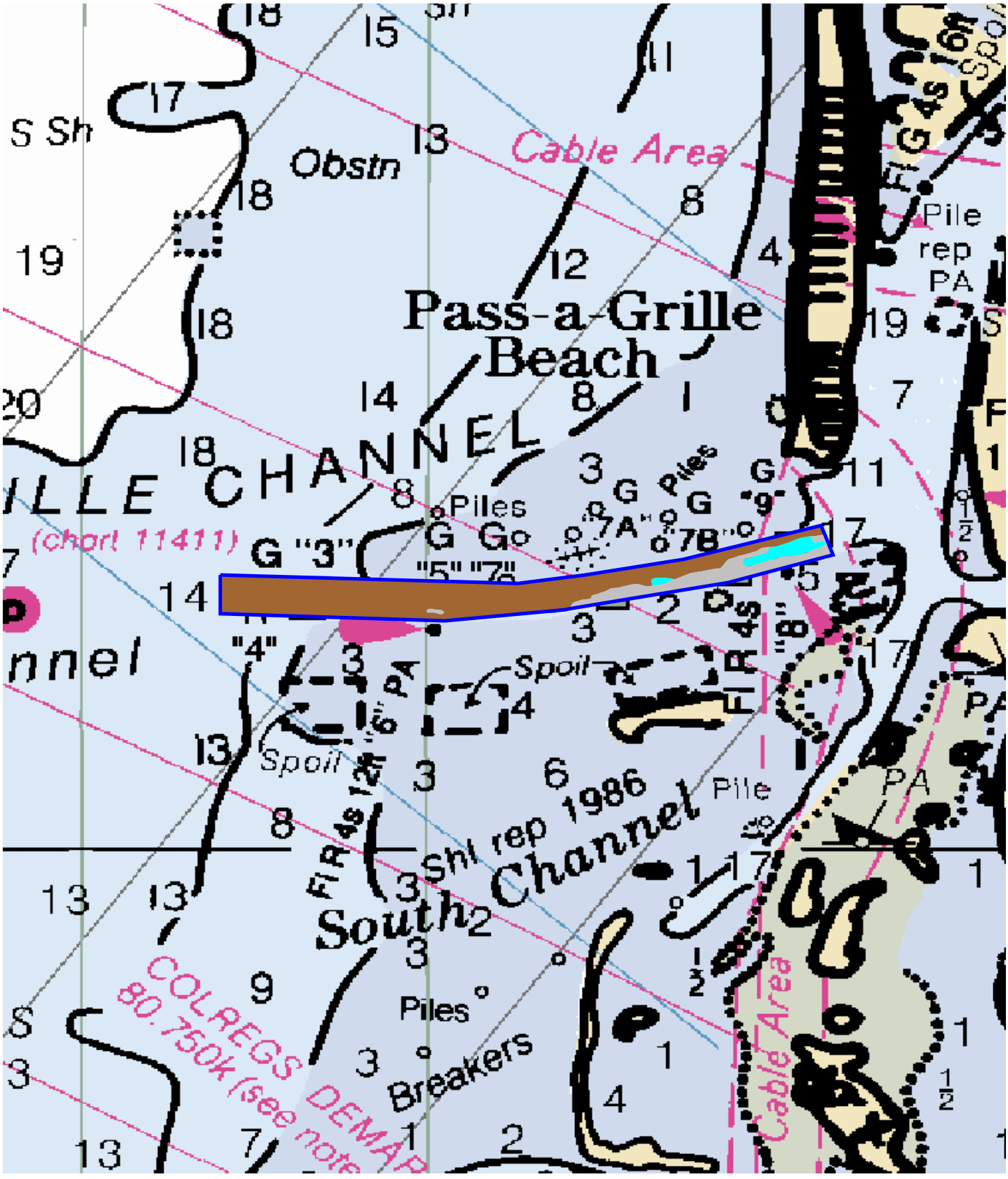
The No-Action Alternative would not result in any changes to the current shore protection measures in place within Pinellas County. The authorized borrow area for the current project is the Egmont Channel Shoal. This shoal area has enough material to supply the current needs of the authorized project. However, the distance from Egmont Channel Shoal to the beaches in need of nourishment or renourishment project makes the use of this area cost prohibitive. Projects along the northern reaches of Pinellas County require that contractors move material needed for the project over 20 miles. This limits the methods that contractors can use, and also increases costs because of the long travel distance with fill material.



Offshore Borrow Areas	
ENVIRONMENTAL ASSESSMENT Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project	
Scale: 1 inch = 2 miles	Drawn By: MR
Date: January, 2003	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J02-582
	Figure 2



Ebb Tidal Shoals	
ENVIRONMENTAL ASSESSMENT Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project	
Scale: 1 inch = 2 miles	Drawn By: MR
Date: January, 2003	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J02-582
	Figure 3



Survey Area for Corridors and Nearshore Staging Areas

Nearshore Resource Map

- Sand
- Shell Hash
- Patchy Hardbottom / Low Relief

2000 0 2000 4000 Feet

Pass-A-Grille	
ENVIRONMENTAL ASSESSMENT Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project	
Scale: 1 inch = 2,000 feet	Drawn By: MR
Date: January, 2003	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J02-582
	Figure 4

2.2 Comparison of Alternatives

A direct comparison of the two alternatives proposed for evaluation in this document is shown in Table 1.

Table 1 Comparison of Alternatives

Resource	No-Action Alternative	Preferred Alternative
Sediment Characteristics	The native sediment characteristics and that of the borrow area will remain unchanged.	The native sediment characteristics will be maintained, with only minor variations in shell content and color.
Protected Species	No impacts to threatened and endangered species are expected as most of the construction activities are scheduled outside of the nesting season of sea turtles. Any construction scheduled during the nesting season will include a program to allow for nest relocation in accordance with state and federal guidelines. The additional beach area will increase sea turtle nesting habitat. The preferred alternative will also enhance the potential nesting and foraging areas of shorebirds.	No impacts to threatened and endangered species are expected as most of the construction activities are scheduled outside of the nesting season of sea turtles. Any construction scheduled during the nesting season will include a program to allow for nest relocation in accordance with state and federal guidelines. The additional beach area will increase sea turtle nesting habitat. The preferred alternative will also enhance the potential nesting and foraging areas of shorebirds.
Hardbottom Resources	No Impact	No impacts to hardbottom resources within the borrow areas will occur. Impact to hardbottom resources within the pipeline corridors only. Impacts to hardbottom resources within the pipeline corridors will be mitigated through the construction of artificial reefs in similar depths to the areas impacted.
Benthic Habitat	Temporary impacts to infaunal communities within the Egmont Channel Shoal borrow area and beach fill area.	Temporary impacts to infaunal communities within the offshore borrow area and beach fill area.

Resource	No-Action Alternative	Preferred Alternative
Essential Fish Habitat	Temporary impacts would include displacement of fishes from nearshore areas during dredging and fill placement, temporary reduction of water quality due to turbidity, and decreased primary productivity until the completion of nourishment.	Temporary impacts would include displacement of fishes from nearshore areas during dredging and fill placement, temporary reduction of water quality due to turbidity, and decreased primary productivity until the completion of nourishment.
Coastal Barrier Resource Units (CBRU)	No impact	No impact
Hazardous, Toxic, and Radioactive Waste	No impact	No impact
Air Quality	No impact	No impact
Noise	A temporary increase in the noise level during construction in the vicinity of the discharge point on the beach will occur.	A temporary increase in the noise level during construction in the vicinity of the discharge point on the beach will occur.
Aesthetic Resources	Construction of the beach fill project will benefit aesthetic resources through increased beach width, vegetated habitat, and dune enhancement.	Construction of the beach fill project will benefit aesthetic resources through increased beach width, vegetated habitat, and dune enhancement.
Recreation	The improved beaches will provide enhanced opportunities for recreational activities. During nourishment activities, the use of the beach in the immediate vicinity of construction would be temporarily restricted for public safety.	The improved beaches will provide enhanced opportunities for recreational activities. During nourishment activities, the use of the beach in the immediate vicinity of construction would be temporarily restricted for public safety.
Navigation	No impact	No impact
Cultural Resources	No impact expected	No impact expected

2.3 Mitigation

Mitigation for any hardbottom impacts associated with construction of projects associated with the Pinellas County Beach Erosion Control Project will be based on surveys conducted to map and assess conditions present in the construction area. New impacts to hardbottom resources within specific areas will be mitigated by the placement of artificial reefs similar to

those used for mitigation in prior projects within Pinellas County. Pinellas County has an organized artificial reef program which uses concrete and limestone boulders for the creation of artificial reefs. The artificial reefs will be created as necessary and placed to provide similar habitat to the habitat that was lost. It is proposed that these reefs will be monitored twice a year (seasonally) for two years for recruitment and their overall success at providing similar habitat. This monitoring will be done in conjunction with the current Pinellas County artificial reef program. The Florida Department of Environmental Protection (DEP), Corps, and Pinellas County will agree upon the details of the monitoring plan prior to implementation.

3.0 AFFECTED ENVIRONMENT

This section describes those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those resources that would affect or that would be affected by the alternatives if they were implemented. This section forms the baseline conditions for determining the environmental impacts of the Project.

3.1 Coastal Environment

The project area is the Gulf of Mexico coastline in Pinellas County, Florida. Pinellas County has a subtropical climate and experiences an average annual rainfall of 53 inches per year. Damaging storms with winds up to hurricane strength occur during fall, winter, and spring. Seven elongated, low-profile islands roughly parallel the mainland. The beaches along these barrier islands are subject to very stressful and dynamic conditions. Typically these habitats have very low species diversity because of the harshness of the environment. The beaches of these seven islands provide feeding areas for aquatic animals and potential sea turtle nesting habitat. These beaches are being eroded at varying rates by winds, waves, and currents.

3.2 Sediment Characteristics of Borrow Areas and Beach

Core boring and sampling have been performed for the Pinellas County Beach Erosion Control Project since 1960. A detailed description of the history of the sampling and testing for this project is contained in the project General Design Memorandum, Addendum IV, and also in the 1st Renourishment Sand Key General Design Memorandum (USACE, 1984; 1996).

3.2.1 Grain Size of Borrow Areas Sediment

The U.S. Geological Survey, Center for Coastal Geology, initiated a West-Central Florida Coastal Erosion Study in 1993, to establish a baseline of coastal information to be used in management decisions. During these surveys, the offshore borrow areas and ebb tidal shoals outlined in this EA were investigated. Side-scan sonar, core boring and grain size analysis were performed (USACE, 1996; EMC, 1998; Sea Systems, 2001; Sea Systems, 2002). Grain sizes of sediments within the offshore borrow areas ranged from 0.23 mm to 0.36 mm with a composite grain size of 0.29 mm for all the offshore borrow areas.

3.2.2 Grain Size of Beach sediment

Native beach sediments within the areas scheduled for nourishment and renourishment have been investigated and monitored many times in the past (USACE, 1996). The most current post construction monitoring of nourished beaches in Pinellas County has mean grain sizes ranging from 0.29 mm to 0.32 mm. Beaches that have never undergone any nourishment tend to have mean grain sizes between 0.19 mm to 0.29 mm (USACE, 1996).

3.2.3 Suitability of Sediments

Comparisons of sediments from the offshore borrow areas and ebb tidal shoals has been previously conducted by the Corps (USACE, 1996). Sediments within the offshore borrow areas and ebb tidal shoals have characteristics similar to those of native sediments and from the previously approved borrow area of Egmont Channel Shoal.

3.3 Threatened and Endangered Species

This section describes the biology of protected species potentially affected by the Preferred Alternative.

3.3.1 Sea Turtles

Four species of sea turtle commonly occur within the area around Pinellas County (Meylan, et al., 1999; EPA, 1981). These are the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), and the hawksbill (*Eretmochelys imbricata*). The loggerhead is listed as threatened and the other three species are listed as endangered. Loggerhead turtles represent most of the sea turtles present in the Tampa Bay area. Data collected on sea turtle nesting in the area shows that the majority of the nests within this area consist of loggerhead nests (Table 2). Of the 279 nests observed on Pinellas County beaches in 2000, 278 were loggerhead nests. The only other nesting activity reported was one green turtle nest. All turtles observed during this survey were loggerhead turtles which were seen with regular consistency while conducting the survey. Stranding records within the Pinellas County area also confirmed that loggerhead turtles are the most numerous species. During this survey, a dead loggerhead was discovered and reported to the Florida Marine Research Institute (FMRI) stranding network.

Table 2 Summary of Loggerhead Sea Turtle Nesting From 1988-2000

Year	Beach Length Surveyed	Number of Nests
1988	69.5	56
1989	63.2	92
1990	62.1	144
1991	67.3	175
1992	63.3	142
1993	42.7	105
1994	52.6	138
1995	58.8	229
1996	49.1	223
1997	58.8	181
1998	52.3	233
1999	62.6	172
2000	62.6	279

Source: Florida Marine Research Institute, 2001

3.3.2 Marine Mammals

The Gulf of Mexico is within the range of the West Indian manatee (*Trichechus manatus*), and up to 28 cetacean species. Marine mammals commonly present within the waters nearshore and offshore the project area include manatee and bottlenose dolphin. Bottlenose dolphins were commonly observed while conducting this survey. As many as 15 dolphins were observed at one time in the areas adjacent to the offshore borrow areas. Weigle (1990) documented that at least three distinct herds of dolphin are common within the Lower Tampa Bay area. This includes as many as 246 individual animals. Many of the dolphins observed by Weigle may have been transient in nature. However, 75 individuals were observed on more than one occasion.

West Indian manatees also utilize habitats within the project area. Manatees inhabit both fresh and saltwater and may be encountered in canals, rivers, estuaries, bays, and on rare occasion have been observed as far as 6 km off the Florida Gulf coast (USFWS, 1996). Aerial surveys indicate that as many as 190 manatees may use Tampa Bay (Ackerman, 1995). Surveys show that over 900 manatees inhabit the west coast of Florida. The highest concentrations of manatees along Florida's Gulf coast exist in Citrus, Levy, Lee, and Collier Counties. Data suggest that of the manatees living in the Tampa Bay area, most occur within the bay where water temperatures are more stable year round. During aerial surveys in 1992, only 15 manatees were surveyed in the eastern portion of Tampa Bay (Ackerman, 1995). Examination of the manatee mortality data for Pinellas and Hillsborough Counties shows that from January 2000-October 2001 a total of 27 manatee deaths were reported. The majority of these deaths involved perinatal, cold stress, or other natural causes.

3.3.3 Other Species

The gulf sturgeon (*Acipenser oxyrinchus desoti*) may also be present in the project area. Current information on the range and distribution of the gulf sturgeon in the areas offshore of Pinellas County is not available, however.

3.4 Fish and Wildlife Resources

3.4.1 Offshore Sand Bottom Communities

Softbottom habitats include areas with little or no rock, limestone, or hard coral structure, and comprise mostly sand, mud, and silt substrates. Where sand is the primary substrate, and vegetation is lacking, the most diverse portion of biota occupying these communities is the benthic infauna. The most consistent fauna within these communities are several taxa of polychaetes, oligochaetes, mollusks, sipunculans, peracarid crustaceans, platyhelminthes, and nemerteans. Other frequent occupants of these habitats include demersal fish (e.g., flounders), bivalves, decapod crustaceans, and certain shrimp.

3.4.2 Hardbottom Communities

The area surveyed included areas offshore of Pinellas County, Florida. These potential borrow areas exist in water depths from seven to ten meters. Lyons and Collard (1974) describe these communities as areas of moderate wave energy with quartz sand and shell fragment sediments extending offshore. Large temperate mollusks and echinoderms tend be the dominant faunal elements. In areas over 10 meters in depth, exposed rock substrate allows for the establishment of scleractinian, molluscan, crustacean, tunicates, and other species more common to shallower waters of south Florida (Smith, 1974; Lyons and Collard, 1974). Quartz sands, with biologically influenced carbonates present, also dominate the sediments within this area.

3.4.2.1 Marine Algae

The marine algae present within the areas offshore of Pinellas County are extremely diverse. Phillips, et al. (1960) identified 95 taxa of algae within areas of similar depth in this area. Dominant algal species observed during this and other studies include *Caulerpa* sp., *Halimeda* sp., *Udotea flabellum*, *Sargassum* sp., and *Rhipocephalus phoenix* (Phillips, et al., 1960; EPA, 1981; CZR, 1991).

3.4.2.2 Invertebrates

Benthic invertebrates associated with livebottom habitats along the eastern Gulf of Mexico include scleractinian, molluscan, crustacean, tunicates, octocoral, echinoderm, and poriferan species. Many of these species are similar to species found in the more tropical waters of the Caribbean and south Florida reef tract. Lyons and Collard (1974) characterized the shallow shelf habitat offshore of Pinellas County as an area with sediments dominated by quartz sand and biogenically derived carbonates with exposed rock substrate. This substrate provides habitat for scleractinian, molluscan, crustacean and other invertebrate species.

Previous studies have identified species common to habitats offshore of Pinellas County (EPA, 1981; CZR, 1991; Child, 1992; Posey, et. al, 1996). The species listed in these previous studies compares closely to species observed during this survey (Table 3). In total, over 40 dominant invertebrates species were observed from the diver and video surveys. There are many more cryptic and less obvious species present within these complex habitats.

Table 3 Dominant Invertebrate Species Observed During Borrow Area Surveys

Scientific Name	Common Name
Sponges	
Cribrochalina vasculum	Brown Bowl Sponge
Xestospongia muta	Giant Barrel Sponge
Spheciospongia vesparium	Loggerhead Sponge
Ircinia sp.	Ball Sponge
Calyx podatypa	Dark Volcano Sponge
Anthosigmella varians	Brown Variable Sponge
Amphimedon compressa	Erect Rope Sponge
Scleractin Corals	
Cladocora arbuscula	Tube Coral
Stephanocoenia mitchelinii	Blushing Star Coral
Isophyllia sinuosa	Cactus Coral
Siderastrea sp.	Starlet Coral
Solenastrea hyades	Knobby Star Coral
Scolymia lacera	Mushroom Coral
Phyllangia americana	Hidden Cup Coral
Manicina aereolata	Rose Coral
Montastrea annularis	Boulder Star Coral
Oculina robusta	Robust Ivory Tree Coral
Millepora alcicornis	Branching Fire Coral
Octocorals	
Eunicea succinea	Shelf-knob Sea rod
Eunicea calyculata	Warty Sea Rod

Scientific Name	Common Name
Plexaurella nutans	Giant Slit-Pore Sea Rod
Muricea laxa	Delicate Spiny Sea Rod
Muricea elongata	Orange Spiny Sea Rod
Pseudoterogorgia sp.	Sea Plume
Pterogorgia citrina	Yellow Sea Whip
Leptogorgia virgulata	Colorful Sea Whip
Pseudoceratina crassa	Branching Tube Sponge
Echinoderms	
Linckia guildingii	Common Comet Star
Astropecten articulatus	Beaded Sea Star
Echinaster spinulosus	Orange-Ridged Sea Star
Luidia clathara	Striped Sea Star
Luidia sp.	Sea Star
Luidia alternata	Banded Sea Star
Echinometra lucunter	Rock-boring Urchin
Lytechinus variegates	Variegated Urchin
Mollusks	
Pinna carnea	Penshell
Charonia variegata	Tritons Trumpet
Busycon contrarium	Lightning Whelk
Pleuroploca gigantean	Florida Horse Conch
Crustaceans	
Menippe mercenaria	Florida Stone Crab
Tunicates	
Clavelina sp.	Colonial tunicates
Family Didemnidae	Overgrowing Tunicates
Eudistoma sp.	Condiminium Tunciate

The most obvious feature of the hardbottom habitats in the eastern Gulf of Mexico include the octocorals, sponges, and scleractinian corals. Eight species of octocoral were observed (e.g. *Eunicea succinea, Eunicea calyculata, Pterogorgia citrina,* etc.), as well as, 11 species of scleractinian (hard) corals (e.g. *Cladocora arbuscula, Solenastrea hyades*) (Table 3). Poriferian species are also one of the dominant phyla present within the hardbottom habitats. Eight species of sponges were identified within the project area and, of these, the loggerhead (*Spheciospongia vesparium*) and barrel sponges (*Xestospongia muta*) were the most obvious. Other sponges common to these hardbottom habitats included *Ircinia* sp., *Cribrochalina vasculum,* and *Anthosigmella varians.*

Typical epifaunal species observed during this survey include *Astropecten articulatus, Luidia clathara, Busycon contrarium,* and *Pleuroploca gigantean*. CZR (1991) and EPA (1981) also found these species to be some of the most common encountered. Sediments within the area consist of sand to shelly sand that support benthic invertebrate communities. In the EPA (1981) study, dominant species in these habitats included sand dollars (*Encope emarginata*),

Luidia sp., and *Enchinocardium cordatum*. Similar species were observed during this study. Benthic sampling conducted during past surveys also shows that polychaetes, oligochaetes, pycnogonids, bivalves, and arthropods are the dominant taxa collected in these habitats (CZR, 1991; Child, 1992; Posey, et al., 1996).

3.4.3 Essential Fish Habitat (EFH)

The Gulf of Mexico Fisheries Management Council (GMFMC) (1998) has designated unvegetated bottom and water column areas within the project area as EFH, in compliance with the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801-1882), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). A complete EFH assessment in located in Appendix B. A summary of that assessment is included here. Managed species that commonly inhabit the project area are shown in Table 4.

Table 4 Managed Species Commonly Occurring Within the Project Area

Common Name	**Scientific Name**
Juvenile Red Snapper	*Lutjanus campechanus*
Cobia	*Rachycentron canadum*
King mackerel	*Scomberomorus cavalla*
Bluefish	*Pomatomus saltatrix*
Dolphin	*Coryphaena hippurus*
Red Drum	*Sciaenops ocellatus*
Brown shrimp	*Penaeus aztecus*
Pink Shrimp	*P. duorarum*
White Shrimp	*P. setiferus*

Source: Gulf of Mexico Fisheries Management Council 1999

The Gulf of Mexico in this region also provides essential forage, cover, and nursery habitats for other species that are important commercially and recreationally. These include the blue crab (*Callinectes sapidus*), flounder (*Syacium* sp.), and mullet (*Mugil* sp.), as well as prey species, such as the longspine porgy (*Stenotomus caprinus*) and dwarf goatfish (*Upeneus parvus*) (Hammer, et al., 2000). A summary of managed species and their seasonal occurrence within the area is shown in Table 5.

Table 5 Species Managed by the Gulf of Mexico Fishery Management Council

Species	Seasonal Occurrence	Habitat Affinity
Brown Shrimp (*Penaeus aztecus*)	Adults- Year Round	Soft Bottom
Pink Shrimp (*Penaeus duorarum*)	Adults-Year Round	Soft Bottom
White Shrimp (*Penaeus setiferus*)	Adults-Year Round Spawning -March to October	Soft Bottom
Stone Crab (*Menippe mercineria*)	Adults-Year Round	Soft Bottom
Gag (*Mycteroperca microlepis*)	Adults-Year Round	Hard Bottom
Scamp (*Mycteroperca phenax*)	Adults-Year Round	Hard Bottom
Cobia (*Rachycentron canadum*)	Adults-Summer	Water Column
Red drum (*Sciaenops ocellatus*)	Adults-Year Round Spawning-Fall and Winter	Soft Bottom
Greater amberjack (*Seriola dumerilli*)	Adults-Year Round	Hard Bottom
Red snapper (*Lutjanus campechanus*)	Juveniles-Year Round	Soft Bottom
Lane snapper (*Lutjanus synagris*)	Adults-Year Round	Hard Bottom
King Mackerel (*Scomberomorous cavalla*)	Adults-Year Round	Water Column
Spanish mackerel (*Scomberomorous maculatus*)	Adults-Year Round	Water Column

Source: Gulf of Mexico Fishery Management Council, 1998.

3.5 Coastal Barrier Resources

Congress passed the Coastal Barrier Resources Act (CBRA) in 1982 to address problems caused by coastal barrier development. This Act defined a list of undeveloped coastal barriers along the Atlantic and Gulf coasts. No designated coastal barrier resources have been identified within the project work area. The proposed borrow sites all lie outside of the adjacent designated Coastal Barrier Resources Areas.

3.6 Water Quality

The waters in the project area are used for swimming, SCUBA diving, fishing, boating, and other recreation. The State of Florida lists the area's waters as Class III, suitable for recreation

and the propagation of fish and wildlife. Section 401 Water Quality Certification will be obtained by the County prior to any construction activities.

3.7 Hazardous, Toxic, and Radioactive Waste

The coastline within the project area is located adjacent to predominately residential, commercial, and recreational areas. The project area contains high energy littoral zones and the material used for nourishment are composed of particles with large grain sizes that do not normally absorb contaminants. No contamination due to hazardous and toxic waste spills is known to be in the project area. Past dredging of the Blind Pass Shoal has produced traces of oil contained within this area. Any dredging of the Blind Pass Shoal would require further geotechnical investigations to insure no contamination is present.

3.8 Air Quality

Air quality in the project area is good due to either on or offshore breezes. Pinellas County is designated as an air quality maintenance zone for the pollutant ozone.

3.9 Noise

Ambient noise levels in the area are low to moderate. The major noise producing sources are breaking surf and the adjacent commercial and residential areas. These sources are expected to remain at their present noise levels.

3.10 Aesthetic Resources

The coastline of Pinellas County possesses visually pleasing attributes including the waters of the Gulf of Mexico and existing beaches. The nourishment of the beach will maintain the natural appearance of the protective beach along the Gulf.

3.11 Recreation Resources

Pinellas County is a heavily populated county on Florida's Gulf Coast, which receives a tremendous volume of tourists, particularly in the winter months. Those beaches, which can be accessed by the general public, are heavily used year round. Those beaches, which are in the proximity of condominiums, apartments, and hotels, have more restricted use. The location of proposed projects includes many miles of beach in Pinellas County. The continued maintenance of these beach resources is important for the economy of the area.

3.12 Cultural Resources

The Pass-A-Grill channel borrow area is being investigated by underwater archeologists. Results of their investigation will be coordinated with the Florida State Historic Preservation Office in accordance with Section 106 of the National Historic Preservation Act, as amended.

4.0 ENVIRONMENTAL EFFECTS

This section summarizes changes that may occur to the existing environment including direct, indirect, and cumulative effects and compares these effects for the No-Action Alternative and Preferred Alternative.

4.1 Coastal Environment

The placement of sand on the beach would restore some of the beach's ability to provide storm protection. No changes in wind, tides, or waves are expected from either the No-Action Alternative or the Preferred Alternative.

4.2 Sediment Characteristics of Borrow Areas and Beach

The physical composition of the material located within the nine offshore borrow areas and the four ebb tidal shoals have similar characteristics. Geotechnical investigations of these potential borrow areas reveals similar grain sizes and composition to material currently in place on Pinellas County's beaches. Full geotechnical analysis for the borrow areas is contained in the *Pinellas County, Florida Beach Erosion Control Project 1st Renourishment Sand Key Segment Design Memorandum,* Appendix A (1996, Revised 1997).

4.3 Threatened and Endangered Species

Potential impacts to threatened and endangered species for each alternative are compared in this section.

4.3.1 Sea Turtles

4.3.1.1 Preferred Alternative

The Preferred Alternative and associated activities may have the potential to impact sea turtles. The utilization of offshore borrow areas may impact sea turtles depending on the methods employed by contractors during construction. The use of hopper dredges within the offshore borrow areas may entrain sea turtles during construction. Deflector dragheads may be used during construction to decrease the likelihood of entrainment should this method be utilized. NMFS has included the borrow areas for this project in their Regional Biological Opinion for Hopper Dredge Use on the Gulf Coast (RBO) (Appendix E).

Beach characteristics following placement of material from the offshore areas may also impact sea turtles. Scarp development, moisture levels, and compaction are all effects that may alter nesting success following construction. Monitoring of the beach characteristics following construction would be necessary to minimize any impacts associated with placement of this material on the beach. Important physical characteristics (grain size, color, silt content etc.) of the material to be placed are similar to those of the native beach and should not adversely affect sea turtle populations.

4.3.1.2 No-Action Alternative

The No-Action Alternative would have similar effects to those described in Section 4.3.1.1. The use of Egmont Channel Shoal would require the use of hopper dredge techniques and shoreline construction equipment would be similar. Precautions and monitoring of beach characteristics (i.e. scarp formation, compaction) would also need to be accomplished following construction.

4.3.2 West Indian Manatee

4.3.2.1 Preferred Alternative

The Preferred Alternative should have no impact on the West Indian manatee. Manatees are infrequent visitors to the offshore areas of Pinellas County. The use of dredges and construction equipment associated with placement with sand on the beach should not directly or indirectly impact manatee populations in the area. Protective measures would be taken during dredging to insure that no manatees will be harmed due to construction activity. Section 5, Environmental Commitments, outlines some of the measures to be taken. Additionally, the contractor would supply the Corps with an Environmental Protection Plan prior to construction.

4.3.2.2 No-Action Alternative

The No-Action Alternative would also not affect manatee populations within the area. Previous environmental documents for beach nourishment projects in Pinellas County determined no impact to the manatee would occur (USACE, 1984; USACE, 1996).

4.3.3 Other Species

4.3.3.1 Preferred Alternative

The gulf sturgeon may be affected by implementation of the Preferred Alternative. No reliable data exists for distribution and abundance of the gulf sturgeon for the areas offshore of Pinellas County. Direct impacts leading to the take of sturgeon during construction are unlikely and should any impacts occur, the NMFS should be contacted immediately. Indirect impact to sturgeon moving from areas where construction is taking place may occur and would be short-term and temporary.

4.3.3.2 No-Action Alternative

Similarly, the No-Action Alternative may affect gulf sturgeon populations in the area. Impacts would be short term and temporary and should have no lasting effects on the gulf sturgeon population of Pinellas County.

4.4 Fish and Wildlife Resources

4.4.1 Sand Bottom Communities

4.4.1.1 Preferred Alternative

Dredging of the offshore borrow areas to construct the beach fill project would have temporary impacts to the benthic infaunal communities. Benthic infauna should be expected to start re-colonizing these areas within days of the end of dredging. Previous studies have shown dredging to have little long-term adverse effects on benthic habitats (Culter and Mahadevan, 1982; Saloman, et al., 1982; Hammer, et al., 2000). Care should be taken not to construct an abrupt pit in the bottom and efforts shall be made to dredge a cut with shallow sloping sides. This would help aid in the re-colonization of benthic organisms. Barry A. Vittor and Associates, Inc. (1999) found that the amount of silt/clay present within sediments and the location offshore can also affect recovery time of benthic infauna. Since very little fine material (silt/clay) is present within the borrow area, recovery should occur rapidly for this project. Infaunal assemblages within the project area should become re-established within one to two years following dredging.

4.4.1.2 No-Action Alternative

The Egmont Channel Shoal borrow area is believed to support organisms similar to the benthic organisms found offshore along the project area. Species of non-motile infaunal invertebrates, as well as, epifaunal invertebrates may inhabit this ebb shoal borrow area. These communities would be impacted during construction and the impacts and recovery of these communities would similar to the effects described in Section 4.4.1.1 regarding impacts to the proposed offshore borrow areas.

4.4.2 Hardbottom/Livebottom Communities

4.4.2.1 Preferred Alternative

Hardbottom impacts associated with the Preferred Alternative would be limited to impacts associated with pipeline placement in the surveyed pipeline corridors and staging areas (Dial Cordy, 2001a; Dial Cordy, 2001b; Dial Cordy, 2002). No impacts are anticipated within the offshore borrow areas. Exclusionary buffers (200 feet) have been established around all documented hardbottom features within the proposed borrow areas to eliminate any direct or indirect impacts to these features from dredging activities. Any impacts to hardbottom/livebottom resources within the pipeline and staging areas from dredging equipment placement would be determined from surveys conducted during construction and mitigation in the form of artificial reef creation will be performed.

4.4.2.2 No-Action Alternative

The No-Action Alternative would lead to no new hardbottom impacts. Impacts would be limited to those previously discussed in prior environmental documents and mitigated for during previous projects (USACE, 1984; USACE, 1996).

4.4.3 Essential Fish Habitat

4.4.3.1 Preferred Alternative

Impacts to EFH within the project area would be temporary in duration. Most of the direct impacts to EFH within the area would be due to water quality changes during dredging and removal of material from the borrow area. These impacts would be localized and temporary. Localized impacts to the water column would include increased turbidity that would reduce light penetration and affect phytoplankton production and zooplankton activity. Sediments disturbed during dredge and fill activities would settle on adjacent habitats, causing some

stress to these communities. Effects on local biota should be minor because these species are relatively tolerant of periodic water quality fluctuations. Loss of benthic infauna during dredging and increased turbidity during the dredging process would temporarily impact fishes within the area. The complete EFH analysis can be found in Appendix B

Short-term effects of dredging and construction would also affect populations of benthic organisms that serve as prey for EFH species and migratory species traveling through the area. Noise from the dredging activities may also cause fishes to move from the area. These temporary impacts may also alter the paths of migratory fishes and baitfish. Although this foraging and migratory habitat would not be available to these species, this effect would be minimal due to the relatively small size of the area involved in construction when compared to the total area available for foraging in the adjacent areas. These effects should not be significant and fishes should move back into the area shortly following the dredging activity.

Other impacts to EFH species within the area would include impact to larval fishes in the water column. These larval fishes may become entrained in the dredge during construction. The majority of larval fishes encountered would depend on the season and location of suction devices. In particular, those species that occur near the lower portions of the water column may be the most affected (Hammer and Zimmerman, 1979). However, given the very high reproductive capacity of these species, the small area in which the dredge would be used and the relatively short period of time that construction would occur, impacts to larval fishes should be very minor.

4.4.3.2 No-Action Alternative

Construction activities associated with the No-Action Alternative would have similar effects to EFH species as described for the Preferred Alternative. These effects have been previously evaluated by other NEPA documents.

4.5 Coastal Barrier Resources

No Coastal Barrier Resources would be impacted by implementation of the No-Action alternative or utilizing any of the offshore borrow areas or ebb tidal shoals.

4.6 Water Quality

The waters offshore of Pinellas County have been designated by the State as an Outstanding Florida Water (OFW). In accordance with State Water Quality standards for an OFW, turbidity levels generated by the work cannot exceed ambient background turbidity levels. This is not possible based on past experience. Previous experience in conducting beach nourishment activities has shown that it is not possible to maintain ambient levels. The Corps

has requested a standard variance from State Water Quality Standards. Under this variance, monitoring of turbidity levels would assure that levels not exceed 29 NTUs above background within a 150 m mixing zone. Should turbidity levels exceed these standards, as determined by monitoring, the contractor would be required to cease work until conditions return to normal. Turbidity generated by work with either proposed alternative would be short-term and minor. Water Quality Certification would be obtained by the County for associated projects.

4.7 Hazardous, Toxic, and Radioactive Waste

The construction of projects within the project area would take place along well-established recreational beaches that have been nourished and renourished in the past. Neither the beach areas nor the borrow areas have had activities associated with them that would be expected to produce any hazardous or toxic wastes. No evidence of contamination by hazardous or toxic wastes was noted during prior surveys or site visits. All wastes and refuse generated by project construction would be removed and properly disposed. Neither the Preferred Alternative nor the No-Action Alternative would affect HTRW within the project area.

4.8 Air Quality

The short-term impact from emissions by the dredge and other construction equipment associated with the project will not significantly impact air quality in the area. The Florida Department of Environmental Protection does not regulate marine or mobile emission sources within Pinellas County. No air quality permits are required for this project in conjunction with either the No-Action Alternative or Preferred Alternative.

4.9 Noise

There would be a temporary increase in the noise level during construction. The principle noise would originate from the vicinity of the discharge point on the beach and the dredge. Construction equipment would be properly maintained to minimize the effects of noise. Increases to the current levels of noise as a result of this project would be localized and minor, and limited to the time of construction.

4.10 Aesthetic Resources

During construction there would be some impact to the aesthetic value of the beaches. Equipment utilized during the construction activities would be visible on the beaches of Pinellas County. After construction the increased beach width would enhance the aesthetic resources of the County's beaches.

4.11 Recreation Resources

During nourishment activities associated with both alternatives, use of the beaches would decrease or be temporarily restricted. 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.

4.12 Cultural Resources

A number of remote sensing surveys and diver evaluations of targets have been conducted for a number of project borrow areas. Results of their investigations have been coordinated with the Florida State Historic Preservation Office.

4.13 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 expenditure of energy would be less than using the No-Action Alternative. Moving sand from borrow areas further away from the project areas would expend more energy to transport the material than using the closer offshore borrow areas proposed.

4.14 Natural or Depletable Resources

In this case, sand is the depletable resource. Using sand from the proposed borrow area would deplete the sand source at that site.

4.15 Cumulative Impacts

Cumulative impacts resulting from removal of material from multiple borrow sites are a concern when evaluating potential long-term effects on marine resources in the area offshore Pinellas County. This analysis assumes that a different area or a different shoal would be dredged each replenishment interval. With the replenishment interval expected to be 5 to 7 years, and that the recovery time of the affected benthic community after sand removal anticipated to be within 1-2 years, the potential for significant cumulative benthic biological impacts is remote. No cumulative impacts to the pelagic environment, including zooplankton, fishes, sea turtles, and marine mammals, are expected from multiple beach nourishment borrow site operations from the nine offshore borrow sites.

Impacts to hardbottom areas within the pipeline corridors may occur. These impacts would be isolated to relatively small areas of rock within the area between the offshore borrow areas and the shoreline. Pipeline corridors should be established to minimize impacts; however, some impacts are inevitable. These impacts would require mitigation in the form on in-kind artificial reef creation. Pipeline corridors, once established, should continue to be utilized to avoid impact to areas not previously impacted. While impacts to these hardbottom features within the pipeline corridors would be adverse they should not be significant. The relatively small areas impacted and long renourishment intervals, coupled with artificial reef creation, should result in a very insignificant overall impact to hardbottom features offshore of Pinellas County.

4.16 Irreversible and Irretrievable Commitment of Resources

4.16.1 Irreversible

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. One example of an irreversible commitment might be the mining of a resource. The use of sand from the proposed borrow area would (for all practical purposes) irreversibly deplete the suitable sand reserves. The sands would not replenish fast enough to be much value to future nourishment and renourishment projects. There would, however, be sufficient sand remaining in the dredged areas for re-colonization of benthic organisms.

4.16.2 Irretrievable

An irretrievable commitment of resources is one in which, due to decisions to mandate the resource for another purpose opportunities to use or enjoy the source, as they presently exist, are lost for a period of time. An example of an irretrievable loss might be when a type of vegetation is lost due to road construction. Livebottom organisms in the pipeline corridors and benthic organisms within the borrow area and beach fill area that would be eliminated during construction would be irretrievably lost for a period of time. Livebottom organisms lost would re-colonize within the pipeline corridors following construction or on mitigation reef areas. Benthic organisms have a very high rate of repopulation that would reduce significant losses to these communities.

4.17 Unavoidable Adverse Environmental Effects

Species of relatively non-motile infaunal invertebrates that inhabit the borrow area would be unavoidably lost during dredging. Those species that are not able to move from the construction area are expected to re-colonize after project completion. Any impacts to hardbottom from pipeline placement in pipeline corridors would also result in unavoidable

impacts. These impacts would be mitigated for and should not be significant. There would be an unavoidable increase in turbidity levels, limited to the immediate dredging and beach fill areas during construction. This impact would be temporary and should disappear shortly after construction activities cease.

4.18 Local Short-Term Uses and Maintenance/Enhancement of Long-Term Productivity

Species of motile epifauna may inhabit the borrow area and nearshore placement areas. Motile organisms such as fish, crabs, and sand dwelling organisms should be able to escape the area during construction. Many of those species that are not able to leave the area are expected to re-colonize after project completion. Indirect impacts to these epifauna may also occur. Increased turbidity and sedimentation may also occur. These indirect impacts should be short-term in duration and cause minimal temporary impacts.

5.0 ENVIRONMENTAL COMMITMENTS

The U.S. Army Corps of Engineers and contractors commit to avoiding, minimizing, and/or mitigating for adverse effects during construction activities by including the following commitments in the contract specifications:

Protection of Fish and Wildlife Resources

The Contractor shall keep construction activities under surveillance, management, and control to minimize interference with, disturbance to, and damage of fish and wildlife. Species that require specific attention along with measures for their protection shall be listed in the Contractor's Environmental Protection Plan prior to the beginning of construction operation.

Endangered Species Protection

1. The Contractor shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees.

2. All construction personnel shall be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, and the Florida Sanctuary Act of 1978. The Contractor may be held responsible for any manatee harmed, harassed, or killed as a result of construction activities.

3. Siltation barriers shall be installed and shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be monitored regularly to avoid manatee entrapment. Barriers shall not block manatee entry to or exit from essential habitat.

4. All vessels associated with the project shall operate at "no wake/idle" speeds at all times while in water where the draft of the vessel provides less than four feet clearance from the bottom and that vessels shall follow routes of deep water whenever possible.

5. If a manatee is sighted within 100 yards of the project area, all appropriate precautions shall be implemented by the Contractor to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet of a manatee. If a manatee is closer than 50 feet to moving equipment or the project area, the equipment shall be shut down and all construction activities shall cease. Construction activities shall not resume until the manatee has departed the project area.

6. Collision and or injury to a manatee should be reported to the USFWS.

7. Temporary signs concerning manatees shall be posted prior to and during construction/ dredging activities. All signs are to be removed by the Contractor upon completion of the project.

8. If nighttime construction occurs, lights must be in place that illuminates a 100-foot radius around the construction site.

Turbidity (Water Quality)

1. The water quality (turbidity) will be monitored twice daily at least 4 hours apart during all dredging and disposal operations.

2. If turbidity values exceed State water quality standards (29 NTU's above background, or exceeds background in adjacent Outstanding Florida Waters (Cockroach Bay Aquatic Preserve and Terra Ceia Aquatic Preserve), construction activities shall cease immediately and not resume until corrective measures have been taken and turbidity has returned to acceptable levels.

Sea Turtle Protection

During hopper dredging activities, the Corps will implement the following measures to minimize adverse effects to sea turtles and Gulf sturgeon:

1. The rigid sea turtle deflector draghead will be used on all hopper dredges.

2. Hopper dredging activities will be completed, when possible, between December and March when sea turtle abundance is lowest throughout the Gulf coastal and inshore waters.

3. There will be one hundred percent observer coverage of hopper dredging operations by NMFS-approved observers. Observers will monitor the hopper spoil, screening, and dragheads for sea turtles and Gulf sturgeon.

4. Any sea turtle or Gulf sturgeon takes would be reported immediately to the NMFS SERO and the FDEP.

5. The Corps will advise inspectors, operators and vessel captains about the prohibitions on taking, harming, or harassing sea turtles and Gulf sturgeon, and the civil penalties that apply.

6. For hopper dredges, 100 percent inflow and overflow screening will be required whenever possible.

7. When disengaging dredging pumps, the dragheads must be firmly on the bottom to prevent impingement or entrainment of sea turtles within the water column.

8. The borrow areas have been designed in a way to ensure that dredging will not occur within a minimum of 200 feet from any hardground area.

6.0 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

6.1 National Environmental Policy Act of 1969

Environmental information on the project has been compiled and this Environmental Assessment prepared. The project is in compliance with the National Environmental Policy Act.

6.2 Endangered Species Act of 1973

The Corps has initiated discussions with the USFWS regarding impacts to threatened or endangered species under their jurisdiction. The USFWS indicated that Section 7 consultation under ESA will be finalized during the normal NEPA review process. On October 30, 2002, the USACE requested concurrence from National Marine Fisheries Service (NMFS) for a may affect for sea turtles and Gulf sturgeon determination for marine endangered and threatened species under the jurisdiction of NMFS. Consultation with NMFS was initiated on October 30, 2002. NMFS has included the proposed borrow areas in the new Regional Biological Opinion for Hopper Dredge Use on the Gulf Coast (RBO). The draft RBO, dated November 7, 2001 was received on November 11, 2001. Since the Pinellas County beaches have already been coordinated with FWS under Section 7 of the ESA, FWS recommended coordinating this EA through them with a separate cover letter re-initiating consultation. A copy of this letter is included in the Appendix E.

6.3 Fish and Wildlife Coordination Act of 1958

This project has been fully coordinated with the USFWS in accordance with the Fish and Wildlife Coordination Act. Existing CAR's covering the Pinellas County Beaches adequately address the issues regarding the proposed project. No further coordination is necessary under this Act.

6.4 National Historic Preservation Act of 1966 (Inter alia)

Archival research, investigations for historic properties, and coordination with the Florida State Historic Preservation Officer were completed in compliance with this Act and with the Archaeological and Historic Preservation Act and 36 CFR Part 800 Protection of Historic Properties. The proposed beach nourishments are in compliance with federal laws regarding historic properties.

6.5 Clean Water Act of 1972

The study is in compliance and all state water quality standards will be met. A Section 404(b) Evaluation is included in this report as Appendix C.

6.6 Clean Air Act of 1972

No air quality permits will be required for this project.

6.7 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 D. State consistency review has been performed the project was found to be consistent with the FCMP. The study will be in full compliance with the Coastal Zone Management Act.

6.8 Farmland Protection Policy Act of 1981

No prime or unique farmland will be impacted by implementation of the alternatives compared in this document. This act is not applicable.

6.9 Wild and Scenic River Act of 1968

No designated Wild and Scenic river reaches will be affected by project related activities.

6.10 Marine Mammal Protection Act of 1972

Incorporation of safe guards to protect threatened and endangered species during project construction will also protect marine mammals in the area. The Preferred Alternative is in compliance with the Act.

6.11 Estuary Protection Act of 1968

No designated estuary will be affected by project implementation.

6.12 Federal Water Project Recreation Act

There is no cost-shared recreation proposed for this project.

6.13 Fishery Conservation and Management Act of 1976

The project has been coordinated with the NMFS and is in compliance with this Act.

6.14 Submerged Lands Act of 1953

Beach nourishment projects and use of the offshore borrow areas will occur on submerged lands of the State of Florida. These projects have been coordinated with the State and are in compliance with the Act.

6.15 Coastal Barrier Resources Act & Coastal Barrier Improvement Act of 1990

There are no designated coastal barrier resources in the project area that would be affected by this project

6.16 Rivers and Harbors Act of 1899

The proposed work will not obstruct navigable waters of the United States. The Preferred Alternative is in full compliance.

6.17 Anadromous Fish Conservation Act

Anadromous fish species will not be affected. The project has been coordinated with NMFS and is in compliance with this Act.

6.18 Migratory Bird Treaty Act and Migratory Bird Conservation Act

No migratory birds will be affected by project activities. The project is in compliance with these Acts.

6.19 Magnuson-Stevens Fishery Conservation and Management Act

The Preferred Alternative may affect essential fishery habitat as defined by GMFMC (1998). Precautions would be implemented during beach renourishment operations to minimize any potential impacts. In addition, artificial reefs would be constructed to mitigate any reef-related impacts associated with the beach nourishment project. The project has been coordinated with NMFS and is in compliance with the Act (Appendix B).

Coordination of this EA constitutes initial consultation with the National Marine Fisheries Service (NMFS) under provisions of this Act. Based on analysis discussed in this EA, the Corps has determined that the proposed action would not adversely affect the essential habitat of species managed under this Act.

6.20 Marine Protection, Research and Sanctuaries Act

The term "dumping" as defined in the Act (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.

6.21 E.O. 11990, Protection of Wetlands

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

6.22 E.O. 11988, Flood Plain Management

No activities associated with the Preferred Alternative will take place within a floodplain, therefore this project is in compliance with the goals of this Executive Order.

6.23 E.O. 12898, Environmental Justice

The Preferred Alternative would not result in adverse human health or environmental effects, nor would the activity impact subsistence consumption of fish or wildlife. The project is in compliance.

6.24 E.O. 13089, Coral Reef Protection

The Preferred Alternative may affect U.S. coral reef ecosystems as defined in this Executive Order. Precautions would be implemented during construction to minimize impacts. Artificial reefs would be constructed to mitigate for any reef impacts associated with the placement of discharge pipelines. The project is in compliance.

6.25 E.O. 13112, Invasive Species

Invasive species would not be impacted by project activities. The E.O. is not applicable.

7.0 PUBLIC INVOLVEMENT

7.1 Scoping and Draft EA

All correspondence regarding scoping of the Draft EA is located in Appendix E.

7.2 Agency Coordination

The projects evaluated within this document has been coordinated with the following agencies: U.S. Fish and Wildlife Service, National Marine Fisheries Service, U. S. Environmental Protection Agency, Florida State Clearinghouse, Florida State Historic Preservation Officer, and the Florida Department of Environmental Protection.

7.3 List of Recipients

The DEA was circulated to federal, state and local agencies and interested groups for review and comment. A listing of those that were sent copies can be found in Appendix F.

7.4 Comments Received and Response

Copies of comments received during the scoping process and from circulation of the Draft EA can be found in Appendix E, Pertinent Correspondence.

8.0 LIST OF PREPARERS

8.1 Preparers

Name	Affiliation	Information
Jason Croop, M.S.	Dial Cordy and Associates Inc.	Primary Author Marine Biologist
Steve Dial, M.S.	Dial Cordy and Associates Inc.	Marine Ecologist Technical Editor
Lee Swain, M.S.	Dial Cordy and Associates Inc.	NEPA Specialist
Michael Rice, M.S.	Dial Cordy and Associates Inc.	GIS Applications
Yvonne Haberer	U.S. Army Corps of Engineers, Jacksonville District	Biologist, Coordination and Review
Cynthia Perez	U.S. Army Corps of Engineers, Jacksonville District	Project Engineer, Coastal Hydraulics Engineer
Eric Gasch	U.S. Army Corps of Engineers, Jacksonville District	Biologist, Mail List Coordination and General Review
Tommy Birchett	U.S. Army Corps of Engineers, Jacksonville District	Archeologist, Historic Properties
Doug Rosen, P.G.	U.S. Army Corps of Engineers, Jacksonville District	Geologist, Geotechnical Analysis of Borrow Area Material
Kenneth Dugger	U.S. Army Corps of Engineers, Jacksonville District	Chief, Gulf Coast Section Environmental Branch, Review

9.0 REFERENCES

Ackerman, B.B. 1995. Aerial surveys of manatees: A summary and progress report. In O'Shea, T.J., Ackerman, B.B., and Percival, H.F. Population Biology of the Florida Manatee. 13-33 pp.

Bullock, L.H, Godcharles, M.F., and Crabtree, R.E. 1996. Reproduction of yellowedge grouper, *Epinephelus flavolimbatus*, from the eastern Gulf of Mexico. Bull. Mar. Sci. 59(1): 216-224.

Coastal Zone Resources, Inc. 1991. Indian Shores beach nourishment project side-scan mosaic and biological report. Prepared for Pinellas County Board of County Commissioners, Clearwater, FL.

Child, C.A. 1992. Shallow water Pychnogonida of the Gulf of Mexico. Mem. Hourglass Cruises 9(1): 86 pp.

Dial Cordy and Associates, Inc. (2001). Marine Biological Survey Pinellas County Shore Protection Project Comprehensive Borrow Area Study. Prepared for U. S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL. 51 pp.

Dial Cordy and Associates, Inc. (2002a). Pinellas County Shore Protection Project Comprehensive Borrow Area Study Borrow Area Resource Identification and Impact Assessment. Prepared for the U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL. 35 pp.

Dial Cordy and Associates, Inc. (2002b). Nearshore Marine Biological Survey and Assessment Pinellas County Shore Protection Project Comprehensive Borrow Area Survey. Prepared for the U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL. 35 pp.

Gilmore, R.G., Bullock, L.H, and Berry, F.H. 1978. Hypothermal mortality in marine fishes of south-central Florida January 1977. Northeast Gulf Science 2(2): 77-97.

EMC Surveying and Mapping. 1998. Pinellas County Beach Erosion Control Project Hardground Survey Area "A" Through "I". Prepared for U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL. 25 pp.

Environmental Protection Agency (EPA). 1981. Marine sampling and measurement program off northern Pinellas County, Florida. A Technical Report, S. Mahadevan, ed. Vol. 1: 306 pp.

Gulf of Mexico Fishery Management Council (GMFMC). 1998. Generic Amendment for Addressing Essential Fish Habitat Requirements of the Gulf of Mexico. Available from GMFMC 3018 U.S. Highway 301 North, Suite 1000. Tampa, FL 33619-2266. 237 pp.

Lyons, W.G., and Collard, S.B. 1974. Benthic invertebrate communities of the eastern Gulf of Mexico. In R.E. Smith, ed. Proceedings of marine environmental implications of offshore drilling in the eastern Gulf of Mexico. State Univ. Syst. FL. Inst. Oceanogr., St. Petersburg, FL. 157-166 pp.

Meylan, A., Redlow, A. Mosier, A., Moody, K., Foley, A. 1999. Occurrence and distribution of sea turtles in Tampa Bay, FL. In J.R. Pribble, A. J. Janicki, and H. Greening , eds. Baywide environmental monitoring report, 1993-1998, Tampa Bay, FL. Tampa Bay Estuary Program, Technical Publication 07-99. St. Petersburg, FL. Chapter 13, 13-1-13-15 pp.

Moe, M.A., and Martin, G. T. 1965. Fishes taken in monthly trawl samples offshore of Pinellas County, Florida, with new additions to the fish fauna of the Tampa Bay area. Tulane Studies in Zoology. 12(4): 129-151.

Nelson, B. D., and Bortone, S.A. 1996. Feeding guilds among artificial-reef fishes in the northern Gulf of Mexico. Gulf of Mexico Science. 1996(2): 66-80.

Phillips, R.C. and Springer, V.G. 1960. Observations on the Offshore Benthic Flora in the Gulf of Mexico off Pinellas County, Florida. The Amer. Midland Nat. 64(2): 362-381.

Pierce, D.J., Wallin, J.E., and Mahmoudi, B. 1998. Spatial and temporal variations in the species composition of bycatch collected during a striped mullet (*Mugil cephalus*) survey. Gulf of Mexico Science 1998(1): 15-27 pp.

Posey, M., Lindberg, W.J., Alphin, T., and Vose, F. 1996. Influence of storm disturbance of an offshore benthic community. Bull. Mar. Sci. 59(3): 523-529.

Roberts, C., Ballantine, W.J., Buxton, C.D., Dayton, P., Crowder, L.B., Milon W., Orback, M.K., Pauly, D., Trexler, J. and Walters, C.J. 1995. Review of the use of marine fishery reserves in the U.S. southeastern Atlantic. NOAA Technical Memorandum NMFS-SEFSC-376. 31pp.

Saloman, C.H., and Naughton, S.P. 1979. Fishes of the littoral zone, Pinellas County, Florida. Florida Sci. 42(2):85-93.

Sea Systems Corporation. (2001). *P*inellas County Sand Key Segment, Side Scan Sonar Hardbottom Mapping Survey, St. Petersburg Beach, Florida, Survey Number 01-149. Sea Systems Corporation, August 2001.

Sea Systems Corporation. (2002). Pinellas County Treasure Island and Long Key Segment Side Scan Sonar Hardbottom Mapping and Survey St. Petersburg, Florida. Survey No.01-247. Prepared for U.S. Army Corps of Engineers, Jacksonville District.

Schirripa, M. J., and Burns, K. M. 1997. Growth estimates for three species of reef fish in the eastern Gulf of Mexico. Bull. Mar. Sci. 61(3): 581-591.

South Atlantic Fishery Management Council (SAFMC). 1998. Final Habitat Plan for the South Atlantic Region: Essential Fish Habitat Requirements for Fishery Management Plans of the South Atlantic Fishery Management Council: The Shrimp Fishery Management Plan, The Red Drum Fishery Management Plan, The Snapper Grouper Fishery Management Plan, The Coastal Migratory Pelagics Fishery Management Plan, The Golden Crab Fishery Management Plan, The Spiny Lobster Fishery Management Plan, The Coral, Coral Reefs, and Live/Hard Bottom Habitat Fishery Management Plan, The Sargassum Habitat Fishery Management Plan, and the Calico Scallop Fishery Management Plan. SAFMC. Charleston, SC, 457 pp.

USACE. (1984) (Revised December 1984). Beach Erosion Control Project Review Study and Environmental Impact Statement for Pinellas County, Florida. U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

USACE. (1994) (Revised August 1994). Limited Re-evaluation Report and Enivronmental Summary for Pinellas County, Florida Beach Erosion Control Project. U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

USACE. (1995). Feature Design Memorandum Northern Treasure Island Pinellas County, Florida Beach Erosion Control Project. U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

USACE (1996) (Revised March 1997). 1st Renourishment Sand Key Segment Design Memorandum with Environmental Assessment Pinellas County, Florida Beach Erosion Control Project. U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

U.S. Fish and Wildlife Service. 1996. Florida Manatee Recovery Plan (*Trichechus manatus latirostris*), Second Revision. Prepared by the Florida Manatee Recovery Team for the southeast region, U.S. Fish and Wildlife Service, Atlanta, GA.

Weigle, B.L., 1990. Abundance, distribution and movements of bottlenose dolphins (*Tursiops trucncatus*) in lower Tamps Bay, Florida. In P.S. Hammond, S. A. Mizorch, and G.P. Donovan, eds. Individual recognition of cetaceans: use of photo-identification and other techniques to estimate population parameters. Rep. Int. Whaling Comm. Spec. Issue 12. 195-201 pp.

10.0 INDEX

APPENDICES

APPENDIX A

Marine Biological Survey
Borrow Area Resource Identification and Impact Assessment
Nearshore Marine Biological Survey and Assessment

Marine Biological Survey
Pinellas County Shore Protection Project
Comprehensive Borrow Area Study

February 2002

Prepared for:
Jacksonville District
U.S. Army Corps of Engineers
400 West Bay Street
Jacksonville, FL 32202

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250

EXECUTIVE SUMMARY

Dial Cordy and Associates, Inc. (DC&A) was contracted by the U.S. Army Corps of Engineers (USACE) to conduct a biological survey of proposed borrow areas in conjunction with the Pinellas County Shore Protection Project. The barrier island beaches of Pinellas County, Florida have had serious problems with shoreline erosion and a lowered beach profile caused by storms, wave action, and currents. To accommodate future nourishment projects, nine offshore borrow areas and four ebb tidal shoals have been identified for consideration as probable borrow sites. Two nearshore areas for use as potential breakwater areas were also identified and mapped for marine resources.

Prior side-scan mapping showed extensive areas of consolidated material within each of the proposed borrow areas (2,309 acres). This survey was used to map and characterize the extent of marine resources in relation to the previous side-scan survey. In total over 15,000 acres of seafloor were mapped using towed video, diver surveys and integrated GIS mapping. Habitats identified with towed video mapping were further characterized by diver surveys. During diver and video surveys living hardbottom resources were characterized by percent coverage and relief. Dominant fishes and invertebrates were also documented. An additional 1,519.6 acres (3,828.6 acres total) of live-bottom habitats were identified and mapped within this study. Within the offshore borrow areas, over 75 percent of the habitat surveyed was open sand (10,000.4 acres) while the remaining 3,828.6 acres consisted of hardbottom habitats. The ebb tidal shoal areas of John's Pass, Blind Pass, Pass-A-Grille, and Egmont Channel all consisted of only open sand habitats.

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1.0 INTRODUCTION

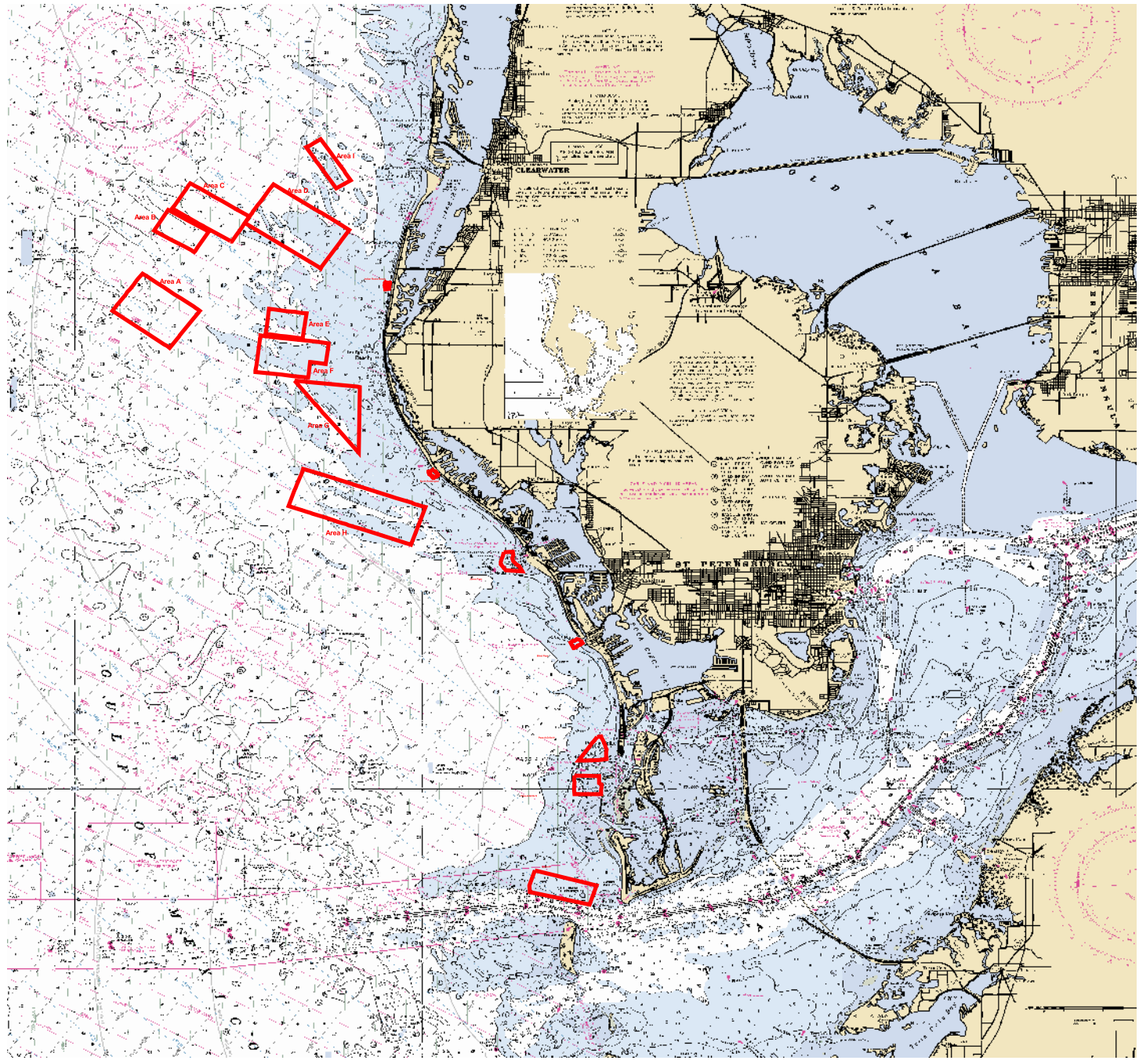
Dial Cordy and Associates, Inc. (DC&A) was contracted by the U.S. Army Corps of Engineers (USACE) to conduct a biological survey of proposed borrow areas in conjunction with the Pinellas County Shore Protection Project. This work was conducted under contract No. DACW17-01-F-0060.

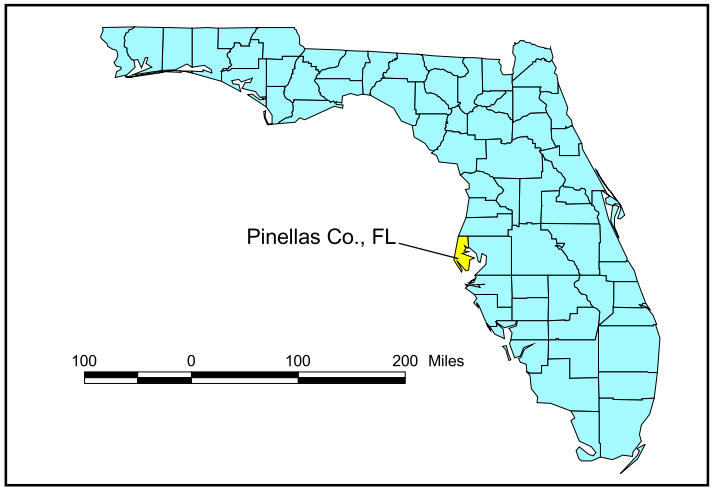
1.1 Purpose and Need

The barrier island beaches of Pinellas County, Florida have had serious problems with shoreline erosion and a lowered beach profile caused by storms, wave action, and currents. As a means of controlling this erosion and increasing storm protection to the island, fill material has been placed along the shoreline. Recent fill projects have included Clearwater Beach, Mullet Key, Treasure Island, Sand Key, and Long Key. Traditionally, the material for these and other beach nourishment projects for the Pinellas County Shore Protection Project was obtained from Egmont Channel Shoal. However, in order to utilize the sand from Egmont Shoal for nourishment of Pinellas County beaches it must be moved a long distance (11-25 miles). This is not always cost effective. To accommodate future nourishment projects, nine offshore borrow areas and four ebb tidal shoals have been identified for consideration as probable borrow sites. These sites were surveyed and the results discussed herein.

1.2 Location

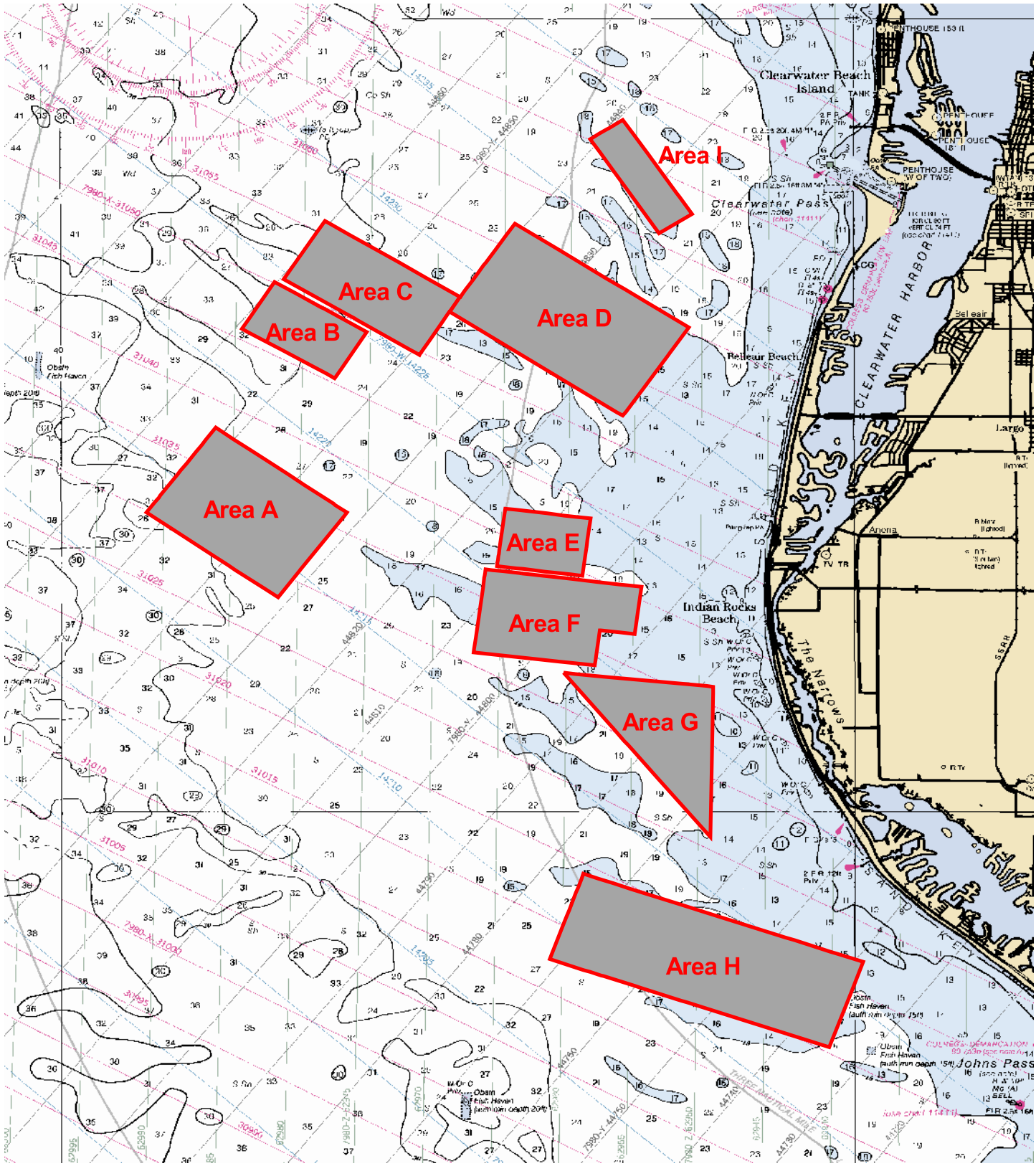
The project area surveyed is located off the Gulf of Mexico coast of Florida, Pinellas County Florida (Figure 1). Specifically, the investigation included nine potential offshore borrow areas (Figure 2) and five ebb tidal shoals (Figure 3). Additionally, two potential nearshore breakwater areas were also surveyed along North Reddington Beach and Indian Rocks Beach (Figure 4).





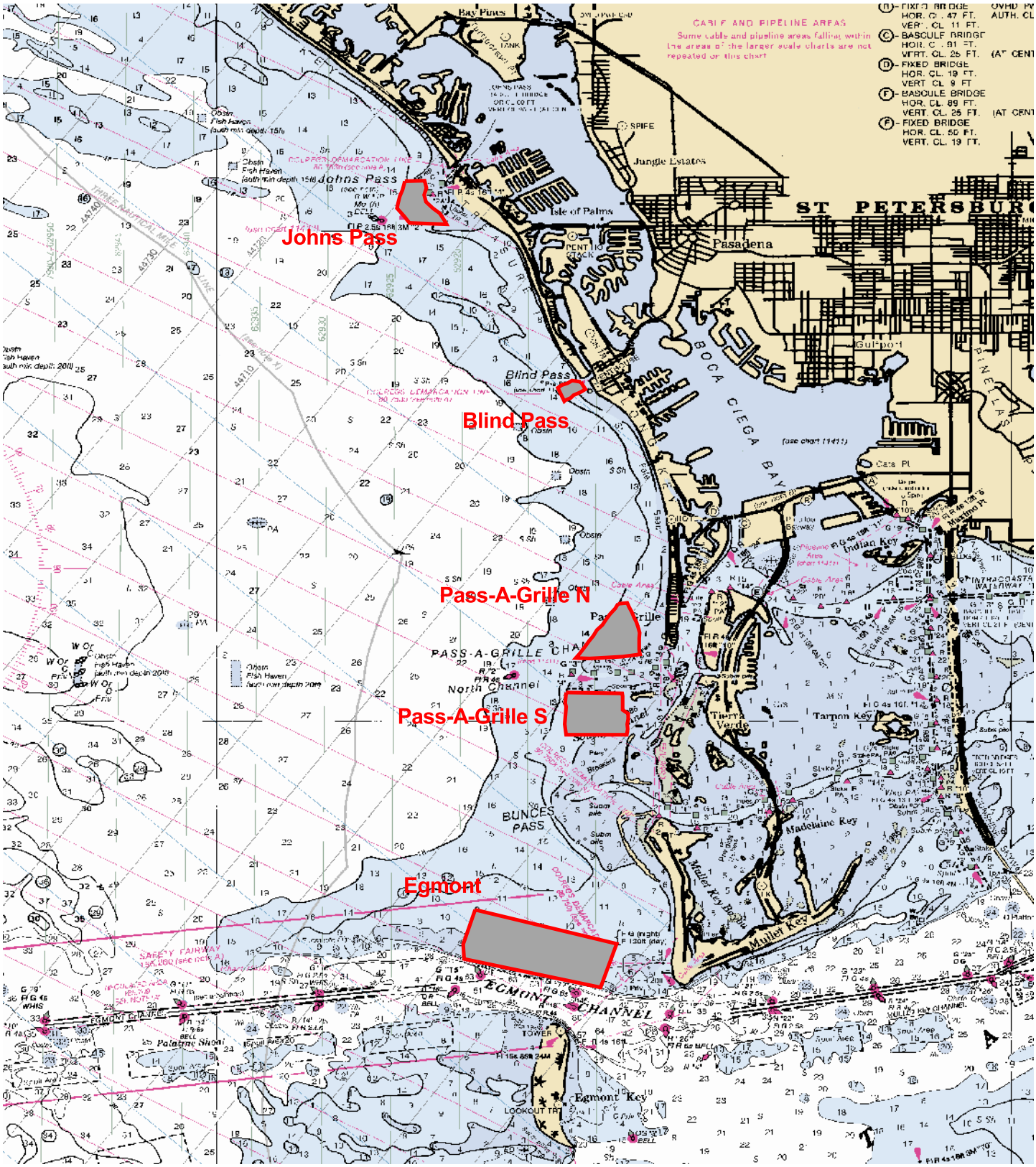
Pinellas County Marine Biological Survey Areas

Location Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 5 miles	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 1



1 0 1 2 3 4 5 Miles

Offshore Borrow Areas	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 2 miles	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493 Figure 2



1 0 1 2 3 4 5 Miles

Ebb Tidal Shoal Borrow Areas	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 2 miles	Drawn By: MR
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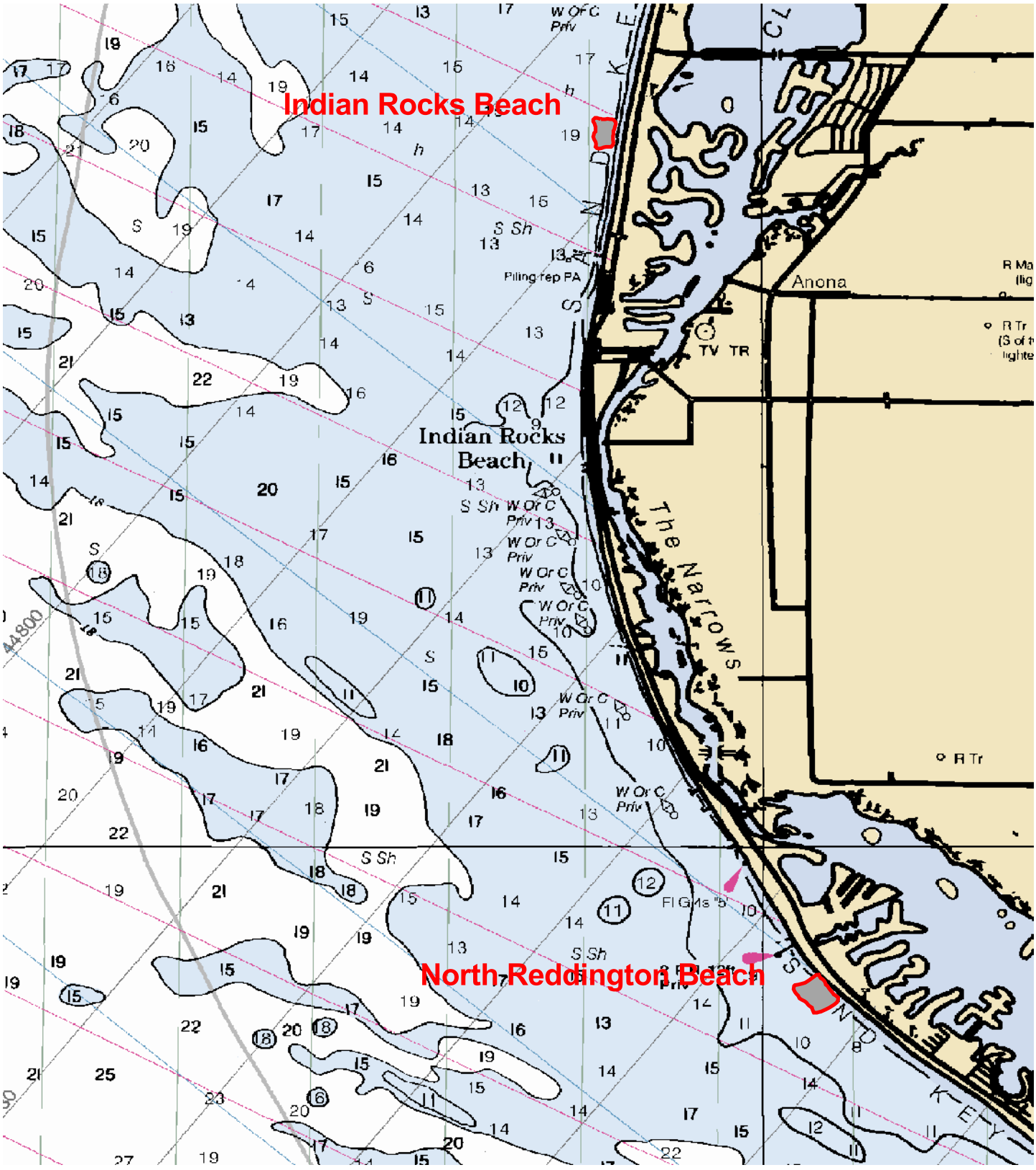
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493 Figure 3



1 0 1 2 3 Miles

Nearshore Breakwater Areas	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 1 mile	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 4

2.0 TECHINCAL APPROACH

DC&A conducted field investigations to locate, delineate, and characterize existing hardground and/or other benthic community resources within the proposed borrow areas. Marine resources were mapped and documented with underwater still and video photography. The field survey was conducted during July-September 2001.

This purpose of this survey was to verify and groundtruth existing side-scan records (SeaSystems 1996). Prior side-scan mapping showed extensive areas of consolidated material within each of the proposed borrow areas (2,309 acres). This survey was used to map and characterize the extent of marine resources in relation to the previous side-scan survey. The accompanying CD-ROM provides a comparison of the hardbottom coverage verified by this survey to the previous side-scan effort. An additional 1,519.6 acres (3,828.6 acres total) of live-bottom habitats were identified and mapped within this study.

2.1 Towed Video Survey and Mapping

To identify and delineate any marine resources present within the proposed borrow areas, a towed video survey was conducted. A towed video camera, in conjunction with Differential Global Positioning System (DGPS) and HYPACKMAX^{TM} navigation software, was utilized. Real time position of the camera was overlaid on the digitally recorded survey record. Transects were established within each borrow area at 500-foot intervals. In total, over 350 nautical miles of transect lines encompassing over 13,800 acres were surveyed (Figures 5-11).

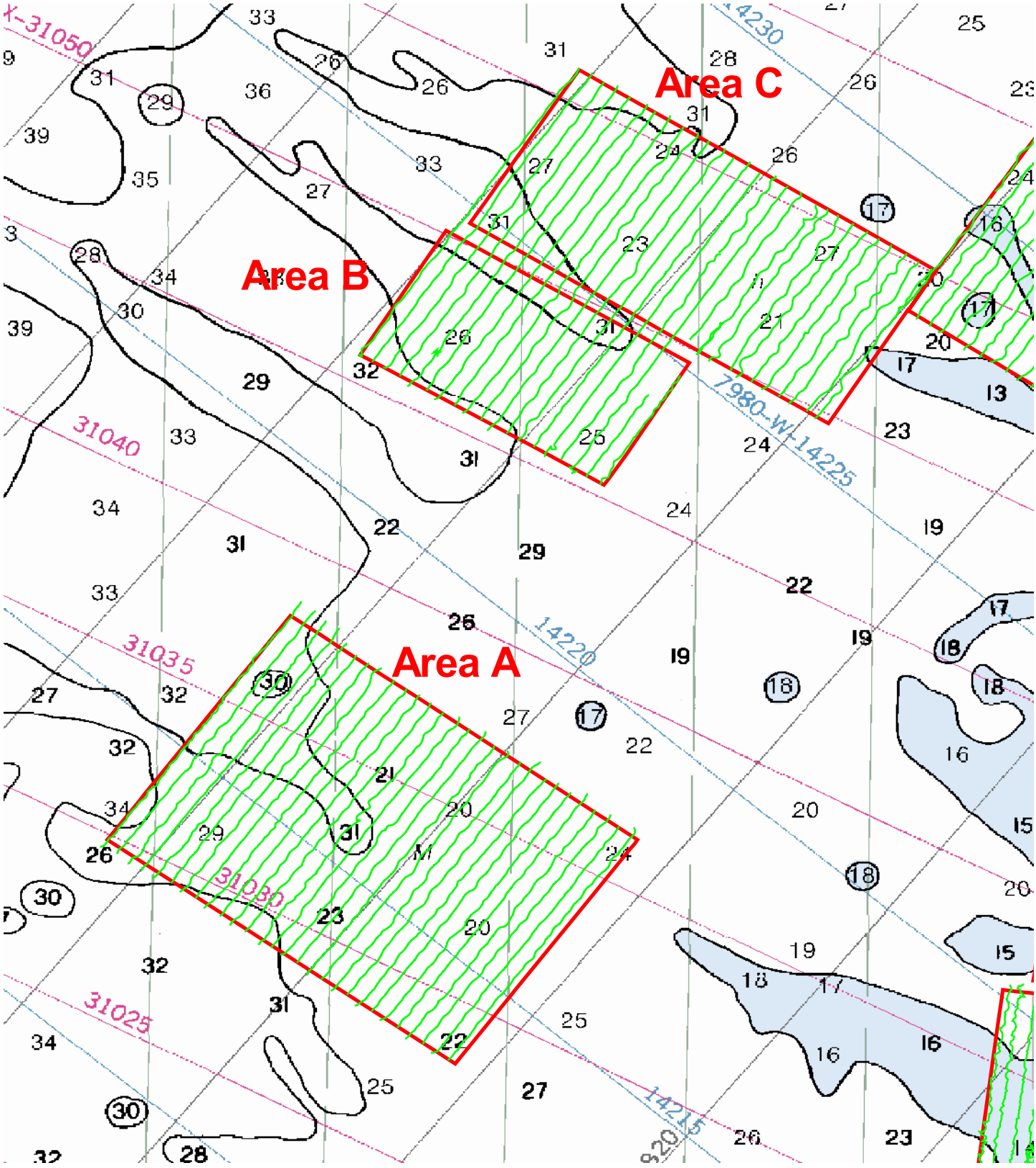
The point at which each transect crossed a change in marine habitat (i.e. hardbottom, sand, etc.) was determined from video analysis. The points were then incorporated into a database and ArcView GIS^{TM} was used to generate resource maps. Hardbottom was classified by percent of coverage and also vertical relief. Hardbottom classifications are shown in Tables 1 and 2.

Table 1 Hardbottom Coverage Classifications Used to Map Marine Resources

Classification	Percent Coverage
Patchy	< 20% coverage
Scattered	20-75% coverage
Dense	>75% coverage

Table 2 Hardbottom Relief Classifications Used to Map Marine Resources

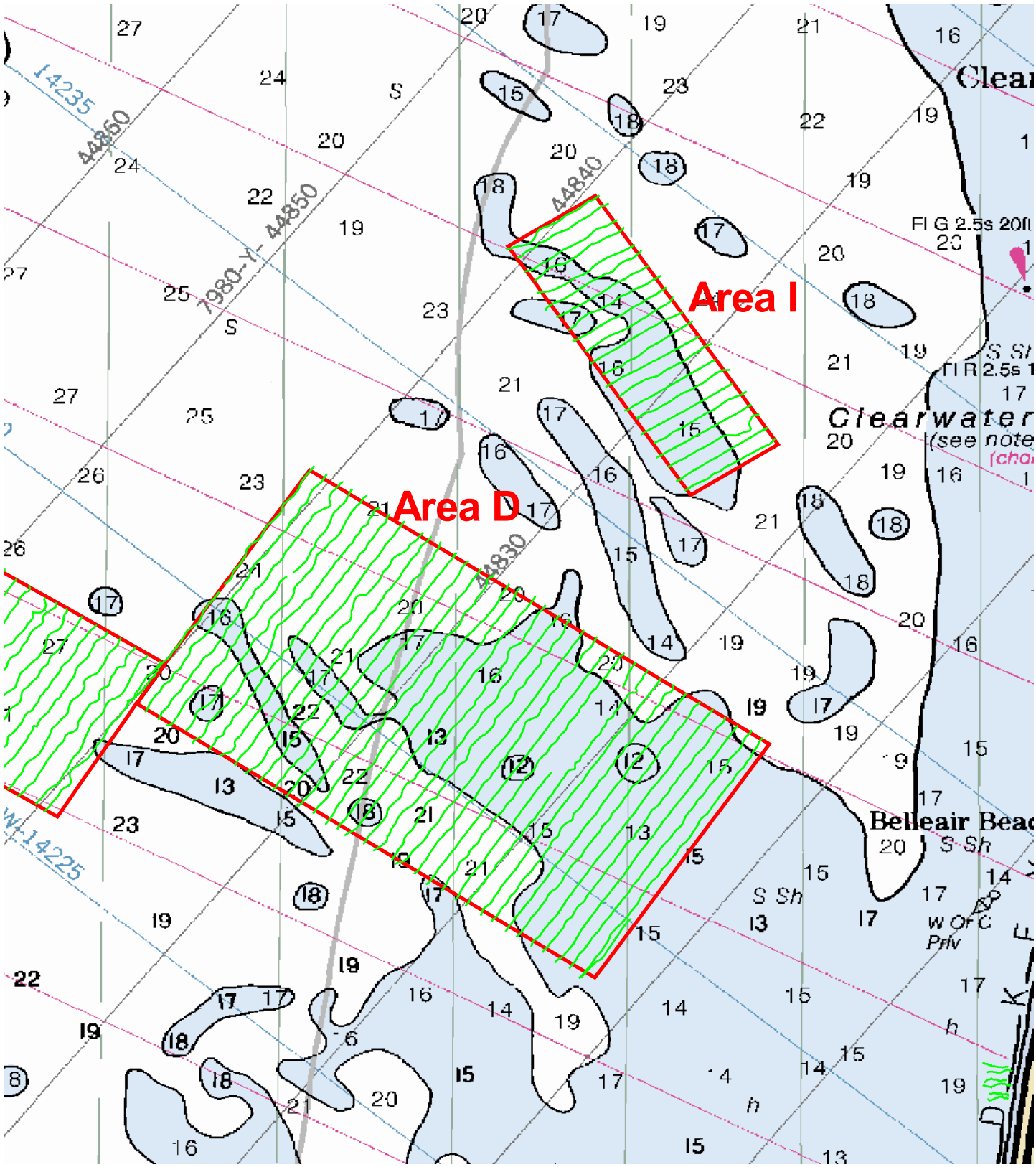
Classification	Relief (cm)
Low Relief	<30 cm
Medium Relief	30-100 cm
High Relief	>100 cm



Transect Survey Lines
Offshore Borrow Areas

4000 0 4000 8000 12000 Feet

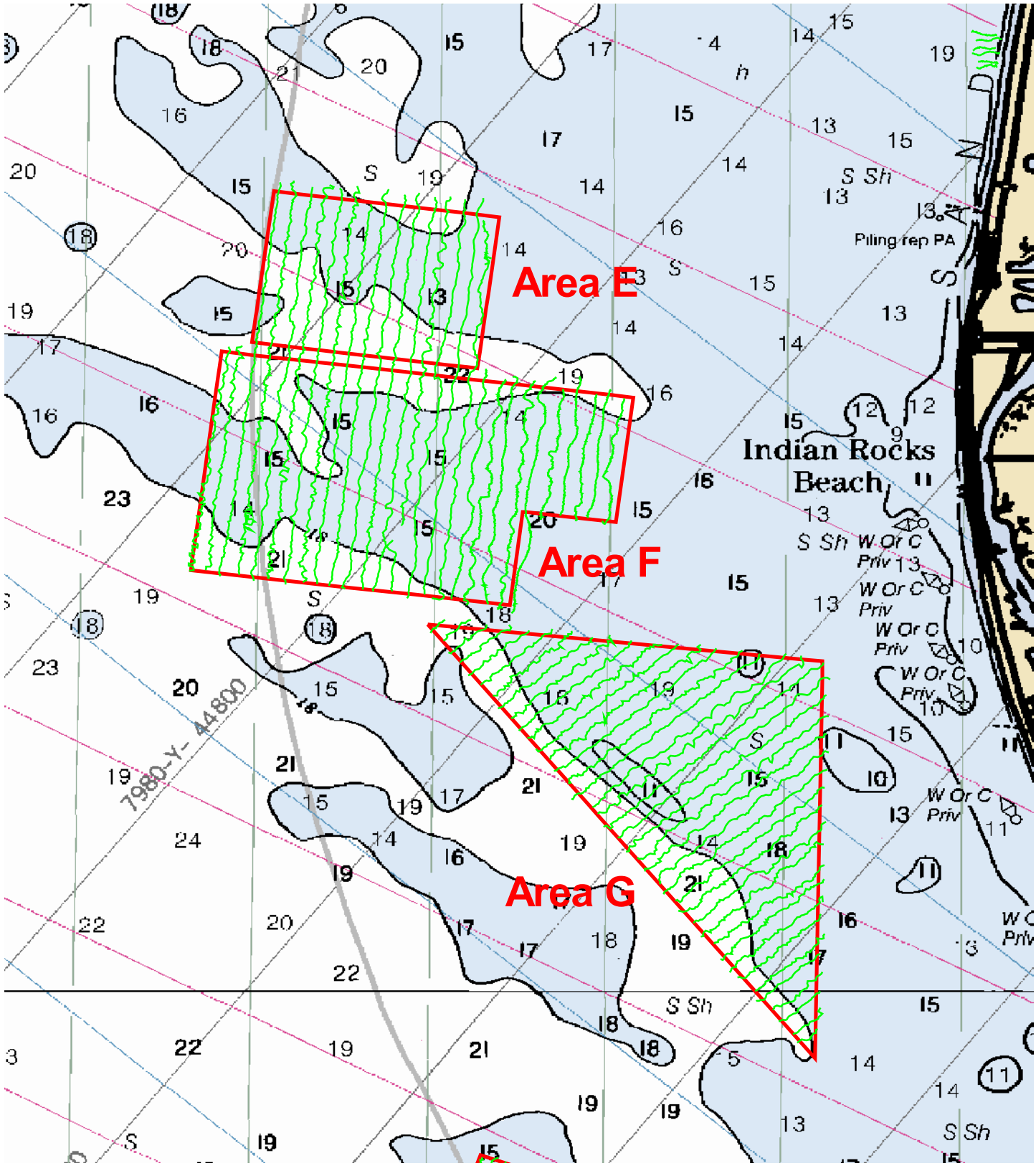
Borrow Areas "A", "B", and "C" Transect Survey Lines	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 4,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 5



Transect Survey Lines
Offshore Borrow Areas

4000 0 4000 8000 12000 Feet

Borrow Areas "D" and "I" Transect Survey Lines	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 4,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 6



Borrow Areas "E", "F", and "G" Transect Survey Lines	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 4,000'	Drawn By: MR
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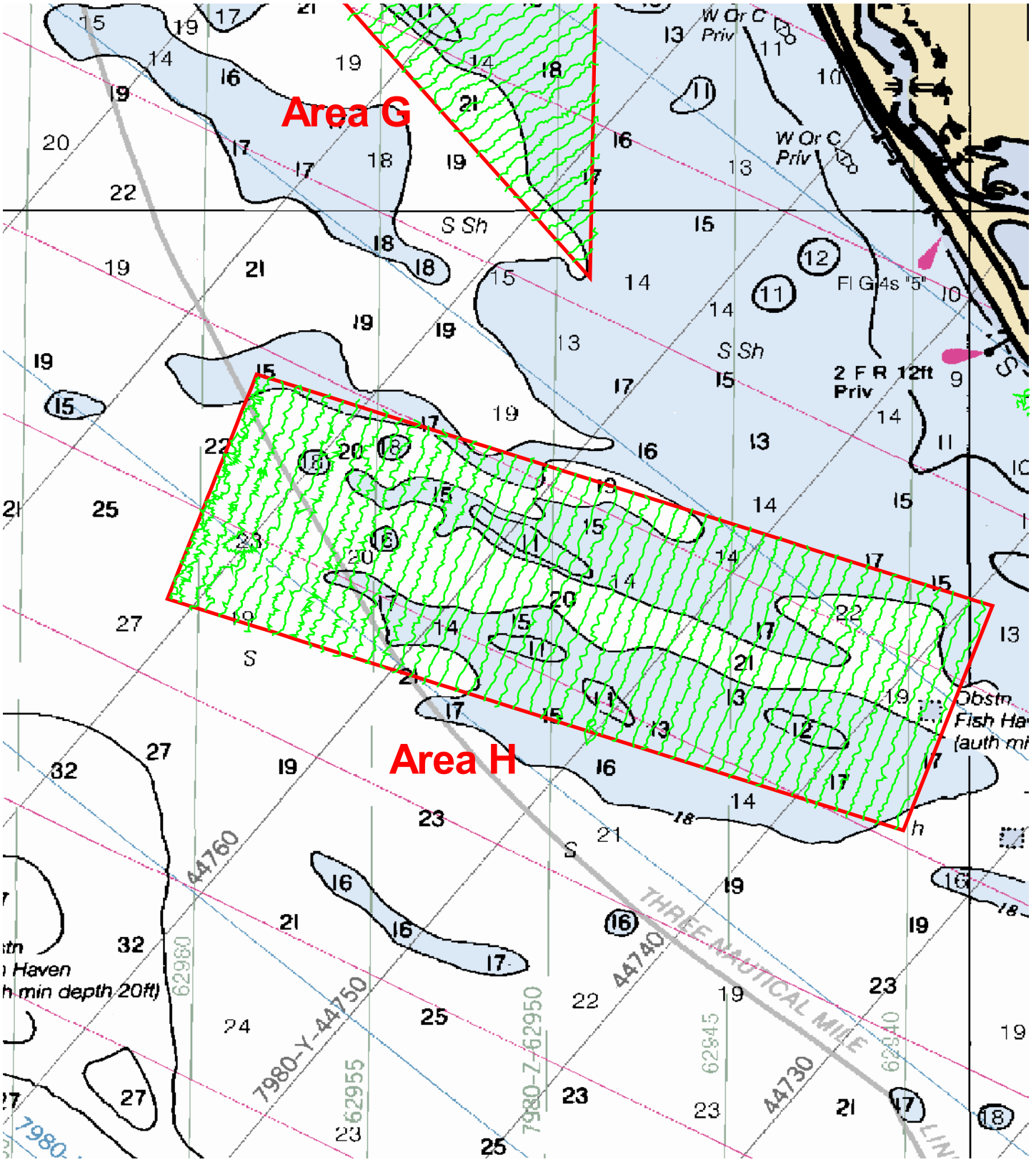
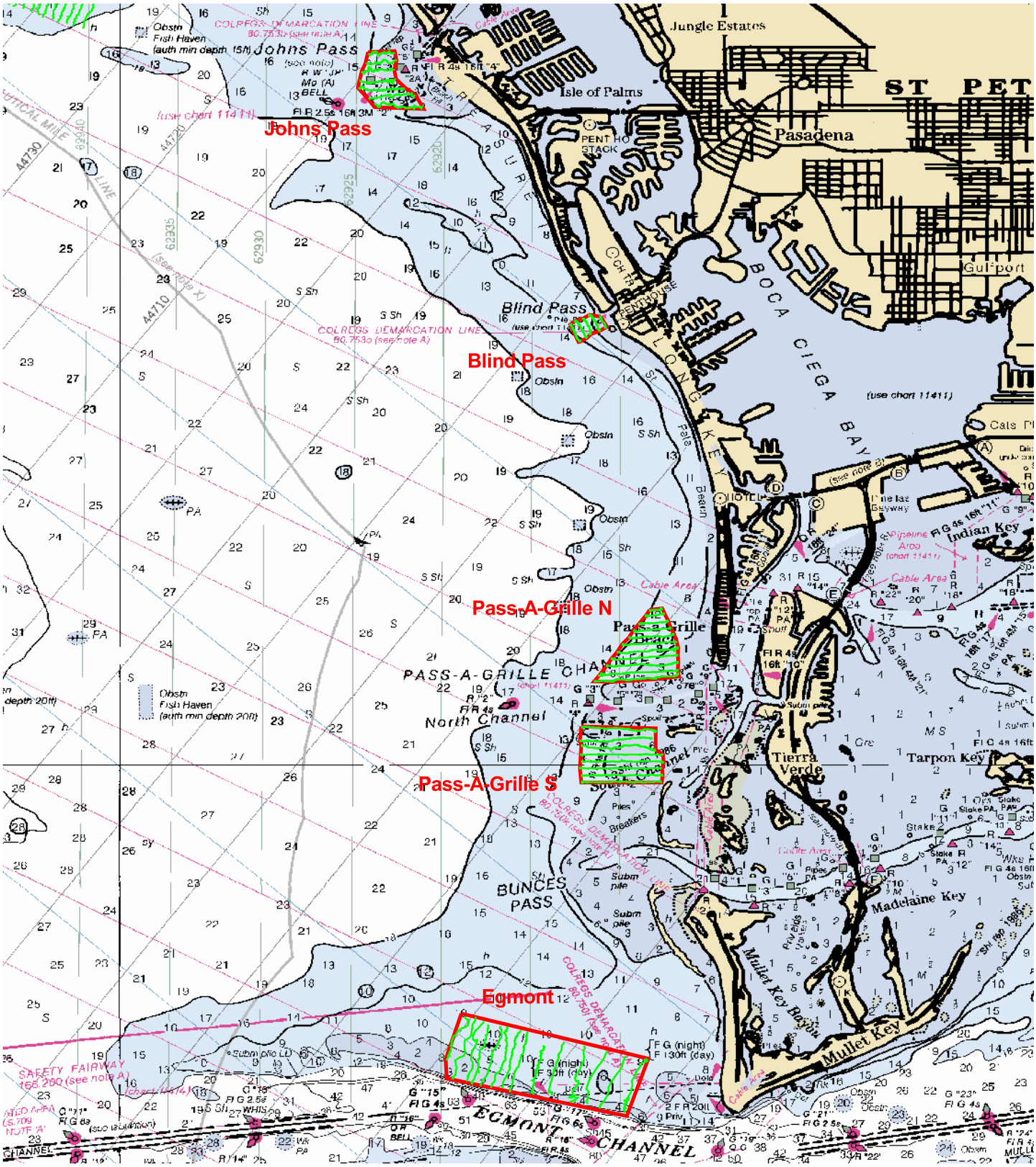
	Figure 7



Transect Survey Lines
Offshore Borrow Areas

4000 0 4000 8000 12000 Feet

Borrow Area "H" Transect Survey Lines	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 4,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 8



Ebb Tidal Shoal Transect Survey Lines	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 8,000'	Drawn By: MR
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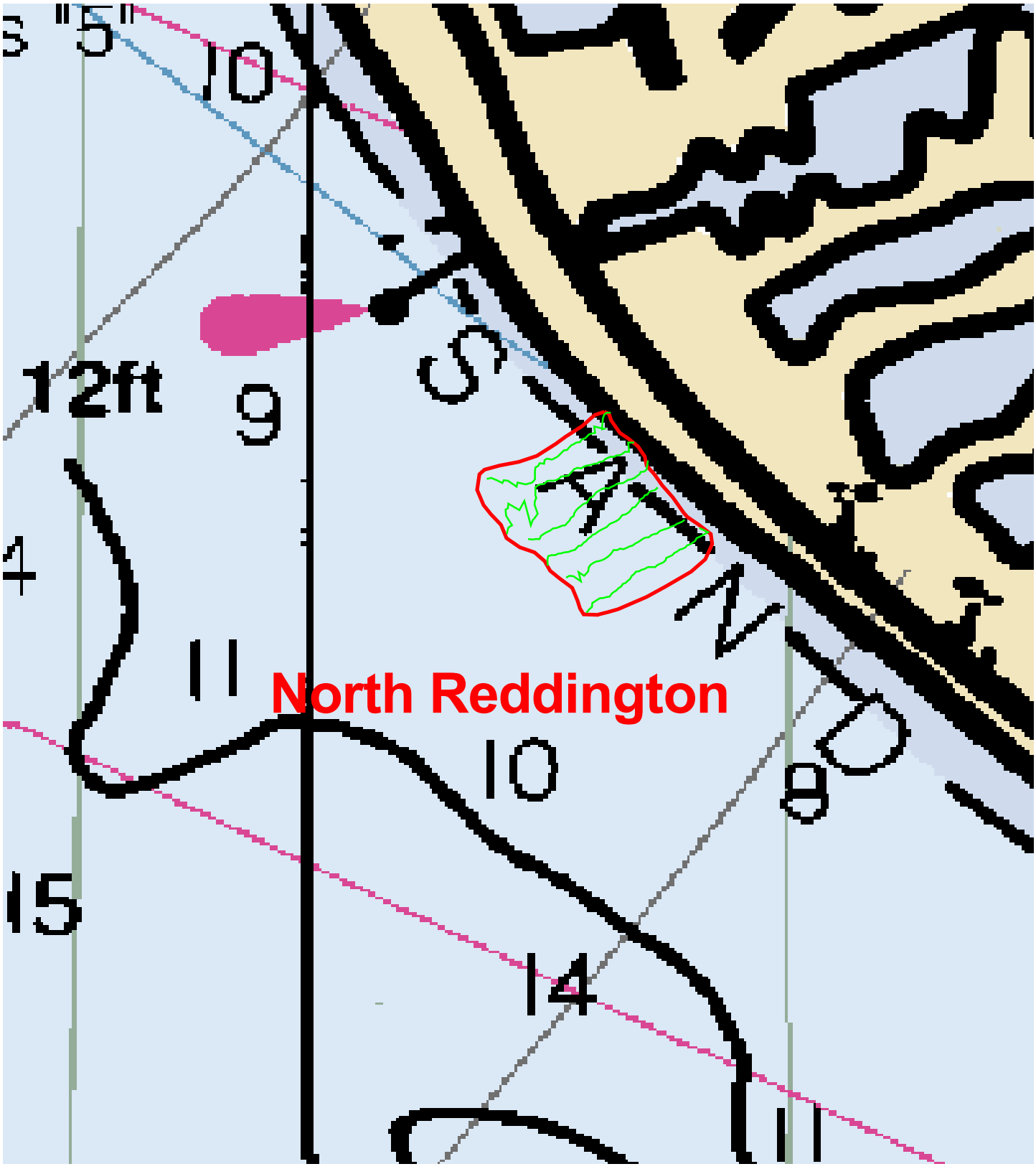
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 9



North Reddington Transect Survey Lines	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
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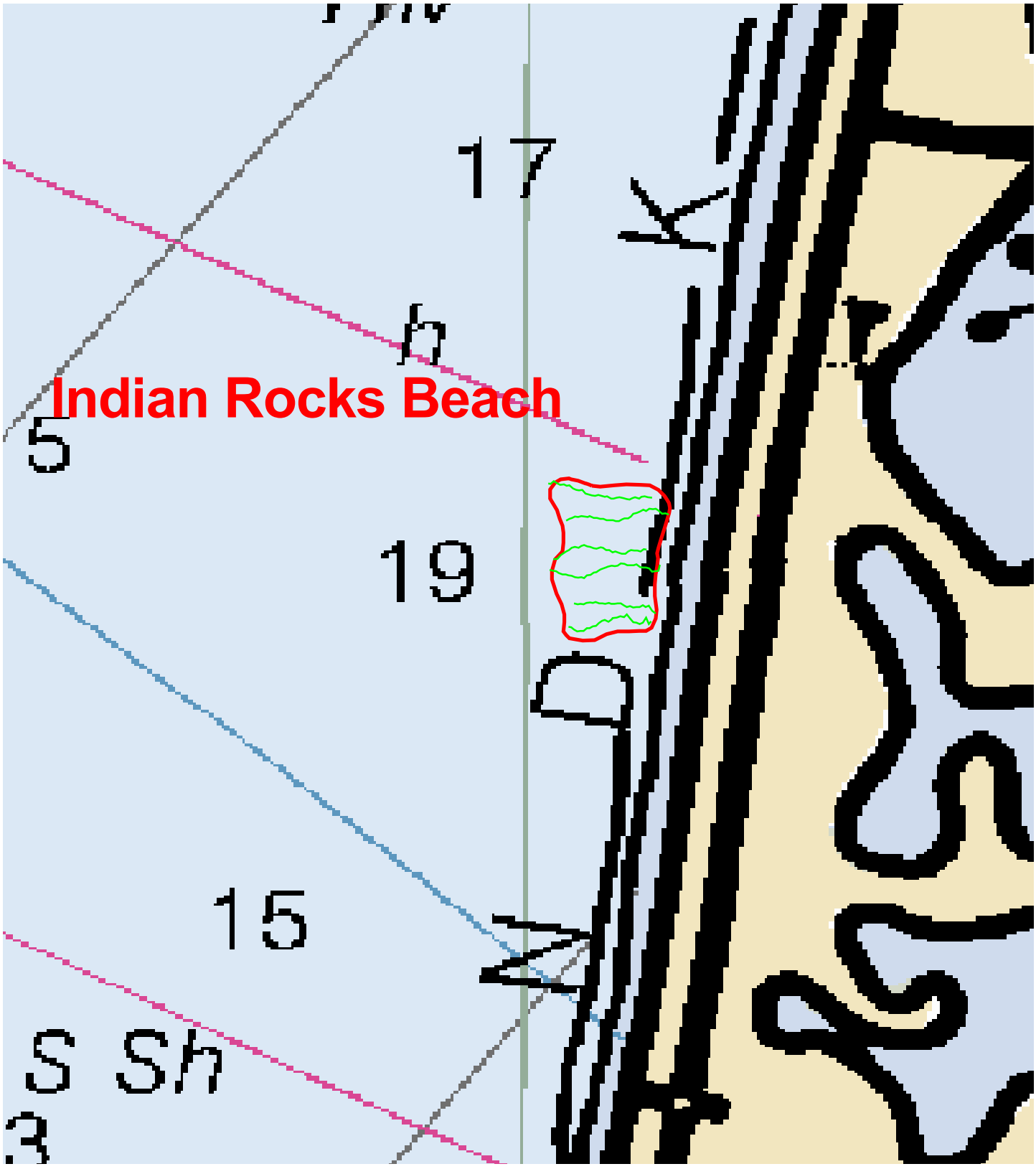
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 10



Indian Rocks Beach Transect Survey Lines	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 1,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 11

2.2 Diver Survey and Characterization

In addition to the towed video survey, diver characterizations of existing habitats were also conducted. Representative habitat types, as determined from video analysis, were located and divers deployed to document the dominant invertebrate, fish, marine algae, and coral communities present within each of the nine borrow areas. Still photographs and hand held video were also used to document the type and extent of living cover, as well as vertical relief and overall quality within these areas.

All diving operations conformed to the requirements of the U.S. Army Corps of Engineers Safety and Health Manual EM 386-1-1, September 3, 1996, OSHA, 29 CFR, Subpart T, and ACOE, Jacksonville District, Safety and Occupational Health Program. Personnel accepted by the District Diving Coordinator (DDC) and approved in the dive plan submitted prior to the field survey performed all diving operations.

3.0 MARINE RESOURCE CHARACTERIZATION

This section summarizes the results of the comprehensive survey conducted as well as a review of pertinent literature.

3.1 Overview of Marine Resources

The area surveyed included areas offshore of Pinellas County, FL. These potential borrow areas exist in water depths from seven to ten meters. Lyons and Collard (1974) describe these communities as areas of moderate wave energy with quartz sand and shell fragment sediments extending offshore. Large temperate mollusks and echinoderms tend be the dominant faunal elements. In areas over 10 meters in depth, exposed rock substrate allows for the establishment of scleractinian, molluscan, crustacean, tunicates, and other species more common to shallower waters of south Florida (Smith 1974, Lyons and Collard 1974). Quartz sands, with biologically influenced carbonates present, also dominate the sediments within this area.

3.1.1 Marine Algae

The marine algae present within the areas offshore of Pinellas County are extremely diverse. Phillips et al. (1960) identified ninety-five taxa of algae within areas of similar depth in this area. Dominant algal species observed during this and other studies includes Caulerpa sp., Halimeda sp., Udotea flabellum, Sargassum sp., and Rhipocephalus phoenix (Phillips et al. 1960, EPA 1981, CZR 1991).

3.1.2 Invertebrates

Benthic invertebrates associated with live bottom habitats along the eastern Gulf of Mexico include scleractinian, molluscan, crustacean, tunicates, octocoral, echinoderm, and porifera species. Many of these species are similar to species found in the more tropical waters of the Caribbean and south Florida reef tract. Lyons and Collard (1974) characterize the shallow shelf habitat offshore of Pinellas County as an area with sediments dominated by quartz sand and biogenically derived carbonates with exposed rock substrate. This substrate provides habitat for scleractinian, molluscan, crustacean and other invertebrate species.

Previous studies have identified species common to habitats offshore of Pinellas County (EPA 1981; CZR 1991; Child 1992; Posey et. al 1996). The species listed in these previous studies compares closely to species observed during this survey (Table 3). In total over 40 dominant invertebrates species were observed from the diver and video surveys. There are many more cryptic and less obvious species present within these complex habitats.

Table 3 Dominant Invertebrate Species Observed During Borrow Area Surveys

Scientific Name	Common Name
Echinoderms	
Linckia guildingii	Common Comet Star
Astropecten articulatus	Beaded Sea Star
Echinaster spinulosus	Orange-Ridged Sea Star
Luidia clathara	Striped Sea Star
Luidia sp.	Sea Star
Luidia alternata	Banded Sea Star
Echinometra lucunter	Rock-boring Urchin
Lytechinus variegates	Variegated Urchin
Mollusks	
Pinna carnea	Penshell
Charonia variegata	Tritons Trumpet
Busycon contrarium	Lightning Whelk
Pleuroploca gigantean	Florida Horse Conch
Scleractin Corals	
Cladocora arbuscula	Tube Coral
Stephanocoenia mitchelinii	Blushing Star Coral
Isophyllia sinuosa	Cactus Coral
Siderastrea sp.	Starlet Coral
Solenastrea hyades	Knobby Star Coral
Scolymia lacera	Mushroom Coral
Phyllangia americana	Hidden Cup Coral
Manicina aereolata	Rose Coral
Montastrea annularis	Boulder Star Coral
Oculina robusta	Robust Ivory Tree Coral
Millepora alcicornis	Branching Fire Coral
Octocorals	
Eunicea succinea	Shelf-knob Sea rod
Eunicea calyculata	Warty Sea Rod
Plexaurella nutans	Giant Slit-Pore Sea Rod
Muricea laxa	Delicate Spiny Sea Rod
Muricea elongata	Orange Spiny Sea Rod
Pseudoterogorgia sp.	Sea Plume
Pterogorgia citrina	Yellow Sea Whip
Leptogorgia virgulata	Colorful Sea Whip
Sponges	
Cribrochalina vasculum	Brown Bowl Sponge
Xestospongia muta	Giant Barrel Sponge
Spheciospongia vesparium	Loggerhead Sponge
Ircinia sp.	Ball Sponge
Calyx podatypa	Dark Volcano Sponge
Anthosigmella varians	Brown Variable Sponge
Amphimedon compressa	Erect Rope Sponge
Pseudoceratina crassa	Branching Tube Sponge
Crustaceans	
Menippe mercenaria	Florida Stone Crab
Tunicates	
Clavelina sp.	Colonial tunicates
Family Didemnidae	Overgrowing Tunicates
Eudistoma sp.	Condiminium Tunciate

The most obvious feature of the hardbottom habitats in the eastern Gulf of Mexico include the octocorals, sponges, and scleractinian corals. Eight species of octocoral were observed (e.g. *Eunicea succinea, Eunicea calyculata, Pterogorgia citrina* etc.), as well as, eleven species of scleractinian (hard) corals (e.g. *Cladocora arbuscula, Solenastrea hyades,* etc.) (Table 3). Poriferian species are also one of the dominant phyla present within the hardbottom habitats. Eight species of sponges were identified within the study area and of these the loggerhead (*Spheciospongia vesparium*) and barrel sponges (*Xestospongia muta*)were the most obvious. Other sponges common to these hardbottom habitats included *Ircinia sp., Cribrochalina vasculum,* and *Anthosigmella varians.*

Typical epifaunal species observed during this survey included *Astropecten articulatus, Luidia clathara, Busycon contrarium,* and *Pleuroploca gigantean*. CZR (1991) and EPA (1981) also found these species to be some of the most common encountered. Sediments within the area consist of sand to shelly sand that support benthic invertebrate communities. In the EPA (1981) study, dominant species in these habitats included sand dollars (*Encope emarginata*), *Luidia* sp., and *Enchinocardium cordatum*. Similar species were observed during this study. Benthic sampling conducted during past surveys also shows that polychaetes, oligochaetes, pycnogonids, bivalves, and arthropods are the dominant taxa collected in these habitats (CZR 1991; Child 1992; Posey et al. 1996).

3.1.3 Fishes

Fishes off of the Pinellas County coast are comprised of both reef and pelagic species. Many of the species present within this area are of commercial importance and addressed under the National Marine Fisheries Service (NMFS) Gulf of Mexico Fishery Management Council (GMFMC) Management Plan (GMFMC 1998). The fish assemblages in the area offshore of Pinellas County Florida and the Gulf of Mexico have been studied many times in the past. These studies have included reports which characterize the offshore and nearshore assemblages of fishes (Moe and Martin 1965; Saloman and Naughton 1979), cold stress of fishes on reef areas (Gilmore et al. 1978; Bullock et al. 1979), growth and reproduction (Shirripa and Burns 1997; Bullock et. al 1996), and the impacts of fishing activities and predation (Pierce et al. 1998; Nelson and Bortone 1996), as well as many other subjects.

Moe and Martin (1965) collected over 2,300 individual fishes from 41 species during sampling conducted at nine separate locations offshore of Pinellas County. The most common fishes collected during this survey included sand perch (*Diplectrum fromosum*), pigfish (*Orthopristus chrysopterus*), silver perch (*Bairdiella chrysura*), spot (*Leiostomus xanthurus*), and pinfish (*Lagodon rhomboides*). Other species collected in this study included searobins (*Prionotus tribulus crassiceps* and *Prionotus scitulus latfirons*), and three species of flounder (*Etropus rimosus, Etropus crossotus atlanticus,* and *Syacium papillosum*).

Fishes of commercial and recreational importance within the eastern Gulf of Mexico include groupers and snappers. These species are included in the GMFMC Snapper-Grouper

Complex fisheries management plan (1998). Species common to the area include yellowedge grouper (*Epinephelus flavolimbatus*) (Bullock et al. 1996), gag (*Mycteroperca microlepis*) and red grouper (*Epinephelus morio*) (Schirripa and Burns 1997). Many of these species have been subjected to overfishing and stocks within the area have declined. This include red porgy (*Pargus pargus*), vermillion snapper (*Rhomboplites aurobens*), and other grouper species (*Epinephelus* sp.) (Roberts et al. 1995).

Pelagic species also occur throughout the Gulf of Mexico in the nearshore and offshore waters. Major coastal pelagic families include Rachycentridae (cobia), Mugilidae (mullets), Pomatomidae (bluefish), Caranagidae (jacks), Scombridae (tunas and mackerels), Engraulidae (anchovies), and Carahahinidae (requiem sharks). Many of these pelagic species form large schools (e.g. jacks, mullet, mackerel, etc.), while others travel singly or in small groups (e.g. cobia). Distribution of these species can vary seasonally and usually depends on water column attributes that vary seasonally.

Fishes observed during diver and video surveys in this study are shown in Table 4. In total 17 species from 15 families were observed. Most species observed included small demersal species common to hardbottom areas. The most common species observed were wrasses (Labridae); in particular the slippery dick (*Halichoeres bivittatus*). Other common fishes included searobins (*Prionotus* sp.), and menhaden (*Brevoortia sp.)*. Anecdotal observations of pelagic fishes during the survey included large schools of baitfish (Engraulidae and Clupeidae), sharks (Carahahinidae), mackerel (Scombridae), and a nurse shark (*Ginglymostoma cirratum*).

Table 4 Fishes Observed Within Borrow Area During Diving Surveys

Scientific Name	Common Name
Haemulon sp.	Juv. Grunt
Equetus umbrosus	Juv. Highhat
Synodus intermedius	Sand Diver
Opsanus beta	Toadfish
Monocanthus sp.	Filefish
Halichoeres bivittatus	Slippery Dick
Diplectrum fromosum	Sand Perch
Archosargus probatocephalus	Sheepshead
Calamus sp.	Porgy
Parablennius marmoreus	Seaweed Blenny
Diplodus holbrooki	Spotfin Pinfish
Brevoortia sp.	Menhaden
Prionous sp.	Sea Robin
Echeneis naucrates	Sharksucker
Centropristis striata	Black Sea Bass
Gymnothorax saxicola	Honeycomb Moray
Serranus subligarius	Belted Sandfish

3.1.4 Other Vertebrates

Other vertebrate species, which utilize these offshore habitats, include many threatened and endangered species. The Gulf of Mexico is within the range of five species of sea turtle, the West Indian manatee (*Trichechus manatus*), and up to 28 cetacean species. Of these, four species of sea turtle, the manatee, and one cetacean, the bottlenose dolphin (*Tursiops truncatus*) occur within the study area.

3.1.4.1 Sea Turtles

Four species of sea turtle commonly occur within the area around Pinellas County (Meylan et al. 1999; EPA 1981). These are the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), and the hawksbill (*Eretmochelys imbricata*). The loggerhead is listed as threatened and the other three species are listed as endangered. Loggerhead turtles represent most of the sea turtles present in the Tampa Bay area. Data collected on sea turtle nesting in the area shows that the majority of the nests within this area consist of loggerhead nests (Table 5). Of the 279 nests observed on Pinellas County beaches in 2000, 278 were loggerhead nests. The only other nesting activity reported was one green turtle nest. All turtles observed during this survey were loggerhead turtles which were seen with regular consistency while conducting the survey. Stranding records within the Pinellas County area also confirmed that loggerhead turtles are the most numerous species. During this survey a dead loggerhead was discovered and reported to the FMRI stranding network.

Table 5 Summary of Loggerhead Sea Turtle Nesting from 1988-2000

Year	Beach Length Surveyed	Number of Nests
1988	69.5	56
1989	63.2	92
1990	62.1	144
1991	67.3	175
1992	63.3	142
1993	42.7	105
1994	52.6	138
1995	58.8	229
1996	49.1	223
1997	58.8	181
1998	52.3	233
1999	62.6	172
2000	62.6	279

Source: Florida Marine Research Institute 2001

3.1.4.2 Marine Mammals

Marine mammals commonly present within the waters nearshore and offshore the study area include manatee and bottlenose dolphin. Bottlenose dolphins were commonly observed while conducting this survey. As many as 15 dolphins were observed at one time in the areas adjacent to the offshore borrow areas. Weigle (1990) documented that at least three distinct herds of dolphin are common within the Lower Tampa Bay area. This includes as many as 246 individual animals. Many of the dolphins observed may have been transient in nature. However, 75 individuals were observed on more than one occasion.

West Indian manatees also utilize habitats within the study area. Manatees inhabit both fresh and saltwater and may be encountered in canals, rivers, esturaries, bays, and on occasion have been observed as far as 6 km off the Florida Gulf coast (USFWS, 1996). Aerial surveys indicate that as many as 190 manatees may use Tampa Bay (Ackerman , 1995). Surveys show that over 900 manatees inhabit the west coast of Florida. The highest concentrations of manatees along Florida's Gulf coast exists in Citrus, Levy, Lee, and Collier Counties. Data suggest that of the manatees living in the Tampa Bay area, most occur within the bay where water temperatures are more stable year round. During aerial surveys in 1992, only 15 manatees were surveyed in the eastern portion of Tampa Bay (Akcerman, 1995). Examination of the manatee mortality data for Pinellas and Hillsborough Counties shows that from January 2000-October 2001 a total of 27 manatee deaths were reported. The majority of these deaths involved perinatal, cold stress, or other natural causes.

3.2 Offshore Borrow Areas

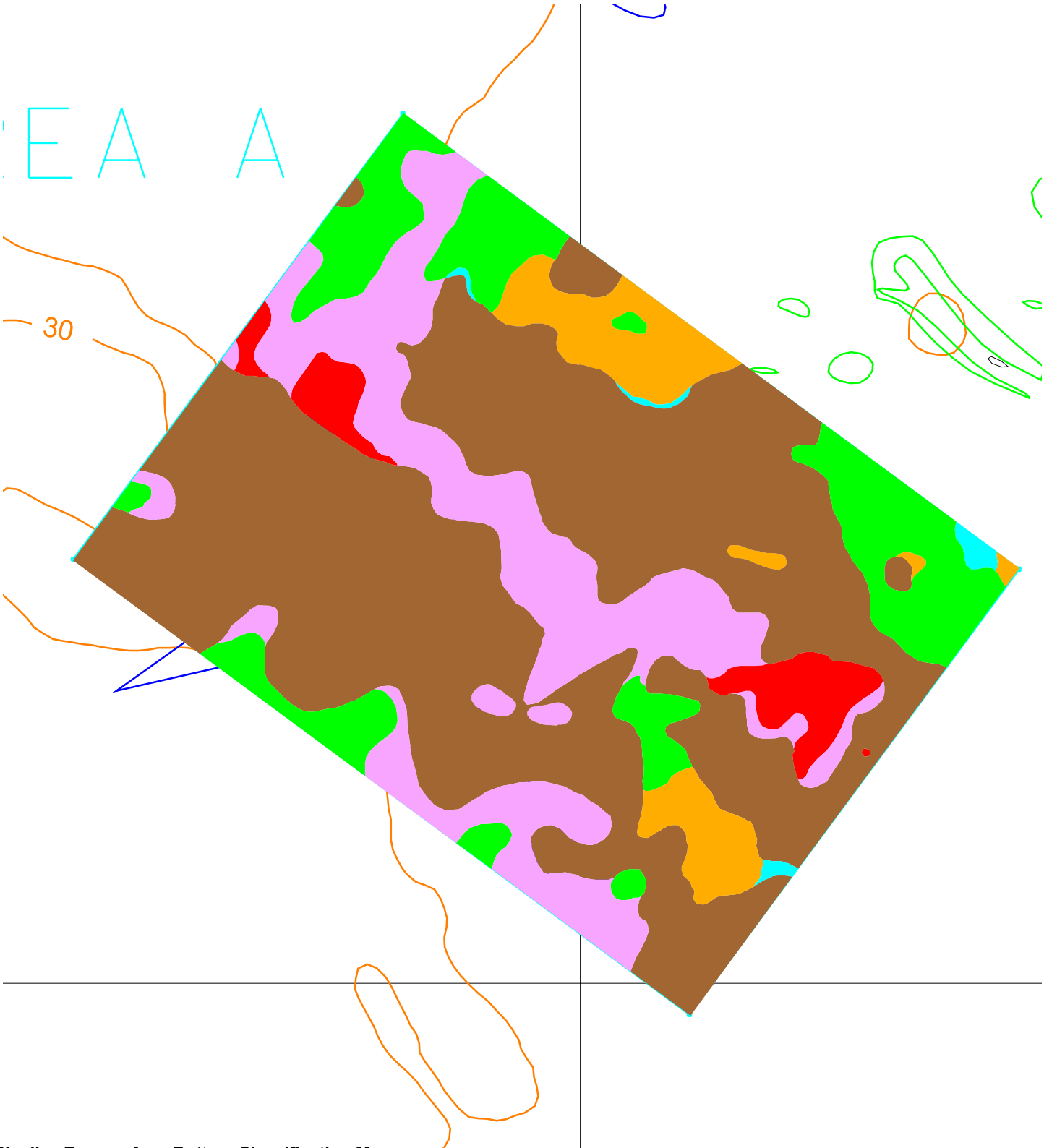
In total, nine offshore borrow areas were surveyed. These nine areas entail a total area of 13,829 acres. Within these areas, over 75 percent of the habitat surveyed was open sand (10,000.4 acres) while the remaining 3,828.6 acres consisted of hardbottom habitats.

3.2.1 Area A

Offshore Borrow Area A lies six miles offshore of Indian Rocks Beach, Florida. Borrow Area A encompasses 2,030 acres in approximately 25 feet of water. Of these 2,030 acres, 1,153 acres are sand, while 877 acres of area is exposed hardbottom habitat (Figure 12).

3.2.1.1 Habitat Description

Borrow Area A has the most exposed hardbottom areas of all of the areas mapped. Most of the 880 acres of hardbottom within Area A consists of scattered medium relief habitats. In total 390 acres of the hardbottom habitat is scattered medium relief hardbottom, 126 acres of



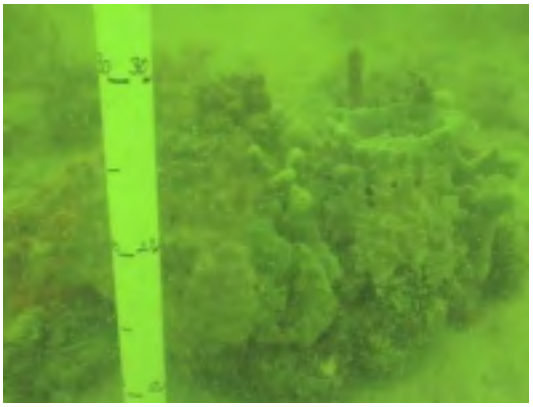
Pinellas Borrow Area Bottom Classification Map

- Dense Hardbottom (>75% Cover), High Relief (>100 cm)
- Dense Hardbottom (>75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75%, Cover), Low Relief (<30cm)
- Patchy Hardbottom (<20% Cover), Low Relief (<30cm)
- Sand

2000 0 2000 4000 Feet

Borrow Area "A" Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 2,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 12

scattered low relief hardbottom, with the remaining 249 acres being dense medium/high relief habitat (Table 6). Relief within Area A averages 32 cm and is predominately low-lying sponges, gorgonians, and hard corals. Photograph 1 shows a typical area of exposed hardbottom with relief. Hardbottom in Area A is dominated by gorgonian and sponge species. In particular, *Muricea* sp., and *Pseudopterogonia* sp. tended to be dominant. *Echinometra lucunter* and *Luidia* sp. were the most common motile invertebrates encountered. Overall, hardbottom habitats within Area A tended to be of medium quality. In areas that diver surveys were conducted there tended to be a high degree of siltation present with many corals and sponges slightly covered. Gorgonian species, with a higher relief when compared to the low lying rock, tended to be the healthiest species present. Fish species encountered within Area A included *Equetus umbrosus* and *Opsanus beta.*



Photograph 1. Area A scattered medium relief hardbottom.

3.2.2 Borrow Area B

Borrow Area B is a 703.8 acre block located 5.6 nautical miles offshore of Bellair Beach, FL. Figure 6 shows the relative layout of sand and exposed hardbottom. Within Area B there are 210.3 acres of hardbottom compared to 493.5 acres of open sand habitat.

3.2.2.1 Habitat Description

Hardbottom habitats within Area B consist of predominately low relief features (Figure 13). Dense medium relief hardbottom was the dominant cover type, occupying over 154 acres. Some areas had small ledge features that had vertical relief in excess of 50 cm. Algae, sponges, and tunicates dominated exposed rock cover within Area B. In particular, *Udotea*

Table 6 Summary of Marine Resource Cover Types Within Each Area Surveyed

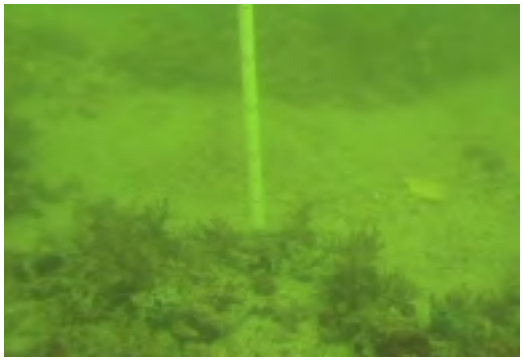
	Acres						
Survey Area	**Total Size**	**Sand**	**Patchy Low Relief**	**Scattered Low Relief**	**Scattered Medium Relief**	**Dense Medium Relief**	**Dense High Relief**
Area A	2,030.0	1,153.9	10.8	126.1	390.2	275.2	74.7
Area B	703.8	493.5	5.1	0.7	41.6	154.2	9.1
Area C	1,363.7	1,055.7	5.6	142.3	12.4	82.8	10.4
Area D	2,653.7	1,819.2	8.4	47.7	236.8	529.6	---
Area E	592.7	390.9	30.8	3.6	131.3	12.3	23.8
Area F	1,410.5	1,095.6	27.6	16.5	82.3	21.8	166.8
Area G	1,344.4	1,142.5	---	15.8	97.5	15.9	72.7
Area H	3,202.1	2,533.8	59.0	89.7	353.0	119.5	47.3
Area I	527.3	315.3	5.6	---	121.3	85.2	---
John's Pass	152.1	152.1	---	---	---	---	---
Blind Pass	38.5	38.5	---	---	---	---	---
Pass-a-grille North	249.5	249.5	---	---	---	---	---
Pass-a-grille South	298.0	298.0	---	---	---	---	---
Egmont Channel	831.9	831.9	---	---	---	---	---
North Reddington Beach Breakwater	28.3	23.5	---	---	3.7	---	1.1
Indian Rocks Beach Breakwater	16.3	14.0	---	2.0	---	---	0.3

Pinellas Borrow Area Bottom Classification Map

- Dense Hardbottom (>75% Cover), High Relief (>100 cm)
- Dense Hardbottom (>75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75%, Cover), Low Relief (<30cm)
- Patchy Hardbottom (<20% Cover), Low Relief (<30cm)
- Sand

1500 0 1500 3000 Feet

Borrow Area "B" Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 1,500'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 13



flabellum, and *Sargassum* sp. were the most visible algal species. Sponges in the area included *Ircinia* sp. and *Cribrochalina vasculum.* One noticeable feature of the areas where SCUBA reconnaissance was conducted in Area B was the lack of gorgonian species in these hardbottom areas. Invertebrate species common to the area included *Luidia* sp, and the whelk, *Busycon contrarium.* Photograph 2 shows typical hardbottom coverage in Area B with vertical relief shown.

Photograph 2. Area of scattered low relief hardbottom in Area B.

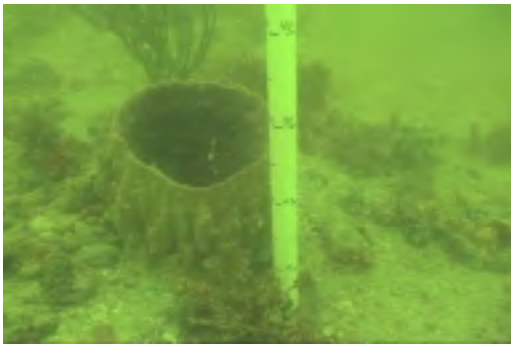
3.2.3 Borrow Area C

Five miles west of Bellair Beach is Borrow Area C. Area C lies in approximately 20-25 feet of water and has a total area of 1363.7 acres. Within this area, 1,055.7 acres is open sand, while the remaining 308 acres is composed of exposed rock/live bottom habitat (Figure 14).

3.2.3.1 Habitat Description

Dense hardbottom habitats within Area C tended to have a relatively higher quality and diversity in comparison to other offshore areas surveyed. Overall there was a total of 93.2 acrea of dense medium/high relief hardbottom and 154.5 acres of scattered low/medium relief hardbottom in Area C (Table 6). Of particular note within this area, there were colonies of the hard corals *Solenastrea hyades* and *Oculina robusta* and also barrel sponges (*Xestospongia muta*). Fishes were more common in this area with sand divers (*Synodus intermedius*), toadfish, and slipperly dicks along with schools of menhaden (*Brevoortia sp)* and spotfin pinfish (*Diplodus holbrooki)* observed (Photograph 3). Also observed within this area was the commercially important stone crab (*Menippe mercenaria*). Typical relief of hardbottom within Area C was 20 cm (Photograph 4). In some areas, where gorgonian species such as *Pterogorgia anceps* were present, the relief was as high as 40 cm, however.

Photograph 3. Sand Diver (*Synodus intermedius*) in Area C.



Photograph 4. Area C Hardbottom with Relief Shown

Pinellas Borrow Area Bottom Classification Map

- Dense Hardbottom (>75% Cover), High Relief (>100 cm)
- Dense Hardbottom (>75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75%, Cover), Low Relief (<30cm)
- Patchy Hardbottom (<20% Cover), Low Relief (<30cm)
- Sand

1500 0 1500 3000 Feet

Borrow Area "C" Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 2,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 14

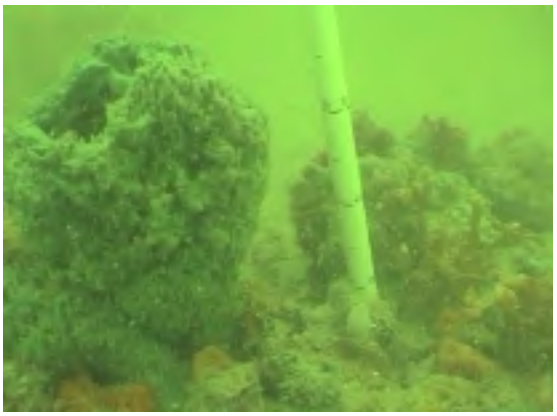
3.2.4 Borrow Area D

Borrow Area D lies 2.8 nautical miles offshore of Bellair Beach in the northern portion of the study area (Figure 2). Area D contains 2,653.7 acres of bottom with 1,819.2 acres of sand and 834.5 acres of hardbottom habitats (Figure 15) (Table 6). Area D has the second most available acres of open sand habitat of the nine offshore borrow areas surveyed.

3.2.4.1 Habitat Description

Photograph 5. Large sponges with relief shown in Area D

Borrow Area D has 529 acres of dense medium relief hardbottom areas dominated by large sponges and gorgonians. Many large sponges such as *Spheciospongia vesparium* and *Cribrochalina vasculum* were present within the area (Photograph 5). In addition there were also some large gorgonian species. These sponges and gorgonians in areas had relief of over 70 cm. Overall within Area D the relief of the hardbottom features averaged 36 cm, with 292.9 acres of low/medium relief patchy and scattered habitat. Photograph 6 depicts typical hardbottom features in Area D with relief shown. Fishes were also common in the hardbottom areas within Area D, and included sand divers, juvenile grunts, blennies, and sheepshead (*Archosargus probatocephalus*) were observed within the area. A large sharksucker (*Echeneis naucrates*) was also seen in the area.



Photograph 6. Typical scattered low relief hardbottom in Area E.

3.2.5 Borrow Area E

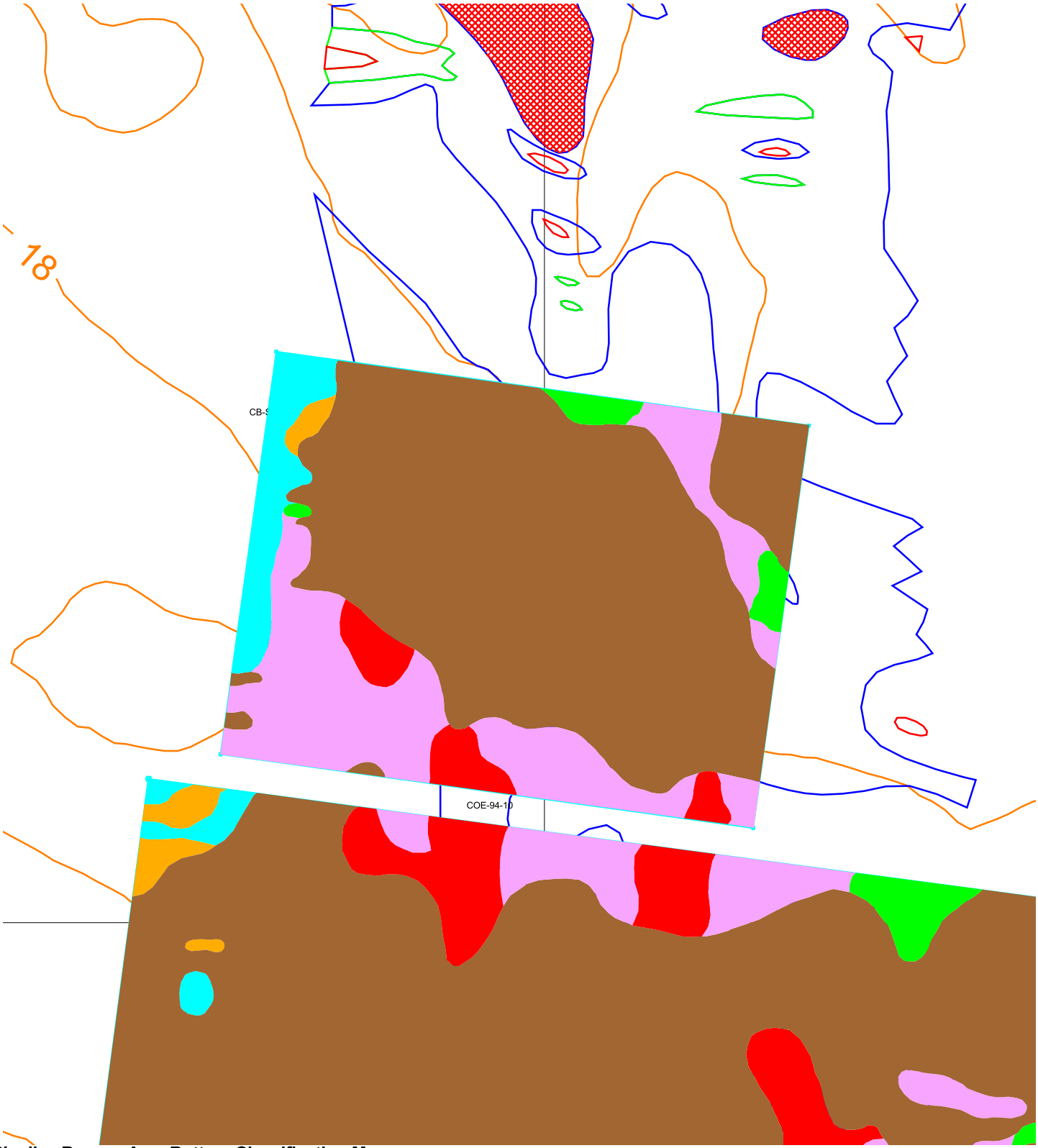
Offshore Borrow Area E is the second smallest area surveyed at 592.7 acres (Figure 16). Within this area, the survey revealed 201.8 acres of hardbottom habitat and 390.9 acres of open sand habitat. Borrow Area E is 2.5 miles west of Indian Rocks Beach.

Pinellas Borrow Area Bottom Classification Map

- Dense Hardbottom (>75% Cover), High Relief (>100 cm)
- Dense Hardbottom (>75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75%, Cover), Low Relief (<30cm)
- Patchy Hardbottom (<20% Cover), Low Relief (<30cm)
- Sand

2000 0 2000 4000 Feet

Borrow Area "D" Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 2,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 15



Pinellas Borrow Area Bottom Classification Map

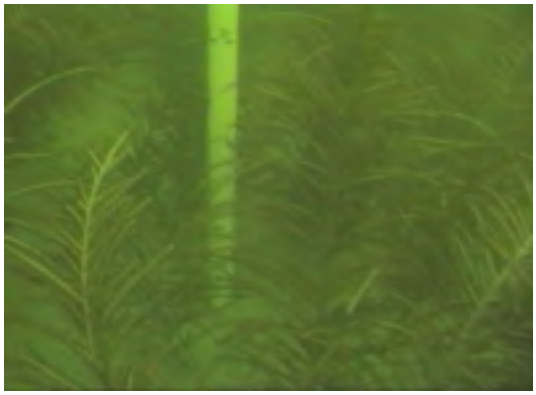
- Dense Hardbottom (>75% Cover), High Relief (>100 cm)
- Dense Hardbottom (>75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75%, Cover), Low Relief (<30cm)
- Patchy Hardbottom (<20% Cover), Low Relief (<30cm)
- Sand

1500 0 1500 3000 Feet

Borrow Area "E" Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 1,500'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 16

3.2.5.1 Habitat Description

Marine resources in Area E were predominately comprised of low/medium relief exposed rock features (Figure 16) (Table 6). In total, 134.9 acres of habitat were scattered low/medium relief hardbottom. In most areas the hardbottom features were merely scattered rock/rubble with associated sponges, algae, and coral (Photograph 6). Large areas adjacent to and among these rubble areas consisted of large octocorals (*Pseudoterogorgia sp.*, *Plexaurella nutans* etc.) (Photograph 7). Within these areas of dense gorgonians, the relief averaged over 50 cm. The surrounding rock features in the area had average relief of less than 20 cm.



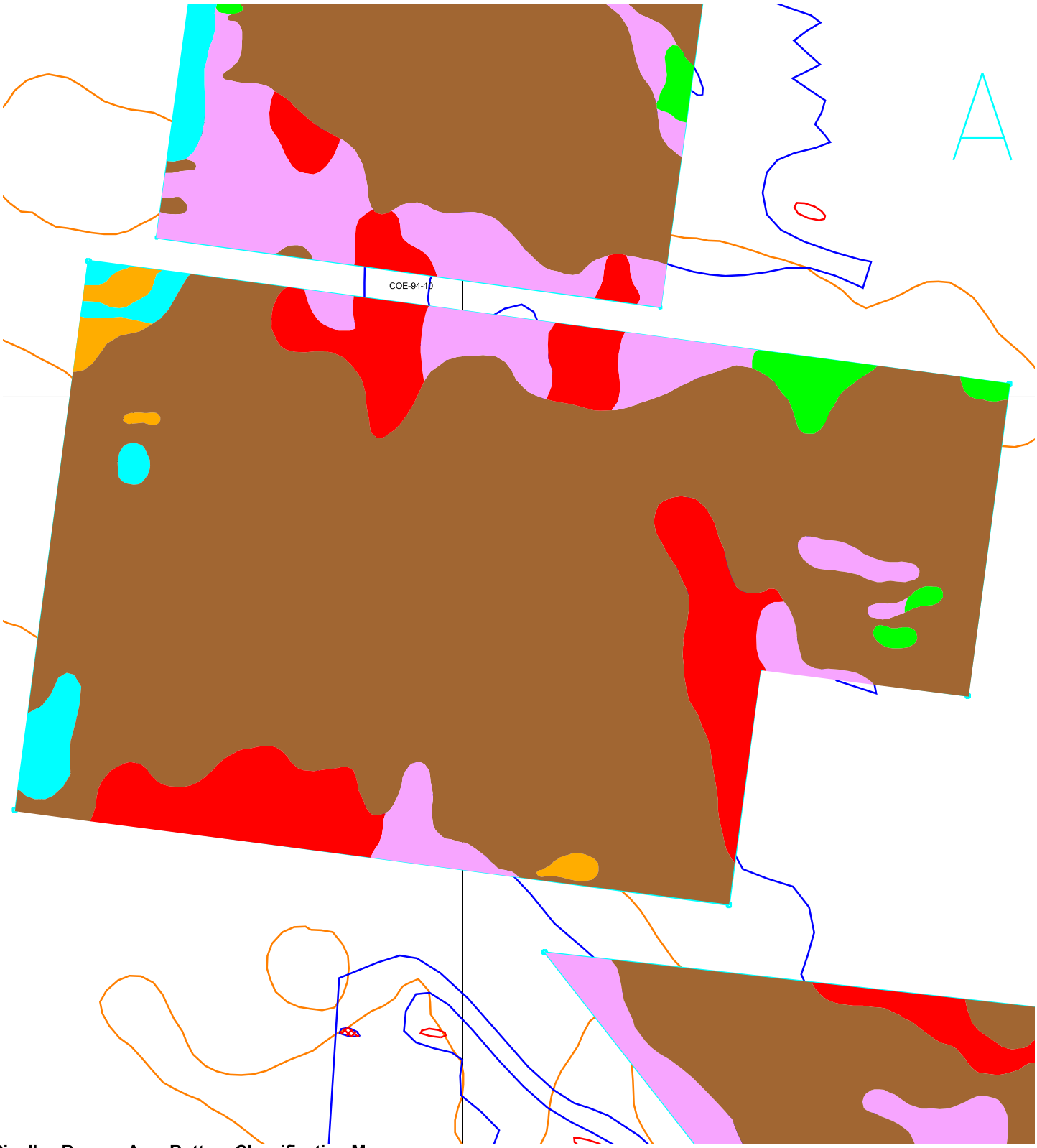
Photograph 7. Octocoral community within Area E

3.2.6 Borrow Area F

Directly south of Area E is 1,410.5-acre Area F (Figure 2). Habitat distribution within this area was a total of 315 acres of hardbottom habitat and 1,095.6 acres of open sand (Figure 17).

3.2.6.1 Habitat Description

Borrow Area F has over 187 acres of high quality dense medium/high relief hardbottom habitat (Table 6). Hardbottom areas within Area F are comprised of scleractinian species such as *Solenastrea hyades* (Photograph 8), as well as a variety of gorgonian species. Also present within this area were large overgrowing tunicates (Family Didemnidae). Fishes observed within these hardbottom habitats included numerous sea robins (*Prionous* sp.), moray eels (*Gymnothorax* sp.), and juvenile grunts. Invertebrate species encountered included the very common *Luidia clathara, Lytechinus variegates*, and *Echinometra lucunter*, as well as a very large specimen of the lightning whelk, *Busycon contrarium* (Photograph 9). Another 100 acres of scattered low/medium relief also occurs within this area. A typical view of this relief is shown in Photograph 10.



Pinellas Borrow Area Bottom Classification Map

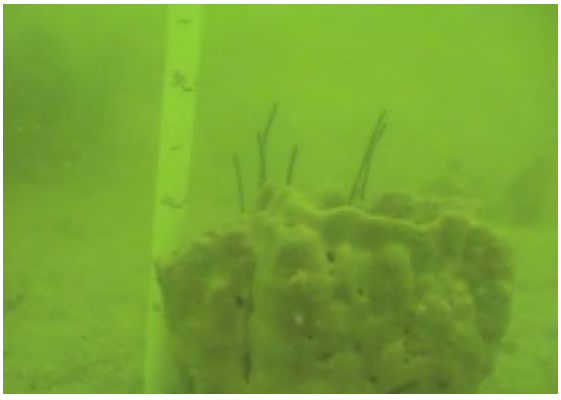
- Dense Hardbottom (>75% Cover), High Relief (>100 cm)
- Dense Hardbottom (>75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75%, Cover), Low Relief (<30cm)
- Patchy Hardbottom (<20% Cover), Low Relief (<30cm)
- Sand

1500 0 1500 3000 Feet

Borrow Area "F" Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 1,500'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 17

Photograph 8. Solanastrea hyades coral typical to dense hardbottom areas in Area F.

Photograph 9. Large lightning whelk found in Area F.

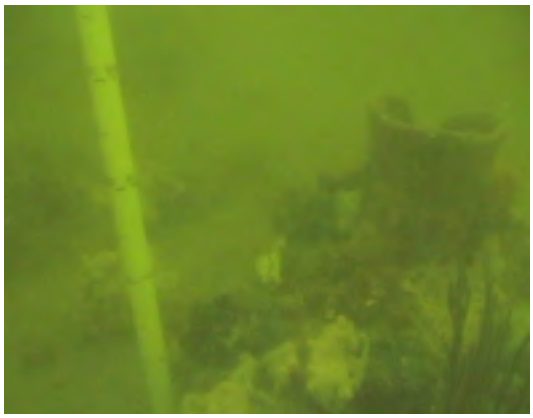


Photograph 10. Typical scattered low relief habitat in Area F.

3.2.7 Borrow Area G

Borrow Area G is the closest to shore of all the borrow areas (1.8 nm) and also has a large percentage of sand available (1,142.5.0 acres, 85 percent). Hardbottom areas within Area G only totaled 15 percent (201.9) of the total 1,344.4 acres surveyed. Most of these hardbottom areas were small distinct patches low/medium relief hardbottom scattered throughout the area. These patches ranged in size from 1.3 acres to over 17 acres. The remainder of the hardbottom present within the area was found along the western and northern ends of the borrow area and included areas of dense hardbottom (Figure 18).

3.2.7.1 Habitat Description



Photograph 11. Typical relief of scattered medium relief habitat in Area G.

With a vertical relief of 35 cm, the scattered medium relief hardbottom present within Area G represented some of the highest quality hardbottom encountered during the survey. Large gorgonian species interspersed with large sponges and hard corals typified the area. Photograph 11 shows some of the typical relief within the area. Some areas within Area G had a relief of over 50 cm. *Ircinia* sp., *Cribrochalina vasculum*, and *Spheciospongia vesparium* were the most common porifera species encountered. The gorgonian, *Leptogorgia virgulata*, was also common within the area.

3.2.8 Borrow Area H

The largest borrow area surveyed was Area H (Figure 19). In total, Area H encircles 3,202.1 acres of seafloor, 2.8 miles offshore of Sand Key. Within this area there was a total of 2533.8 acres of open sand habitat, the largest of all areas surveyed. This represents 80 percent of the total acreage within Area H. Hardbottom habitats within this potential borrow area covered 668.3 acres.

Pinellas Borrow Area Bottom Classification Map

- Dense Hardbottom (>75% Cover), High Relief (>100 cm)
- Dense Hardbottom (>75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75%, Cover), Low Relief (<30cm)
- Patchy Hardbottom (<20% Cover), Low Relief (<30cm)
- Sand

2000 0 2000 4000 Feet

Borrow Area "G" Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 2,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 18

3.2.8.1 Habitat Description

Habitat distributions varied across Area H. In the western half of the borrow area, randomly distributed patches of scattered medium relief hardbottom were typical (Figure 19). These areas vary in size from small areas (< 1.0 acre) to large tracts of hardbottom (70 acres). In the eastern half of Area H, the northeast section is composed of a large area of open sand habitat. This area encompasses over 2,500 acres of area. Vertical relief of resources within Area H averaged just over 30 cm (Photograph 12). Marine resources here were similar to those found in other areas, with large sponges and gorgonians being the dominant species. Numerous sea robins were also seen on the sand areas interspersed between hardbottom areas.

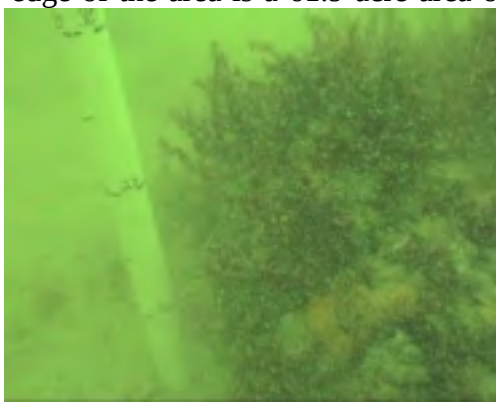
Photograph 12. Typical relief of hardbottom in Area H.

3.2.9 Borrow Area I

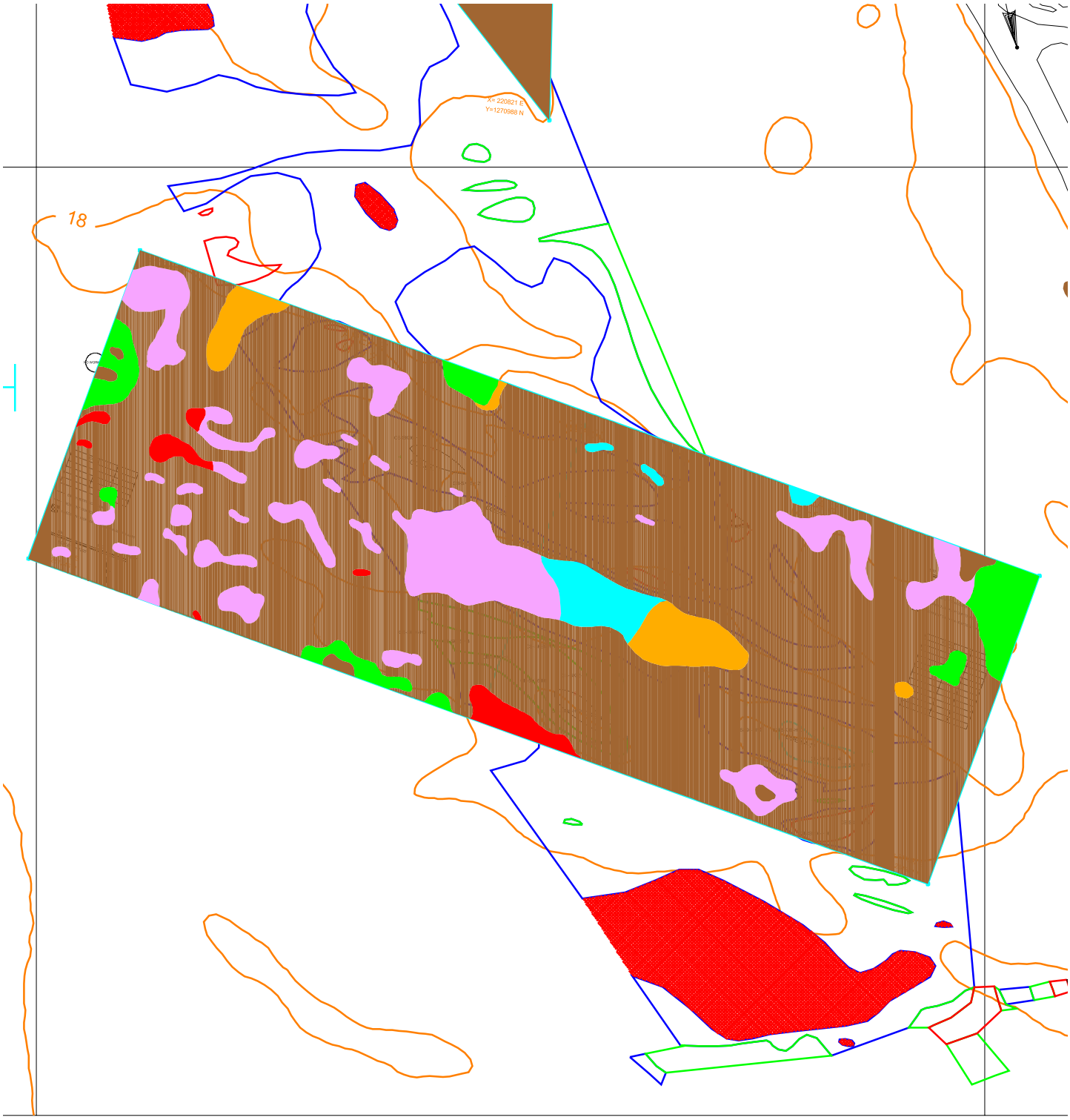
The northern most offshore area surveyed in Borrow Area I, located 3.0 nm offshore of Clearwater Pass (Figure 2). Area I is also the smallest area surveyed at only 527.3 acres. Within Area I a total of 212.3 acres of hardbottom resources were mapped. The remaining 315.3 acres consisted of open sand habitat (Figure 20).

3.2.9.1 Habitat Description

Hardbottom resources within Area I can be separated into two large areas. Along the northern edge of the area is a 61.9-acre area of hardbottom. In addition to this, a 56.9-acre area runs along the eastern edge (Figure 20). Throughout the middle of borrow area lies 375.7 acres of unvegetated sand habitat. Much of the hardbottom present in these two areas is scattered medium relief. Average relief in this area averaged 32 cm, with a few gorgonian species approaching 100 cm in height. Exposed rock within this area was covered with a combination of sponges, *Sargassum* sp., colonial tunicates (*Clavelina sp.)*, and hard corals (Photograph 13). The sand perch (*Diplectrum fromosum*) was common in the area, and a triton's trumpet (*Charonia variegata*) was also observed.



Photograph 13. Hard coral assemblage typical to Area I.

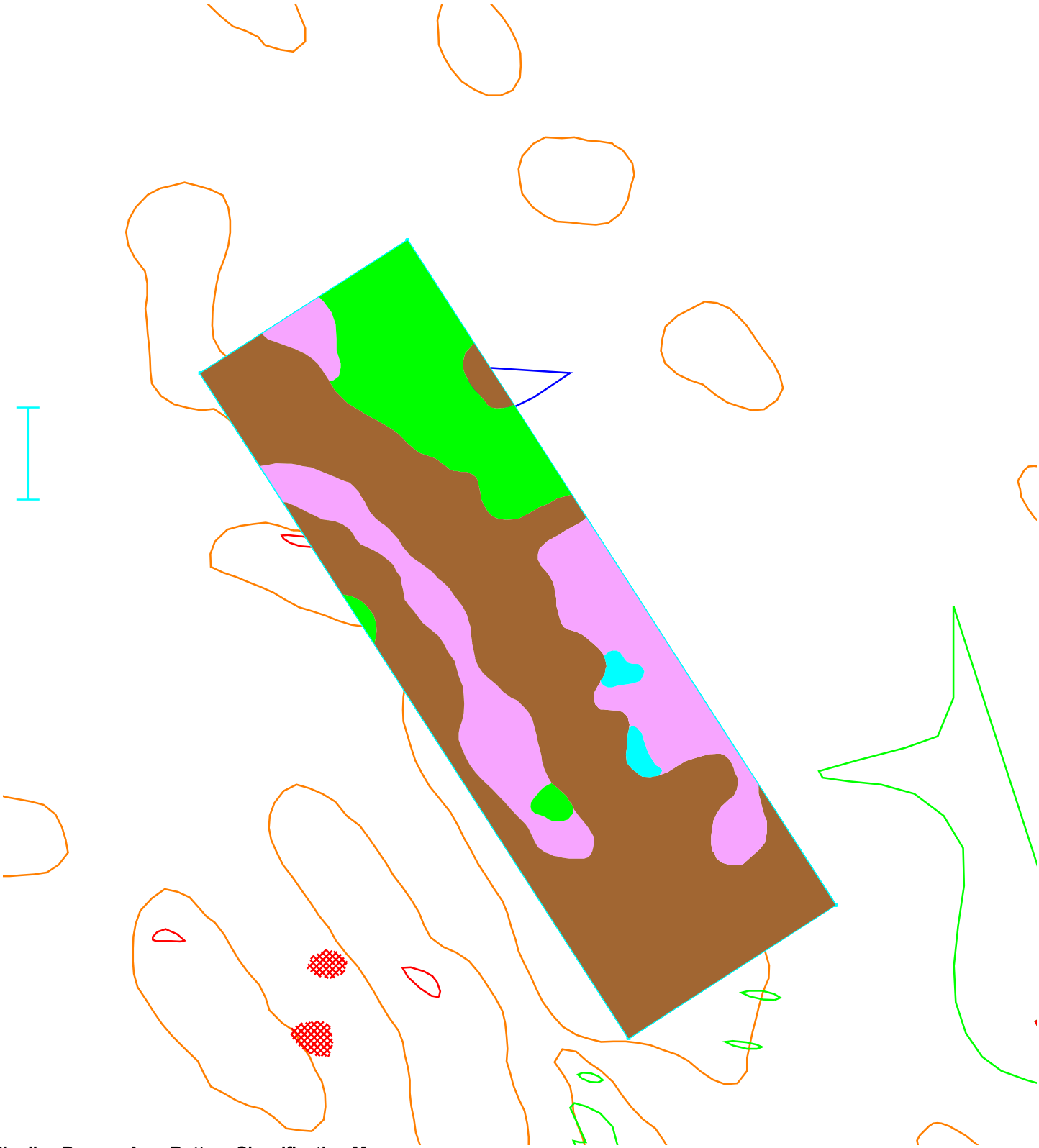


Pinellas Borrow Area Bottom Classification Map

- Dense Hardbottom (>75% Cover), High Relief (>100 cm)
- Dense Hardbottom (>75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75%, Cover), Low Relief (<30cm)
- Patchy Hardbottom (<20% Cover), Low Relief (<30cm)
- Sand

3000 0 3000 6000 Feet

Borrow Area "H" Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 3,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 19



Pinellas Borrow Area Bottom Classification Map

- Dense Hardbottom (>75% Cover), High Relief (>100 cm)
- Dense Hardbottom (>75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75% Cover), Medium Relief (30cm-100cm)
- Scattered Hardbottom (20% - 75%, Cover), Low Relief (<30cm)
- Patchy Hardbottom (<20% Cover), Low Relief (<30cm)
- Sand

1500 0 1500 3000 Feet

Borrow Area "I" Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 1,500'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 20

3.3 Ebb Shoal Borrow Areas

In addition to the nine offshore borrow areas, five ebb tidal shoal borrow areas were also surveyed for marine resources. These included John's Pass, Blind Pass, Pass-A-Grille north, Pass-A-Grille south, and Egmont Shoal (Figures 21 and 22). No hardbottom or seagrass was documented within these ebb shoal areas. All areas consisted of large shallow areas of sand. In the John's Pass, Blind Pass, and the Pass-A-Grille survey areas, portions of the shoals are exposed during low tide events. In total within these ebb tidal shoal survey areas there are 1,569.5 acres of sand habitat.

3.4 Nearshore Breakwater Areas

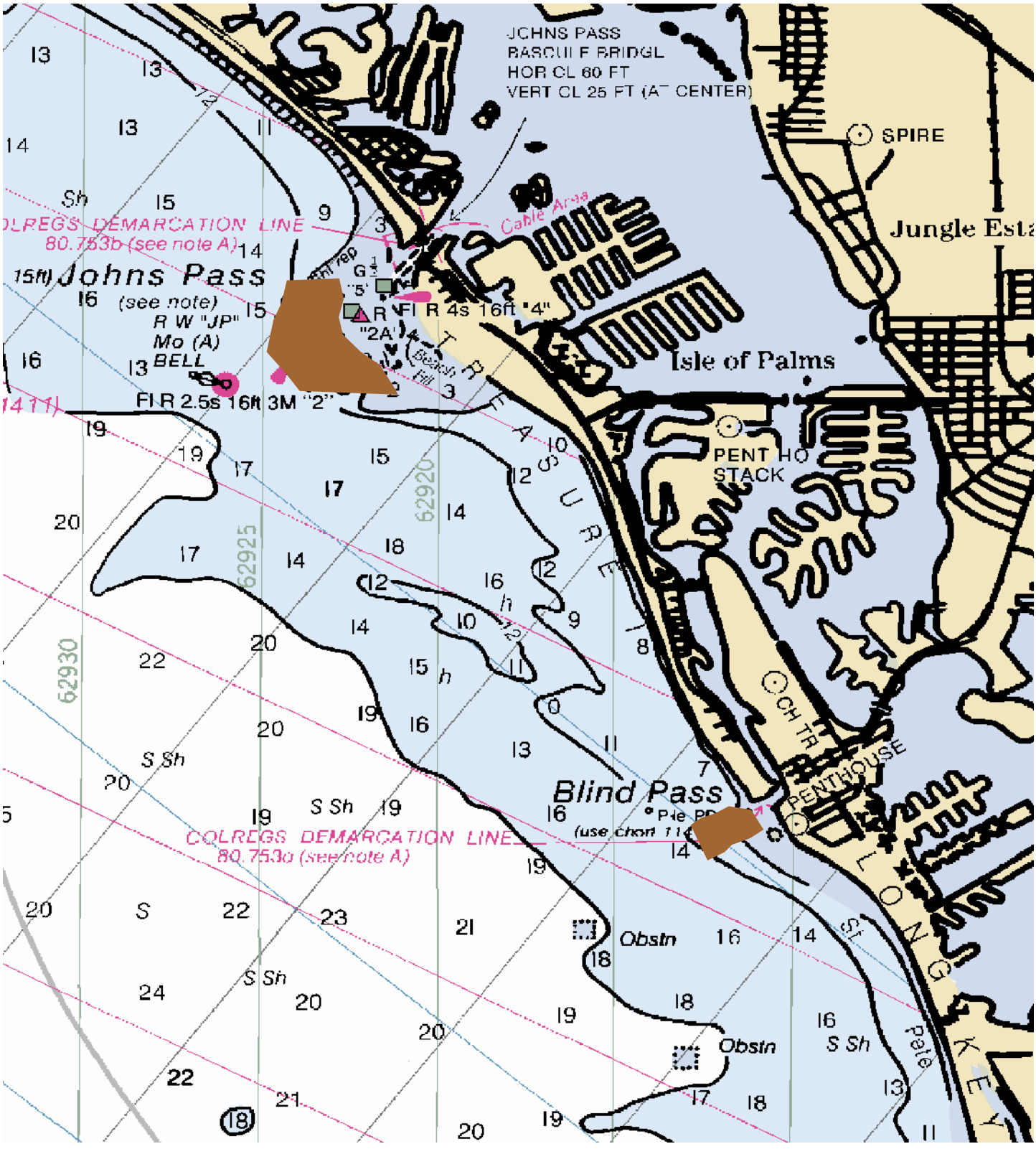
In addition to the potential borrow areas surveyed, two nearshore areas to be used as breakwater areas were also surveyed. These included an area just offshore of North Reddington Beach and an area off of Indian Rocks Beach (Figure 23 and 24).

3.4.1 North Reddington Beach Breakwater Area

The North Reddington Beach breakwater area is just offshore between Department of Environmental Protection (DEP) monuments R-105 and R-107. The area surveyed includes a total of 28.3 acres, with 3.7 acres being scattered medium relief, 1.1 acres of high relief hardbottom, and 23.5 acres of sand (Figure 23).

3.4.1.1 Habitat Description

Hardbottom habitats within the North Reddington Beach breakwater area occur in the northern and southern sectors of the survey block. Within the northern reach of the area surveyed there is an area of high relief dense hardbottom (Figure 23). Octocorals and sponges, with small-interspersed scleractinian corals, dominate this area of dense high relief hardbottom. This habitat changes into the larger scattered medium relief area totaling just over 1.0 acre in area. Another area of medium relief scattered and high relief hardbottom is located in the southeastern corner of the survey area. Sand areas between the hardbottom areas are dominated by echinoderms and mollusks, in particular the sand dollar (*Mellita quinquiesperforata*).

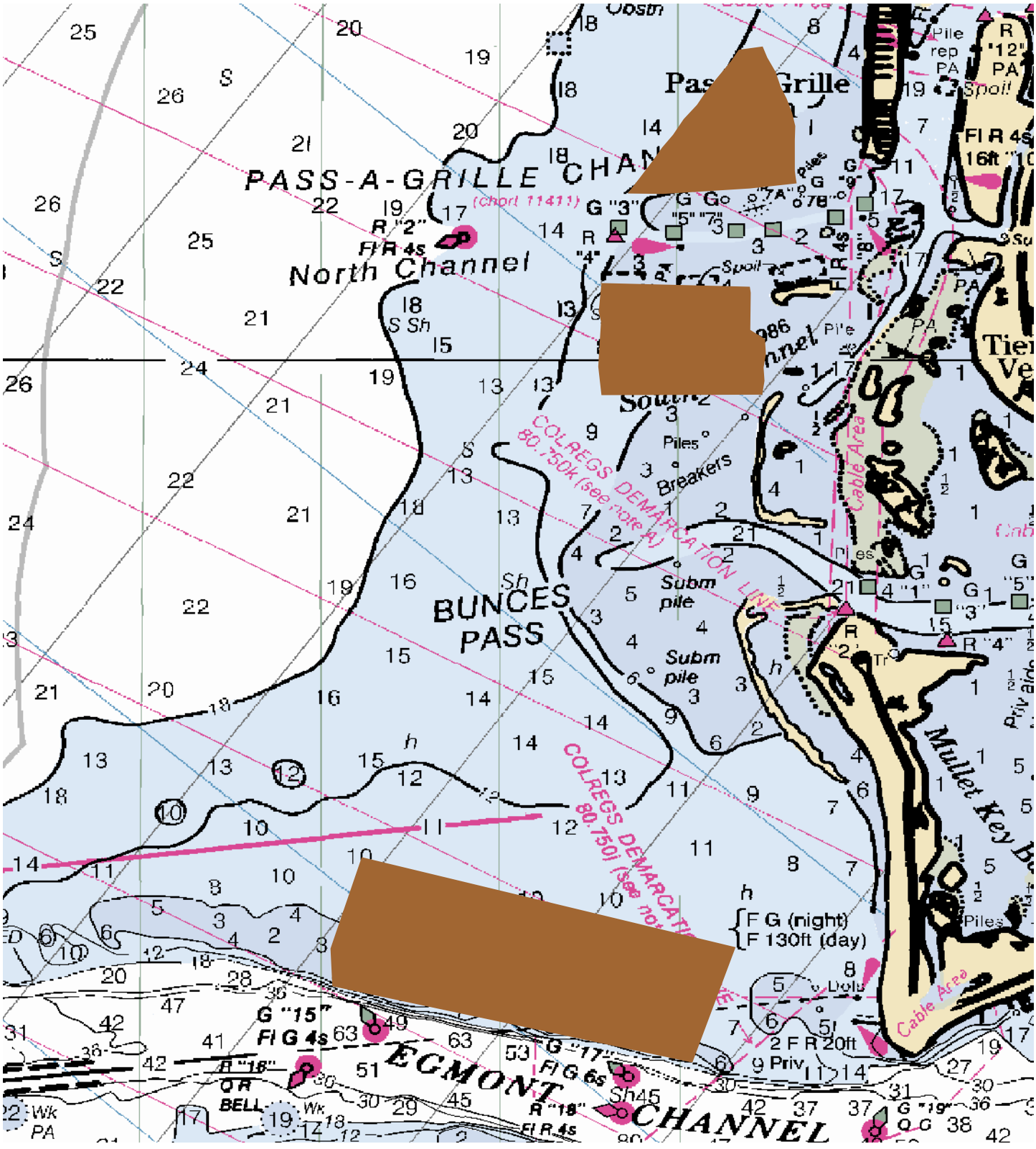


Ebb Tidal Shoals Bottom Classification Map

Sand

4000 0 4000 8000 Feet

Ebb Tidal Shoals - North Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 4,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 21

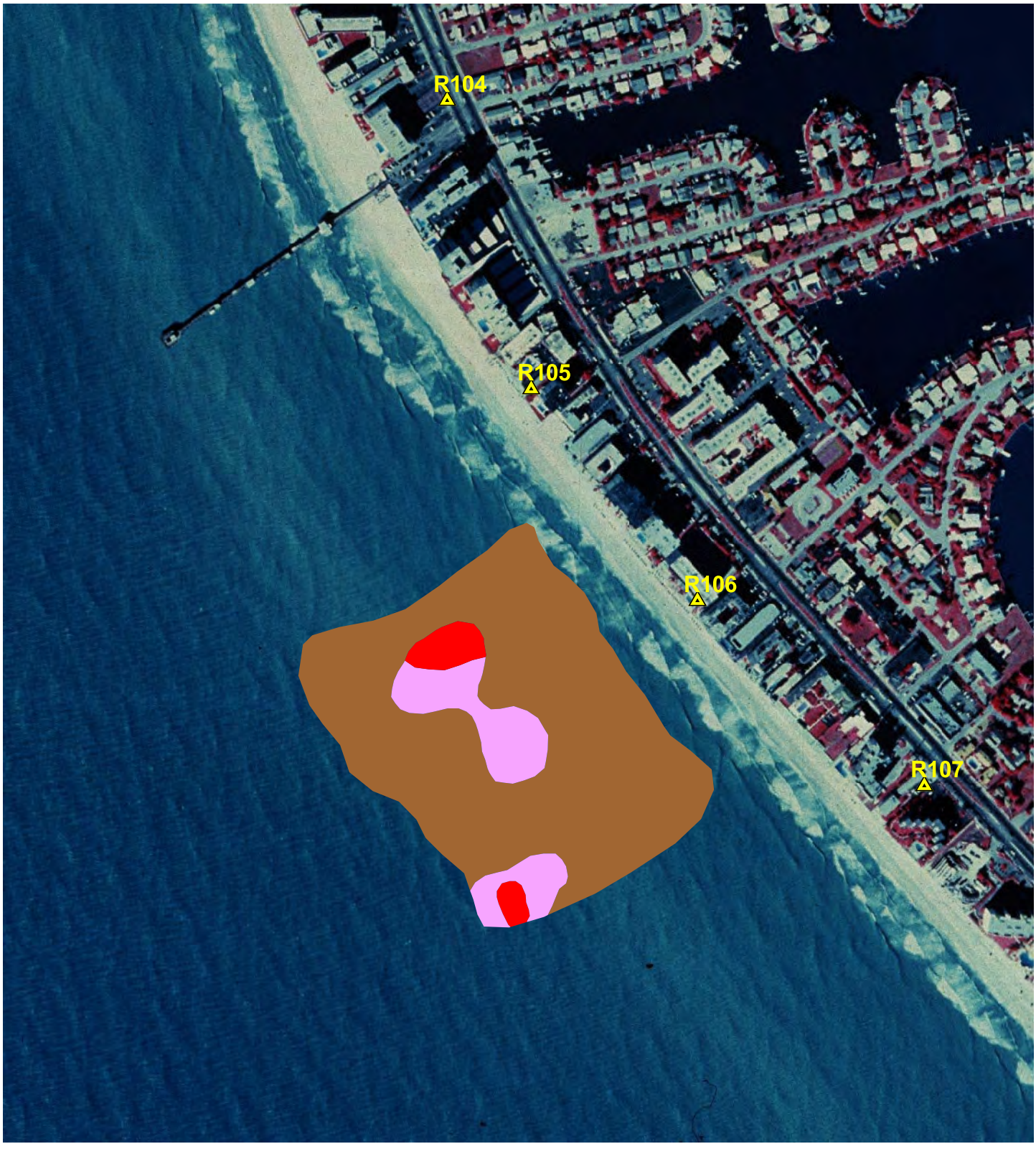


Ebb Tidal Shoals Bottom Classification Map

Sand

4000 0 4000 8000 Feet

Ebb Tidal Shoals - South Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 4,000'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 22



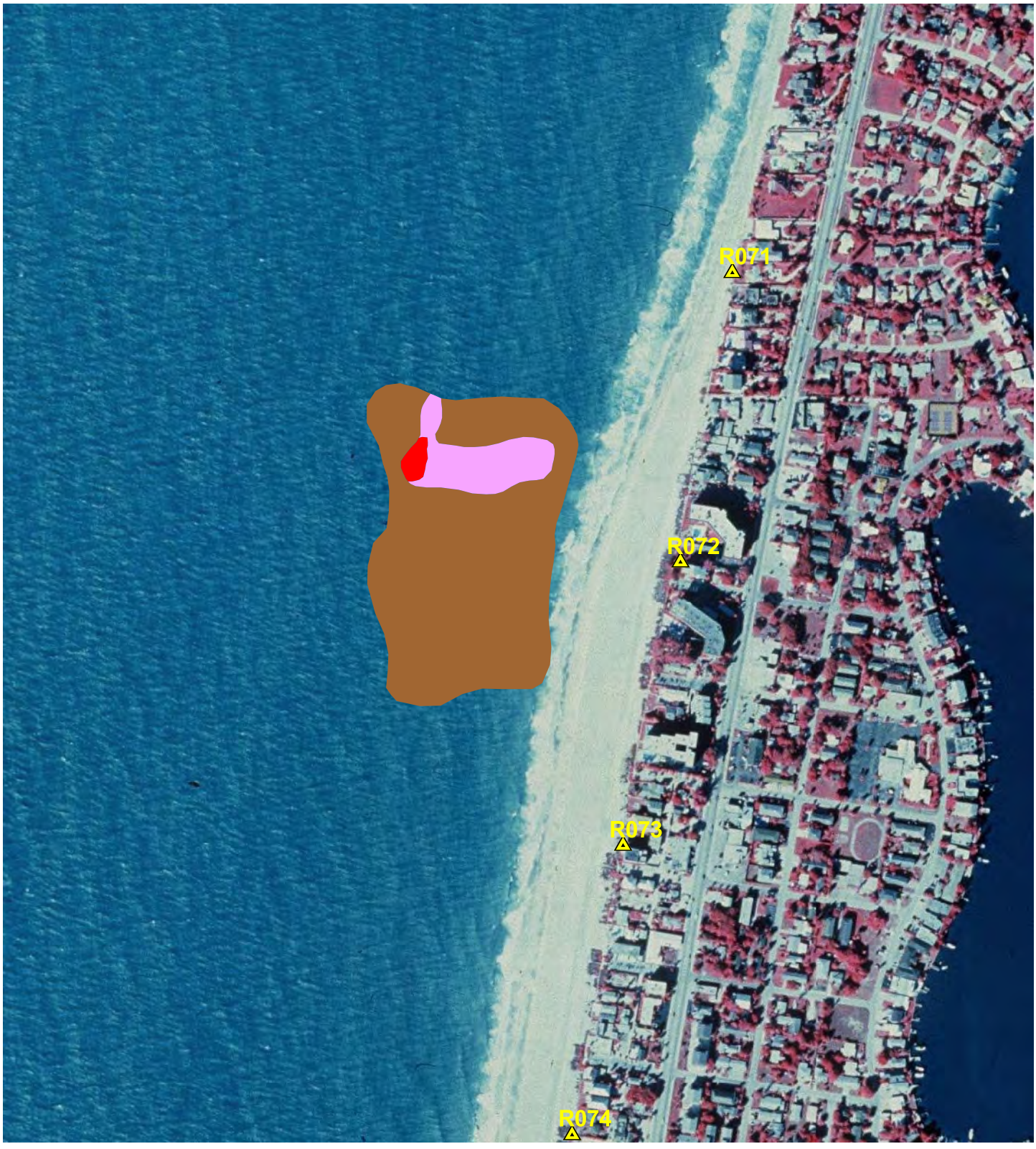
△ FDNR Range Monument

Pinellas Nearshore Bottom Classification Map

- Dense Hardbottom (>75% Cover), High Relief (>100cm)
- Scattered Hardbottom (20-75% Cover), Medium Relief (30-100cm)
- Sand

500 0 500 1000 Feet

North Reddington Beach Breakwater Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 500'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 23



FDNR Range Monument

Pinellas Nearshore Bottom Classification Map

- Dense Hardbottom (>75% Cover), High Relief (>100cm)
- Scattered Hardbottom (20-75% Cover), Medium Relief (30-100cm)
- Sand

500 0 500 1000 Feet

Indian Rocks Beach Breakwater Marine Resource Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 500'	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 24

3.4.2 Indian Rocks Beach Breakwater Area

The breakwater survey area off of Indian Rocks Beach (DEP monuments R-71 to R-73) is a 28.3-acre block with a small area of hardbottom present (Figure 24). Overall, there are 3.7 acres of scattered medium relief hardbottom habitat and a 1.1-acre area of high relief hardbottom habitat.

3.4.2.1 Habitat Description

Hardbottom habitat within the Indian Rocks Beach breakwater survey block included 2.3 acres of scattered medium relief habitat in the northern section of the survey area. A small area (0.3 acres) of high relief dense hardbottom habitat is also found in the northeast corner of the survey block. This area exhibits more exposed rock area and larger gorgonian and sponge species. The majority of the area surveyed within this area was open sand habitat (14.0 acres).

4.0 REFERENCES

Ackerman, B.B. 1995. Aerial surveys of manatees: A summary and progress report. In O'shea, T.J., Ackerman, B.B., and Percival, H.F. Population Biology of the Florida Manatee. 13-33 pp.

Bullock, L.H, Godcharles, M.F., and Crabtree, R.E. 1996. Reproduction of yellowedge grouper, *Epinephelus flavolimbatus*, from the eastern Gulf of Mexico. Bull. Mar. Sci. 59(1): 216-224.

Coastal Zone Resources, Inc. 1991. Indian Shores beach nourishment project side-scan mosaic and biological report. Prepared for Pinellas County Board of County Commissioners, Clearwater, FL.

Child, C.A. 1992. Shallow water Pychnogonida of the Gulf of Mexico. Mem. Hourglass Cruises 9(1): 86 pp.

Gilmore, R.G., Bullock, L.H, and Berry, F.H. 1978. Hypothermal mortality in marine fishes of south-central Florida January 1977. Northeast Gulf Science 2(2): 77-97.

Environmental Protection Agency. 1981. Marine sampling and measurement program off northern Pinellas County, Florida. A Technical Report, S. Mahadevan, ed. Vol. 1: 306 pp.

Gulf of Mexico Fishery Management Council. 1998. Generic Amendment for Addressing Essential Fish Habitat Requirements of the Gulf of Mexico. 237 pp.

Lyons, W.G., and Collard, S.B. 1974. Benthic invertebrate communities of the eastern Gulf of Mexico. In R.E. Smith, ed. Proceedings of marine environmental implications of offshore drilling in the eastern Gulf of Mexico. State Univ. Syst. FL. Inst. Oceanogr., St. Petersburg, FL. 157-166 pp.

Meylan, A., Redlow, A. Mosier, A., Moody, K., Foley, A. 1999. Occurrence and distribution of sea turtles in Tampa Bay, FL. In J.R. Pribble, A. J. Janicki, and H. Greening , eds. Baywide environmental monitoring report, 1993-1998, Tampa Bay, FL. Tampa Bay Estuary Program, Technical Publication 07-99. St. Petersburg, FL. Chapter 13, 13-1-13-15 pp.

Moe, M.A., and Martin, G. T. 1965. Fishes taken in monthly trawl samples offshore of Pinellas County, Florida, with new additions to the fish fauna of the Tampa Bay area. Tulane Studies in Zoology. 12(4): 129-151.

Nelson, B. D., and Bortone, S.A. 1996. Feeding guilds among artificial-reef fishes in the northern Gulf of Mexico. Gulf of Mexico Science. 1996(2): 66-80.

Phillips, R.C. and Springer, V.G. 1960. Observations on the Offshore Benthic Flora in the Gulf of Mexico off Pinellas County, Florida. The Amer. Midland Nat. 64(2): 362-381.

Pierce, D.J., Wallin, J.E., and Mahmoudi, B. 1998. Spatial and temporal variations in the species composition of bycatch collected during a striped mullet (*Mugil cephalus*) survey. Gulf of Mexico Science 1998(1): 15-27 pp.

Posey, M., Lindberg, W.J., Alphin, T., and Vose, F. 1996. Influence of storm disturbance of an offshore benthic community. Bull. Mar. Sci. 59(3): 523-529.

Roberts, C., Ballantine, W.J., Buxton, C.D., Dayton, P., Crowder, L.B., Milon W., Orback, M.K., Pauly, D., Trexler, J. and Walters, C.J. 1995. Review of the use of marine fishery reserves in the U.S. southeastern Atlantic. NOAA Technical Memorandum NMFS-SEFSC-376. 31pp.

Saloman, C.H., and Naughton, S.P. 1979. Fishes of the littoral zone, Pinellas County, Florida. Florida Sci. 42(2):85-93.

Schirripa, M. J., and Burns, K. M. 1997. Growth estimates for three species of reef fish in the eastern Gulf of Mexico. Bull. Mar. Sci. 61(3): 581-591.

U.S. Fish and Wildlife Service. 1996. Florida Manatee Recovery Plan (*Trichechus manatus latirostris*), Second Revision. Prepared by the Florida Manatee Recovery Team for the southeast region, U.S. Fish and Wildlife Service, Atlanta, GA.

Weigle, B.L., 1990. Abundance, distribution and movements of bottlenose dolphins (*Tursiops trucncatus*) in lower Tamps Bay, Florida. In P.S. Hammond, S. A. Mizorch, and G.P. Donovan, eds. Individual recognition of cetaceans: use of photo-identification and other techniques to estimate population parameters. Rep. Int. Whaling Comm. Spec. Issue 12. 195-201 pp.

Pinellas County Shore Protection Project
Comprehensive Borrow Area Study
Borrow Area Resource Identification and Impact Assessment

May 2002

Prepared for:
Jacksonville District
U.S. Army Corps of Engineers
400 West Bay Street
Jacksonville, FL 32202

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250

EXECUTIVE SUMMARY

Dial Cordy and Associates, Inc. (DC&A) was contracted by the U.S. Army Corps of Engineers (USACE) to conduct a biological survey of proposed borrow areas in conjunction with the Pinellas County Shore Protection Project. To accommodate future nourishment projects, nine offshore borrow areas and four ebb tidal shoals have been identified for consideration as probable borrow sites. These sites were surveyed and the results discussed herein. DC&A conducted field investigations to locate, delineate, and characterize existing hardground and/or other benthic community resources within the proposed borrow areas. Marine resources were mapped and documented with underwater still and video photography. The field survey was conducted during July-September 2001. This report analyzes the potential direct and indirect impacts associated with removing borrow material from each of the proposed offshore borrow sites. Within each area there may be more than one potential borrow site. Potential borrow sites were determined from mapping and groundtruthing conducted by EMC Corporation (1998) and DC&A (2001). Impacts to benthic and pelagic communities could be considered as relatively minimal when examined on a spatial scale. Since construction of Pinellas County nourishment projects will most likely be staggered over time, biological communities common to the soft bottom habitat in the borrow areas will have time to recover. No significant or adverse impacts are expected to occur to hardbottom resources as a 200-foot buffer from adjacent hardbottom habitat has been established for each borrow site.

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1.0 INTRODUCTION

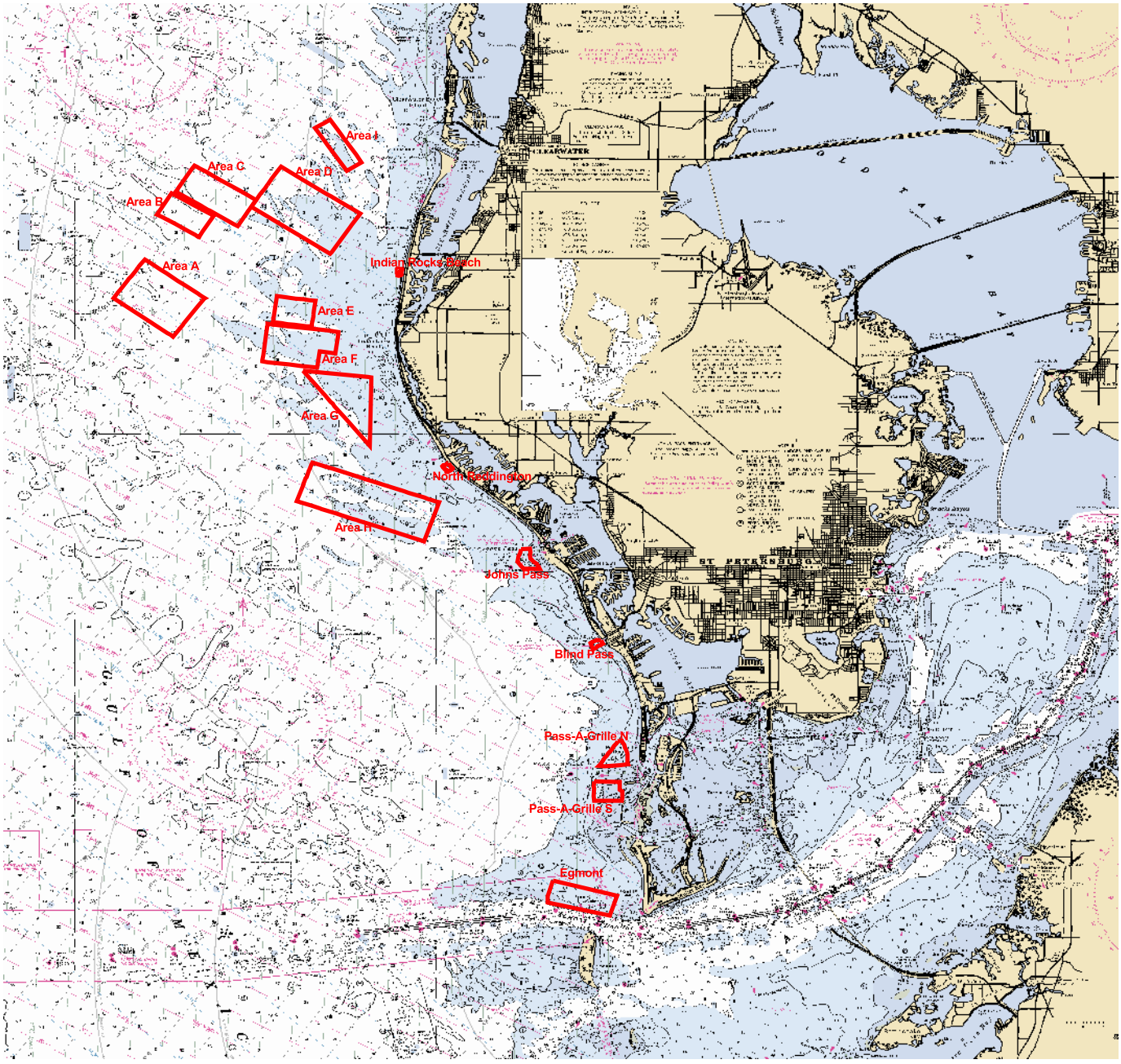
Dial Cordy and Associates, Inc. (DC&A) was contracted by the U.S. Army Corps of Engineers (USACE) to conduct a biological survey of proposed borrow areas in conjunction with the Pinellas County Shore Protection Project (DC&A, 2001). This report assesses the impacts to these biological resources. This work was conducted under contract No. DACW17-01-F-0060.

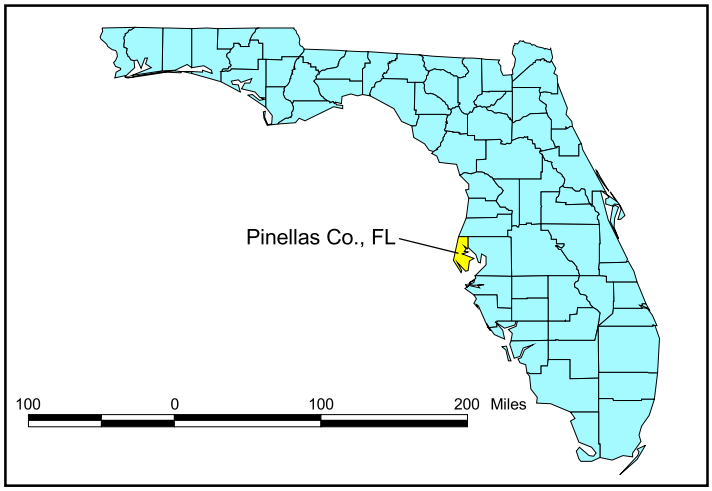
1.1 Purpose and Need

The barrier island beaches of Pinellas County, Florida have had serious problems with shoreline erosion and a lowered beach profile caused by storms, wave action, and currents. As a means of controlling this erosion and increasing storm protection to the island, fill material has been placed along the shoreline. Recent fill projects have included Clearwater Beach, Mullet Key, Treasure Island, Sand Key, and Long Key. Traditionally, the material for these and other Pinellas County Shore Protection projects was obtained from Egmont Channel Shoal, which involved moving the sand a considerable distance (11-25 miles). To accommodate future nourishment projects, nine potential offshore borrow areas and four ebb tidal shoals have been identified. These sites were surveyed and the results discussed in DC&A, 2001.

1.2 Location

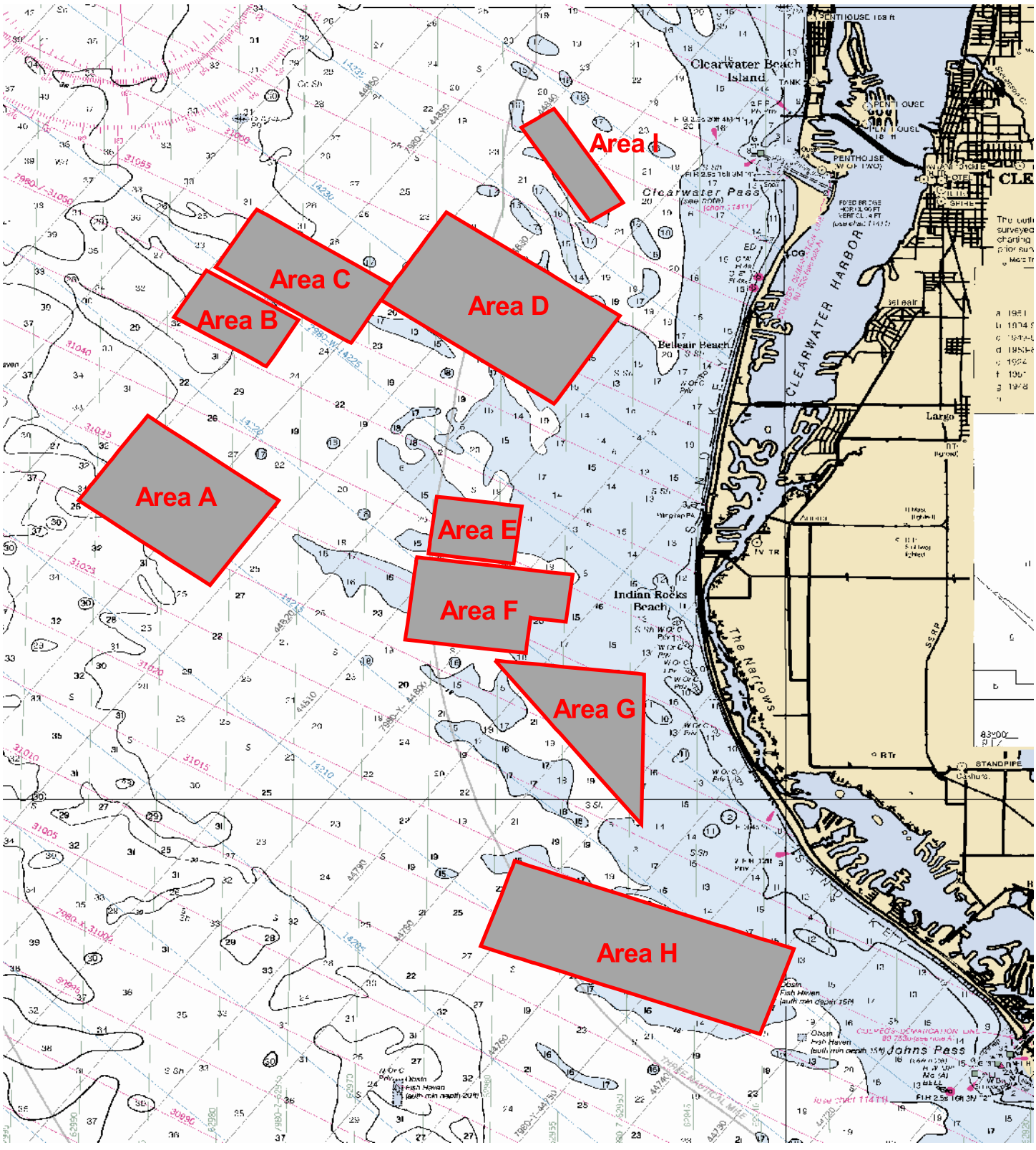
The project area surveyed is located off the Gulf of Mexico coast of Florida, Pinellas County Florida (Figure 1). Specifically, the investigation included nine potential offshore borrow areas (Figure 2) and five ebb tidal shoals (Figure 3).





Pinellas County Marine Biological Survey Areas

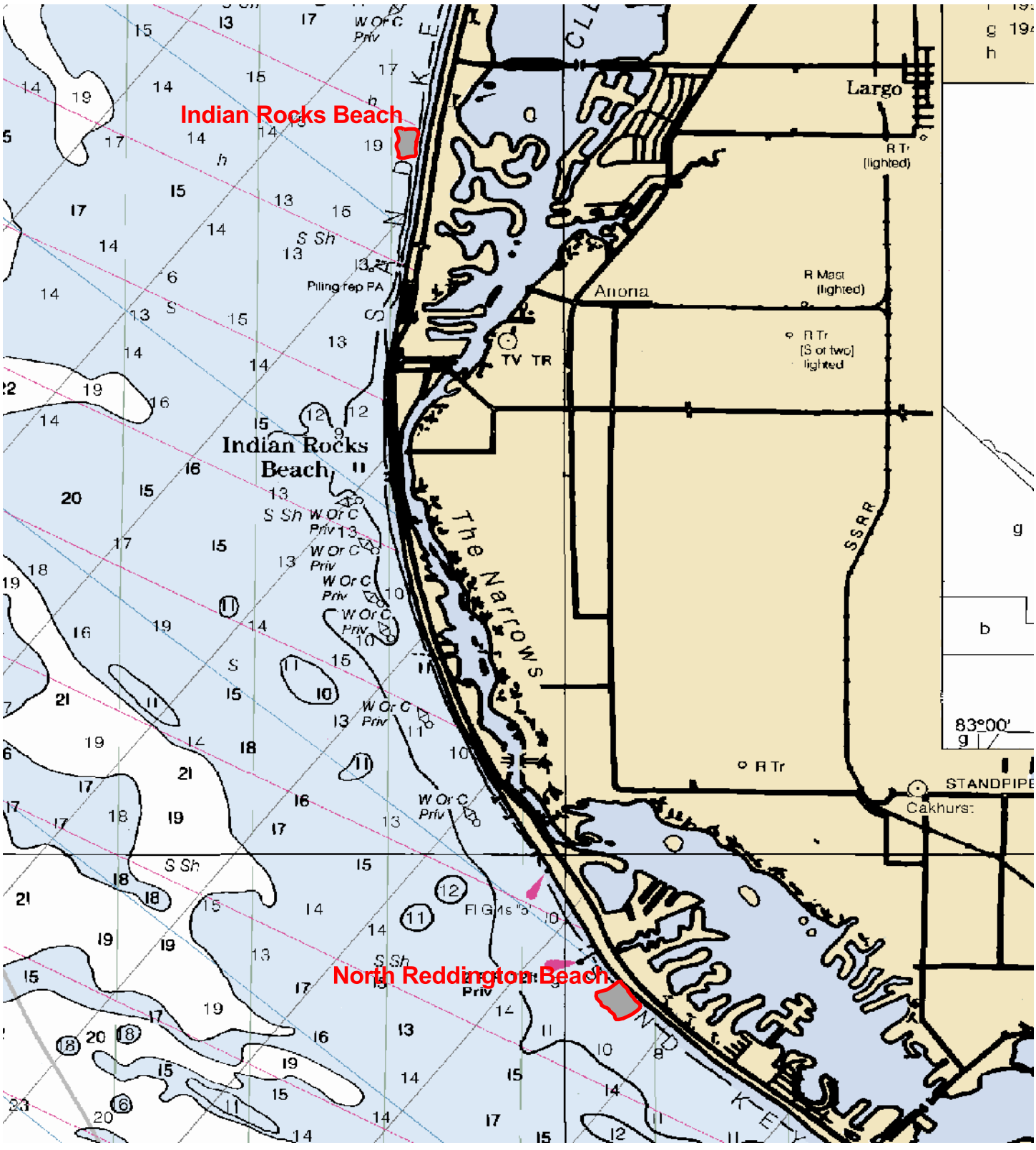
Location Map	
Pinellas County SPP Borrow Area Resource Identification and Impact Assessment	
Scale: 1" = 5 miles	Drawn By: MR
Date: February, 2002	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 1



Offshore Borrow Areas

2 0 2 4 Miles

Offshore Areas	
Pinellas County SPP Borrow Area Resource Identification and Impact Assessment	
Scale: 1" = 2 miles	Drawn By: MR
Date: February, 2002	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 2



Nearshore Breakwater Areas

1 0 1 2 Miles

Nearshore Areas	
Pinellas County SPP Borrow Area Resource Identification and Impact Assessment	
Scale: 1" = 1 mile	Drawn By: MR
Date: February, 2002	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 3

2.0 TECHINCAL APPROACH

DC&A (2001) conducted field investigations to locate, delineate, and characterize existing hardground and/or other benthic community resources within the proposed borrow areas. Marine resources were mapped and documented with underwater still and video photography. The field survey was conducted during July-September 2001.

The purpose of this survey was to verify and groundtruth existing side-scan records (EMC, 1998). Prior side-scan mapping recorded extensive areas of consolidated material within each of the proposed borrow areas (2,309 acres). This survey was used to map and characterize the extent of marine resources in relation to the previous side-scan survey.

Hardbottom resources within each respective borrow area were mapped and a 200-foot buffer established around each resource area. Sand areas within the borrow areas were then identified and isopach contours of available sand were analyzed to approximate the total amount of available borrow material available within each borrow area. Isopach contours were provided by the USACE from previous geo-technical analysis. An analysis of the impacts associated with sand removal within each area is assessed in the following sections.

3.0 MARINE RESOURCE IMPACT ANALYSIS

This section will analyze the potential direct and indirect impacts associated with removing borrow material from each of the potential offshore borrow sites. Within each area there may be more than one potential borrow site. Potential borrow sites were determined from mapping and groundtruthing conducted by EMC Corporation (1998) and DC&A (2001).

3.1 Overview of Borrow Area Resources

A total of nine offshore borrow areas, representing a total of 13,829 acres was surveyed. Within these areas, over 75 percent of the habitat surveyed was open sand (10,000.4 acres) while the remaining 3,828.6 acres consisted of hardbottom habitats.

The water depths of these potential borrow areas varied from 20 to 33 feet. Lyons and Collard (1974) describe these communities as areas of moderate wave energy with quartz sand and shell fragment sediments extending offshore. Large temperate molluscs and echinoderms tend be the dominant faunal elements. In areas over 33 feet in depth, exposed rock substrate allows for the establishment of scleractinians, molluscs, crustaceans, tunicates, and other species more common to shallower waters of south Florida (Lyons and Collard, 1974). Quartz sand, with biologically influenced carbonates present, also dominate the sediments within this area.

3.2 Offshore Borrow Areas

This section summarizes the potential sand sources for each offshore borrow area. A summary of available sand resources is found in Table 1.

Table 1 Volume of Potential Borrow Material Located Within Each Borrow Area

	Minimum Sand Depth (ft)				
Borrow Area	**2 ft**	**4 ft**	**6 ft**	**8 ft**	**Total (Area)**
Borrow Area A	885,129 CY	572,212 CY	144,778 CY	1,612,730 CY	1,612,730 CY
Borrow Area B	562,177 CY	7,016 CY	76,881 CY	-	646,074 CY
Borrow Area C	974,282 CY	318,315 CY	156,882 CY	71,043 CY	1,520,522 CY
Borrow Area D	2,693,648 CY	532,873 CY	609,153 CY	43,312 CY	3,878,986 CY
Borrow Area E	407,460 CY	419,150 CY	106,414 CY	286,746 CY	1,219,770 CY
Borrow Area F	1,558,533 CY	33,517 CY	207,630 CY	-	1,799,680 CY
Borrow Area G	689,243 CY	583,858 CY	256,006 CY	9,879 CY	1,538,986 CY
Borrow Area H	1,332,821 CY	775,733 CY	371,455 CY	253,535 CY	2,733,544 CY
Borrow Area I	183,793 CY	49,141 CY	121,575 CY	-	354,509 CY
Total (isopach)	9,287,086 CY	3,291,815 CY	2,050,774 CY	675,126 CY	15,304,801 CY

3.2.1 Borrow Area A

Offshore Borrow Area A lies six miles offshore of Indian Rocks Beach, FL. This borrow area encompasses 2,030 acres, of which 1,153 acres are sand, and 877 acres of area is exposed hardbottom habitat (Figure 4).

3.2.1.1 Available Borrow Material

Within Borrow Area A, there is a total of 1,612,730 cubic yards (CY) of potential borrow material (Table 1). This volume was determined by using the minimum depth as determined from the isopach contours. Open sand habitat areas within Area A that have a minimum sand depth of 4 feet or greater consists of 727,601 CY of material (Table 1).

3.2.2 Borrow Area B

Borrow Area B is a 703.8-acre block located 5.6 nautical miles offshore of Bellair Beach, FL. Figure 5 shows the relative layout of sand and exposed hardbottom. Within Area B there is 210.3 acres of hardbottom compared to 493.5 acres of open sand habitat

3.2.2.1 Available Borrow Material

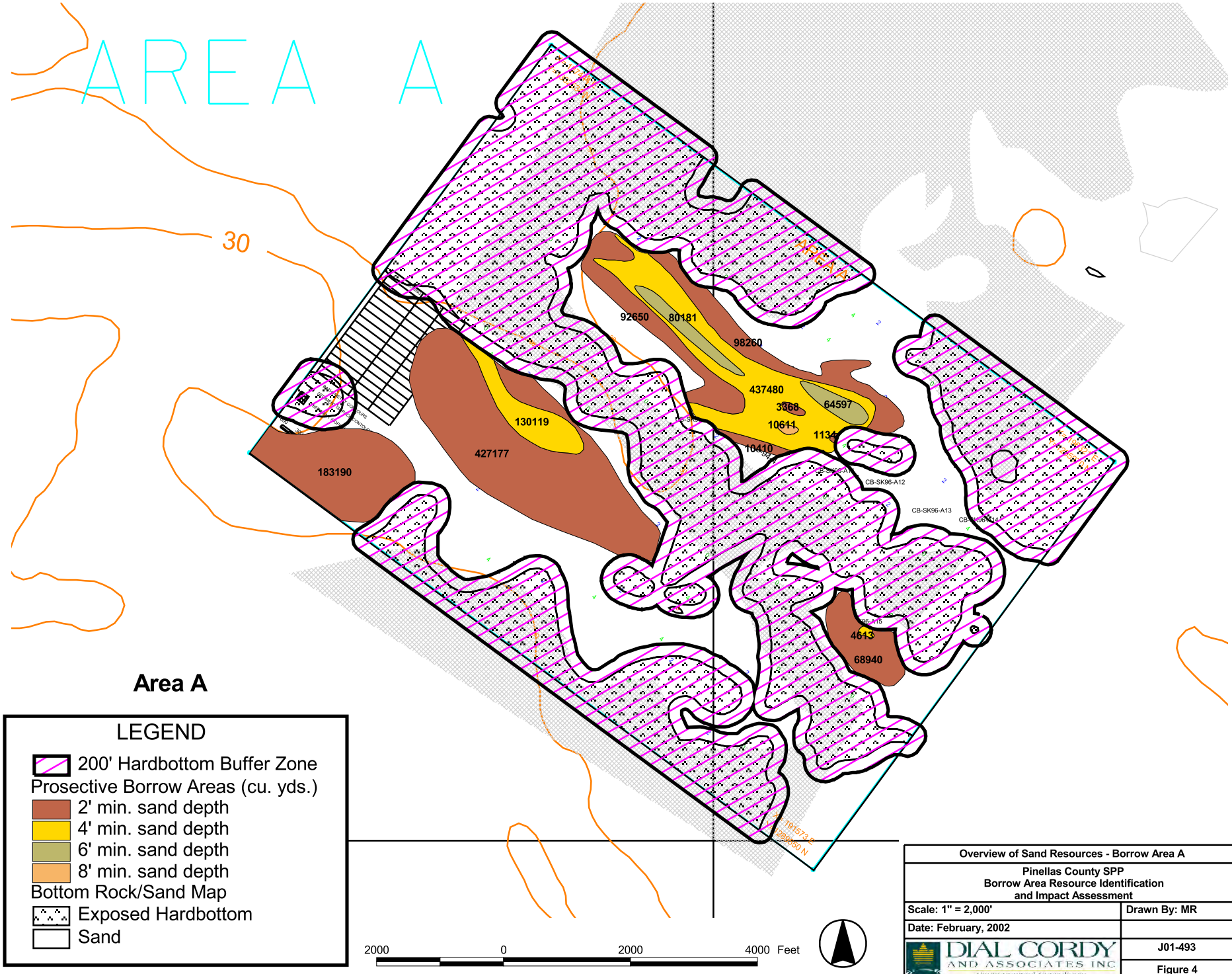
Borrow Area B has a total of 493.5 acres of open sand habitat. Analyses of sand habitats that exist outside the 200-foot buffer include a total of 646,074 CY of material. The majority of the sand available within Area B has a minimum depth of 2 feet (Table 1). Potential borrow areas within Area B with a minimum depth of 4 feet or greater have a total of 83,897 CY of material available. The majority of these sand resources are located in the central portion of Area B (Figure 5).

3.2.3 Borrow Area C

Five miles west of Bellair Beach is Borrow Area C. Area C lies in approximately 20-25 feet of water and has a total area of 1,363.7 acres. Within this area, 1,055.7 acres is open sand, while the remaining 308 acres is composed of exposed rock/live bottom habitat (Figure 6).

3.2.3.1 Available Borrow Material

A total of 1,520,522 CY of sand are available within Borrow Area C. The majority of these sand resources have a minimum depth of between 2-4 feet. A total of 546,240 CY of material is available in areas with a minimum depth of 4 feet (Table 1). This material is located in the southern portion of the borrow area (Figure 6).


AREA A
30
92650
80181
98260
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10410
130119
427177
183190
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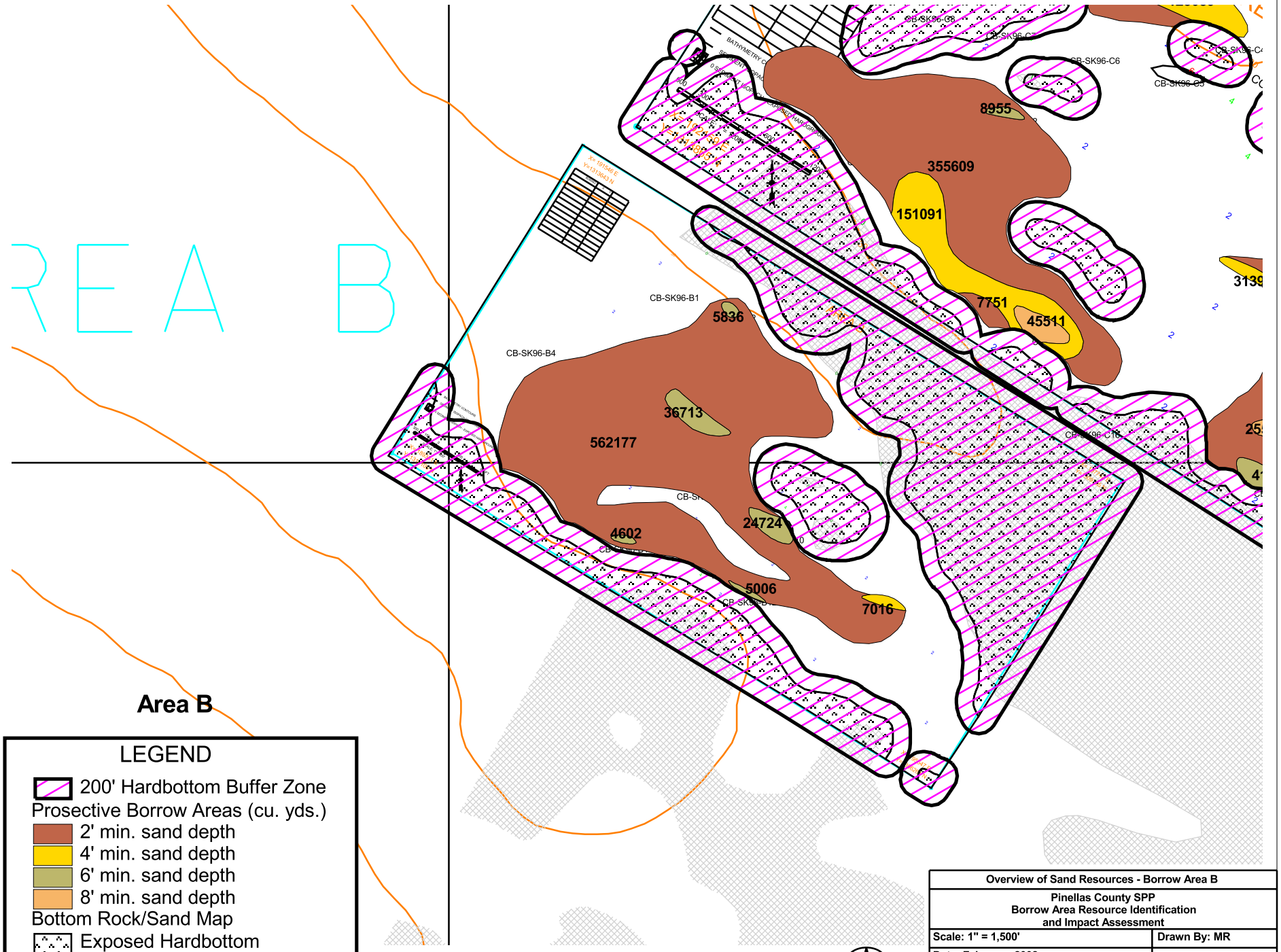
68940
CB-SK96-A12
CB-SK96-A13
191573 E
289950 N
Area A
LEGEND
200' Hardbottom Buffer Zone
Prosective Borrow Areas (cu. yds.)
2' min. sand depth
4' min. sand depth
6' min. sand depth
8' min. sand depth
Bottom Rock/Sand Map
Exposed Hardbottom
Sand
2000
0
2000
4000 Feet
Overview of Sand Resources - Borrow Area A
Pinellas County SPP
Borrow Area Resource Identification
and Impact Assessment
Scale: 1" = 2,000'
Drawn By: MR
Date: February, 2002
DIAL CORDY AND ASSOCIATES INC
Environmental Consultants
J01-493
Figure 4


REA B
CB-SK96-C8
CB-SK96-C7
CB-SK96-C6
CB-SK96-C5
CB-SK96-C4
CB-SK96-B1
CB-SK96-B4
CB-SK96-C1B
8955
355609
151091
7751
45511
3139
5836
36713
562177
24724
4602
5006
7016
Area B
LEGEND
200' Hardbottom Buffer Zone
Prosective Borrow Areas (cu. yds.)
2' min. sand depth
4' min. sand depth
6' min. sand depth
8' min. sand depth
Bottom Rock/Sand Map
Exposed Hardbottom
Sand
1500
0
1500
3000 Feet
Overview of Sand Resources - Borrow Area B
Pinellas County SPP
Borrow Area Resource Identification
and Impact Assessment
Scale: 1" = 1,500'
Drawn By: MR
Date: February, 2002
DIAL CORDY AND ASSOCIATES INC
Environmental Consultants
J01-493
Figure 5

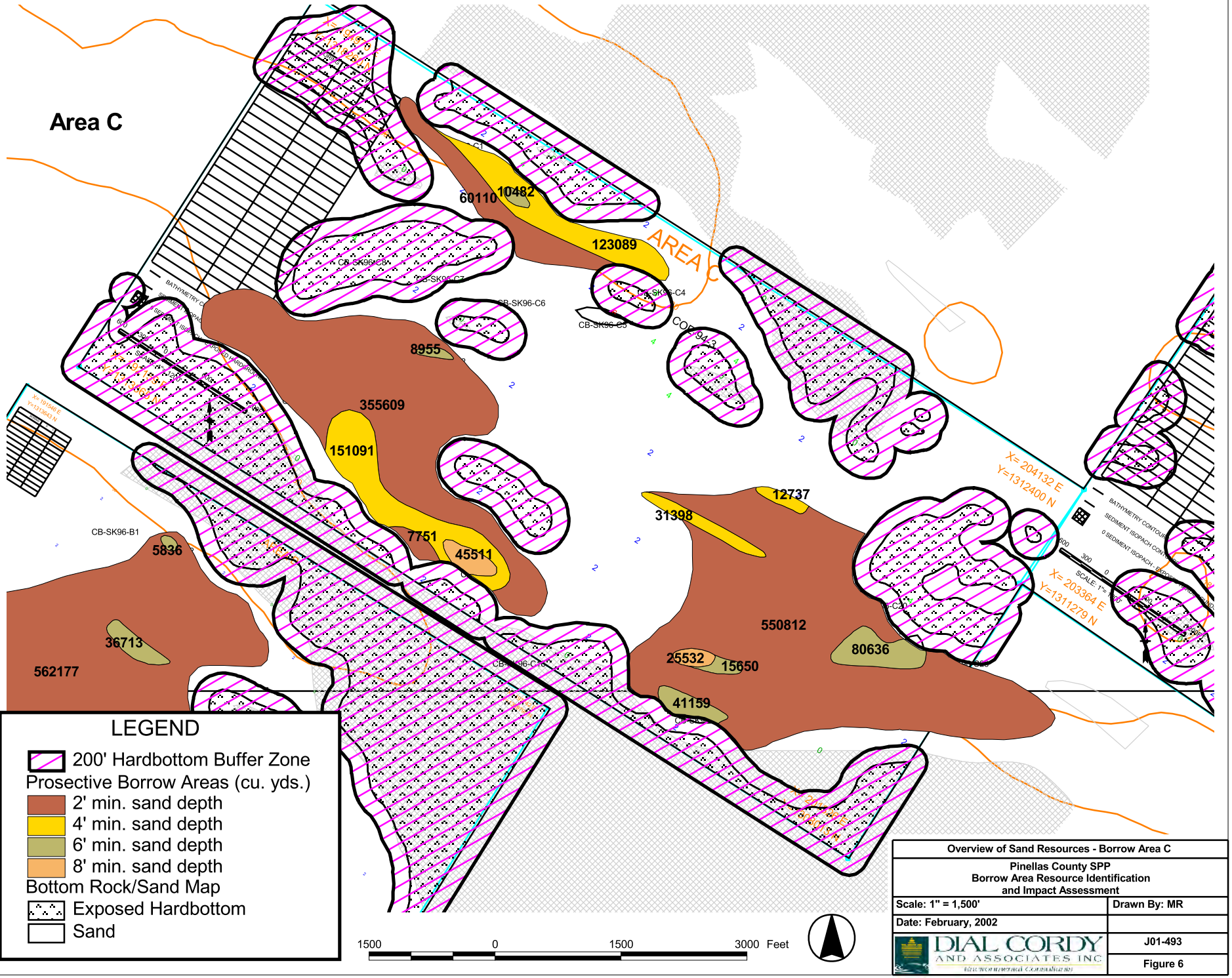

Area C
AREA C
60110
10482
123089
8955
355609
151091
7751
45511
5836
562177
36713
31398
12737
550812
80636
25532
15650
41159
CB-SK96-C1
CB-SK96-C2
CB-SK96-C3
CB-SK96-C4
CB-SK96-C5
CB-SK96-C6
CB-SK96-B1
X= 204132 E
Y=1312400 N
X= 203364 E
Y=1311279 N
LEGEND
200' Hardbottom Buffer Zone
Prosective Borrow Areas (cu. yds.)
2' min. sand depth
4' min. sand depth
6' min. sand depth
8' min. sand depth
Bottom Rock/Sand Map
Exposed Hardbottom
Sand
1500
0
1500
3000 Feet
Overview of Sand Resources - Borrow Area C
Pinellas County SPP
Borrow Area Resource Identification
and Impact Assessment
Scale: 1" = 1,500'
Drawn By: MR
Date: February, 2002
DIAL CORDY AND ASSOCIATES INC
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Figure 6

3.2.4 Borrow Area D

Borrow Area D lies 2.8 nautical miles offshore of Bellair Beach in the northern portion of the study area (Figure 2). Area D contains 2,653.7 acres of bottom with 1,819.2 acres of sand and 834.5 acres of hardbottom habitats (Figure 7). Area D has the second most available acres of open sand habitat of the nine offshore borrow areas surveyed.

3.2.4.1 Available Borrow Material

Borrow Area D has the largest amount of potential borrow material (3,878,986 CY) of the nine offshore borrow areas mapped. Over 2.6 MCY of this material is composed of a sand layer that has a sediment depth of between 2 feet and 4 feet. Sediment layers with a minimum depth of 4 feet or greater, total 1,185,338 CY (Table 1). A majority of this material is accessible in the northeastern corner of the borrow area away from many of the hardbottom resources (Figure 7).

3.2.5 Borrow Area E

Offshore Borrow Area E is the second smallest area surveyed at 592.7 acres (Figure 8). Within this area, the survey revealed 201.8 acres and 390.9 acres of hardbottom and open sand habitat, respectively. Borrow Area E is 2.5 miles west of Indian Rocks Beach.

3.2.5.1 Available Borrow Material

Available borrow material within Borrow Area E totals 1,219,770 CY. Although Area E is a relatively small area, a large amount of potential borrow material exists there. Sand resources within this borrow area are located primarily in the center portion of the study area (Figure 8). Sand areas with depths of at least 4 feet total 419,150 CY while an additional 393,160 CY of material is located in isopach contours of over 6 feet in depth (Table 1).

3.2.6 Borrow Area F

Directly south of Area E is 1,410.5-acre Area F (Figure 2). Habitat distribution within this area consists of a total of 315 acres of hardbottom habitat and 1,095.6 acres of open sand (Figure 9).

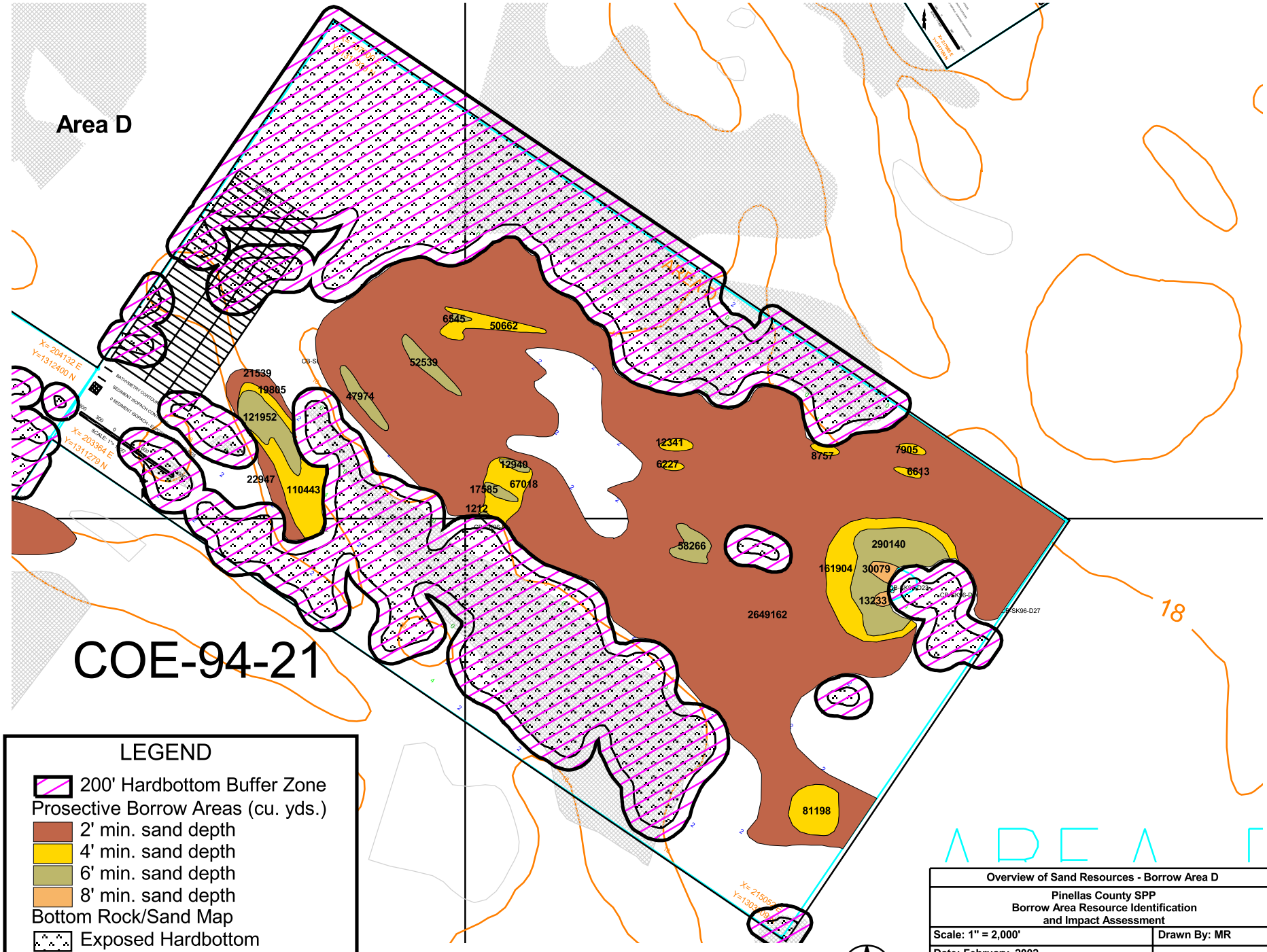
Area D
COE-94-21
6845
50662
52539
21539
19805
47974
121952
22947
110443
17585
67018
12940
1212
12341
6227
8757
7905
6613
58266
290140
161904
30079
13233
2649162
81198
18
LEGEND
200' Hardbottom Buffer Zone
Prosective Borrow Areas (cu. yds.)
2' min. sand depth
4' min. sand depth
6' min. sand depth
8' min. sand depth
Bottom Rock/Sand Map
Exposed Hardbottom
Sand
2000
0
2000
4000 Feet
Overview of Sand Resources - Borrow Area D
Pinellas County SPP
Borrow Area Resource Identification
and Impact Assessment
Scale: 1" = 2,000'
Drawn By: MR
Date: February, 2002
DIAL CORDY AND ASSOCIATES INC
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Figure 7

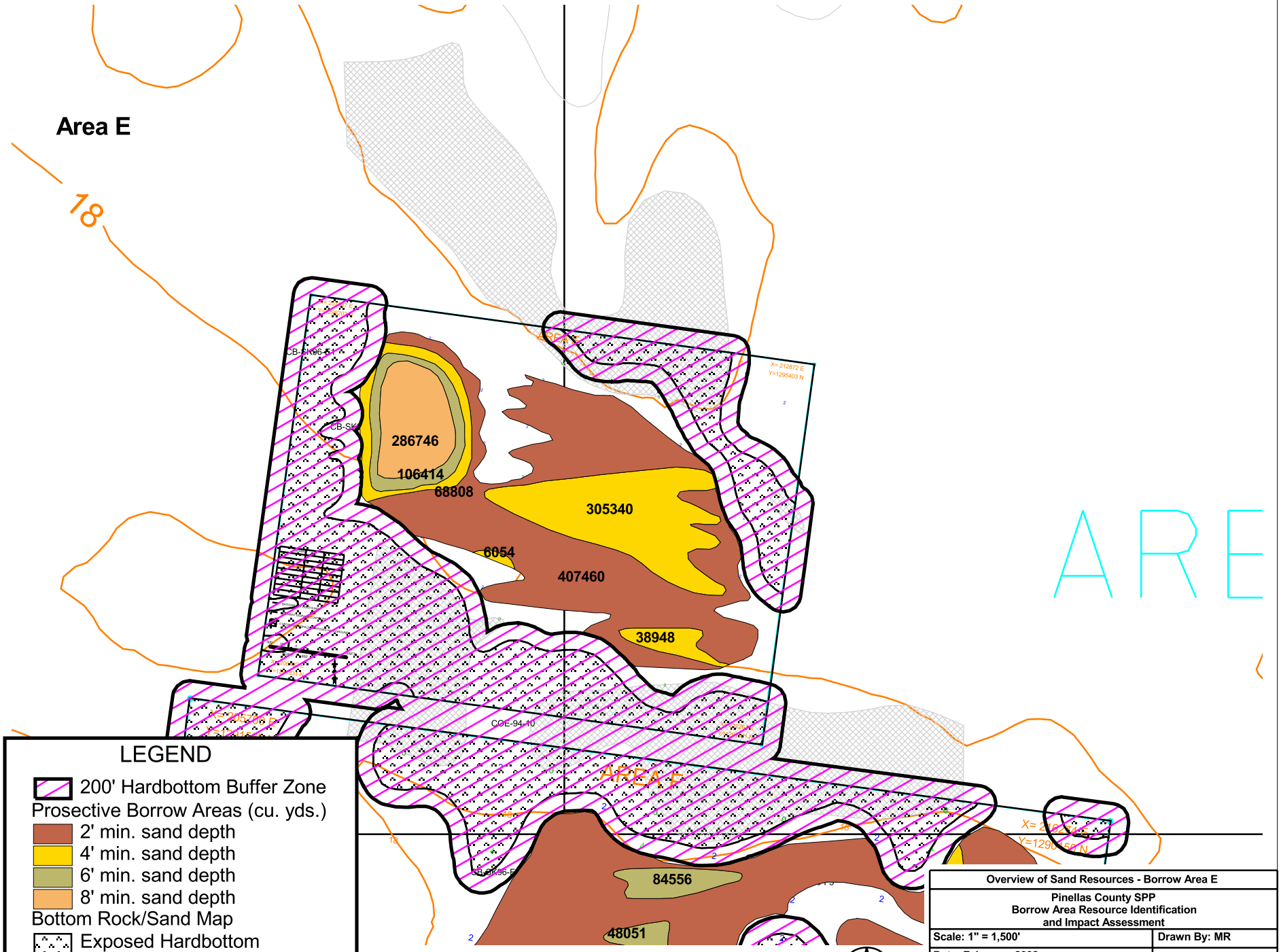
Area E
18
286746
106414
68808
305340
6054
407460
38948
84556
48051
AREA E
CB-SK96-K1
CB-SK
COE-94-10
LEGEND
200' Hardbottom Buffer Zone
Prosective Borrow Areas (cu. yds.)
2' min. sand depth
4' min. sand depth
6' min. sand depth
8' min. sand depth
Bottom Rock/Sand Map
Exposed Hardbottom
Sand
1500
0
1500
3000 Feet
Overview of Sand Resources - Borrow Area E
Pinellas County SPP
Borrow Area Resource Identification
and Impact Assessment
Scale: 1" = 1,500'
Drawn By: MR
Date: February, 2002
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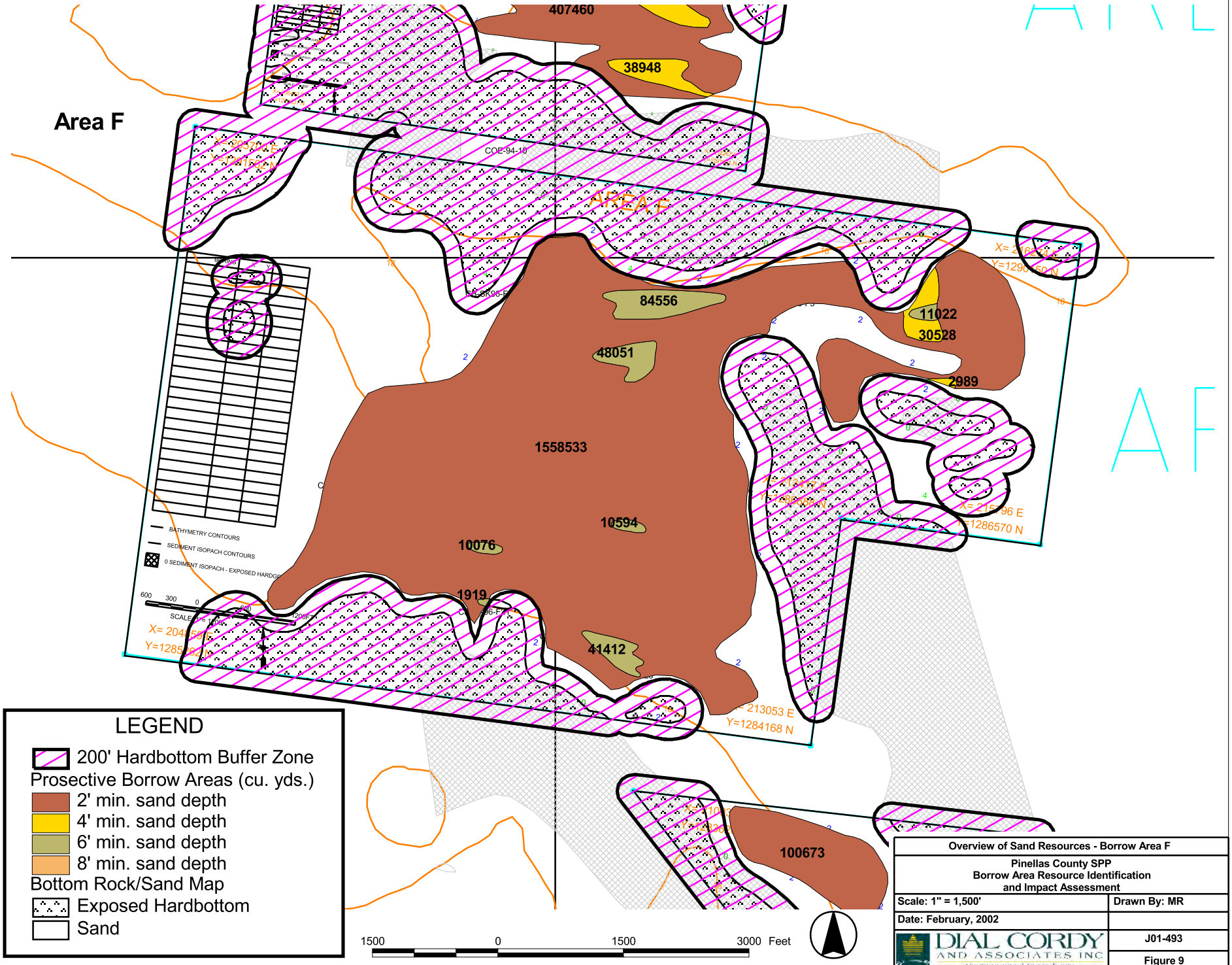
Figure 8



Overview of Sand Resources - Borrow Area F	
Pinellas County SPP Borrow Area Resource Identification and Impact Assessment	
Scale: 1" = 1,500'	Drawn By: MR
Date: February, 2002	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 9

3.2.6.1 Available Borrow Material

While geographically close to Area E, Area F has a different distribution of available sand resources. Within this potential borrow area the majority of the sand resources available have a sediment depth of 2 feet. There is a total of 1.5 MCY of material contained within the 2-foot isopach contour. In relation, there are a total of 241,147 CY of borrow material located in the 4-foot and 6-foot isopach contours. These occur in small isolated areas throughout the borrow area (Figure 9).

3.2.7 Borrow Area G

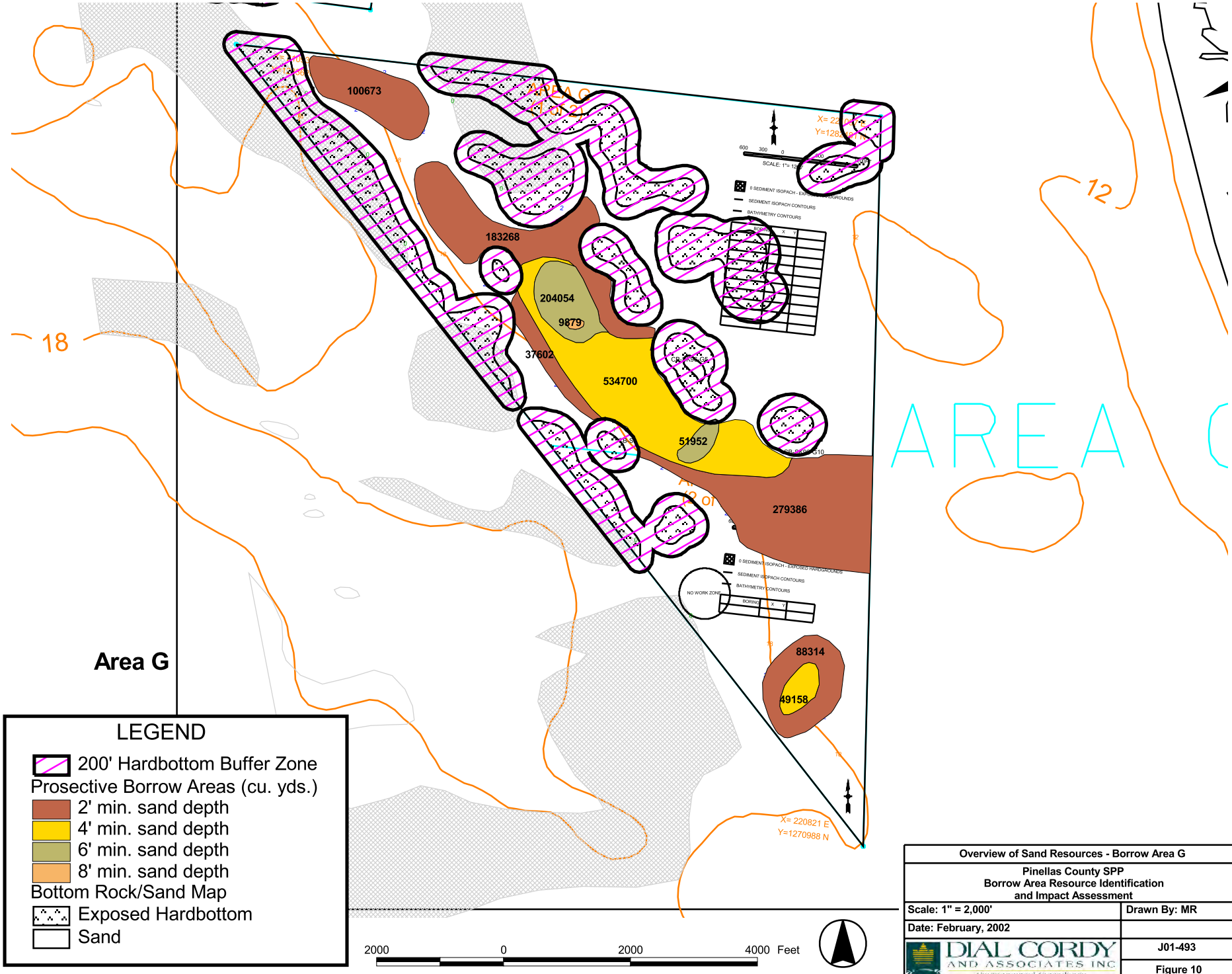
Borrow Area G is the closest to shore (1.8 nm) of all the borrow areas surveyed. It also has a large percentage of sand available (1,142.5.0 acres, 85 percent) compared to the hardbottom acres (201.9 acres, 15 percent). Most of these hardbottom areas were small distinct patches of low/medium relief hardbottom scattered throughout the area. These patches ranged in size from 1.3 acres to over 17 acres. The remainder of the hardbottom present within the area was found along the western and northern ends of the borrow area and included areas of dense hardbottom (Figure 10).

3.2.7.1 Available Borrow Material

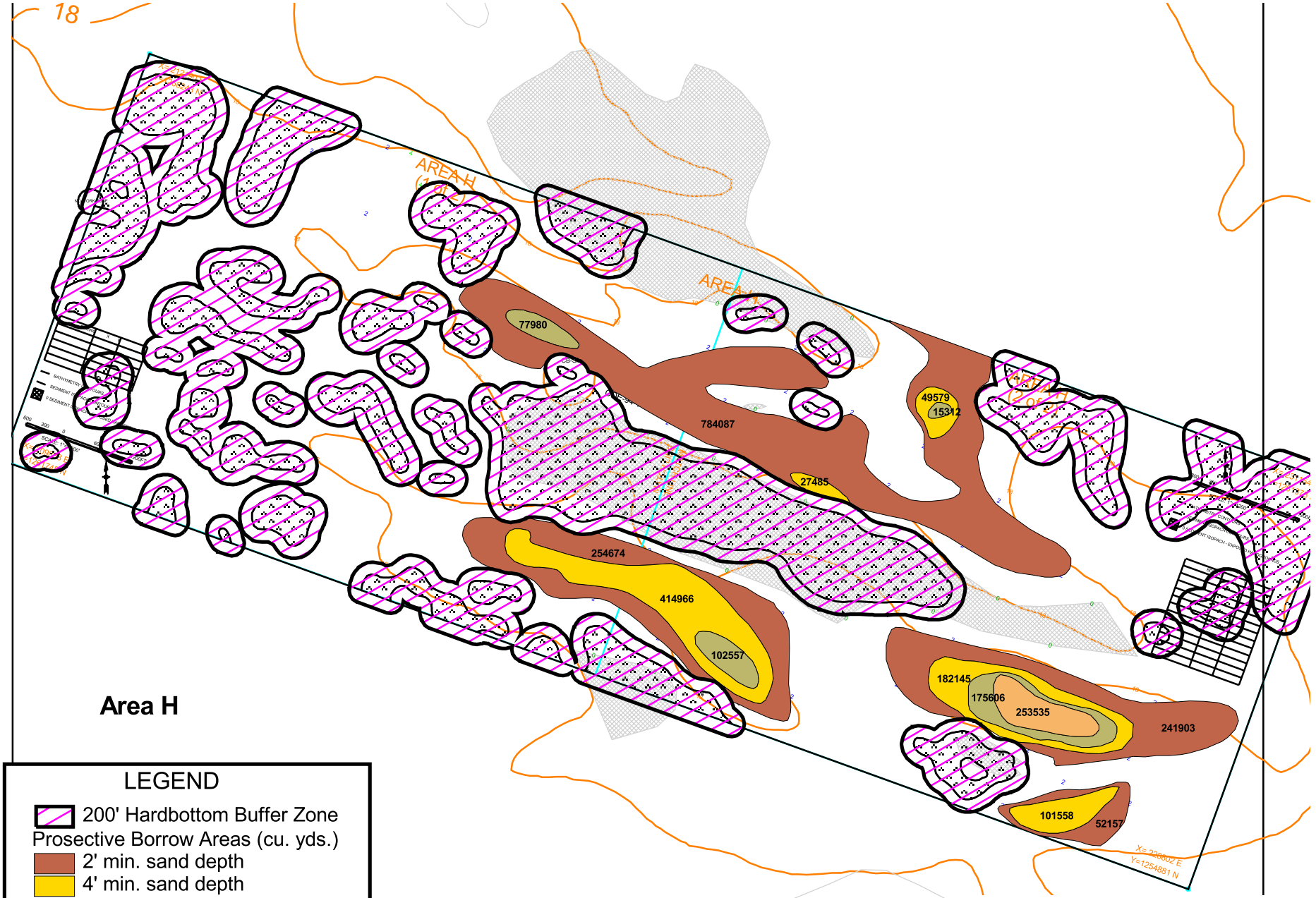
Available borrow material in Area G is generally located within the center of this triangular area (Figure 10). Overall, there is a total of 1.5 MCY of material available within Area G. Areas that have a depth > 4 feet have a total of 849,743 CY of material available for use in beach restoration projects (Table 1). This material is located in a large continuous area within the center of Borrow Area G (Figure 10).

3.2.8 Borrow Area H

The largest borrow area surveyed was Area H (Figure 11). In total, Area H encompasses a total of 3,202.1 acres of seafloor, 2.8 miles offshore of Sand Key. Within this area there was a total of 2,533.8 acres of open sand habitat, the largest of all areas surveyed. This represents 80 percent of the total acreage within Area H. Hardbottom habitats within this potential borrow area covered 668.3 acres.



Overview of Sand Resources - Borrow Area G	
Pinellas County SPP Borrow Area Resource Identification and Impact Assessment	
Scale: 1" = 2,000'	Drawn By: MR
Date: February, 2002	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 10



Overview of Sand Resources - Borrow Area H	
Pinellas County SPP Borrow Area Resource Identification and Impact Assessment	
Scale: 1" = 2,000'	Drawn By: MR
Date: February, 2002	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 11

3.2.8.1 Available Borrow Material

Borrow Area H has over 2.7 MCY of available borrow material (Table 1). The areas with the most potential as borrow areas are located within the southeastern portion of Area H (Figure 11). These areas have a total of 1.7 MCY of material. Within the southeastern corner, sand resources are deeper than in other areas of the borrow area. This area has a minimum of 700,000 CY of material present in isopach layers of $\geq$4 feet (Figure 11).

3.2.9 Borrow Area I

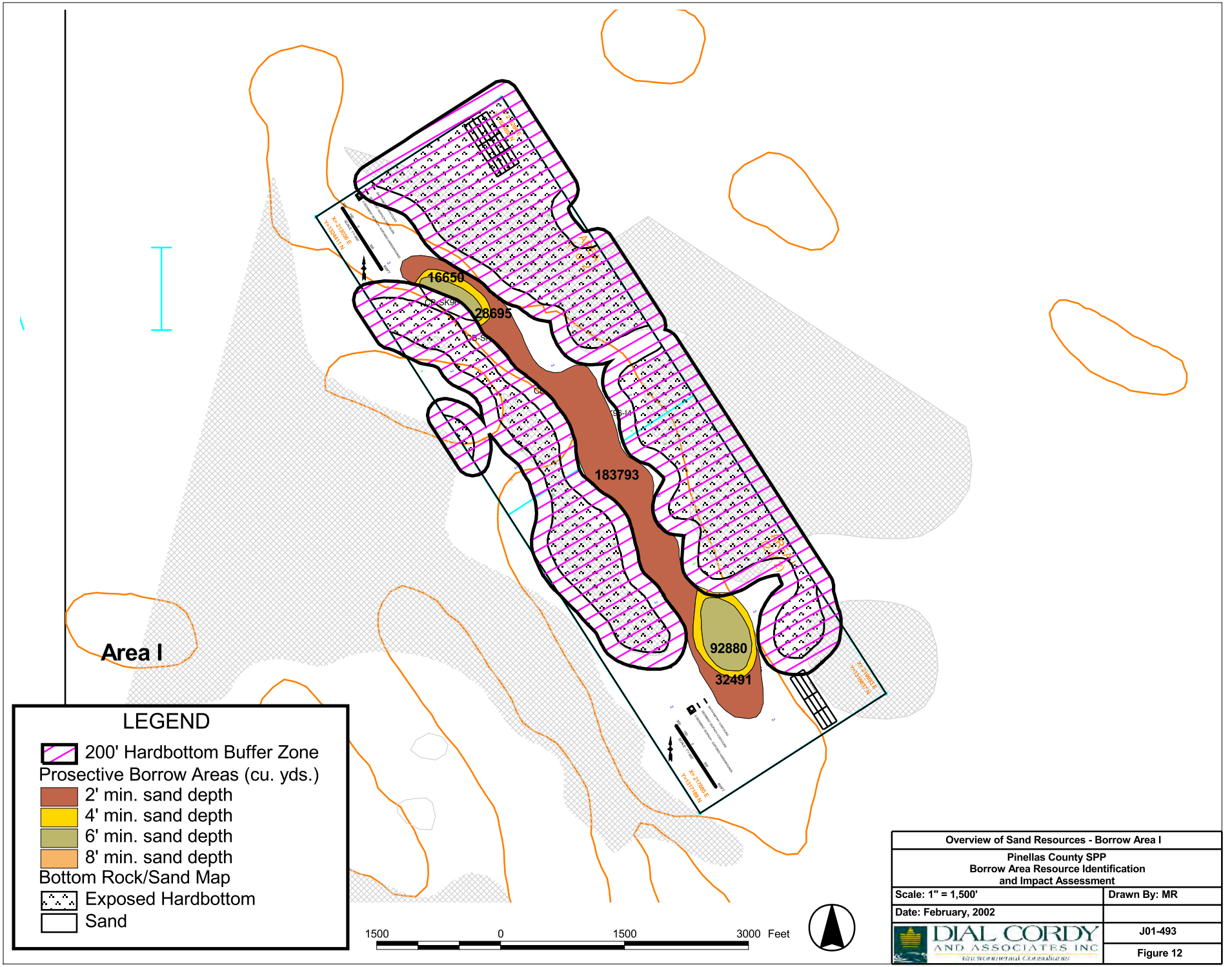
The northern most offshore area surveyed in Borrow Area I, located 3.0 nautical miles offshore of Clearwater Pass (Figure 2). Area I is also the smallest area surveyed at only 527.3 acres. Within Area I, a total of 212.3 acres of hardbottom resources were mapped. The remaining 315.3 acres consisted of open sand habitat (Figure 12).

3.2.9.1 Available Borrow Material

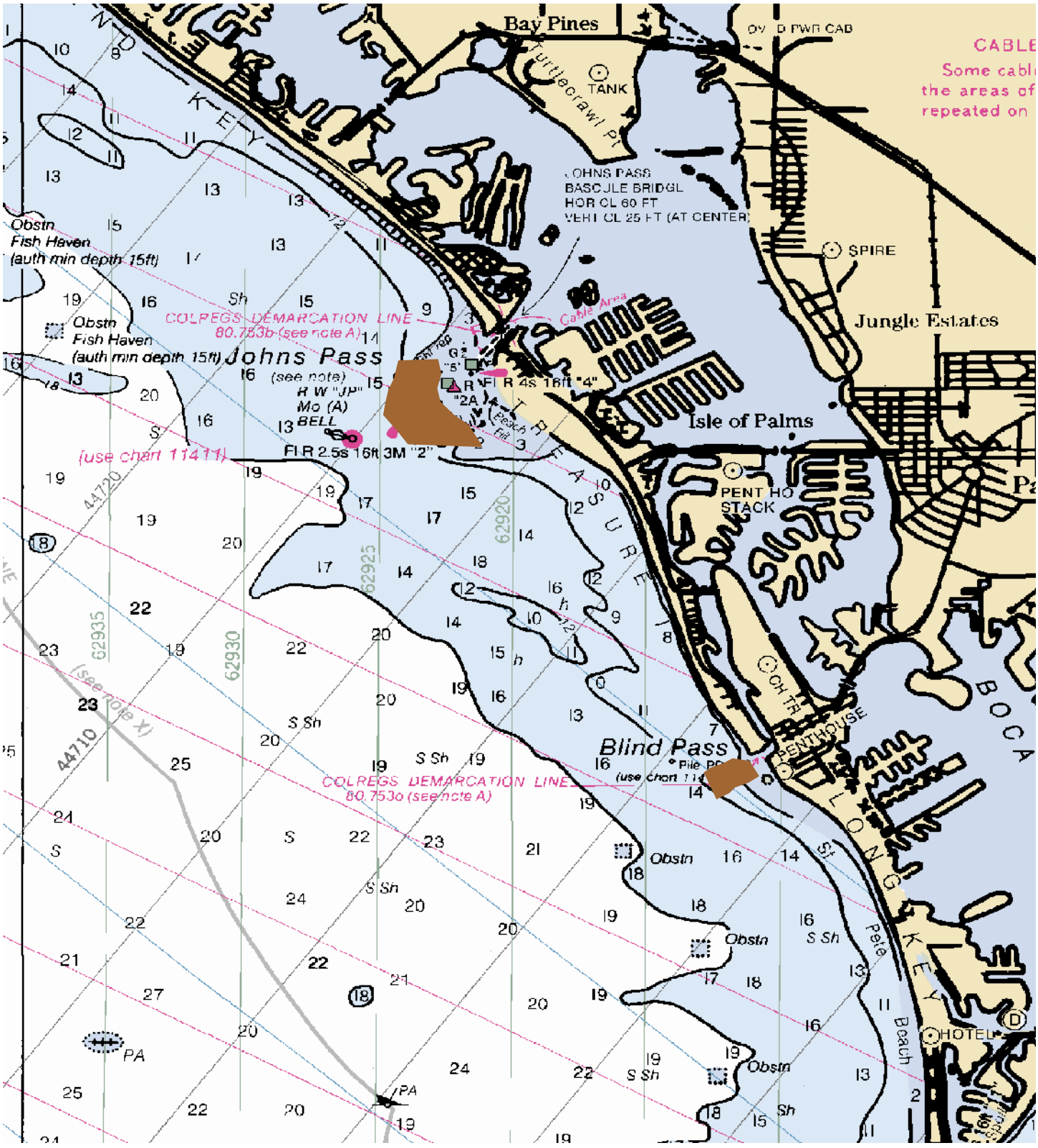
Borrow material within Area I totals 354,509 CY. The majority of this material is located in the center of the borrow area at a depth of $\geq$ 2 feet. Along the southeastern edge of Area I sand resources maintain a depth of $\geq$ 4 feet, totaling 125,371 CY of material (Figure 12).

3.3 Ebb Tidal Shoal Borrow Areas

In addition to the nine offshore borrow areas, five ebb tidal shoal borrow areas were also surveyed for marine resources. These included John's Pass, Blind Pass, Pass-A-Grille north, Pass-A-Grille south, and Egmont Shoal (Figures 13 and 14). No hardbottom or seagrass was documented within these ebb shoal areas. All areas consisted of large shallow areas of sand. In the John's Pass, Blind Pass, and the Pass-A-Grille survey areas, portions of the shoals are exposed during low tide events. Within these ebb tidal shoal survey areas a total of 1,569.5 acres of sand habitat was identified. Further geo-technical analysis of these areas will estimate the total amount of sand material available for placement.



Overview of Sand Resources - Borrow Area I	
Pinellas County SPP Borrow Area Resource Identification and Impact Assessment	
Scale: 1" = 1,500'	Drawn By: MR
Date: February, 2002	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 12

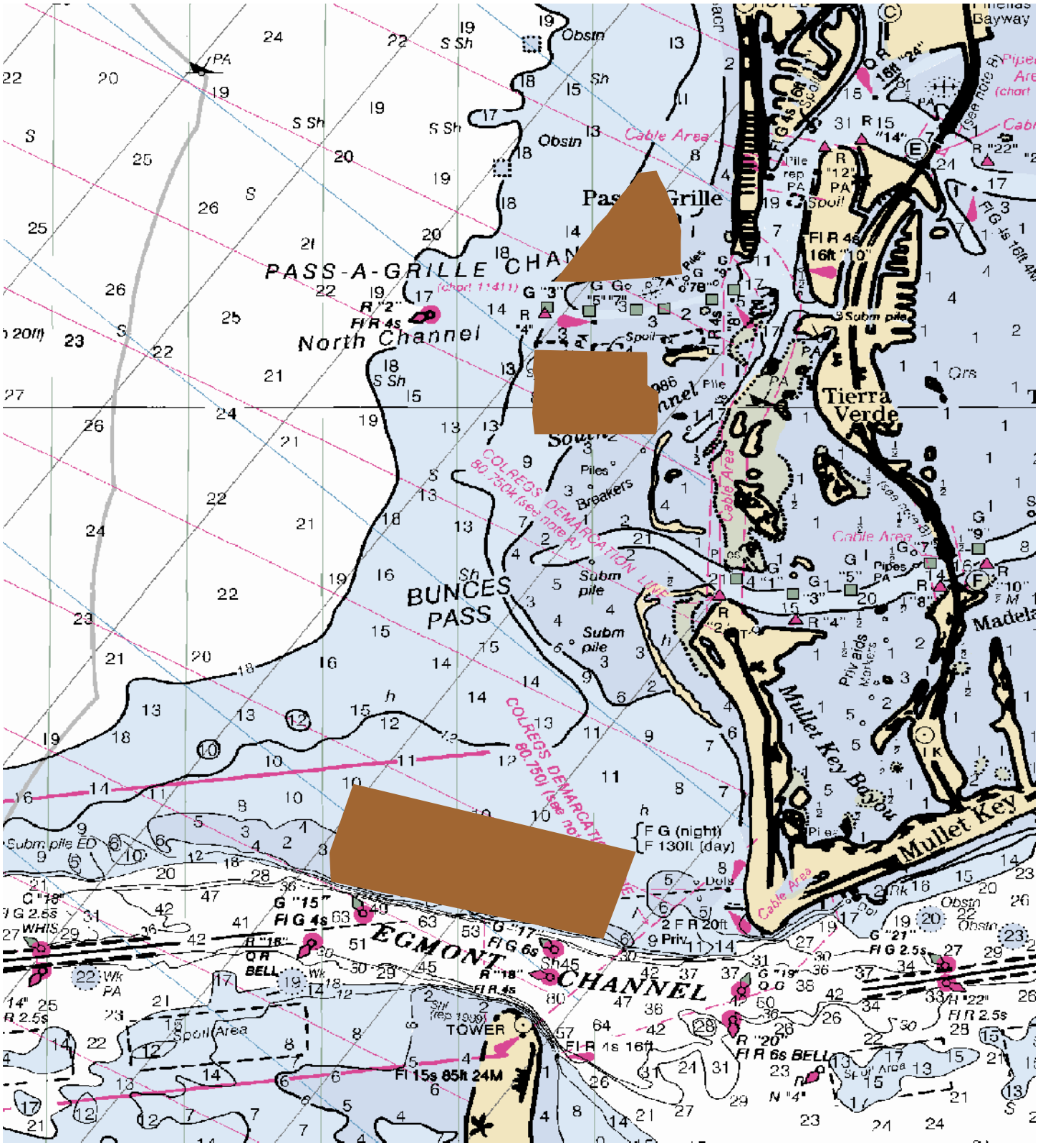


Ebb Tidal Shoals Bottom Classification Map

Sand

1 0 1 2 Miles

Overview of Sand Resources - Shoal Areas (North)	
Pinellas County SPP Borrow Area Resource Identification and Impact Assessment	
Scale: 1" = 1 mile	Drawn By: MR
Date: February, 2002	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 13



Ebb Tidal Shoals Bottom Classification Map

Sand

1 0 1 2 Miles

Overview of Sand Resources - Shoal Areas (South)	
Pinellas County SPP Borrow Area Resource Identification and Impact Assessment	
Scale: 1" = 1 mile	Drawn By: MR
Date: February, 2002	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 14

4.0 IMPACT ANALYSIS

The purpose of this section is to identify the preliminary effects of dredging activity on the marine resources located within the offshore borrow areas. This section discusses the potential impacts associated with sand removal on softbottom and hardbottom habitats and their associated biological communities.

4.1 Impacts to Benthic Habitats

4.1.1 Softbottom Benthic Resources

The physical removal of surficial sediments from a borrow site results in the loss of benthic infaunal habitat, as well as, any epifaunal species which cannot avoid entrainment. This results in localized drastic reductions in numbers of individuals, species richness, diversity, and biomass. This would most greatly affect infaunal species, which are incapable of avoiding the dredging activities. Within the study area, these communities are comprised of predominately invertebrates, which include crustacean, echinoderm, mollusc, and annelid species.

Impacts to benthic infaunal and epifaunal communities would be considered as relatively minimal when examined on a spatial scale. Since construction of nourishment projects within Pinellas County will most likely be staggered over time, impacts to borrow area resources will have time to recover between nourishment events. Infaunal communities in particular have very high reproductive potential and recruitment. Adjacent areas that have not been impacted would most likely be the primary source of recruitment to the impacted areas. Previous studies have shown a relatively short recovery time for infaunal communities following dredging (Culter and Mahadevan, 1982; Saloman et. al, 1982). Succession of infaunal communities post dredging should begin within days following construction. This initial settlement usually consists of pelagic larval recruits settling within the borrow area. Later succession from adjacent non-impacted areas will be more gradual, and involve less opportunistic species. Saloman et. al (1982) stated that communities would be close to pre-dredge conditions within one year and potentially as quickly as 8-9 months. Culter and Mahadevan (1982) found similar results and no long-term effects to benthic communities resulting from beach nourishment in Panama City Beach, FL. Based on these previous studies infaunal communities will most likely be re-established within 1-2 years post dredging.

Impacts to epifaunal and demersal ichthyofaunal populations would be less than those to infaunal communities; however, some minor impacts can be expected to occur. Loss of some members of the community can be expected due to entrainment during dredging activities. These losses should have a small impact on local populations. The majority of impacts to

these species would most likely be indirect, through alteration of benthic habitats after dredging is completed. The reduction of benthic infaunal communities following dredging may have an adverse affect on demersal ichthyofaunal communities, which utilize these species as prey. These predators would most likely migrate to areas that have not been impacted. This would result in no net loss in production within the region.

The method of dredging utilized during construction will determine the amount of sediment suspension that will take place. Should a cutterhead suction dredge be utilized for removing sand, the amount of suspended material should be insignificant. This type of dredging generally limits the amount of sediment re-suspended to lower portions of the water column. These impacts would be short term and localized.

Implementation of sediment removal of material from the borrow area with a hopper dredge may suspend more material in the water column and as such require a larger mixing zone. Care should be taken to monitor turbidity levels associated with this type of dredging and to also monitor the amount of material settling on adjacent hardbottom areas. The inclusion of a 200-foot buffer around all hardbottom resources identified in each area should help to reduce indirect impacts to these resources.

4.1.3 Hardbottom Resources

There are 3,828.6 acres of hardbottom habitats present within the nine proposed offshore borrow areas. Due to exclusionary mapping, there should be no direct impacts to hardbottom resources in the area during dredging. Mapping and analysis of impacts for this project were designed to include a 200-foot buffer around all identified hardbottom resources (Figures 4-12). Care should be taken during the dredging operation to avoid anchoring in these buffer zones. If the total exclusion of construction equipment and pipelines from these buffer zones is followed during construction there should be no direct impacts.

Indirect impacts to adjacent hardbottom areas may occur. However, with the 200-foot buffer zone impacts should be minimal from suspension and deposition of sediments. These impacts can be more easily identified once a definite dredging method and exact cut areas are outlined. Monitoring of turbidity during the dredging activities and sedimentation rates on adjacent hardbottom should be implemented to ensure no adverse impacts to the hardbottom resources occur.

Pipeline corridors to and from these borrow areas have not yet been defined. Once potential areas for material removal are identified, pipeline corridors will be established to avoid direct impacts to hardbottom resources within the study area from pipeline placement. Mapping of hardbottom resources within pipeline corridors from borrow areas to the beach needs to be studied to determine the most effective corridors for placement.

4.2 Impacts to Pelagic Environment

This section discusses the adverse potential impacts to organisms utilizing the water column in the vicinity of the borrow areas.

4.2.1 Zooplankton

4.2.1.1 Entrainment

Entrained zooplankton are assumed to die from physical trauma (Reine and Clarke, 1998). The most detrimental consequence of zooplankton entrainment is the death of fish and invertebrate larvae. This loss of larval organisms may in turn have an adverse effect on adult populations. The rate of zooplankton entrainment by hydraulic dredges depends upon local hydrographic patterns and the spatial and temporal dynamics of local populations. The characteristics of the dredging operation also affect the rate of entrainment of zooplankton. The use of suction dredges will have a greater affect on zooplankton near the seafloor, while a hopper dredge may entrain species utilizing the entire water column. Taxa or life stages that spend part of their time associated with the benthic environment, such as demersal fish eggs or demersal zooplankton would be especially vulnerable from either method. Unfortunately, no information exists on the abundance or composition of demersal zooplankton in the sand resource areas or borrow site. Owing to the high reproductive capacity of zooplankton along with the relatively small area of the dredge suction field and the volume of water entrained compared to the overall volume of surrounding waters, it is unlikely that entrainment would greatly affect zooplankton populations or assemblages in the offshore borrow sites.

4.2.1.2 Turbidity

Sediment suspended and dispersed by the action of a working dredge can affect zooplankton by impeding feeding activity and physiological impairment. Most larvae are filter feeders and inorganic particles can easily foul the fine structures on feeding appendages of crustaceans such as copepods, and crab and shrimp larvae (Sullivan and Hancock, 1977). Zooplankton feeding by ciliary action (e.g., echinoderm larvae) also would be susceptible to mechanical effects of suspended particles (Sullivan and Hancock, 1977). In contrast, larval fishes are visual feeders that depend on adequate light levels for their foraging success (Blaxter, 1968). High turbidity reduces light levels in the water column, which in turn shortens the reactive distance between a larval fish and its prey.

While increase turbidity is likely to occur in the vicinity of the dredging operation, little impact to zooplankton communities should occur. Due to the limited extent and transient nature of the sediment plume, it is unlikely that turbidity would greatly affect zooplankton populations or assemblages in the borrow sites.

4.2.2 Fishes

4.2.2.1 Entrainment

Entrainment of adult fishes by hydraulic dredging has been reported for several projects (McGraw and Armstrong, 1988; Reine and Clarke, 1998). Results from these previous studies show that relatively few species of fish become entrained during dredging activity. The most commonly entrained species were demersal fishes (McGraw and Armstrong, 1988). Use of hopper dredging techniques would lower the numbers of entrained fishes further. Few of the coastal pelagic fishes occurring offshore of Pinellas County should become entrained and many pelagic species have sufficient mobility to avoid the dredging operations.

4.2.2.2 Turbidity

Turbidity can cause feeding impairment, avoidance and attraction movements, and physiological changes in adult pelagic fishes. As discussed for larval fishes, pelagic species are primarily visual feeders and when turbidity reduces light penetration, the fish's reactive distance decreases (Vinyard and O' Brien, 1976). Turbidity can also have an effect on light scattering, which also will hamper fish predation (Benfield and Minello, 1996).

Suspended sediments can also clog gill cavities preventing normal respiration and mechanically affecting food gathering in planktivorous species (Bruton, 1985). Storm events have increased the amount of suspended sediments enough to contribute to the death of nearshore and offshore fishes by clogging gill cavities and eroding gill lamellae (Robins, 1957).

Due to the limited extent and transient nature of the sediment plume, it is unlikely that turbidity would greatly affect fish populations or assemblages in the borrow sites.

4.2.2.3 Essential Fish Habitat (EFH)

The Gulf of Mexico Fisheries Management Council (GMFMC) (1998) has designated unvegetated bottom and water column areas within the study area as Essential Fish Habitat (EFH), in compliance with the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801-1882), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267).

The Gulf of Mexico in this region also provides essential forage, cover, and nursery habitats for other species that are important commercially and recreationally. These include the blue crab (*Callinectes sapidus*), flounder (*Syacium* sp.), and mullet (*Mugil* sp.), as well as prey species, such as the longspine porgy (*Stenotomus caprinus*) and dwarf goatfish (*Upeneus parvus*).

Dredging will impact both the open water and unvegetated bottom habitats within the borrow areas. These impacts should only temporarily displace fishes utilizing these habitats. Impacts to larval fishes within the vicinity of the dredging operation will also occur. However, due to the relatively small area covered by the removal of sand from the borrow areas and the length of time between borrow events the impacts should be insignificant.

4.2.3 Sea Turtles

4.2.3.1 Physical Injury

Although any of the five sea turtle species may be present in the project area, loggerhead, green, and Kemp's Ridley turtles are considered to be most at risk from dredging activities because of their life cycle and behavioral patterns (Dickerson et al., 1992). Loggerheads are expected to be the most abundant of these three turtles in the project area (LeBuff, 1990, Meylan et. al, 1999).

The main potential effect of dredging on sea turtles is physical injury or death caused by the suction and/or cutting action of the dredge head. Numerous sea turtle injuries and mortalities have been documented during dredging projects, particularly along Florida's east coast (Studt, 1987; Dickerson et al., 1992; Slay, 1995). Impacts typically can be minimized by a combination of project scheduling and equipment selection, accompanied if necessary by turtle removal and/or monitoring.

4.2.3.2 Turbidity

Sea turtles in and near the project area may encounter turbid water during dredging. Since removal of material is likely to occur over a relatively small area, turbidity is considered unlikely to significantly affect turtle behavior or survival.

4.2.3.3 Noise

Many human activities in the marine environment produce underwater noise. The noise associated with dredging is unlikely to significantly affect sea turtles because of their limited hearing ability (Ridgway et al., 1969; Lenhardt, 1994). These animals do not rely upon sound to any significant degree for communication or food location.

4.2.4 Marine Mammals

4.2.4.1 Physical Injury

Marine mammals commonly present within the waters nearshore and offshore the study area include manatee and bottlenose dolphin. Bottlenose dolphins were commonly observed while conducting this survey. As many as 15 dolphins were observed at one time in the areas adjacent to the offshore borrow areas. Weigle (1990) documented that at least three distinct herds of dolphin are common within the Lower Tampa Bay area. This includes as many as 246 individual animals. Many of the dolphins observed may have been transient in nature. However, 75 individuals were observed on more than one occasion. Dolphins are fast, agile swimmers and are presumed capable of avoiding direct physical injury from dredging operations. Dolphins also may avoid the immediate vicinity of the project due to the associated noise and turbidity. Manatees are unlikely to venture offshore in the vicinity of the dredging activity and would most likely avoid dredging activity.

4.2.4.2 Turbidity

Marine mammals in and near the project area may encounter turbid water during dredging. This turbidity could temporarily interfere with feeding or other activities, but the animals could easily swim to avoid turbid areas. Turbidity is unlikely to significantly affect marine mammals within the study area.

4.2.4.3 Noise

Underwater noise from dredging activities could have minor impacts on marine mammals. Noise can cause marine mammals to temporarily avoid certain areas (Gales, 1982; Richardson et al., 1995). However, sound levels from dredging activities are unlikely to account for hearing loss or other auditory discomfort or damage to marine mammals. Dolphins and manatees could easily move away from noise that would cause them discomfort, danger, harm, or interfere with normal behaviors. Observations of marine mammals in the vicinity of boat traffic suggest that routine vessel operations have little effect on normal behavior.

4.3 Potential Cumulative Impacts

Cumulative impacts resulting from removal of material from multiple borrow sites are a concern when evaluating potential long-term effects on marine resources in the area offshore Pinellas County. This analysis assumes that a different area or a different shoal, would be dredged each replenishment interval. With the replenishment interval expected to be 5 to 7 years, and that the recovery time of the affected benthic community after sand removal anticipated to be within 1-2 years, the potential for significant cumulative benthic biological impacts is remote. No cumulative impacts to the pelagic environment, including zooplankton, fishes, sea turtles, and marine mammals, are expected from multiple beach nourishment borrow site operations from the nine offshore borrow sites.

5.0 REFERENCES

Benfield, M.C. and T.J. Minello 1996. Relative effects of turbidity and light intensity on reactive distance and feeding of an estuarine fish. Environmental Biology of Fishes, 46: 211-216.

Blaxter, J.H.S. 1968. Visual thresholds and spectral sensitivity of herring larvae. Journal of Experimental Biology, 48: 39-53.

Bruton, M.N. 1985. The effects of suspensoids on fish. Hydrobiologia, 125: 221-241.

Culter, J.K., and Mahadevan, S. 1982. Long-term Effects of Beach Nourishment on the Benthic Fauna of Panama City Beach, Florida. U.S. Army Corps of Engineers Coastal Engineering Research Center Miscellaneous Report No. 82-2. 57 pp.

Dial Cordy and Associates. (2001). Marine Biological Survey Pinellas County Shore Protection Project Comprehensive Borrow Area Study. Prepared for U. S. Army Corps of Engineers, Jacksonville District, Jacksonville FL. 51 pp.

Dickerson, D.D., D.A. Nelson, M. Wolff and L. Manners. 1992. Summary of Dredging Impacts on Sea Turtles: King's Bay, Georgia and Cape Canaveral, Florida. *In:* M. Salmon and J. Wyneken (comps.), Proceedings of the Eleventh Annual Workshop on Sea Turtle Biology and Conservation, Jekyll Island, GA. NOAA Tech. Mem. NMFS-SEFSC-302, pp. 148-151.

EMC Surveying and Mapping. 1998. Pinellas County Beach Erosion Control Project Hardground Survey Area "A" Through "I". Prepared for U.S. Army Corps of Engineers, Jacksonville District, Jacksonville FL. 25 pp.

Gales, R.S. 1982. Effects of Noise of Offshore Oil and Gas Operations on Marine Mammals -- An Introductory Assessment. Technical Report 844, Naval Ocean Systems Center, San Diego, CA.

Gulf of Mexico Fishery Management Council. 1998. Generic Amendment for Addressing Essential Fish Habitat Requirements in the Following Fishery Management Plans of the Gulf of Mexico: Shrimp Fishery of the Gulf of Mexico, United States Waters, Red Drum Fishery of the Gulf of Mexico, Reef Fishery of the Gulf of Mexico, Coastal Migratory Resources (Mackerels) in the Gulf of Mexico and South Atlantic, Stone Crab Fishery of the Gulf of Mexico, Spiny Lobster Fishery of the Gulf of Mexico and South Atlantic, and Coral and Coral Reefs of the Gulf of Mexico. Gulf of Mexico Fishery Management Council, Tampa, Florida, 238 pp. +app.

LeBuff, C.R. 1990. The Loggerhead Turtle in the Eastern Gulf of Mexico. Caretta Research, Inc. Sanibel, FL .216 pp.

Lenhardt, M.L.. 1994. Seismic and Very Low Frequency Sound Induced Behaviors in Captive Loggerhead Marine Turtles (*Caretta caretta*). *In:* K.A. Bjorndal, A.B. Bolten, D.A. Johnson, and P.J. Eliazar (comps.), Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation, Hilton Head, SC. U.S. Department of Commerce, National Oceanic and Oceanographic Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Miami, FL.

Lyons, W.G., and Collard, S.B. 1974. Benthic invertebrate communities of the eastern Gulf of Mexico. *In:* R.E. Smith, ed. Proceedings of marine environmental implications of offshore drilling in the eastern Gulf of Mexico. State Univ. Syst. FL. Inst. Oceanogr., St. Petersburg, FL. 157-166 pp.

Malme, C.I., P.R. Miles, C.W. Clark, P. Tyack, and J.E. Bird. 1983. Investigations of the Potential Effects of Underwater Noise from Petroleum Industry Activities on Migrating Gray Whale Behavior. Report by Bolt, Beranek and Newman, Inc., Cambridge, MA, for the U.S. Department of the Interior, Minerals Management Service, Anchorage, AK. BBN Rep. 5366.

McGraw, K.A. and D.A. Armstrong. 1988. Fish Entrainment by Dredges in Grays Harbor, Washington. In: C.A. Simenstad (ed.), Effects of Dredging on Anadromous Pacific coast Fishes, Workshop Proceedings, University of Washington Sea Grant, pp. 113-131.

Meylan, A. 1992. Hawksbill Turtle *Eretmochelys imbricata.* In: P. Moler (ed.), Rare and Endangered Biota of Florida, University Press of Florida, Gainesville, FL, pp. 95-99.

Meylan, A., A. Redlow, A. Mosier, K. Moody, A. Foley. 1999. Occurrence and distribution of sea turtles in Tampa Bay, FL. *In*: J.R. Pribble, A. J. Janicki, and H. Greening , (eds.) Baywide environmental monitoring report, 1993-1998, Tampa Bay, FL. Tampa Bay Estuary Program, Technical Publication 07-99. St. Petersburg, FL. Chapter 13, 13-1-13-15 pp.

Robins, C.R. 1957. Effects of storms on the shallow-water fish fauna of southern Florida with records of fishes from Florida. Bulletin of Marine Science in the Gulf and Caribbean, 7(3): 266-275.

Reine, K.J. and D.G. Clark. 1998. Entrainment by Hydraulic Dredges – A Review of Potential Impacts. U. S. Army Engineer Waterways Experiment Station, Research and Development Center, Vicksburg, MS, DOER Tech. Notes Collection (TN DOER-E1).

Richardson, W.J., C.R. Greene, Jr., C.I. Malme, and D.H. Thomson. 1995. Marine Mammals and Noise. Academic Press, San Diego. 576 pp.

Ridgway, S.H., E.G. Wever, J.G. McCormick, J. Palin, and J.H. Anderson. 1969. Hearing in the giant sea turtle, *Chelonia mydas*. Proceedings of the National Academy of Sciences, 64(3): 884-890.

Saloman, C.H., S.P. Naughton, and J.L. Taylor. 1982. Benthic Community Response to Dredging Borrow Pits, Panama City Beach, Florida. U.S. Army Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, VA, Miscellaneous Report No. 82-3. 138 pp.

Slay, C.K. 1995. Sea Turtle Mortality Related to Dredging Activities in the Southeastern U.S.: 1991. In: J.I. Richardson and T.H. Richardson (comps.). Proceedings of the Twelfth Annual Workshop on Sea Turtle Biology and Conservation, Jekyll Island, GA, NOAA Tech. Mem. NMFS-SEFSC-361, pp. 132-133.

Studt, J.F. 1987. Amelioration of Maintenance Dredging Impacts on Sea Turtles, Canaveral Harbor, Florida. In: W. Witzell (ed.), Ecology of East Florida Sea Turtles. Proceedings of the Cape Canaveral, Florida Sea Turtle Workshop, Miami, FL. NOAA Technical Report NMFS 53, pp. 55-58.

Sullivan, B.K. and D. Hancock. 1977. Zooplankton and dredging: Research perspectives from a critical review. Water Research Bulletin, 13(3): 461-468.

Vinyard, G.L. and J.W. O'Brien. 1976. Effects of light and turbidity on the reactive distance of bluegill (*Lepomis macrochirus*). Journal of the Fisheries Research Board of Canada, 33: 2,845-2,849.

Weigle, B.L., 1990. Abundance, distribution and movements of bottlenose dolphins (*Tursiops truncatus*) in lower Tampa Bay, Florida. *In:* P.S. Hammond, S. A. Mizorch, and G.P. Donovan (eds.) Individual recognition of cetaceans: use of photo-identification and other techniques to estimate population parameters. Rep. Int. Whaling Comm. Spec. Issue 12:195-201.

Nearshore Marine Biological Survey and Assessment Pinellas County Shore Protection Project Comprehensive Borrow Area Study

December 2002

Prepared for:
Jacksonville District
U.S. Army Corps of Engineers
400 West Bay Street
Jacksonville, FL 32202

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250

EXECUTIVE SUMMARY

Dial Cordy and Associates Inc. (DC&A) was contracted by the U.S. Army Corps of Engineers, Jacksonville District (Corps) to conduct a nearshore marine environmental baseline survey and report for the Pinellas County Shore Protection Project. This portion of the study focuses on the nearshore pipeline corridors and staging areas leading from potential offshore borrow areas. This work was done under contract GS-10F-0124L. Marine resources were mapped and documented with underwater still and video photography during July and August 2002.

Resources maps and summaries of habitat types delineated during the survey are reviewed in this report. Since the methods to be employed by the dredging contractors are not known, a complete impact assessment cannot be fully reviewed at this time. The information contained in this report should be used for planning of future beach nourishments and renourishments utilizing these offshore borrow areas and corridors. However, further surveying of the pipeline placement during construction, as well as equipment placement may need to be conducted before, during, and after construction to judge actual impacts to the marine resources present in each area.

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1.0 INTRODUCTION

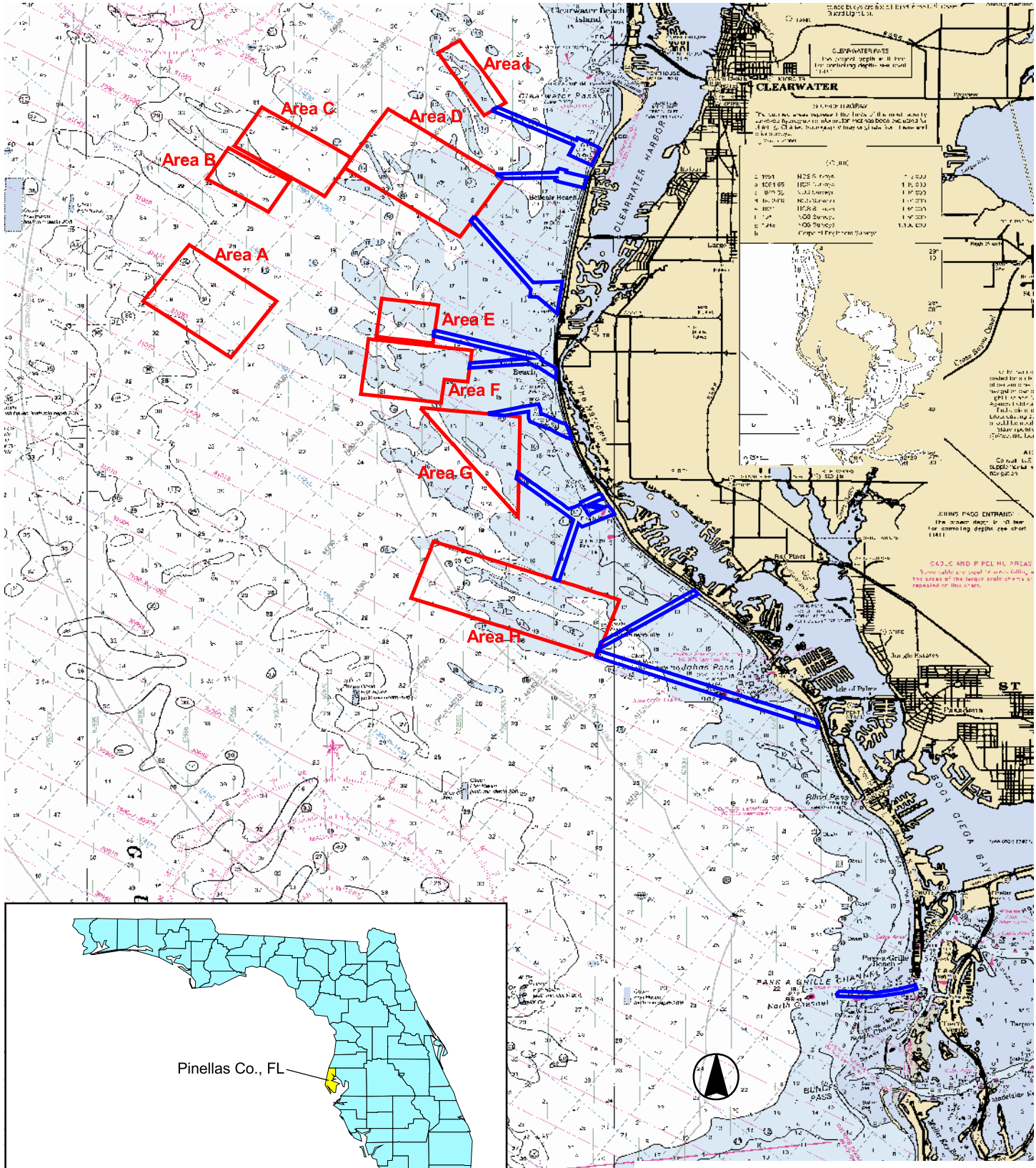
Dial Cordy and Associates Inc. (DC&A) was contracted by the U.S. Army Corps of Engineers, Jacksonville District (Corps) to conduct a nearshore marine environmental baseline survey and report for the Pinellas County Shore Protection Project. This portion of the study focuses on the nearshore pipeline corridors and staging areas leading from potential offshore borrow areas. This work was done under contract GS-10F-0124L.

1.1 Purpose and Need

Shoreline erosion and a lowered beach profile caused by storms, wave action, and currents have become a serious concern along Pinellas County barrier island beaches. As a means of controlling shoreline erosion and providing storm protection to these barrier islands fill material has been placed along the shorelines. The Pinellas County Shore Protection Project has historically obtained beach quality fill from inlet borrow areas and the Egmont Channel Shoal for nourishment of Pinellas County beaches. The use of the Egmont Channel Shoal is not always a cost effective option for nourishment of Pinellas County's beaches due to the logistical and cost constraints associated with moving material such a large distance (22 miles). To help offset some of the costs associated within renourishment activity nine offshore borrow areas have been identified for future use (Dial Cordy 2001). Bathymetry and side-scan sonar of nearshore marine habitats has also been performed (SeaSystems 2001). Identification of nearshore pipeline corridors and staging areas for construction equipment for these offshore areas is evaluated in this report. These nearshore areas required evaluation to document occurrence and quality of marine habitats to facilitate minimization of impacts.

1.2 Location

The project area is located in Pinellas County on the West coast of Florida, near the central portion of the Florida peninsula, approximately 25 miles west of Tampa. The sites investigated include the nearshore areas of Sand Key, Long Key, Treasure Island, and the Pass-a -Grille Channel (Figure 1).



Survey Area for Pipeline Corridors and Nearshore Staging Areas

Offshore Borrow Areas (Dial Cordy, 2001)

Location Map	
Nearshore Marine Biological Survey and Assessment Pinellas County Shore Protection Project Comprehensive Borrow Area Study	
Scale: 1 inch = 3 miles	Drawn By: MR
Date: October, 2002	
DIAL CORDY AND ASSOCIATES INC.	J02-582
	Figure 1

2.0 TECHNICAL APPROACH

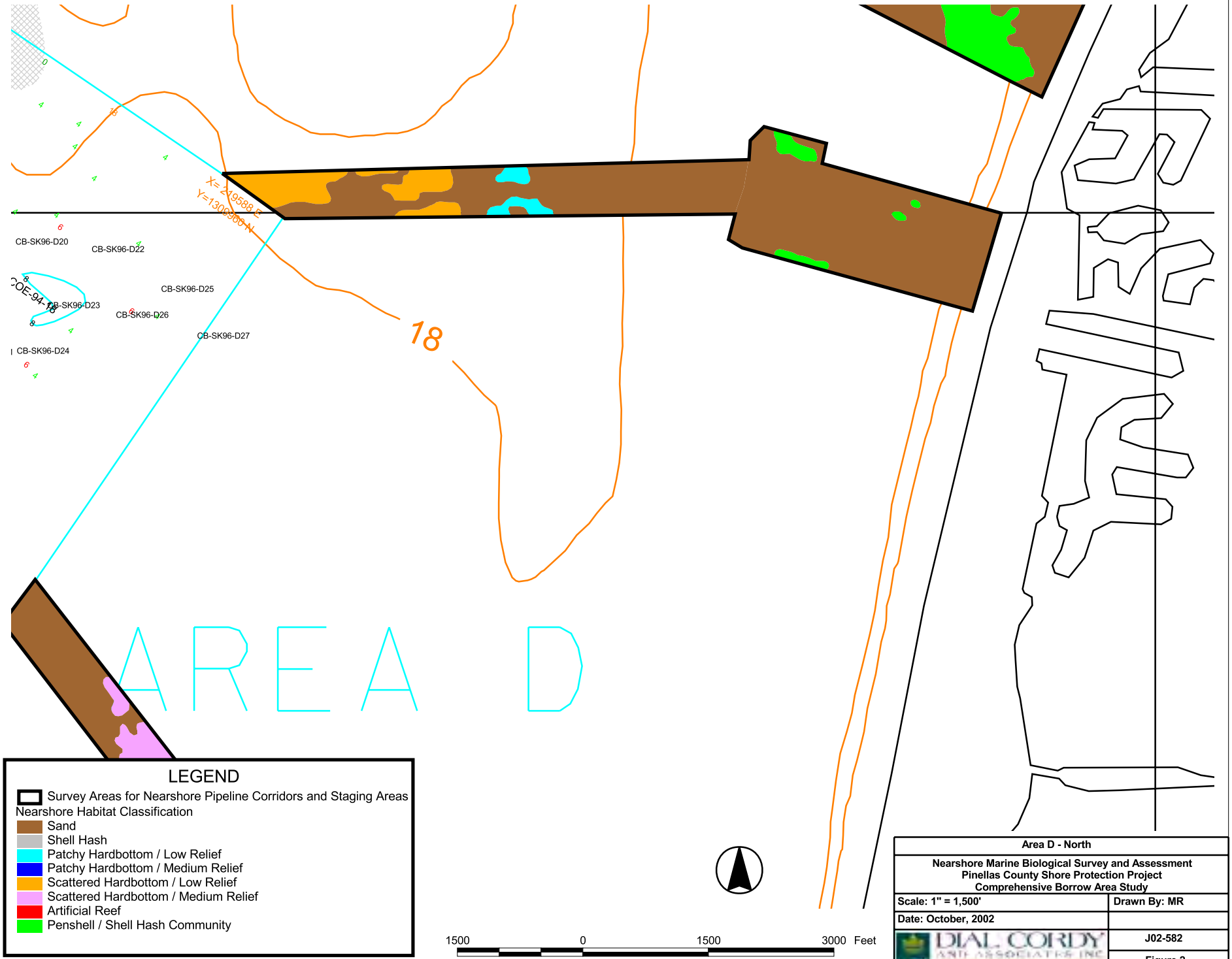
DC&A conducted field investigations to locate, delineate, and characterize existing hardground and/or other benthic community resources within the proposed pipeline corridors and staging areas. Marine resources were mapped and documented with underwater still and video photography. The field survey was conducted during July and August 2002.

2.1 Towed Video Survey and Mapping

To identify and delineate any marine resources present within the proposed pipeline corridors and staging areas, a towed video survey was conducted. A towed video camera, in conjunction with Differential Global Positioning System (DGPS) and HYPACKMAX™ navigation software, was utilized (Photograph 1). Real time position of the camera was overlaid on the digitally recorded survey record. Transects were established within each area at 100-foot intervals. In total, over 160 nautical miles of transect lines encompassing over 2000 acres were surveyed (Figures 2-9).

Photograph 1 Towed video camera and sled used for mapping and assessment of marine resources offshore Pinellas County

The point at which each transect crossed a change in marine habitat (i.e. hardbottom, sand, etc.) was determined from video analysis. The points were then incorporated into a database and ArcView GIS™ was used to generate resource maps. Hardbottom was classified by percent of coverage and also vertical relief. Hardbottom classifications are shown in Tables 1 and 2.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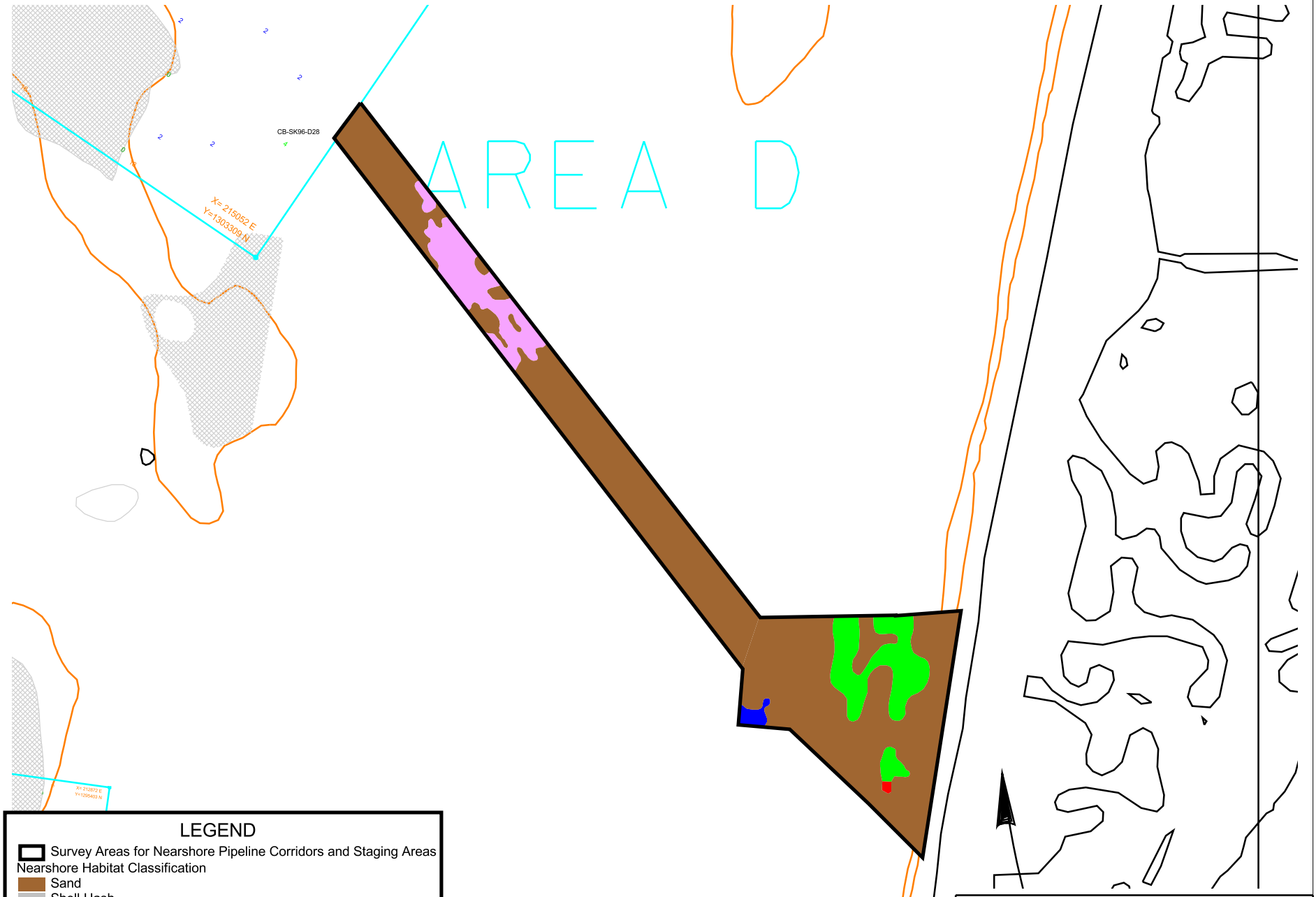
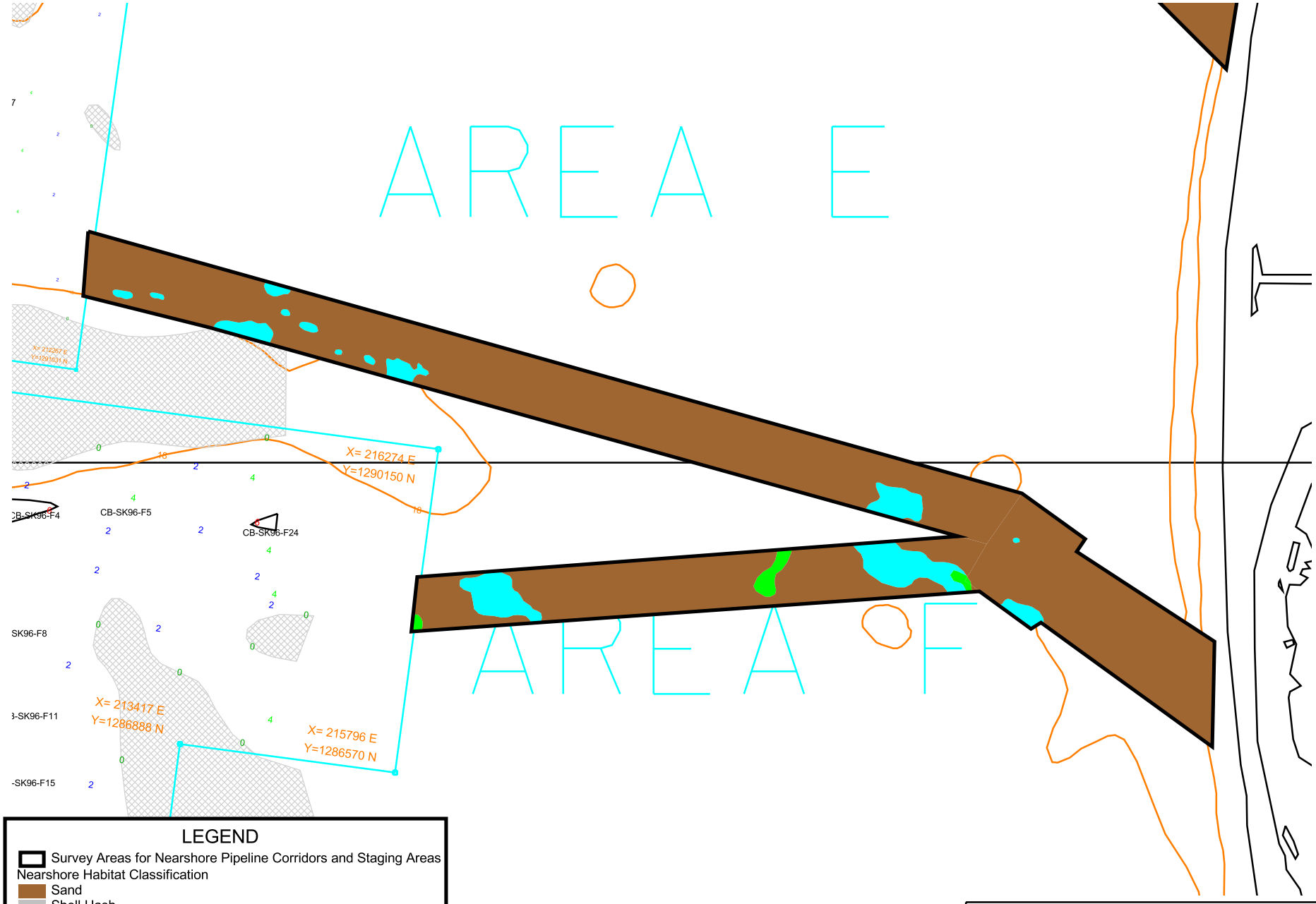
CB-SK96-D22
CB-SK96-D25
CB-SK96-D23
CB-SK96-D26
CB-SK96-D27
CB-SK96-D24
COE-94-18
18
AREA D
LEGEND
Survey Areas for Nearshore Pipeline Corridors and Staging Areas
Nearshore Habitat Classification
Sand
Shell Hash
Patchy Hardbottom / Low Relief
Patchy Hardbottom / Medium Relief
Scattered Hardbottom / Low Relief
Scattered Hardbottom / Medium Relief
Artificial Reef
Penshell / Shell Hash Community
1500
0
1500
3000 Feet
Area D - North
Nearshore Marine Biological Survey and Assessment
Pinellas County Shore Protection Project
Comprehensive Borrow Area Study
Scale: 1" = 1,500'
Drawn By: MR
Date: October, 2002
DIAL CORDY AND ASSOCIATES INC
J02-582
Figure 2



Area D - South	
Nearshore Marine Biological Survey and Assessment Pinellas County Shore Protection Project Comprehensive Borrow Area Study	
Scale: 1" = 2,000'	Drawn By: MR
Date: October, 2002	
DIAL CORDY AND ASSOCIATES INC	J02-582
	Figure 3



LEGEND

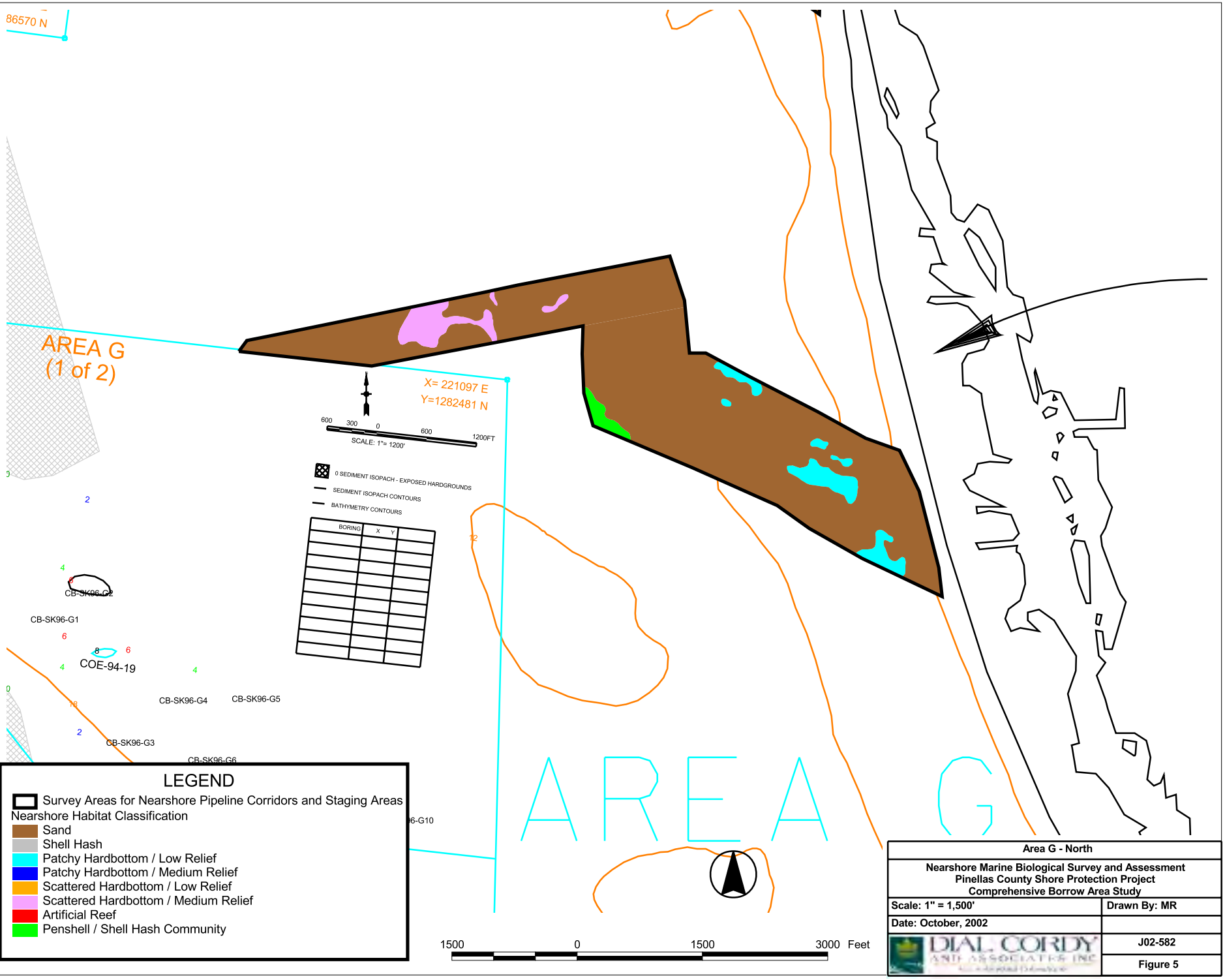
- Survey Areas for Nearshore Pipeline Corridors and Staging Areas

Nearshore Habitat Classification

- Sand
- Shell Hash
- Patchy Hardbottom / Low Relief
- Patchy Hardbottom / Medium Relief
- Scattered Hardbottom / Low Relief
- Scattered Hardbottom / Medium Relief
- Artificial Reef
- Penshell / Shell Hash Community

1500 0 1500 3000 Feet

Area E and F	
Nearshore Marine Biological Survey and Assessment Pinellas County Shore Protection Project Comprehensive Borrow Area Study	
Scale: 1" = 1,500'	Drawn By: MR
Date: October, 2002	
DIAL CORDY AND ASSOCIATES INC	J02-582
	Figure 4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SEDIMENT ISOPACH CONTOURS
BATHYMETRY CONTOURS
BORING X Y
CB-SK96-G2
CB-SK96-G1
COE-94-19
CB-SK96-G4
CB-SK96-G5
CB-SK96-G3
CB-SK96-G6
CB-SK96-G10
AREA G
LEGEND
Survey Areas for Nearshore Pipeline Corridors and Staging Areas
Nearshore Habitat Classification
Sand
Shell Hash
Patchy Hardbottom / Low Relief
Patchy Hardbottom / Medium Relief
Scattered Hardbottom / Low Relief
Scattered Hardbottom / Medium Relief
Artificial Reef
Penshell / Shell Hash Community
1500 0 1500 3000 Feet
Area G - North
Nearshore Marine Biological Survey and Assessment
Pinellas County Shore Protection Project
Comprehensive Borrow Area Study
Scale: 1" = 1,500'
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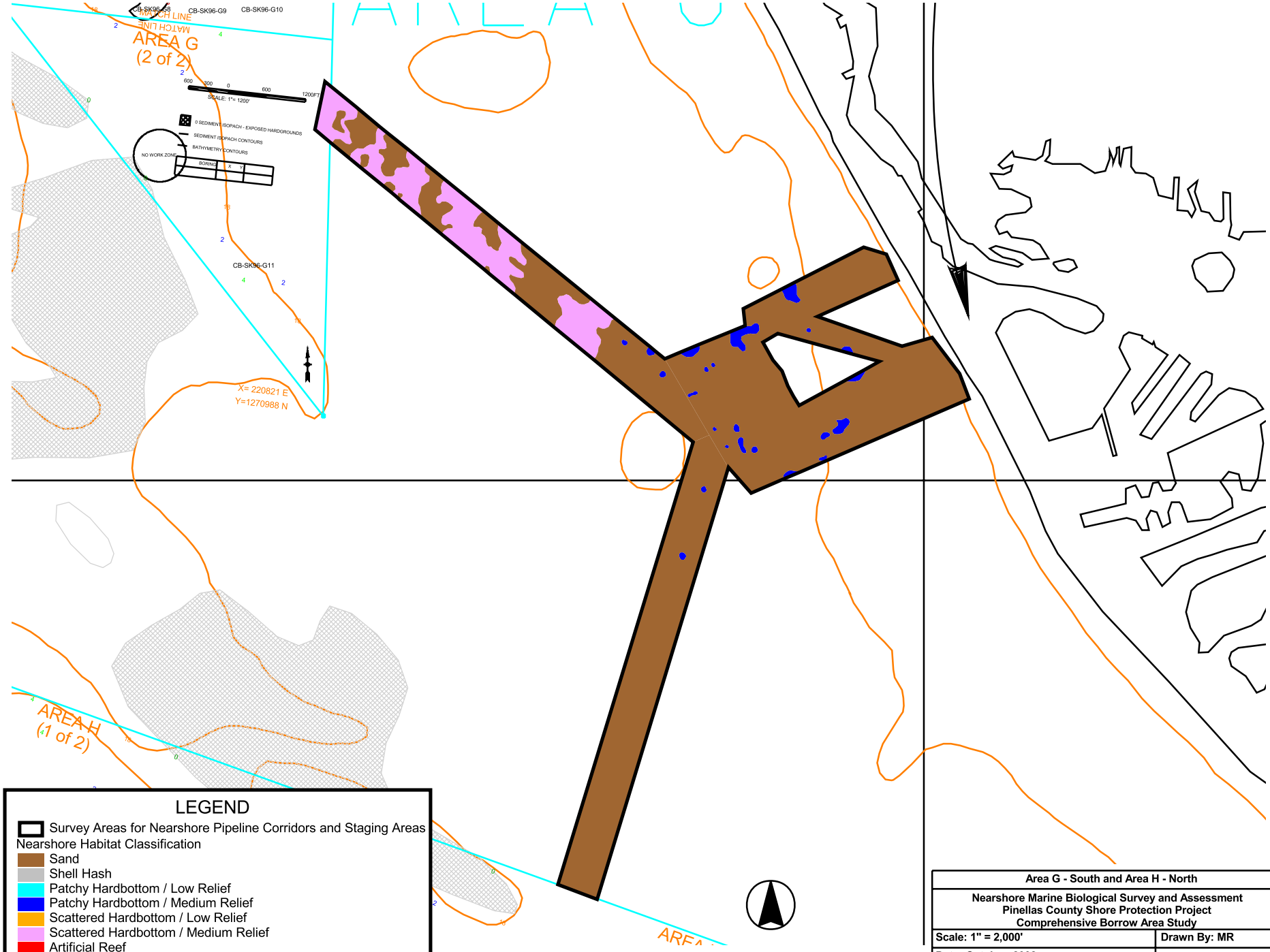
Figure 5


CB-SK96-G8
CB-SK96-G9
CB-SK96-G10
MATCH LINE
AREA G
(2 of 2)
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SCALE: 1"= 1200'
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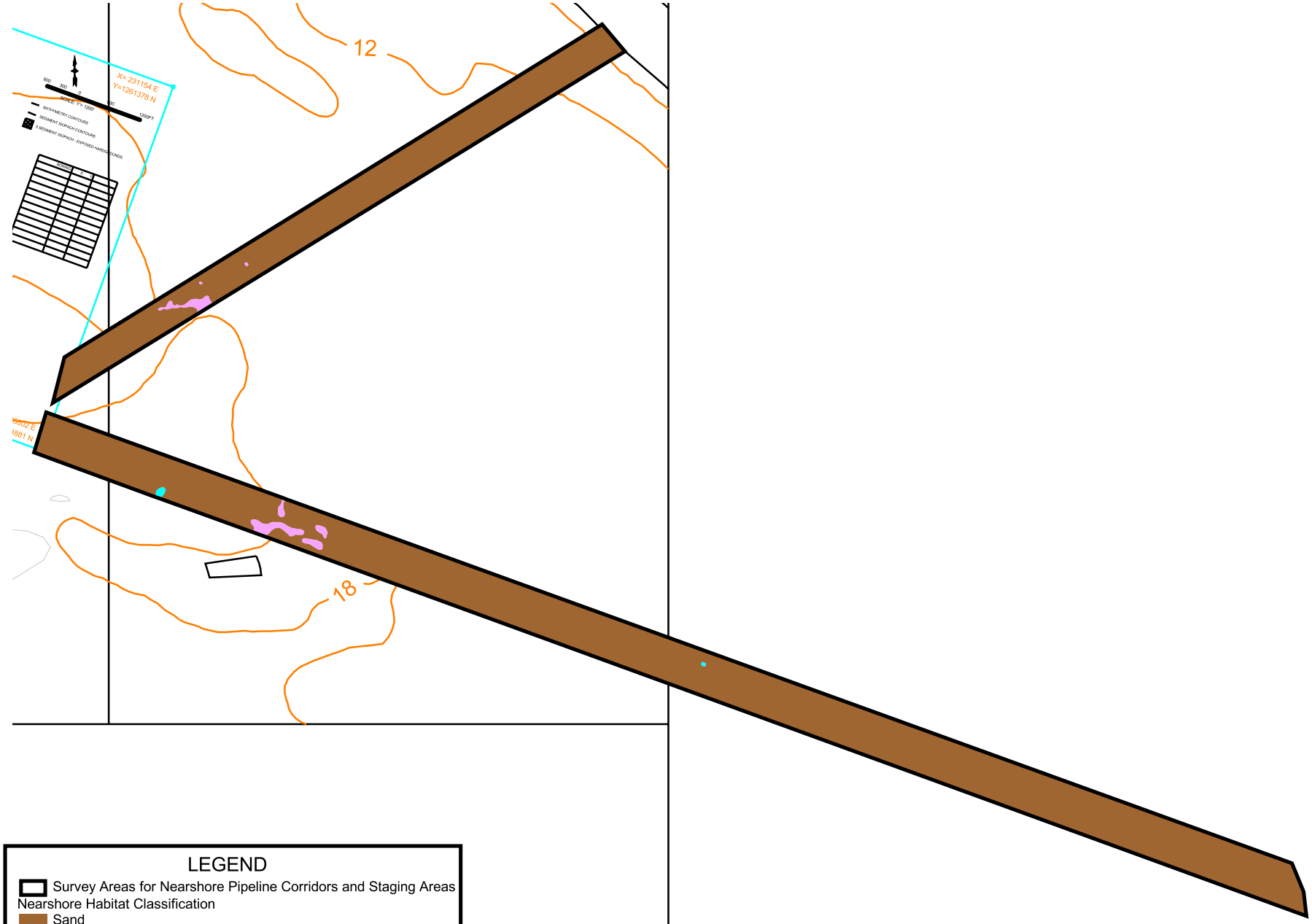
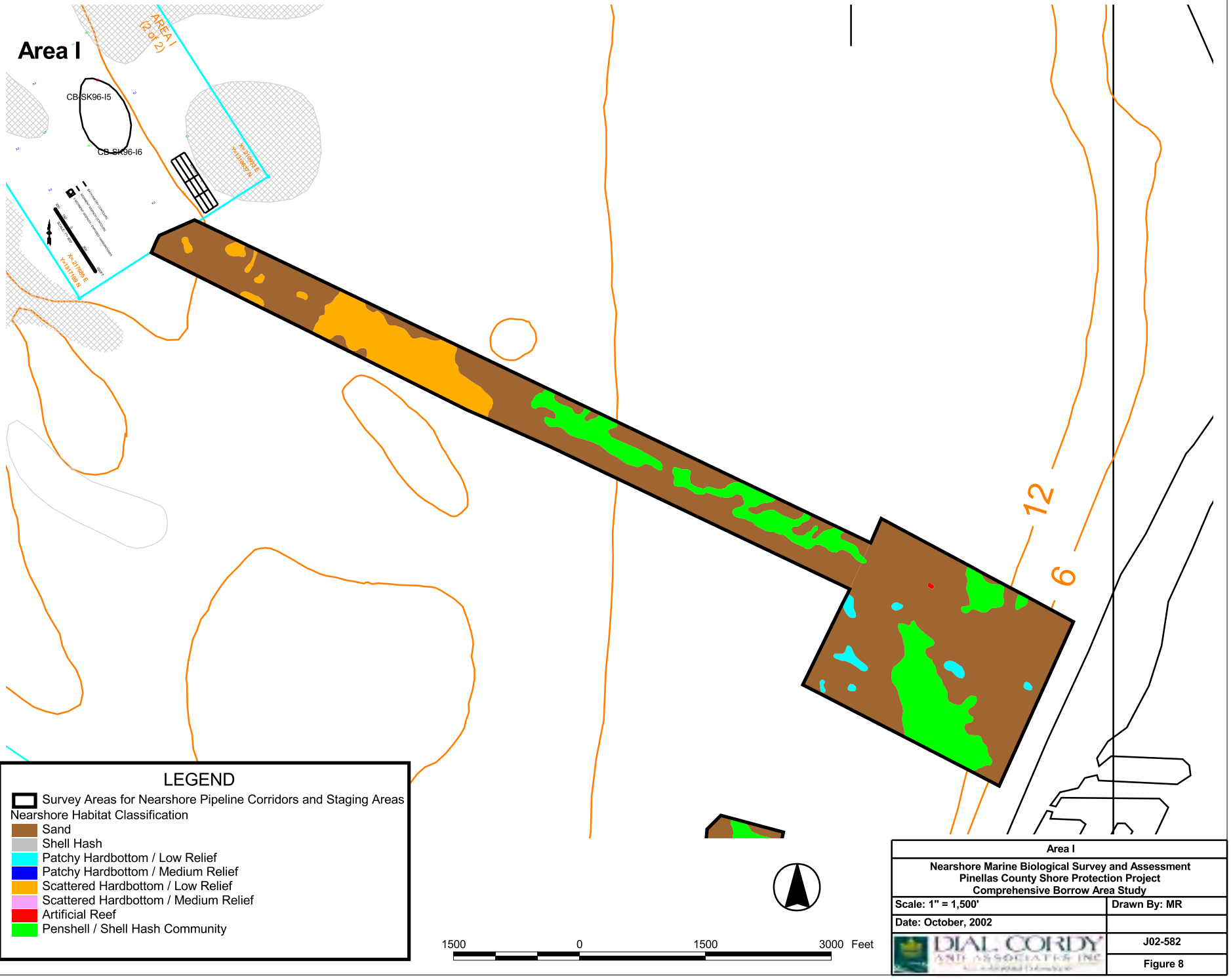
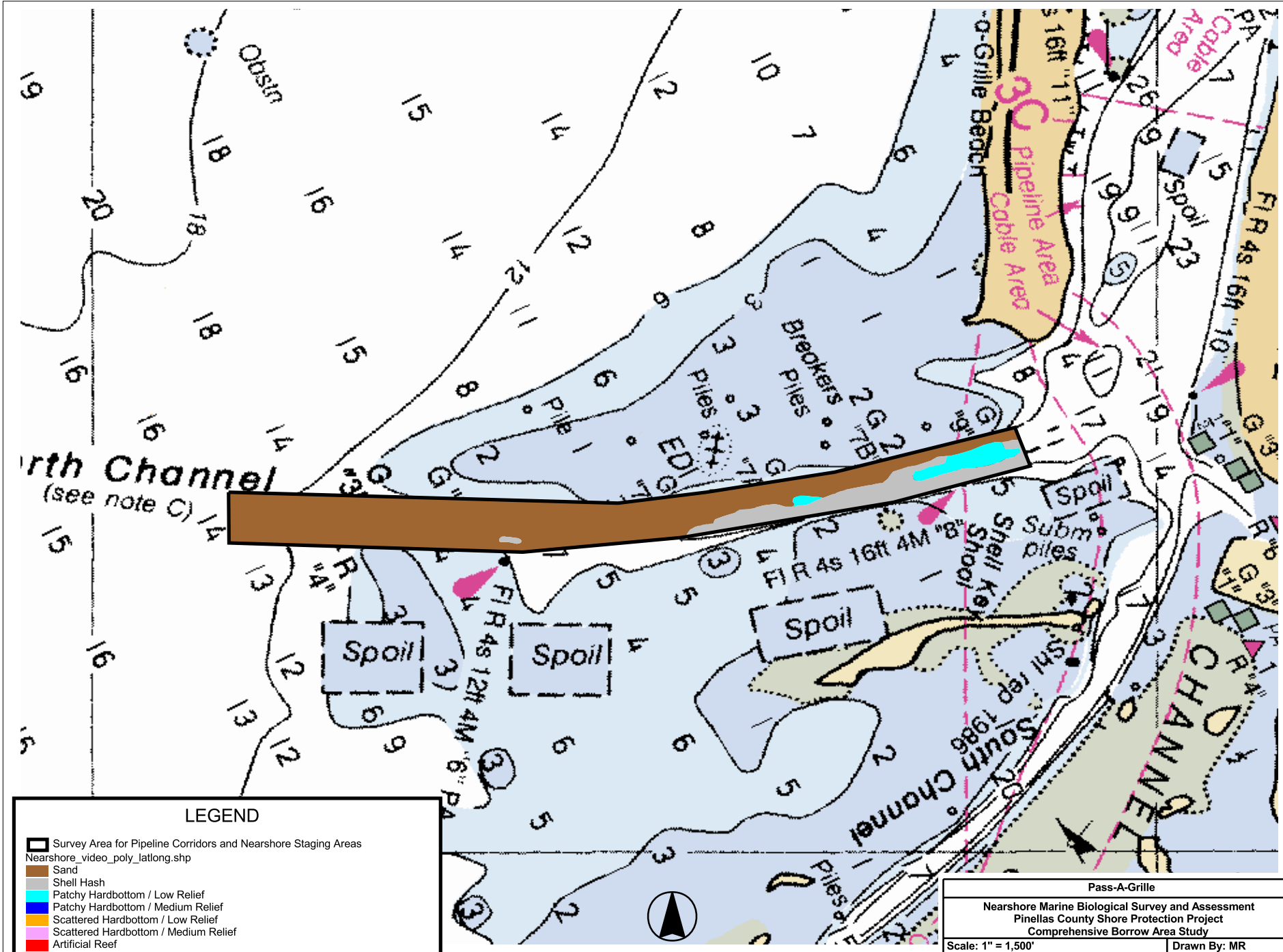
SEDIMENT ISOPACH CONTOURS
BATHYMETRY CONTOURS
NO WORK ZONE
BORING X Y
CB-SK96-G11
X= 220821 E
Y=1270988 N
AREA H
(1 of 2)
LEGEND
Survey Areas for Nearshore Pipeline Corridors and Staging Areas
Nearshore Habitat Classification
Sand
Shell Hash
Patchy Hardbottom / Low Relief
Patchy Hardbottom / Medium Relief
Scattered Hardbottom / Low Relief
Scattered Hardbottom / Medium Relief
Artificial Reef
Penshell / Shell Hash Community
2000 0 2000 4000 Feet
Area G - South and Area H - North
Nearshore Marine Biological Survey and Assessment
Pinellas County Shore Protection Project
Comprehensive Borrow Area Study
Scale: 1" = 2,000'
Drawn By: MR
Date: October, 2002
DIAL CORDY AND ASSOCIATES INC
J02-582
Figure 6



Area H - Central and South	
Nearshore Marine Biological Survey and Assessment Pinellas County Shore Protection Project Comprehensive Borrow Area Study	
Scale: 1" = 2,500'	Drawn By: MR
Date: October, 2002	
DIAL CORDY AND ASSOCIATES INC	J02-582
	Figure 7


Area I
AREA I
(2 of 2)
CB-SK96-I5
CB-SK96-I6
12
6
LEGEND
Survey Areas for Nearshore Pipeline Corridors and Staging Areas
Nearshore Habitat Classification
Sand
Shell Hash
Patchy Hardbottom / Low Relief
Patchy Hardbottom / Medium Relief
Scattered Hardbottom / Low Relief
Scattered Hardbottom / Medium Relief
Artificial Reef
Penshell / Shell Hash Community
1500
0
1500
3000 Feet
Area I
Nearshore Marine Biological Survey and Assessment
Pinellas County Shore Protection Project
Comprehensive Borrow Area Study
Scale: 1" = 1,500'
Drawn By: MR
Date: October, 2002
DIAL CORDY AND ASSOCIATES INC
J02-582
Figure 8



LEGEND

- Survey Area for Pipeline Corridors and Nearshore Staging Areas
  Nearshore_video_poly_latlong.shp
- Sand
- Shell Hash
- Patchy Hardbottom / Low Relief
- Patchy Hardbottom / Medium Relief
- Scattered Hardbottom / Low Relief
- Scattered Hardbottom / Medium Relief
- Artificial Reef
- Penshell / Shell Hash Community
- Offshore Borrow Areas (Dial Cordy, 2001)

1500 0 1500 3000 Feet

Pass-A-Grille

Nearshore Marine Biological Survey and Assessment
Pinellas County Shore Protection Project
Comprehensive Borrow Area Study

Scale: 1" = 1,500'	Drawn By: MR
Date: October, 2002	
DIAL CORDY AND ASSOCIATES INC	J02-582
	Figure 9

Table 1 Hardbottom Coverage Classification Used to Map Marine Resources

Classification	Percent Coverage
Penshell/Shellhash	Variable coverage in nearshore areas
Patchy	< 20% coverage
Scattered	20-75% coverage
Dense	>75% coverage

Table 2 Hardbottom Relief Classification Used to Map Marine Resources

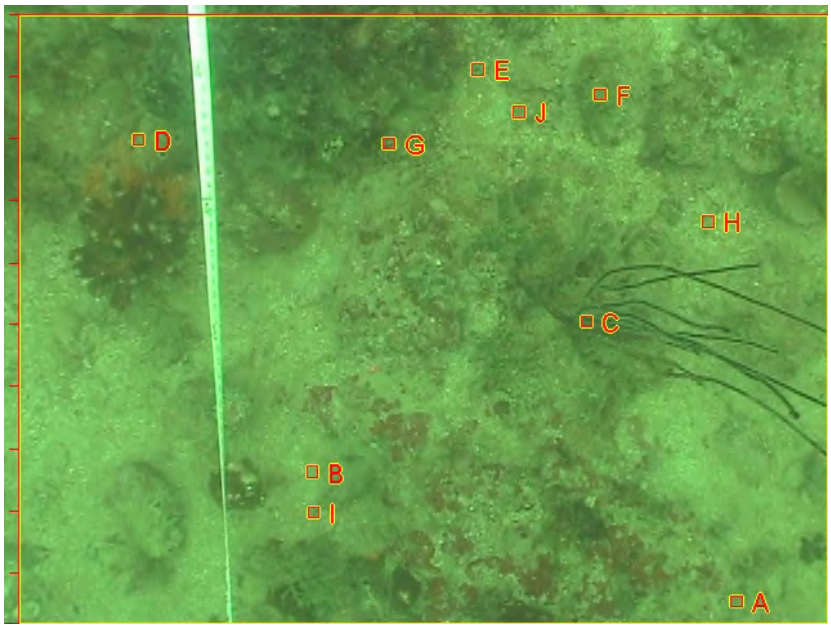
Classification	Relief (cm)
Low Relief	<30 cm
Medium Relief	30-100 cm
High Relief	>100 cm

2.2 Diver Survey and Characterization

In addition to the towed video survey, diver characterizations of existing habitats were also conducted. Representative habitat types, as determined from video analysis, were located and divers deployed to document the dominant invertebrate, fish, marine algae, and coral communities present within each of the survey areas.

2.2.1 Digital Image Analysis

The aim of the image analysis portion of the survey was to characterize the sessile biota (hard corals, soft corals, sponges and algae) located within each survey area. Within each survey area a 50 m transect was randomly laid to assess coverage of livebottom resources in the area. A diver with a digital video camera would then swim along the transect and collect a still image of the bottom type at every 5 m. Distance from the transect line was kept constant using a positioning device attached to the camera to allow for comparison between images. Images were then post processed and a random point analysis done on the images to assess percent coverage of habitat types (USGS BRD 2000). These images were viewed in Adobe Photoshop ® 5.0.2 and overlaid with 10 random dots on each photograph (Microsoft Excel® 2000) (Photograph 2). Percent coverage was estimated by counting the total number of dots covering each habitat type and data collected in a spreadsheet. The percent cover of each habitat type was then determined for each area and this summary percent cover used to map the respective habitats in each area.



Photograph 2 Sample grabbed digital image with point count dot overlay used in percent cover analysis.

Vertical relief and overall quality were also recorded. Still photographs and hand held video were also used to document the type and extent of living cover located within these areas.

2.2.2 Hardbottom Relief Assessment

Along each 50 m transect, relief measurements of hardbottom resources were also taken. At each 5 m sampling location, a graduated measuring rod was used to estimate the relief from the seafloor of significant marine resources. These measurements were averaged over each transect and the average relief of the survey area utilized for characterization and mapping.

3.0 MARINE RESOURCE CHARACTERIZATION

This section summarizes the results of the two-year comprehensive survey of offshore borrow areas, pipeline corridors and staging areas, as well as a review of pertinent literature.

3.1 Overview of Marine Resources

The area surveyed included areas offshore of Pinellas County, FL. These potential borrow areas, pipeline corridors and staging areas exist in water depths up to ten meters. Lyons and Collard (1974) describe these communities as areas of moderate wave energy with quartz sand and shell fragments extending offshore. Large temperate mollusks and echinoderms tend be the dominant faunal elements. In areas over 10 meters in depth, exposed rock substrate allows for the establishment of scleractinian, molluscan, crustacean, tunicates, and other species more common to shallower waters of south Florida (Smith 1974, Lyons and Collard 1974). Quartz sands, with biologically influenced carbonates present, also dominate the sediments within this area.

3.1.1 Fishes

Fishes off of the Gulf coast of western Florida are comprised of both reef and pelagic species. Many of the species present within this area are of commercial importance and addressed under the National Marine Fisheries Service (NMFS) Gulf of Mexico Fishery Management Council (GMFMC) Management Plan (GMFMC 1998). The fish assemblages in the area offshore of Pinellas County Florida and the Gulf of Mexico have been studied many times in the past. These studies have included reports which characterize the offshore and nearshore assemblages of fishes (Moe and Martin 1965; Saloman and Naughton 1979), cold stress of fishes on reef areas (Gilmore, et. al 1978; Bullock, et. al 1979), growth and reproduction (Shirripa and Burns 1997; Bullock, et. al 1996), and the impacts of fishing activities and predation (Pierce, et. al 1998; Nelson and Bortone 1996), as well as many others.

Moe and Martin (1965) collected over 2300 individual fishes from 41 species during sampling conducted nine separate locations offshore of Pinellas County. The most common fishes collected during this survey included sand perch (*Diplectrum fromosum*), pigfish (*Orthopristus chrysopterus*), silver perch (*Bairdiella chrysura*), spot (*Leiostomus xanthurus*), and pinfish (*Lagodon rhomboides*). Other species collected in this study included searobins (*Prionotus tribulus crassiceps* and *Prionotus scitulus latfirons*) and three species of flounder (*Etropus rimosus*, *E. crossotus atlanticus*, and *Syacium papillosum*).

Fishes of commercial and recreational importance within the eastern Gulf of Mexico include groupers and snappers. These species are included in the GMFMC snapper-grouper complex

fisheries management plan (1998). Species common to the area include yellowedge grouper (*Epinephelus flavolimbatus*) (Bullock, et. al 1996), gag (*Mycteroperca microlepis*) and red grouper (*Epinephelus morio*) (Schirripa and Burns 1997). Many of these species have been subjected to overfishing and stocks within the area have declined. This include red porgy (*Pargus pargus*), vermilion snapper (*Rhomboplites aurobens*), and other grouper species (*Epinephelus* sp.) (Roberts, et al. 1995).

Pelagic species also occur throughout the Gulf of Mexico in the nearshore and offshore waters. Major coastal pelagic families include Rachycentridae (cobia), Mugilidae (mullets), Pomatomidae (bluefish), Caranagidae (jacks), Scombridae (tunas and mackerels), Engraulidae (anchovies), and Carahahinidae (requieum sharks). Many of these pelagic species form large schools (e.g. jacks, mullet, mackerel, etc.), while others travel singly or in small groups (e.g. cobia). Distribution of these species can vary seasonally and usually depends on water column attributes that vary seasonally.

Fishes observed during diver and video surveys in this study are shown in Table 3. In total 22 species from 16 families were observed. Most species observed included small demersal species common to hardbottom areas. The most common species observed were sand perch (*Diplectrum fromosum*) and belted sandfish (*Serranus subligarius*); wrasses, in particular the slippery dick (*Halichoeres bivittatus*), were also very common in the study area. Other common fishes included searobins (*Prionotus* sp.) and menhaden (*Brevoortia sp.)*. Anecdotal observations of fishes during the survey included large schools of baitfish (Engraulidae and Clupeidae), sharks (Carahahinidae), seahorse (Sygnathidae), batfish (Ogcocephalidae) and mackerel (Scombridae).

Table 3 Fishes Observed Within Borrow Area During Diving Surveys

Scientific Name	Common Name
Haemulon sp.	Juv. Grunt
Equetus umbrosus	Juv. Highhat
Haemulon sciurus	Bluestriped Grunt
Haemulon chrysargyreum	Smallmouth Grunt
Haemulon melanurum	Cottonwick
Lutjanus griseus	Gray Snapper
Lachnolaimus maximus	Hogfish
Synodus intermedius	Sand Diver
Opsanus beta	Toadfish
Monocanthus sp.	Filefish
Halichoeres bivittatus	Slippery Dick
Diplectrum fromosum	Sand Perch
Archosargus probatocephalus	Sheepshead
Chaetodipterus faber	Spadefish
Calamus sp.	Porgy
Parablennius marmoreus	Seaweed Blenny

Scientific Name	Common Name
Diplodus holbrooki	Spottail Pinfish
Brevoortia sp.	Menhaden
Prionous sp.	Searobin
Echeneis naucrates	Sharksucker
Centropristis striata	Black Sea Bass
Epinephelus morio	Red Grouper
Sphoeroides testudineus	Checkered Puffer
Serranus subligarius	Belted Sandfish

3.1.2 Invertebrates

Benthic invertebrates associated with livebottom habitats along the eastern Gulf of Mexico include scleractinian, molluscan, crustacean, tunicates, octocoral, echinoderm, and porifera species. Many of these species are similar to species found in the more tropical waters of the Caribbean and south Florida reef tract. Lyons and Collard (1974) characterize the shallow shelf habitat offshore of Pinellas County as an area with sediments dominated by quartz sand and biogenically derived carbonates with exposed rock substrate. This substrate provides habitat for scleractinian, molluscan, crustacean and other invertebrate species.

Previous studies have identified species common to habitats offshore of Pinellas County (EPA 1981; CZR 1991; Child 1992; Posey et. al 1996). The species listed in these previous studies compares closely to species observed during this survey (Table 4). In total, over 40 dominant invertebrates species were observed from the diver and video surveys. There are many more cryptic and less obvious species present within these complex habitats.

Table 4 Dominant Invertebrate Species Observed During Borrow Area Surveys

Scientific Name	Common Name
Echinoderms	
Linckia guildingii	Common Comet Star
Astropecten articulatus	Beaded Sea Star
Echinaster spinulosus	Orange-Ridged Sea Star
Luidia clathara	Striped Sea Star
Luidia sp.	Sea Star
Luidia alternata	Banded Sea Star
Echinometra lucunter	Rock-boring Urchin
Lytechinus variegates	Variegated Urchin
Mollusks	
Pinna carnea	Penshell
Charonia variegata	Tritons Trumpet
Busycon contrarium	Lightning Whelk
Pleuroploca gigantean	Florida Horse Conch

Scientific Name	Common Name
Scleractin Corals	
Cladocora arbuscula	Tube Coral
Stephanocoenia mitchelinii	Blushing Star Coral
Isophyllia sinuosa	Cactus Coral
Siderastrea sp.	Starlet Coral
Solenastrea hyades	Knobby Star Coral
Scolymia lacera	Mushroom Coral
Phyllangia americana	Hidden Cup Coral
Manicina aereolata	Rose Coral
Montastrea annularis	Boulder Star Coral
Oculina robusta	Robust Ivory Tree Coral
Millepora alcicornis	Branching Fire Coral
Octocorals	
Eunicea succinea	Shelf-knob Sea rod
Eunicea calyculata	Warty Sea Rod
Plexaurella nutans	Giant Slit-Pore Sea Rod
Muricea laxa	Delicate Spiny Sea Rod
Muricea elongata	Orange Spiny Sea Rod
Pseudoterogorgia sp.	Sea Plume
Pterogorgia citrina	Yellow Sea Whip
Leptogorgia virgulata	Colorful Sea Whip
Sponges	
Cribrochalina vasculum	Brown Bowl Sponge
Xestospongia muta	Giant Barrel Sponge
Spheciospongia vesparium	Loggerhead Sponge
Ircinia sp.	Ball Sponge
Calyx podatypa	Dark Volcano Sponge
Anthosigmella varians	Brown Variable Sponge
Amphimedon compressa	Erect Rope Sponge
Pseudoceratina crassa	Branching Tube Sponge
Crustaceans	
Menippe mercenaria	Florida Stone Crab
Tunicates	
Clavelina sp.	Colonial tunicates
Family Didemnidae	Overgrowing Tunicates
Eudistoma sp.	Condiminium Tunciate

3.1.3 Marine Algae

The marine algae present within the areas offshore of Pinellas County are extremely diverse. Phillips, et al. (1960) identified 95 taxa of algae within areas of similar depth in this area. Dominant algal species observed during this and other studies includes *Caulerpa* sp., *Halimeda* sp., *Udotea flabellum*, *Sargassum* sp., and *Rhipocephalus phoenix* (Phillips, et al. 1960; EPA 1981; CZR 1991).

3.1.4 Other Vertebrates

Other vertebrate species, which utilize these offshore habitats, include many threatened and endangered species. The Gulf of Mexico is within the range of five species of sea turtle, the West Indian manatee (*Trichechus manatus*), and up to 28 cetacean species. Of these, four species of sea turtle, the manatee, and one cetacean, the bottlenose dolphin (*Tursiops truncatus*), occur within the study area.

3.1.4.1 Sea Turtles

Four species of sea turtle commonly occur within the area around Pinellas County (Meylan, et al. 1999; EPA 1981). These are the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), and the hawksbill (*Eretmochelys imbricata*). The loggerhead is listed as threatened and the other three species are listed as endangered. Loggerhead turtles represent most of the sea turtles present in the Pinellas County area. Data collected on sea turtle nesting in the area shows that the majority of the nests within this area consist of loggerhead nests (Table 5). Of the 279 nests observed on Pinellas County beaches in 2000, 278 were loggerhead nests and all 195 nests in 2001 were loggerhead. The only other nesting activity reported was one green turtle nest. In 2000, there was one reported green turtle nest and in 2002, two Kemp's Ridley nests were found on Sand Key (FMRI 2002). All turtles observed during this survey were loggerhead turtles; which were seen with regular consistency while conducting the survey. Stranding records within the Pinellas County area also confirmed that loggerhead turtles are the most numerous species.

Table 5 Summary of Loggerhead Sea Turtle Nesting From 1988-2000

Year	Beach Length Surveyed	Number of Nests
1988	69.5	56
1989	63.2	92
1990	62.1	144
1991	67.3	175
1992	63.3	142
1993	42.7	105
1994	52.6	138
1995	58.8	229
1996	49.1	223
1997	58.8	181
1998	52.3	233
1999	62.6	172
2000	62.6	279
2001	62.6	195

Source: Florida Marine Research Institute 2002

3.1.4.2 Marine Mammals

Marine mammals commonly present within the waters nearshore and offshore the study area include manatee and bottlenose dolphin. Bottlenose dolphins were commonly observed while conducting this survey. As many as 15 dolphins were observed at one time in the areas adjacent to the offshore borrow areas. Weigle (1990) documented that at least three distinct herds of dolphin are common within the Lower Tampa Bay area. This includes as many as 246 individual animals. Many of the dolphins observed may have been transient in nature. However, 75 individuals were observed on more than one occasion.

West Indian manatees also utilize habitats within the study area. Manatees inhabit both fresh and saltwater and may be encountered in canals, rivers, estuaries, bays, and on occasion have been observed as far as 6 km off the Florida Gulf coast (USFWS 1996). Aerial surveys indicate that as many as 190 manatees may use Tampa Bay (Ackerman 1995). Surveys show that over 900 manatees inhabit the west coast of Florida. The highest concentrations of manatees along Florida's Gulf coast exists in Citrus, Levy, Lee, and Collier Counties. Data suggest that of the manatees living in the Tampa Bay area, most occur within the bay where water temperatures are more stable year round. During aerial surveys in 1992, only 15 manatees were surveyed in the eastern portion of Tampa Bay (Akcerman 1995). Examination of the manatee mortality data for Pinellas and Hillsborough Counties shows that from January 2000-October 2001 a total of 27 manatee deaths were reported. The majority of these deaths involved perinatal, cold stress, or other natural causes.

3.1.5 Hardbottom and Livebottom Characterization

Hardbottom and livebottom within each of the survey areas was characterized for mapping and impact assessment. A summary of the results for each area is discussed in this section.

3.1.5.1 Digital Image Analysis

The aim of the image analysis portion of the survey was to characterize the sessile biota (hard corals, soft corals, sponges, and algae) located within each survey area. A total of 132 photographic quadrats were collected and analyzed. Overall, the mean coverage of living resources within all areas was 26.7 percent. A summary breakdown of means for each coverage classification is shown in Table 6. The major cover types within each area surveyed were sponges and macroalgae. Hard corals accounted for the lowest percentage living cover types identified with 0.7 percent.

Table 6 Summary of Mean Percent Cover For Each Classification Category From Image Analysis For All Areas Surveyed

Classification	Mean Cover (%)	Standard Deviation (n=132)
Coral	0.7	0.7
Gorgonians	4.2	5.5
Sponges	10.6	10.5
Macroalgae	9.8	6.2
Other, Live	1.4	3.4
Sand, Rubble	72.6	17.4
Unknown	0.7	0.7

3.1.5.2 Relief

Relief measurements within each survey area were averaged to obtain the mean relief within each area. These mean relief numbers were then used during the mapping of each area to develop a characterization of each area. A summary of mean relief within each area is shown in Table 7.

Table 7 Summary of Mean Relief From Diver Characterization

Survey Area	Mean Relief (cm)	Standard Deviation (n=11)
Area D South Site 1	39	6.1
Area D South Site 2	20.9	15.6
Area D	9.5	7.2
Area D Staging Area	3.9	3.6
Area E	1.4	3.2
Area F	12.2	13.1
Area F Staging Area	7.7	17.7
Area G North	20	22.5
Area G South	23.6	22.6
Area H	32.2	28.4
Area I	23.2	11.7

The extremely variable hardbottom distribution within each area accounts for the deviations in relief within each area. Outcroppings of limestone covered in living bottom interspersed with patches of open substrate are common in these areas. This mosaic of habitats creates communities of hardbottom/livebottom within these areas. Penshell/shellhash communities in these nearshore locations characterized survey areas with particularly low relief.

3.2 Pipeline Corridors

This section contains a description of marine resources located within each potential pipeline corridor surveyed. A summary of hardbottom resources within each pipeline corridor is shown in Table 8.

Table 8 Summary of Marine Resource Cover Types Within Each Area Surveyed

	Acres						
Corridor Survey Areas	**Sand**	**Penshell /Shellhash**	**Patchy Low Relief**	**Patchy Medium Relief**	**Scattered Low Relief**	**Scattered Medium Relief**	**Shellhash**
Area D north	58.9	------	4.0	------	17.4	------	------
Area D south	117.6	------		------	------	29.9	------
Area E	149.1	------	10.2	------	------	------	------
Area F	69.6	3.1	15.2	------	------	------	------
Area G north	58.1	------	------	------	------	7.9	------
Area G south	65.2	------	------	0.6	------	50.1	------
Area H north	159.3	------	------		------	2.7	------
Area H center	103.1	------	------	0.4	------	------	------
Area H south	418.4	------	0.7	------	------	5.5	------
Area I	80.7	20		------	27.8		------
Pass-a-grille	75.8	------	4.6	------			16.2
Staging Area Survey Areas							
Area D north (R62-R-63)	86.2	4.3	------	------	------	------	------
Area D south (R-74-R-78)	132.7	32.9	------	2.7	------	------	------
Area EF (R-84-R-86)	66.4	0.1	1.9	------	------	------	------
Area G north (R-91-R-93)	125.3	2.6	9.9	------	------	------	------
Area G south (R-99-R-103)	172.4	------	------	8.2	------	------	------
Area I (R-58-R-61)	99.4	27.0	3.2	------	------	------	------

3.2.1 Borrow Area D

Borrow Area D is located in the northern extent of the survey area offshore Pinellas County (Figure 1) (Dial Cordy 2001). Two potential pipeline corridors were identified from prior investigations and surveyed for marine resources.

3.2.1.1 North Corridor

Marine resources in the north corridor of Area D are shown in Figure 2. Marine resources located in this potential pipeline corridor include 17.4 acres of scattered/low relief hardbottom. These resources are located along the western extents of the corridor near the borrow area. An additional 4.0 acres of patchy/low relief hardbottom is also located in this corridor. Overall the hardbottom within this corridor is variable in its distribution and very low relief.

3.2.1.2 South Corridor

The south corridor for Area D contains a total of 29.9 acres of hardbottom habitat. These marine resources are located primarily in one extensive area of scattered/medium relief hardbottom (Figure 3). This hardbottom habitat has an average relief of over 30 cm. Percent coverage of hardbottom features in this area was over 20 percent living resources.

3.2.2 Borrow Area E

Area E could provide over 1MCY of material for potential placement along Indian Rocks Beach (Figure 4) (Dial Cordy 2001). Hardbottom resources within the pipeline corridor for Area E are limited to 10.2 acres of patchy/low relief hardbottom. Diver characterization of these resources revealed an average relief of less than 10 cm and an average coverage by living resources of less than 10 percent.

3.2.3 Borrow Area F

The pipeline corridor leading from Borrow Area F contains 18.2 acres of marine livebottom resources. These resources consist of 15.2 acres of patchy low relief hardbottom and an additional 3.1 acres of penshell/shellhash community. These hardbottom resources had an average of 33 percent cover and a relief of 27 cm with a mean relief over the entire area of 12.2 cm.

3.2.4 Borrow Area G

Borrow Area G has over 1.5 MCY of material available for placement along Pinellas County's beaches (Dial Cordy 2001). This material is situated over 1,100 acres of seafloor approximately 1.8 nm offshore of the area just south of Indian Rocks Beach, FL (Figure 1).

3.2.4.1 North Corridor

The northern corridor leading from Borrow Area G contains areas of scattered/medium relief hardbottom (Figure 5). These areas of scattered hardbottom total 7.9 acres and occur in the center of the pipeline corridor. This medium relief (μ=20 cm) hardbottom has an average percent cover of 33.3 percent. The most dominant living resource features covering the limestone in these areas were macroalgae and sponges (19.2 percent and 0.1 percent, respectively). Four percent of the living bottom surveyed along the transects surveyed were covered in gorgonian species.

3.2.4.2 South Corridor

The southern pipeline corridor leading from Borrow Area G has extensive hardbottom features (Figure 6). In total there are 50.1 acres of scattered/medium relief hardbottom and 0.6 acres of patchy/medium relief hardbottom within the survey limits of this pipeline corridor. The average percent cover of these hardbottom features was 35.5 percent with an average relief of 23.6 cm. Hardbottom features in this area consisted of medium relief limestone ledges and outcrops. Gorgonian species were one of the dominant features covering these rock features and accounted for 16.4 percent of the living cover.

3.2.5 Borrow Area H

Borrow Area H is the southernmost offshore borrow area surveyed and contains approximately 2.7 MCY material that could be placed on Pinellas County's beaches. Borrow Area H is 2.8 nautical miles offshore of the Treasure Island area (Dial Cordy 2001). Three pipeline corridors were surveyed, a northern corridor that terminates in the staging area located offshore of Florida Department of Environmental Protection (FDEP) Monuments R-99 to R-103, a central corridor that terminates on the beach just north of Johns Pass, and a southern corridor that would allow sand to be placed south of the Johns Pass area (Figures 1, 6, and 7).

3.2.5.1 North Corridor

The northern pipeline corridor leading from Borrow Area H has very little hardbottom resources located within the extents of the survey area. Only 2.7 acres of hardbottom resources were located during this survey. These are two small areas of patchy/medium relief hardbottom located near the nearshore end of the corridor (Figure 6).

3.2.5.2 Center Corridor

The central pipeline corridor for Borrow Area H contains one small area of hardbottom. This area of patchy/medium relief hardbottom covers 0.4 acres of seafloor. No other hardbottom resources exist in this pipeline corridor (Figure 7).

3.2.5.3 South Corridor

The longest pipeline corridor surveyed was the southern corridor leading from Borrow Area H. This corridor was just over 4 nautical miles in length. Located within this survey area was 5.5 acres of scattered/medium relief hardbottom. This area has a 41 percent living resource cover and a relief of approximately 50 cm. Sponges were the most dominant resource cover type in these hardbottom areas and results of the image analysis reveal that 16.4 percent was covered with sponge growth, while in this same area, macroalgae accounted for 12.7 percent and gorgonians 1.8 percent of the coverage.

3.2.6 Borrow Area I

Borrow Area I is the northern most and smallest of the offshore borrow areas. One pipeline corridor was investigated for Borrow Area I and would allow material to come ashore in the area south of Clearwater Pass (Figures 1 and 8).

Located within the pipeline corridor for Area I is an extensive area of scattered/low relief hardbottom. This area of hardbottom covers over 27.8 acres and extends the entire width of the surveyed corridor. Additionally, there are 20 acres of penshell/shellhash community along the eastern portion of this pipeline corridor. Point count analysis and diver characterizations show that this area of low relief hardbottom covers approximately 50 percent of the bottom where it occurs and has a relief of 23 cm. Sponges (32.1 percent), macroalgae (10.4 percent), gorgonians (3.8 percent, and corals (2.8 percent) are the cover types that typify these hardbottom areas.

3.3 Nearshore Staging Areas

Since the methods that dredging contractors will use to move the sand from the offshore borrow areas to the beach to be nourished is not known (i.e. hopper dredge, cutterhead dredge etc.) nearshore staging areas for dredge equipment were also surveyed for potential use. In total, six nearshore staging areas were surveyed and a summary of marine resources located in each area is discussed in this section.

3.3.1 Borrow Area D North (R-62 to R-63)

The staging area for the pipeline corridor Borrow Area D north is located offshore of FDEP Monuments R-62 to R-63. This staging area and nearshore corridor is predominately sand bottom with a few areas of penshell/shellhash communities. In total, 4.3 acres of penshell/shellhash community exists within this area (Figure 2). These communities, while not true hardbottom, do support a variety of marine life. In particular, it is an important community for the stone crab, which was documented extensively in these areas during the diver characterization.

3.3.2 Borrow Area D South (R-74 to R-78)

Located offshore between monuments R-74 to R-78 is the staging area surveyed for the pipeline corridor leading from the southern end of Borrow Area D (Figure 3). This staging area and nearshore corridor contains a permitted Pinellas County artificial reef site. The location of this artificial reef is shown on Figure 3. During the survey, debris from this artificial reef site was located north of the buoys marking the limits of the artificial reef. These areas where debris was located are shown on Figure 3 immediately north of the area defined as the reef site. There are 2.7 acres of patchy/medium relief hardbottom located in the southwestern corner of this staging area. Additionally, there are 32.9 acres of penshell/shellhash community located nearshore.

3.3.3 Borrow Areas E and F (R-84 to R-86)

The staging area surveyed between monuments R-84 to R-86 contains only 1.9 acres of patchy/low relief hardbottom. The majority of this resource is located in an isolated patch of hardbottom along the southeastern corner of the staging area (Figure 4).

3.3.4 Borrow Area G North (R- 91to R-93)

The northern pipeline corridor for Borrow Area G ends at the staging area offshore of Monuments R-91 to R-93. This staging area has a total of 12.5 acres of marine resources.

Figure 5 shows the relative distribution of patchy/low relief hardbottom located within this area. In total, there are 9.9 acres of patchy/low relief hardbottom in this area. The remaining 2.6 acres located in this area are along the southeastern boundary of the survey area and consists of penshell/shellhash community.

3.3.5 Borrow Area G South and H (R-99 to R-103)

Resources within this staging area are isolated patches randomly scattered throughout the area. In total, 8.2 acres of patchy/medium relief hardbottom are located within this area. These resources are distributed over the majority of the staging area (Figure 6). The largest areas of occurrence are along the northern edge of the staging area.

3.3.6 Borrow Area I (R-58 to R-61)

The staging area for Borrow Area I has a total area of 129.6 acres. This area is predominately sand (99.4 acres) and penshell/shellhash community (27.0 acres). Located in this staging area are also 3.2 acres of patchy/low relief hardbottom resources (Figure 7).

3.4 Pass-a-Grille Channel

The Pass-a-Grille Channel was also surveyed and characterized during this study. A total of 4.6 acres of marine resources were located within the survey limits of Pass-a-Grille Channel (Figure 9). These areas consisted of patchy/low relief hardbottom/livebottom within the interior portions of the channel.

4.0 CONCLUSIONS AND RECOMMENDATIONS

This survey was conducted to determine the potential for utilization of the pipeline corridors and nearshore areas located offshore of the Pinellas County shoreline. Since the methods to be employed by the contractors are not known a complete impact assessment cannot be fully reviewed at this time. Recommendations on the use of these areas and their potential for utilization in the future will be addressed in this section.

4.1 Pipeline Corridors

Utilization of pipeline corridors by dredging contractors may result in impacts to marine resources. The corridors for Borrow Areas D and G have particularly extensive areas of hardbottom resources (Table 8). These resources would not be avoidable should they be used for pipeline access to the beach. Both of these areas have nearshore staging areas that may be utilized and if it is cost effective, hopper dredging or some other technique may be utilized to minimize impacts. Should impacts be unavoidable, mitigation for these impacts would be required. Construction of artificial reefs may be attempted to offset the damage done by pipe placement.

The other pipeline corridors surveyed have few or isolated areas of hardbottom/livebottom habitats, and avoidance of these habitats may be possible. The corridors surveyed were 500 feet in width and the majority of pipeline corridors will only need to be approximately 50 feet in width. Careful planning and placement by the contractor can be used to avoid or minimize impacts to these resources.

Further surveying of the pipeline placement during construction, as well as equipment placement may need to be conducted before, during and after construction to judge actual impacts to the marine resources present in each area. This monitoring of the construction activity will allow for correct mitigation ratios and impact assessments.

4.2 Nearshore Staging Areas

The use of hopper dredges or booster pumps may require the utilization of the nearshore staging areas. Portions of these areas have marine resources as described above and summarized in Table 8. In most cases, however, these areas may be utilized with minimal impact to hardbottom/livebottom resources. Exclusion zones can be created in areas where marine resources are present, and access by the contractors machinery can be denied in these areas. Additionally, placement of pipelines can be done to avoid these nearshore habitats. Should any impacts be unavoidable within these nearshore areas mitigation would be required.

The staging area located at the southern end of Borrow Area D contains an artificial reef, which should be avoided. Buffer zones would need to be established to avoid this area. This survey revealed an area of debris north of this artificial reef. Storm events may be moving areas of this artificial reef from its original location. Examination of the side scan record and further surveying in the area prior to construction may be needed to insure a clear corridor for equipment prior to use.

The penshell/shellhash communities present within some of these nearshore staging areas are not true hardbottom. They do, however, appear to be an important marine resource within this area. Impacts to these areas should be included in any impacts analysis done for future projects. Consultation with the appropriate agencies for these habitats may also need to be done prior to any construction.

Monitoring of the areas to be utilized during a project should be done before, during and after construction. Monitoring of these habitats will not only allow better impact assessment but also aid in mitigation of these impacts and allow for better planning for future projects.

5.0 REFERENCES

Ackerman, B.B. 1995. Aerial surveys of manatees: A summary and progress report. In O'Shea, T.J., Ackerman, B.B., and Percival, H.F. Population Biology of the Florida Manatee. 13-33 pp.

Bullock, L.H, Godcharles, M.F., and Crabtree, R.E. 1996. Reproduction of yellowedge grouper, *Epinephelus flavolimbatus,* from the eastern Gulf of Mexico. Bull. Mar. Sci. 59(1): 216-224.

CZR Incorporated. 1991. Indian Shores beach nourishment project side-scan mosaic and biological report. Prepared for Pinellas County Board of County Commissioners, Clearwater, FL.

Child, C.A. 1992. Shallow water Pychnogonida of the Gulf of Mexico. Mem. Hourglass Cruises 9(1): 86 pp.

Dial Cordy and Associates. (2001). Marine Biological Survey Pinellas County Shore Protection Project Comprehensive Borrow Area Study. Prepared for U. S. Army Corps of Engineers, Jacksonville District, Jacksonville FL. 51 pp.

Gilmore, R.G., Bullock, L.H, and Berry, F.H. 1978. Hypothermal mortality in marine fishes of south-central Florida January 1977. Northeast Gulf Science 2(2): 77-97.

Environmental Protection Agency. 1981. Marine sampling and measurement program off northern Pinellas County, Florida. A Technical Report, S. Mahadevan, ed. Vol. 1: 306 pp.

Gulf of Mexico Fishery Management Council. 1998. Generic Amendment for Addressing Essential Fish Habitat Requirements of the Gulf of Mexico. 237 pp.

Lyons, W.G., and Collard, S.B. 1974. Benthic invertebrate communities of the eastern Gulf of Mexico. In R.E. Smith, ed. Proceedings of marine environmental implications of offshore drilling in the eastern Gulf of Mexico. State Univ. Syst. FL. Inst. Oceanogr., St. Petersburg, FL. 157-166 pp.

Meylan, A., Redlow, A. Mosier, A., Moody, K., Foley, A. 1999. Occurrence and distribution of sea turtles in Tampa Bay, FL. In J.R. Pribble, A. J. Janicki, and H. Greening , eds. Baywide environmental monitoring report, 1993-1998, Tampa Bay, FL. Tampa Bay Estuary Program, Technical Publication 07-99. St. Petersburg, FL. Chapter 13, 13-1-13-15 pp.

Moe, M.A., and Martin, G. T. 1965. Fishes taken in monthly trawl samples offshore of Pinellas County, Florida, with new additions to the fish fauna of the Tampa Bay area. Tulane Studies in Zoology. 12(4): 129-151.

Nelson, B. D., and Bortone, S.A. 1996. Feeding guilds among artificial-reef fishes in the northern Gulf of Mexico. Gulf of Mexico Science. 1996(2): 66-80.

Phillips, R.C. and Springer, V.G. 1960. Observations on the Offshore Benthic Flora in the Gulf of Mexico off Pinellas County, Florida. The Amer. Midland Nat. 64(2): 362-381.

Pierce, D.J., Wallin, J.E., and Mahmoudi, B. 1998. Spatial and temporal variations in the species composition of bycatch collected during a striped mullet (*Mugil cephalus*) survey. Gulf of Mexico Science 1998(1): 15-27 pp.

Posey, M., Lindberg, W.J., Alphin, T., and Vose, F. 1996. Influence of storm disturbance of an offshore benthic community. Bull. Mar. Sci. 59(3): 523-529.

Roberts, C., Ballantine, W.J., Buxton, C.D., Dayton, P., Crowder, L.B., Milon W., Orback, M.K., Pauly, D., Trexler, J. and Walters, C.J. 1995. Review of the use of marine fishery reserves in the U.S. southeastern Atlantic. NOAA Technical Memorandum NMFS-SEFSC-376. 31pp.

Saloman, C.H., and Naughton, S.P. 1979. Fishes of the littoral zone, Pinellas County, Florida. Florida Sci. 42(2):85-93.

Schirripa, M. J., and Burns, K. M. 1997. Growth estimates for three species of reef fish in the eastern Gulf of Mexico. Bull. Mar. Sci. 61(3): 581-591.

U.S. Geological Survey, Biological Resources Division. 2000. Using Videotape to Sample Coral Reefs. Virgin Islands Field Station, St. John, USVI. 38pp.

U.S. Fish and Wildlife Service. 1996. Florida Manatee Recovery Plan (*Trichechus manatus latirostris*), Second Revision. Prepared by the Florida Manatee Recovery Team for the southeast region, U.S. Fish and Wildlife Service, Atlanta, GA.

Weigle, B.L., 1990. Abundance, distribution and movements of bottlenose dolphins (*Tursiops trucncatus*) in lower Tamps Bay, Florida. In P.S. Hammond, S. A. Mizorch, and G.P. Donovan, eds. Individual recognition of cetaceans: use of photo-identification and other techniques to estimate population parameters. Rep. Int. Whaling Comm. Spec. Issue 12. 195-201 pp.

APPENDIX B

Essential Fish Habitat Assessment

Essential Fish Habitat Assessment for the Alternative Sand Source Utilization Pinellas County Shore Protection Project Pinellas County, Florida

January 2003

Prepared for:
U.S. Army Corps of Engineers
Jacksonville District
701 San Marco Blvd
Jacksonville, FL 32207

Prepared by:
Dial Cordy and Associates Inc.
490 Osceola Avenue
Jacksonville Beach, FL 32250

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1.0 INTRODUCTION

1.1 Project Location

The project area is located in Pinellas County on the West coast of Florida, near the central portion of the Florida peninsula, approximately 25 miles west of Tampa. The sites evaluated in this document include the nearshore and offshore areas of Sand Key, Long Key, and Treasure Island (Figure 1).

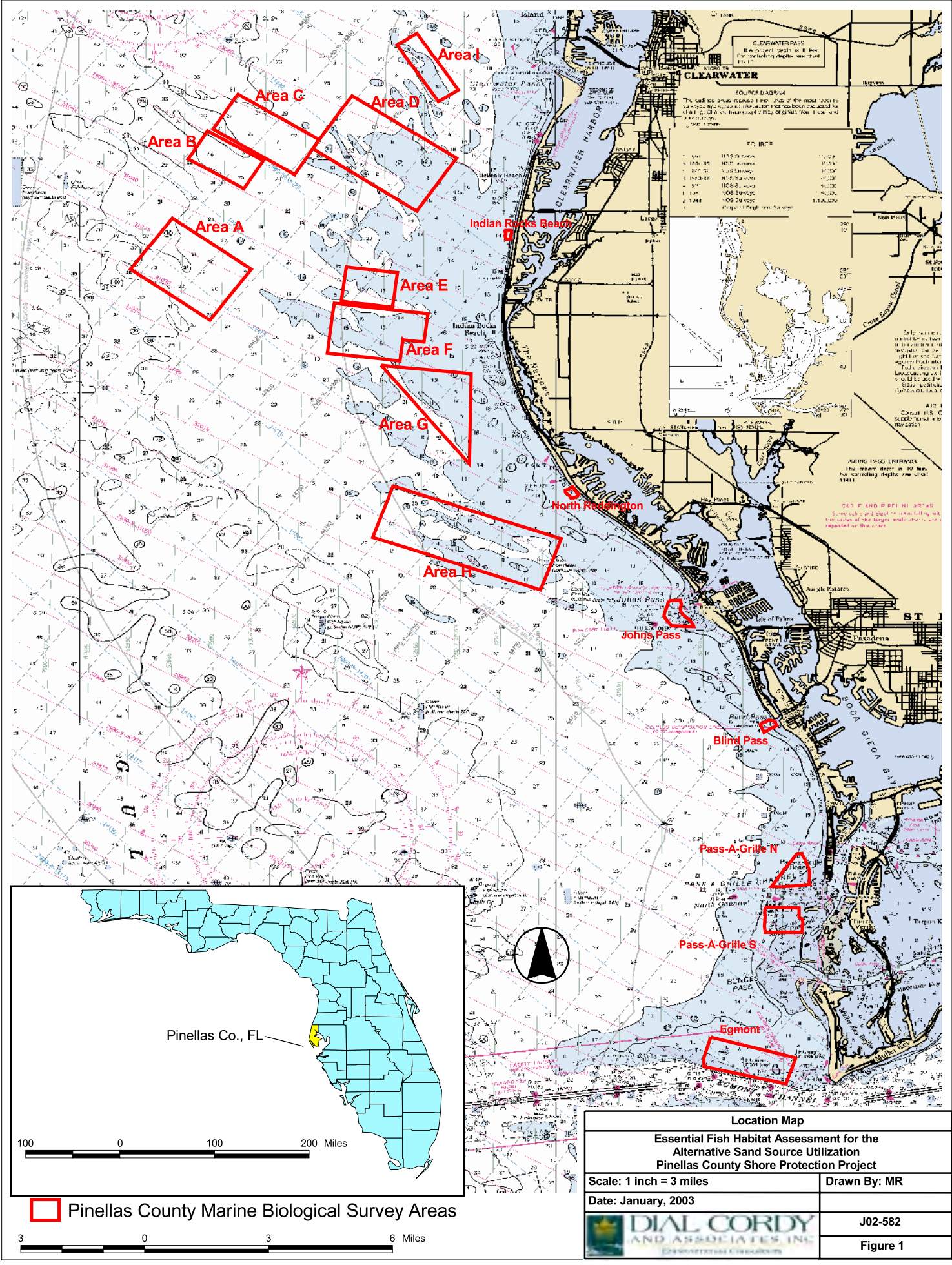
1.2 Project Need or Opportunity

Shoreline erosion and a lowered beach profile caused by storms, wave action, and currents have become a serious concern along Pinellas County barrier island beaches. As a means of controlling shoreline erosion and providing storm protection to these barrier islands, fill material has been placed along the shorelines. The Pinellas County Beach Erosion Control Project has historically obtained beach quality fill from inlet borrow areas and the Egmont Channel Shoal for nourishment of Pinellas County beaches. Nine offshore borrow areas and four ebb tidal shoal areas have been identified for future use. Bathymetry and side-scan sonar of nearshore marine habitats have also been performed. Marine habitats within these nearshore areas have been evaluated for occurrence and quality to facilitate minimization of impacts to these resources due to utilization of the offshore and ebb tidal shoal borrow areas.

1.3 Agency Goal or Objective

1.3.1 Objective

The objective of the Preferred Alternative is to utilize sand sources closer to the project areas previously authorized for maintenance renourishment activity. The currently authorized borrow area of Egmont Key Shoal is more than 20 miles away from the beaches authorized for renourishment. This is not always a cost effective alternative for small nourishment events. Borrow areas closer to the project areas would offer more cost effective construction options.



Location Map

Essential Fish Habitat Assessment for the Alternative Sand Source Utilization Pinellas County Shore Protection Project

Scale: 1 inch = 3 miles	Drawn By: MR
Date: January, 2003	
DIAL CORDY AND ASSOCIATES, INC.	J02-582
	Figure 1

1.3.2 Preferred Alternative

The Preferred Alternative would allow the U.S. Army Corps of Engineers (Corps) to utilize the nine offshore areas and four ebb tidal shoals as potential borrow areas for future beach nourishment/renourishment activities. These borrow areas would be utilized in lieu of/in addition to the authorized Egmont Shoal borrow area.

2.0 ESSENTIAL FISH HABITAT DESIGNATION

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976 and the 1996 Sustainable Fisheries Act, an Essential Fish Habitat (EFH) assessment is necessary for implementation of the Preferred Alternative. An EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." *Waters* include aquatic areas and their associated physical, chemical, and biological properties that are use by fishes and may include areas historically used by fishes. *Substrate* includes sediment, hardbottom, structures underlying the waters, and any associated biological communities. *Necessary* means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. *Spawning, breeding, feeding, or growth to maturity* covers all habitat types used by a species throughout its life cycle. Only species managed under a federal fishery management plan (FMP) are covered (50 C.F.R. 600). The act requires federal agencies to consult on activities that may adversely influence EFH designated in the FMPs. The activities may have direct (e.g., physical disruption) or indirect (e.g., loss of prey species) effects on EFH and may be site-specific or habitat-wide. The adverse result(s) must be evaluated individually and cumulatively.

2.1 Assessment

Assessments of marine resources within the proposed project area were conducted in 2001 and 2002 by Dial Cordy and Associates Inc. (Dial Cordy). Dominant aquatic community types were documented within and adjacent to the proposed borrow areas, pipeline corridors and nearshore areas. Surveys of the ebb tidal shoal areas and the Pass-a-Grille channel were also performed (Dial Cordy, 2001a; 2001b; 2002). Marine habitats identified during the survey included hardbottom, shell hash, and open sand habitat. The aquatic communities associated with these different bottom types and the water column have been identified as EFH in accordance with the amendment to the Fishery Management Plans of the Gulf of Mexico Fishery Management Council (GMFMC, 1998).

2.2 Managed Species

The Gulf of Mexico Fisheries Management Council (GMFMC) (1998) has designated unvegetated bottom, livebottom, and water column areas within the study area as EFH, in compliance with the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801-1882), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). Managed species that commonly inhabit the study area are shown in Table 1. Consequently, the Project area has been designated as EFH for theses fishes, brown shrimp, white shrimp, pink shrimp, and spiny lobster (Table 1). Six coastal migratory pelagic fish species have been included owing to their distribution patterns along the Florida coast. In addition, the nearshore bottom and offshore hardbottom habitats of the Gulf coast of Florida have also been designated as EFH (GMFMC, 1998).

Table 1 Managed Species Identified by the Gulf of Mexico Fishery Management Council That Are Known to Occur in Pinellas County, Florida

Common Name	Taxa
Balistidae	
Gray Triggerfish	*Balistes capriscus*
Carangidae	
Yellow Jack	*Caranx bartholomaei*
Blue Runner	*Caranx crysos*
Crevalle Jack	*Caranx hippos*
Bar JackLesser Amberjack	*Caranx rubberSeriola fasciata*
Greater Amberjack	*Seriola dumerili*
Coryphaenidae	
Dolphin [1]	*Coryphaena hippurus*
Ephippidae	
Spadefish	*Chaetodipterus faber*
Haemulidae	
Black Margate	*Anisotremus surinamensis*
Porkfish	*Anisotremus virginicus*
Margate	*Haemulon album*
Tomtate	*Haemulon aurolineatum*
Smallmouth Grunt	*Haemulon chrysargyreum*
French Grunt	*Haemulon flavolineatum*
Spanish Grunt	*Haemulon macrostomum*
Cottonwick	*Haemulon melanurum*
Sailors Choice	*Haemulon parra*
White Grunt	*Haemulon plumieri*
Blue Stripe Grunt	*Haemulon sciurus*
Labridae	
Puddingwife	*Halichoeres radiatus*
Hogfish	*Lachnolaimus maximus*

Common Name	Taxa
Lutjanidae	
Mutton Snapper	*Lutjanus analis*
Vermillion Snapper	*Rhomboplites aurorubens*
Schoolmaster	*Lutjanus apodus*
Red Snapper	*Lutjanus campechanus*
Gray Snapper	*Lutjanus griseus*
Dog Snapper	*Lutjanus jocu*
Mahogany Snapper	*Lutjanus mahogoni*
Lane Snapper	*Lutjanus synagris*
Yellowtail Snapper	*Ocyurus chrysurus*
Rachycentridae	
Cobia [1]	*Rachycentron canadum*
Scombridae	
Little Tunny [1]	*Euthynnus alletteratus*
King Mackerel [1]	*Scomberomorus cavalla*
Spanish Mackerel [1]	*Scomberomorus maculates*
Cero [1]	*Scomberomorus regalis*
Serranidae	
Black Sea Bass	*Centropristis striata*
Rock HindScamp Grouper	*Epinephelus adscensionisMycteroperca phenax*
Goliath Grouper	*Epinephelus itajara*
Red Grouper	*Epinephelus morio*
Black Grouper	*Mycteroperca bonaci*
Gag	*Mycteroperca microlepis*
Sparidae	
Sheepshead	*Archosargus probatocephalus*
Jolthead Porgy	*Calamus arctifrons*
Invertebrates	
Brown Shrimp	*Farfantepenaeus aztecus*
Pink Shrimp	*Farfantepenaeus duorarum*
White Shrimp	*Litopenaeus setiferus*
Spiny Lobster	*Panulirus argus*

[1] Coastal Migratory Pelagic Fish Species

The species addressed in this section consist of fishes and invertebrates of both recreational and commercial importance that are managed under the Magnuson-Stevens Fishery Conservation and Management Act (PL94-265).

2.2.1 Crustacea

2.2.1.1 Life Histories

2.2.1.1.1 Brown Shrimp

Brown shrimp larvae occur offshore and migrate from offshore as post-larvae from January through November with peak migration from February through April. Post-larvae move into the estuaries primarily at night on incoming tides. Once in the estuaries, post-larvae seek out the soft silty/muddy substrate common to both vegetated and non-vegetated, shallow estuarine environments. This environment yields an abundance of detritus, algae, and microorganisms that comprise their diet at this developmental stage. Post-larvae have been collected in salinities ranging from zero to 69 ppt with maximum growth reported between 18° and 25°C, peaking at 32°C (Lassuy, 1983). Maximum growth, survival, and efficiency of food utilization has been reported at 26°C (Lassuy, 1983). The density of post-larvae and juveniles is highest among emergent marsh and submerged aquatic vegetation (Howe et al., 1999; Howe and Wallace, 2000), followed by tidal creeks, inner marsh, shallow non-vegetated water, and oyster reefs. The diet of juveniles consists primarily of detritus, algae, polychaetes, amphipods, nematodes, ostracods, chironomid larvae, and mysids (Lassuy, 1983). Although some of their potential prey will initially be lost during dredging activities, recovery will be rapid (Culter and Mahadevan, 1982; Saloman et al., 1982) and they can forage in adjacent areas that have not been impacted as they emigrate offshore. Emigration of sub-adults from the shallow estuarine areas to deeper, open water takes place between May through August, with June and July reported as peak months. The stimulus behind emigration appears to be a combination of increased tidal height and water velocities associated with new and full moons. After exiting the estuaries, adults seek out deeper (18 m), offshore waters in search of silt, muddy sand, and sandy substrates. Adults reach maturity in offshore waters within the first year of life.

2.2.1.1.2 Pink Shrimp

Of the three penaeid shrimp species, pink shrimp is the most prevalent in Florida waters. Consequently, the pink shrimp fishery is the most economically important of all fisheries in Florida. Spawning of pink shrimp occurs in oceanic waters at depths of 4 to 48 m and possibly deeper (Bielsa et al., 1983) where adult females lay demersal eggs. Spawning takes place year round in some areas (e.g., Tortugas Shelf), but peak spawning activity appears to coincide with maximum bottom water temperatures (Bielsa et al., 1983). Recruitment of planktonic post-larvae into estuarine and coastal bay nursery areas occurs in the spring and late fall during flood tides. Post-larvae become benthic at approximately 10 mm total length

and prefer areas with a soft sand or mud substrate mixture containing sea grasses and turtle grass (Bielsa et al., 1983; Howe et al., 1999; Howe and Wallace, 2000). Pink shrimp spend from 2 to 6 months in the nursery ground prior to emigration. During the shift from post-larvae to juveniles there is a dietary shift from nauplii and microplankton to polychaetes, ostracods, caridean shrimps, nematodes, algae, diatoms, amphipods, mollusks, and mysids, (Bielsa et al., 1983). Although some of their potential prey will initially be lost during dredging activities, recovery will be rapid (Culter and Mahadevan, 1982; Saloman et al., 1982) and they can forage in adjacent areas that have not been impacted as they emigrate offshore. Emigration from the nursery grounds to offshore occurs year round with a peak during the fall and a smaller peak during the spring. The greatest concentrations of adults have been reported between 9 and 44 m, although some have been found as deep as 110 m in Florida waters. Although detailed dietary studies concerning adults are non-existent, Williams (1955) reported foraminiferans, gastropod shells, squid, annelids, crustaceans, small fishes, plant material, and debris in the stomachs of adults collected in North Carolina estuaries.

2.2.1.1.3 White Shrimp

White shrimp spawn along the South Atlantic coast from March to November, with May and June reported as peak months along the offshore waters of northeast Florida. Spawning takes place in water ≥ 9 m deep and within 9 km from the shore where they prefer salinities of ≥ 27 ppt (Muncy, 1984). The increase in bottom water temperature in the spring is thought to trigger spawning. After the demersal eggs hatch, the planktonic post-larvae live offshore for approximately 15-20 days. During the second post-larval stage, they enter Florida estuaries in April through early May by way of tidal currents and flood tides and become benthic. During this larval stage, the diet consists of zooplankton and phytoplankton. It has been documented that juvenile white shrimp tend to migrate further upstream than do juvenile pink or brown shrimp; as far as 210 km in northeast Florida (Pérez-Fartante, 1969). Juveniles prefer to inhabit shallow estuarine areas with a muddy substrate with loose peat and sandy mud and moderate salinity. Juvenile white shrimp are benthic omnivores (e.g., fecal pellets, detritus, chitin, bryozoans, sponges, corals, algae, annelids) and feed primarily at night. White shrimp usually become sexually mature at age one during the calendar year after they hatched. The emigration of sexually mature adults to offshore waters is influenced primarily by body size, age, and environmental conditions. Studies have shown that a decrease in water temperature in estuaries triggers emigration in the south Atlantic (Muncy, 1984). The life span of white shrimp usually does not extend beyond one year.

2.2.1.1.4 Spiny Lobster

The spiny lobster inhabits the coastal waters from North Carolina to Rio de Janeiro, Brazil, including Bermuda and the Gulf of Mexico. The Florida spiny lobster is a valuable species both commercially and recreationally, and supports Florida's second most valuable shellfishery. During its life cycle, the spiny lobster occupies three different habitats (Marx

and Herrnkind, 1986). The phyllosoma larvae are planktonic and inhabit the epipelagic zone of the Caribbean, Gulf of Mexico, and the Straits of Florida. The duration of the phyllosome stage is approximately 6 to 12 months. A brief (several weeks) non-feeding, oceanic phase follows, where the larva metamorphoses into a puerulus offshore. The pueruli migrate to shore by night using specialized abdominal pleopods. Large concentrations of pueruli have been recorded along the southeast Florida coast and the southern shores of the Florida Keys year round, with a peak in the spring and a lesser peak in the fall. In addition, these large concentrations are usually associated with the new and first quarter lunar phases. When suitable inshore substrate is encountered by pueruli, they rapidly settle out of the water column and within days molt into the first juvenile stage. The specific factors that stimulate post-larval settlement is not well understood. Known nursery areas of young benthic larvae and juveniles consist of macroalgae beds along rocky shorelines interspersed with seagrasses where they live a solitary existence (Marx and Herrnkind, 1986). Juveniles larger than 20 mm carapace length tend to aggregate in biotic (e.g., sponges, small coral heads, sea urchins) and abiotic (ledges) structures in protected bays, including estuaries with high salinity. As adults, spiny lobsters inhabit coral reef crevices, rocky outcroppings, and ledges. Refuge availability plays an important role regarding population distribution because spiny lobsters do not have the ability to construct dens. However, in a study where additional artificial structures were placed in Biscayne Bay, FL, the population was re-distributed, but the number of spiny lobsters in the Bay did not increase (Marx and Herrnkind, 1986). Consequently, the south Florida population may be limited by recruitment, emigration, food, and other factors.

2.2.1.1.5 Stone Crabs

The stone crab (*Menippe mercenaria*) is a commercially important species along the West Coast of Florida. Adult stone crabs use burrows under rock ledges, hardbottom features, dead shell, or vegetative clumps. Stone crabs may also be abundant in seagrass flats, particularly turtle grass (*Thalassia testudinum*). Juveniles of the species usually do not dig burrows but inhabit available hiding places in naturally occurring features. Occasionally juveniles will be associated with shell hash habitat, sponges, and, occasionally, mats of seagrass.

Stone crab have a planktonic larvae that drift with ocean currents and then settle out. The most productive habitat for stone crabs occurs within Florida Bay. The area of the Gulf of Mexico in the vicinity of Tampa Bay (Pinellas County) is also an important recruitment ground. Stone crabs are dependent upon estuaries for prey production. These areas provide cover and prey species important to stone crab recruitment and development. Seagrass areas may be especially important for producing prey species (GMFMC 1994).

2.2.1.2 Summary of Impacts to Shrimp, Stone Crabs and Spiny Lobsters

As outlined by GMFMC (1998), EFH for penaeid shrimps includes coastal inlets and both state identified overwintering areas and nursery habitats. Seagrass beds common to the bays of Florida are particularly important areas. Essential fish habitats for stone crab and spiny

lobster are varied including nearshore shelf/oceanic waters, shallow, benthic subtidal areas, seagrass beds, soft sediment, coral and both live and hardbottom, sponges, algal communities, mangroves (GMFMC, 1998; SAFMC, 1998).

The Project area includes sand bottom, sand-veneered hardbottom, hardbottom, and water column that may be used by all three penaeid species, stone crabs, and spiny lobster as post-larvae, juvenile, and adults. The Preferred Alternative would impact a relatively small area of the sand and hardbottoms, and the impacts would be minor. Some possible refuge may be lost in regards to the impact to the hardbottom areas within pipeline corridors; however, additional refuge would be created by the construction of artificial reefs to serve as replacement habitat. Penaeid shrimp and spiny lobster would be temporarily displaced, but would quickly return to the Project area.

2.2.2 Coral and Live Hardbottom Habitat

The Gulf of Mexico Fisheries Management Council has designated hardbottom areas within the study site as EFH. Over 60 species of coral can occur off the coast of Florida all of which fall under the protection of the management plan (GMFMC, 1998). Fourteen of these coral species are listed as endangered by the Florida Committee on Rare and Endangered Plants and Animals (SAFMC, 1998). A list of coral and other species observed in hardbottom habitats within the study area during recent surveys is included in Table 2.

Table 2 Benthic Taxa Observed During Borrow Area Surveys (Dial Cordy 2001a, 2002)

Scientific Name	Common Name
Sponges	
Cribrochalina vasculum	Brown Bowl Sponge
Xestospongia muta	Giant Barrel Sponge
Spheciospongia vesparium	Loggerhead Sponge
Ircinia sp.	Ball Sponge
Calyx podatypa	Dark Volcano Sponge
Anthosigmella varians	Brown Variable Sponge
Amphimedon compressa	Erect Rope Sponge
Scleractin Corals	
Cladocora arbuscula	Tube Coral
Stephanocoenia mitchelinii	Blushing Star Coral
Isophyllia sinuosa	Cactus Coral
Siderastrea sp.	Starlet Coral
Solenastrea hyades	Knobby Star Coral
Scolymia lacera	Mushroom Coral
Phyllangia americana	Hidden Cup Coral
Manicina aereolata	Rose Coral

Scientific Name	Common Name
Montastrea annularis	Boulder Star Coral
Oculina robusta	Robust Ivory Tree Coral
Millepora alcicornis	Branching Fire Coral
Octocorals	
Eunicea succinea	Shelf-knob Sea Rod
Eunicea calyculata	Warty Sea Rod
Plexaurella nutans	Giant Slit-Pore Sea Rod
Muricea laxa	Delicate Spiny Sea Rod
Muricea elongata	Orange Spiny Sea Rod
Pseudoterogorgia sp.	Sea Plume
Pterogorgia citrina	Yellow Sea Whip
Leptogorgia virgulata	Colorful Sea Whip
Pseudoceratina crassa	Branching Tube Sponge
Echinoderms	
Linckia guildingii	Common Comet Star
Astropecten articulatus	Beaded Sea Star
Echinaster spinulosus	Orange-Ridged Sea Star
Luidia clathara	Striped Sea Star
Luidia sp.	Sea Star
Luidia alternata	Banded Sea Star
Echinometra lucunter	Rock-boring Urchin
Lytechinus variegates	Variegated Urchin
Mollusks	
Pinna carnea	Penshell
Charonia variegata	Tritons Trumpet
Busycon contrarium	Lightning Whelk
Pleuroploca gigantean	Florida Horse Conch
Crustaceans	
Menippe mercenaria	Florida Stone Crab
Tunicates	
Clavelina sp.	Colonial Tunicate
Family Didemnidae	Overgrowing Tunicates
Eudistoma sp.	Condiminium Tunciate

2.2.2.1 Summary of Impacts to Coral and Hardbottom Habitat

Hardbottom impacts associated with the Preferred Alternative will be limited to impacts associated with pipeline placement in the surveyed pipeline corridors and staging areas (Dial Cordy 2001a, Dial Cordy 2001b, Dial Cordy 2002). No impacts are anticipated within the

offshore borrow areas. Exclusionary buffers (200 feet) have been established around all documented hardbottom features within the proposed borrow areas to eliminate any direct or indirect impacts to these features from dredging activities. Any impacts to hardbottom/livebottom resources within the pipeline and staging areas from dredging equipment placement will be determined from surveys conducted during construction and mitigation in the form of artificial reef creation will be performed.

2.2.2.2 Beach and Sand Bottom Habitat

Shoreline erosion and a lowered beach profile caused by storms, wave action, and currents have become a serious concern along Pinellas County barrier island beaches. Species richness is usually low in these habitats, but localized species can be abundant. Typical beach fauna in the proposed Project area includes the mole crab (*Emerita talpoida*), surf clam (*Donax variabilis*) and ghost crab (*Ocypode quadrata*). These and other beach infauna provide food for a wide variety of shorebirds such as plovers (*Charadrius spp.),* willets *(Catoptrophorous semipalmatus*), and ruddy turnstones (*Arenaria interpres*). Drift algae and *Sargassum* stranded on the beach may support large numbers of insects and other invertebrate life. Beyond the beach, polychaetes, gastropods, portunid crabs, and burrowing shrimp are the most abundant fauna in shallow, softbottom habitats. As depth increases, these habitats are dominated by amphipods, polychaetes, and bivalves (*Donax* sp., *Tellina* sp.). This nearshore habitat is managed under the Magnuson-Stevens Fishery Conservation and Management Act (L 94-265).

2.2.2.3 Summary of Impacts to Beach and Sand Bottom Habitat

Several studies have examined the effects of beach nourishment on benthic fauna and sediments. Nelson (1989) reviewed literature regarding the effects of beach nourishment on beach sand fauna and concluded that minimal biological effects occurred. Mortality of some organisms may occur where grain size is a poor match to existing sediments; however, recovery was rapid. 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*) did not exhibit any significant impacts resulting from beach nourishment (Nelson, 1989). In a review of beach nourishment effects on beach fauna, Hackney, et al. (1996) came to the same conclusions as Nelson (1989), with the suggestion that beach nourishment should take place during the winter months to minimize the impacts, and that the sand should match as closely as possible.

In a beach renourishment project in Panama City Beach, Florida, Culter and Mahadevan (1982) concluded that the initial destruction of the benthic community at the borrow sites was followed by a rapid recovery which was virtually complete after one year. There were minor differences in sediment parameters, but no differences in fauna in or out of the borrow sites were observed. The benthic community at this borrow area consisted primarily of

polychaetes, bivalves, gastropods, amphipods, brachyuruns, and amphipods. No species that required a permanent attachment site and only a few tube dwelling organisms were present at this site. The overall findings were that no long-term adverse environmental effects as a result of beach renourishment existed within the nearshore area and that no adverse conditions were present at the borrow sites.

In another study conducted along Panama City Beach, Saloman, et al. (1982) observed an immediate decline in the benthic community followed by a rapid recovery within 8 - 12 months as indicated by species richness, abundance, and diversity. The benthic community was composed of primarily annelids, arthropods, mollusks, and to a much lesser extent platyhelminths, nematodes, echinoderms, and hemichordates. After one year post-dredging, some short-term ecological changes including minor alterations in sediment, and a small decline in the diversity and abundance of benthic invertebrates were reported. However, no long-term effects were observed regarding the benthic community, sediments, and water quality along the shore and in and around the borrow sites.

The removal of sediment from the proposed borrow areas will directly impact the benthic habitat including both the infaunal and epifaunal community. Initially, this will result in a significant, but localized reduction in the abundance, diversity, and biomass of the immediate fauna. Species affected most are those that have limited capabilities or are incapable in avoiding the dredging activities. The fauna most affected will include predominantly invertebrates such as crustaceans, echinoderms, mollusks, and annelids, as well as finfish larvae. However, due to the relatively small area that will be impacted as viewed on a spatial scale, impacts to the benthic community will be minimal due to the relatively short period of recovery regarding infaunal communities following dredging activities (Culter and Mahadevan, 1982; Saloman, et al., 1982). Adjacent areas not impacted will most likely be the primary source of recruitment to the impacted area. To minimize any adverse effects to beach fauna, the Preferred Alternative will be implemented during the winter months, outside the recruitment window for many impacted species, and a high quality source of sand containing a small percentage of fine material will be used. The Preferred Alternative will not have any significant, long lasting impacts on the beach sand infaunal communities.

2.2.3 Reef Fish

Pinellas County, Florida is designated as EFH for 13 species of reef fishes (Table 1) that are listed under the Gulf of Mexico Fishery Management Council Comprehensive EFH Amendment (GMFMC, 1998). The association of these fishes with coral or hardbottom structure, vegetated and unvegetated inshore areas during some period of their life cycle, and their contribution to a reef fishery ecosystem is why they are included in the reef fish plan. A discussion of how these fishes utilize the different inshore habitats and the hardbottom and reef communities follows.

2.2.3.1 Life History

2.2.3.1.1 Balistidae

Pinella County is designated as EFH for one species of triggerfish (Table 1). The gray triggerfish inhabits shallow inshore areas (e.g., bays, harbors, lagoons, sandy areas, grassy areas, rubble rock, coral reefs, artificial reefs, or dropoffs adjacent to offshore reefs) to offshore waters as deep as 275 m. This triggerfish is an important component of the reef assemblage of both natural and artificial reefs (Vose and Nelson, 1994). Information regarding balistid reproduction is limited and varied (Thresher, 1984). The basic balistid (e.g., gray triggerfish) spawning behavior involves the production of dermersal, adhesive eggs that are thought to stick to corals and algae near or on the bottom. Unfortunately, egg and larval development is poorly understood regarding most species; however, a long (≥ 1 year) planktonic stage appears common for many species. As juveniles, it has been suggested that they are planktonic, taking refuge among floating masses of *Sargassum* (Johnson and Saloman, 1984). During this stage of development, the diet consists of primarily zooplankton associated with the *Sargassum* or drifting in the water column. The exact timing or the environmental cues that trigger settlement is not well understood. However, juvenile gray triggerfish as small as 16 - 17 cm standard length have been reported to colonize hardbottom habitats (Thresher, 1984). After juveniles take on a benthic existence, their diet shifts to benthic fauna including algae, hydroids, barnacles, and polychaetes. All triggerfish feed diurnally and are well adapted to prey upon hard-shell invertebrates, especially adults. Adult gray triggerfish feed primarily on sea urchins, but in their absence, will shift to other benthic invertebrates such as crabs, chiton, and sand dollars (Frazer, et al., 1991; Vose and Nelson, 1994). Triggerfishes are commercially important in the aquarium trade and to some extent as a gamefish.

2.2.3.1.2 Carangidae

Pinellas County is designated as EFH for two carangids (Table 1) because they utilize the offshore and possibly inshore areas adjacent to the study area. Although spawning data regarding the greater amberjack does not exist, it is assumed that it is similar to the other carangid species. Based on collections of juvenile carangid species, there is some indication that there is a mobile, northward population of developing young in the Gulf Stream that developed from spawning that occurred in more southern waters (Berry, 1959). The greater amberjack is a far ranging species that inhabits inlets, shallow reefs, rock outcrops, and wrecks with reef fishes such as snappers, sea bass, grunts, and porgies (Manooch and Potts, 1997a). They are generally restricted to the continental shelf to depths as great as 350 m (Manooch and Haimovici, 1983). Small individuals (< 1 m SL) are usually found in water < 10 m deep while larger individuals frequent waters 18 - 72 m deep (Manooch and Potts, 1997b). Greater amberjack are a fast growing species and are recruited to the headboat fishery

in the Gulf by age four and fully recruited to the fishery by age eight (Manooch and Potts, 1997a; 1997b).

All carangids are popular sport fishes among recreational fishers, but not as popular commercially where they are harvested using handlines, bottom longlines, and in some cases traps and trawls. Some Florida fishers feel that amberjack are being exposed to too much fishing pressure, especially owing to their attraction to reefs which make them an easy target for overfishing (Manooch and Potts, 1997a). However, as of 1997 there is no evidence of overfishing in either the Gulf of Mexico or southeast Florida (Manooch and Potts, 1997b).

2.2.3.1.3 Lutjanidae

Pinellas County is designated as EFH for four species of snapper (Table 1). Collectively, the EFH of these snappers ranges from shallow estuarine areas (e.g., vegetated sand bottom, mangroves, jetties, pilings, bays, channels, mud bottom) to offshore areas (e.g., hard and livebottom, coral reefs, rocky bottom) as deep as 400 m (Allen, 1985; Bortone and Williams, 1986). Like most snappers, these species participate in group spawning, which indicates either an offshore migration or a tendency for larger, mature individuals to take residency in deeper, offshore waters. Data suggests that adults tend to remain in one area. Both the eggs and larvae of these snappers are pelagic (Richards, et al., 1994). After an unspecified period of time in the water column, the planktivorous larvae move inshore and become demersal juveniles. The diet of these newly settled juveniles consists of benthic crustaceans and fishes. Juveniles inhabit a variety of shallow, estuarine areas including vegetated sand bottom, bays, mangroves, finger coral, and seagrass beds. As adults, most are common to deeper offshore areas such as live and hardbottoms, coral reefs, and rock rubble. However, adult gray, and lane snapper also inhabit vegetated sand bottoms with gray snapper less frequently occurring in estuaries and mangroves (Bortone and Williams, 1986). The diet of adult snappers includes a variety fishes, shrimps, crabs, gastropods, cephalopods, worms, and plankton. All four species are of commercial and/or recreational importance In particular, gray, lane, and yellowtail snapper comprise the major portion of Florida's snapper fishery (Bortone and Williams, 1986).

2.2.3.1.4 Serranidae

Pinellas County is designated as EFH for four species of sea bass (Table 1). Collectively, the EFH of these sea bass ranges from shallow estuarine areas (e.g., seagrass beds, jetties, mangrove swamps) to offshore waters as deep as 300 m (Heemstra and Randall, 1993; Jory and Iverson, 1989; Mercer, 1989). Like all other serranids, these species are protogynous hermaphrodites; functioning initially as females only to undergo a sexual transformation at a later time to become functional males. In addition, like all other serrranids, these species produce offshore planktonic eggs, moving into shallow, inshore water during their post-larval benthic stage. Juveniles inhabit estuarine, shallow areas such as seagrass beds, bays, harbors, jetties, piers, shell bottom, mangrove swamps, and inshore reefs. Juveniles feed on estuarine

dependent prey such as invertebrates, primarily crustaceans, that comprise the majority of their diet at this developmental stage. As sub-adults and adults, they migrate further offshore taking refuge along rocky, hard, or livebottom, on artificial or coral reefs, in crevices, ledges, or caverns associated with rocky reefs. During this stage in their lives, the bulk of their diet consists of fishes, supplemented with crustaceans, crabs, shrimps, and cephalopods. Except for the Goliath grouper, the other species discussed in this section have some importance to commercial and/or recreational fisheries.

2.2.3.2 Summary of the Impacts to the Reef Fishes

The project area includes sand bottom, sand-veneered hardbottom, hardbottom, and water column that may be used by these managed fishes and their prey. The Preferred Alternative would impact a relatively small area of the sand and hardbottoms, and the impacts would be minor and short-term. Some possible refuge and related prey may be lost in regards to the impact to the hardbottom and sand areas; however, additional refuge would be created by the construction of artificial reefs to serve as replacement habitat. The Preferred Alternative will cause localized turbidity during construction; however, turbidity would be minimized using the management practices outlined in the Environmental Assessment, so that any impacts would be minor and temporary. These fishes and possible prey would be temporarily displaced, but should quickly return to the Project area.

2.2.4 Coastal Migratory Pelagics Complex

Pinellas County, Florida is designated as EFH for six species of coastal migratory pelagic fishes that are listed under the Generic Amendment for Addressing Essential Fish Habitat Requirements (GMFMC, 1998). Collectively, these six species, representing three different families, are all members of the Coastal Migratory Pelagics Fish Species as outlined by GMFMC (1998). The association of these fishes or their prey with coral or hardbottom structure, or inshore waters during some period of their life cycle and their contribution to a reef fishery ecosystem is why they are included in this complex. A discussion of how these fishes utilize the different inshore habitats and the hardbottom and reef communities follows.

2.2.4.1 Life History

2.2.4.1.1 Coryphaenidae

The dolphin is oceanic and distributed worldwide in both tropical and subtropical waters. Data suggest that this species may be involved in northward migrations during the spring and summer with some occasional movements and migrations being controlled by drifting objects in open waters. Spawning which is poorly documented, it thought to take place in oceanic waters where pairing of the sexes occurs (Ditty, et al., 1994). Based on the occurrence of

young dolphin in the Florida Current, spawning may be almost year round (November - July) with peak activity in January through March (Palko et al., 1982). Owing to the oceanic distribution of this species, it is not surprising that both the egg and larval stages are pelagic. Upon hatching, this species experiences rapid growth throughout its life with both sexes reaching sexually maturity within the first year (Palko et al., 1982). In the Straits of Florida, female dolphin begin to mature at 350 mm FL and become fully mature at 550 mm FL. On the other hand, the smallest, mature male on record is 427 mm FL. The maximum life span of dolphin is estimated at 4 years. The diet of dolphin alters throughout its life cycle (Palko, et al, 1982). As larvae, they feed primarily on crustaceans, with copepods as the primary prey item. Adult dolphin are opportunistic, top-level predators. They feed upon a variety of fishes (e.g., flyingfish) and crustaceans, especially those species commonly associated with drifting flotsam and *Sargassum* in the Florida Current. As a prized food, dolphin are sought by both commercial and sport fishers. They are most commonly taken using hook and line around the edges of the continental shelf. In southern Florida, based on recreational catches, they appear most frequently March through August and then again September through February (Palko, et al., 1982).

2.2.4.1.2 Rachycentridae

Cobia are distributed worldwide in tropical, subtropical, and warm temperate waters where they inhabit estuarine and shelf waters depending of their life stage. They appear to associate with structures such as pilings, wrecks and other forms of vertical relief (e.g. oil and gas platforms) and favor the shade from these structures (Mills, 2000). Cobia spawn offshore where external fertilization takes place in large spawning aggregations; however, the pelagic eggs have been collected at both inshore and offshore stations. Based on past collections of gravid females, spawning takes place from mid May, extending through the end of August off South Carolina (Shaffer and Nakamura, 1989). Consequently, spawning may start slightly early off the southeast coast of Florida. Eggs have been collected in the lower Chesapeake Bay inlets, North Carolina estuaries, in coastal waters 20 - 49 m deep, and near the edge of the Florida Current and the Gulf Stream (Ditty and Shaw, 1992). Ditty and Shaw (1992) suggested that cobia spawn during the day since all the embryos they examined were at similar stages of development. Cobia exhibit rapid growth and may attain a length of 2 m total length and are known to live 10 years (Shaffer and Nakamura, 1989). Although females grow faster than males, they attain sexual maturity later in life. Sexual maturity is attained by males at approximately 52 cm total length during the second year and at approximately 70 cm total length for females during their third year (Shaffer and Nakamura, 1989). They are adaptable to their environment and can utilize a variety of habitats and prey. Cobia are voracious predators that forage primarily near the bottom, but on occasion do take some prey near the surface. Their favorite benthic prey are crabs, and to a much less extent other benthic invertebrates and fishes. No predator studies have been conducted, but dolphin fish have been known to feed on small cobia. Adults may be found solitary or in small groups and are known to associate with rays, sharks, and other larger fishes. Cobia is fished both commercially and recreationally; however, the commercial harvest is mostly incidental in both the hook and line and net fisheries. The recreational harvest is primarily through charter boats, party boats, and

fishers fishing from piers and jetties. Tagging studies have documented a north-south, spring-fall migration along the southeast United States and an inshore-offshore, spring-fall migration off South Carolina (Ditty and Shaw, 1992).

2.2.4.1.3 Scombridae

Pinellas County is designated as EFH for six scombrid species (Table 1). Collectively, the EFH of these epipelagic scombrids ranges from clear waters around coral reefs, and inshore and continental shelf waters (Collette and Nauen, 1983). Spawning of king and Spanish mackerel takes place May through September with peaks in July and August. The cero is thought to spawn year round with peaks in April through October, whereas little tunny spawn from April to November. Batch spawning takes place in tropical and subtropical waters, frequently inshore. The eggs are pelagic and hatch into planktonic larvae. Both king and Spanish mackerel are involved in migrations along the western Atlantic coast. With increasing water temperatures, Spanish mackerel move northward from Florida to Rhode Island between late February and July, and back in the fall (Collette and Nauen, 1983). King mackerel have been reported to migrate along the western Atlantic coast in large schools; however, there appears to be a resident population in south Florida as this species is available to sport fishers year round (Collette and Nauen, 1983). Although the little tunny is epipelagic, it typically inhabits inshore waters in schools of similar size fish and/or with other scombrids (Collette and Nauen, 1983). The diet of these scombrids consists of primarily fishes and to a lesser extent penaeid shrimp and cephalopods. The fishes that make up the bulk of their diet are small schooling clupeids (e.g., menhaden, alewives, thread herring, anchovies), atherinids, and to a lesser extent jack mackerels, snappers, grunts, and half beaks (Collette and Nauen, 1983). The king and Spanish mackerel are important both commercially and recreationally. The king mackerel is a valued sport fish year round in Florida while the sport fisheries for Spanish mackerel in southern Florida is concentrated in the winter months. The little tunny is not of commercial or recreational interest.

2.2.5 Summary of Impacts to the Coastal Migratory Pelagics Complex Fishes

The project area includes sand bottom, sand-veneered hardbottom, hardbottom, and water column that may be used by these managed fishes and their prey. The Preferred Alternative would impact a relatively small area of the sand and hardbottoms, and the impacts would be minor and short-term. Some possible refuge and related prey may be lost in regards to the impact to the hardbottom and sand areas; however, additional refuge would be created by the construction of artificial reefs to serve as replacement habitat. These fishes and possible prey would be temporarily displaced, but should quickly return to the project area.

2.3 Associated Species

Associated species consists of living resources that occur in conjunction with the managed species discussed earlier. These living resources would include the primary prey species and other fauna that occupy similar habitats.

2.3.1 Invertebrates

The removal of sediment from an inshore borrow site will directly impact the benthic habitat including both the infaunal and epifaunal community. Initially this will result in a significant, but localized reduction in the abundance, diversity, and biomass of the immediate fauna. Species affected most are those that have limited capabilities or are incapable in avoiding the dredging activities. The fauna most affected would include predominantly invertebrates such as crustaceans, echinoderms, mollusks, and annelids. However, due to the relatively small area that will be impacted as viewed on a spatial scale, impacts to the benthic community will be minimal due to the relatively short period of recovery regarding infaunal communities following dredging activities (Culter and Mahadevan, 1982; Saloman, et al., 1982). Adjacent areas not impacted would most likely be the primary source of recruitment to the impacted area.

Zooplankton are primarily filter feeders and suspended inorganic particles can foul the fine structures associated with the feeding appendages. Zooplankton that feed by ciliary action (e.g., echinoderm larvae) would also be susceptible to mechanical affects of suspended particles (Sullivan and Hancock, 1977). Zooplankton mortality is assumed from the physical trauma associated with dredging activities (Reine and Clark, 1998). The overall impact on the zooplankton community should be minimal due to the limited extent and transient nature of the sediment plume.

2.3.2 Fishes

The larvae of the managed fish species discussed in this document are hatched from planktonic eggs (excluding the gray triggerfish) and the larvae are also planktonic. The primary source of larval food is microzooplankton with a dietary overlap in many species and specialization (Sale, 1991). Algae is most likely food for only the youngest larval stages of certain species or for those larvae that are very small after hatching, and then only for a short time. The algae-eating larvae eventually switch to animal food while they are still small. At this time, varying life history stages of copepods become the dominant food and to a lesser extent cladocerans, tunicate and gastropod larvae, isopods, amphipods, and other crustacea.

Larval feeding efficiency depends on many factors such as light intensity, temperature, prey evasiveness, food density, larva experience, and olfaction to mention a few (Gerking, 1994).

Larval fishes are visual feeders that depend on adequate light levels in the water column which reduces the reaction distance between larval fish and prey. Suspended sediment and dispersion due to dredging activities will increase turbidity levels in the Project area temporarily. This will reduce light levels within the water column which may have a short term negative effect regarding feeding efficiency. In addition, turbidity can affect light scattering which will impede fish predation (Benfield and Minello, 1996). However, because the sediment plumes are transient and temporary, and the area to be impacted is relatively small when examined on a spatial scale, the overall impact to the larval fish population and consequently, the adult population should be minimal (Sale, 1991). The majority of larval fish mortality will be attributed to the physical trauma associated with the dredging activities.

Similar to larval fishes, both juvenile and adult fishes are primarily visual feeders. Consequently, the visual effects of turbidity as outlined above will apply. Also, suspended sediment can impair feeding ability by clogging the interraker space of the gill raker or the mucous layer of filter feeding species (Gerking, 1994). However, because these fishes have the ability to migrate away from the dredging activities, the impact of the sediment plumes which are transient and temporary should be minimal. Although few adult fishes have been entrained by dredging operations (McGraw and Armstrong, 1988; Reine and Clark, 1998), most juvenile and adult fishes again have the ability to migrate away from the dredging activities. Consequently, dredging operations would have minimal effects on juvenile and adult fishes in the area. In addition, the reduction of benthic epifaunal and infaunal prey, and pelagic prey in the immediate area would have little affect on juvenile and adult fishes because they can migrate to adjacent areas that have not been impacted to feed.

In addition to the managed fish species discussed in this document, many other inshore and pelagic fishes in various stages of life occur in the Project area (Moe and Martin, 1965; Saloman and Naughton, 1979). Fishes off of the Pinellas County coast are comprised of both reef and pelagic species. Moe and Martin (1965) collected over 2,300 individual fishes from 41 species during sampling conducted at nine separate locations offshore of Pinellas County. The most common fishes collected during this survey included sand perch (*Diplectrum fromosum*), pigfish (*Orthopristus chrysopterus*), silver perch (*Bairdiella chrysura*), spot (*Leiostomus xanthurus*), and pinfish (*Lagodon rhomboides*). Other species collected in this study included searobins (*Prionotus tribulus crassiceps* and *Prionotus scitulus latfirons*), and three species of flounder (*Etropus rimosus*, *Etropus crossotus atlanticus*, and *Syacium papillosum*).

Pelagic species also occur throughout the Gulf of Mexico in the nearshore and offshore waters. Major coastal pelagic families include Rachycentridae (cobia), Mugilidae (mullets), Pomatomidae (bluefish), Caranagidae (jacks), Scombridae (tunas and mackerels), Engraulidae (anchovies), and Carahahinidae (requiem sharks). Many of these pelagic species form large schools (e.g. jacks, mullet, mackerel, etc.), while others travel singly or in small groups (e.g. cobia). Distribution of these species can vary seasonally and usually depends on water column attributes that vary seasonally.

These nearshore hardbottom habitats may actually serve several nursery-related roles such as, 1) a centrally located refuge for incoming early life stages that would exhibit considerably greater mortality if shelter were not available, 2) habitat for juvenile fishes (e.g., gray snapper, blue stripe grunt) that emigrate out of inlets to offshore waters, and 3) an area to promote growth because of the greater availability of prey at these hardbottom habitats.

2.3.3 Summary of Impacts to Associated Species

Many of the fishes associated with nearshore hardbottom habitats as observed in past studies (Moe and Martin, 1965; Saloman and Naughton, 1979), would be common along Pinellas County. The majority of juvenile and adult fishes would be displaced to adjacent habitat during dredging operations, consequently, mortality of these fishes should be minimal. Only those species that produce demersal eggs and that comprise the demersal ichthyofauna could potentially be impacted more heavily than their pelagic counterparts. Mortality of demersal eggs and larvae would be expected from the physical trauma associated with dredging operations. Suspended sediments produced by these operations can affect the feeding activity of pelagics as outlined earlier; however, the impact to these fishes should be minimal due to the limited extent and transient nature of the sediment plume.

3.0 CONCLUSIONS

The Preferred Alternative will impact unvegetated, sand bottom, hardbottom, sand-veneered hardbottom, and water column. The use of the management practices outlined in the attached Environmental Assessment will help to lessen impacts associated with water quality and turbidity in the project area. Construction of a mitigation reef will create quality hardbottom habitat similar to what is available within the study area. Construction of the mitigation reef should occur either before or concurrently with the construction of the beach nourishment to counteract the loss of fish diversity found in similar beach protection projects (Lindeman and Snyder, 1999). Significant adverse impacts to those species associated with EFH within the project area are not expected.

4.0 REFERENCES

Allen, G.R. 1985. FAO species catalogue. Vol. 6. Snappers of the world. An annotated and illustrated catalogue of lutjanid species known to date. No. 125, Vol. 6. 208 pp.

Benfield, M.C. and T.J. Minello. 1996. Relative effects of turbidity and light intensity on reaction distance and feeding of an estuarine fish. Environmental Biology of Fishes 46:211-216.

Berry, F.H. 1959. Young jack crevalles (*Caranx* species) off the southeastern Atlantic coast of the United States. Fishery Bulletin 152(59):417-535.

Bielsa, L.M., W.H. Murdich, and R.F. Labisky. 1983. Species profile: life histories and environmental requirements of coastal fishes and invertebrates (south Florida) -- Pink shrimp. U.S. Fish and Wildlife Service. FWS/OBS-82/11.17. U.S. Army Corps of Engineers, TR EL-82-4. 21 pp.

Bortone, S.A. and J.L. Williams. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida) -- gray, lane, mutton, and yellowtail snappers. U.S. Fish and Wildlife Service Biological Report 82(11.52). U.S. Army Corps of Engineers, TR EL-82-4. 18 pp.

Chapman, R.W. 1978. Observations of spawning behavior in Atlantic spadefish, *Chaetodipterus faber*. Copeia 1978:336.

Collette, B.B. and C.E. Nauen. 1983. FAO species catalogue. Vol. 2. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. No. 125, Vol. 2. 137 pp.

Culter, J.K. and S. Mahadevan. 1982. Long-term effects of beach nourishment on the benthic fauna of Panama City Beach, Florida. U.S. Army Corps of Engineers Coastal Engineering Research Center Miscellaneous Report No. 82-2. 57 pp.

Cummings, W.C., B.D. Brahy, and J.Y. Spires. 1966. Sound production, schooling, and feeding habits of the margate, *Haemulon album*, off north Bimini, Bahamas. Bulletin of Marine Science 16(3):626-640.

Darcy, G.H. 1983. Synopsis of biological data on the grunts *Haemulon aurolineatum* and *H. plumieri* (Pisces: Haemulidae). NOAA Technical Report NMFS Circular 448, 39 pp.

Darcy, G.H. 1986. Synopsis of biological data on the porgies, *Calamus arctifrons* and *C. proridens* (Pisces: Sparidae). NOAA Technical Report NMFS Circular 44, 19 pp.

Ditty, J.G., C.B. Grimes, and J.S. Cope. 1994. Larval development, distribution, and abundance of common dolphin, *Coryphaena hippurus*, and pompano dolphin, *C. equiselis* (Family: Coryphaenidae), in the northern Gulf of Mexico. Fishery Bulletin 92:275-291.

Ditty, J.G. and R.F. Shaw. 1992. Larval development, distribution, and ecology of cobia *Rachycentron canadum* (Family: Rachycentridae) in the northern Gulf of Mexico. Fishery Bulletin 90:668-677.

Frazer, T.K., W.J. Lindberg, and G.R. Stanton. 1991. Predation on sand dollars by gray triggerfish, *Balistes capriscus*, in the northeastern Gulf of Mexico. Bulletin of Marine Science 48(1):159-164.

Gerking, S.D. 1994. Feeding Ecology of Fish. Academic Press, San Diego, CA. 416 pp.

Goodwin, J.M. and J.H. Finucane. 1985. Reproductive biology of blue runner (*Caranx crysos*) from the eastern Gulf of Mexico. Northeast Gulf Science 7(2):139-146.

Goodwin, J.M. and A.G. Johnson. 1986. Age, growth, and mortality of blue runner, *Caranx crysos* from the northern Gulf of Mexico. Northeast Gulf Science 8(2):107-114.

Gulf of Mexico Fishery Management Council (GMFMC) 1994. Amendment 5 to the fishery management plan for stone crabs.

Gulf of Mexico Fishery Management Council (GMFMC). 1998. Generic Amendment for Addressing Essential Fish Habitat Requirements of the Gulf of Mexico. Available from GMFMC 3018 U.S. Highway 301 North, Suite 1000. Tampa, FL 33619-2266. 237 pp.

Hackney, C.T., M.H. Posey, S.W. Ross, and A.R. Norris. 1996. A review and synthesis of data on surf zone fishes and invertebrates in the South Atlantic Bight and the potential impacts from beach nourishment. Report to the U.S. Army Corps of Engineers, Wilmington, North Carolina. 111 pp.

Heemstra, P.C. and J.E. Randall. 1993. FAO species catalogue. Vol. 16. Groupers of the world (Family Serranidae, Subfamily Epinephelinae). An annotated and illustrated catalogue of the grouper, rockcod, hind, coral grouper and lyretail species known to date. No. 125, Vol. 16. 382 pp.

Howe, J.C., R.K. Wallace, and F.S. Rikard. 1999. Habitat utilization by postlarval juvenile penaeid shrimps in Mobile Bay, Alabama. Estuaries 22(4):971-979.

Howe, J.C. and R.K. Wallace. 2000. Relative abundance of postlarval and juvenile penaeid shrimps in submerged aquatic vegetation and emergent marsh habitats. Gulf of Mexico Science 2:130-137.

Johnson, A.G. and C.H. Saloman. 1984. Age, growth, and mortality of gray triggerfish, *Balistes capriscus*, from the northeastern Gulf of Mexico. Fishery Bulletin 82(3):485-492.

Jory, D.E. and E.S. Iverson. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (South Florida) -- black, red, and Nassau groupers. U.S. Fish and Wildlife Service Biological Report 82(11.110). U.S. Army Corps of Engineers, TR EL-82-4. 21 pp.

Lassuy, D.R. 1983. Species profiles: life histories and environmental requirements (Gulf of Mexico) -- brown shrimp. U.S. Fish and Wildlife Service, Division of Biological Services. FWS/OBS-82/11.1. U.S. Army Corps of Engineers, TR EL-82-4. 15 pp.

Lindeman, K.C. and D.B. Snyder. 1999. Nearshore hardbottom fishes of southeast Florida and effects of habitat burial caused by dredging. Fisheries Bulletin 97(3):508-525.

Manooch, C.S. and C.A. Barans. 1982. Distribution, abundance, and age and growth of the tomtate, *Haemulon aurolineatum*, along the southeastern United States coast. Fishery Bulletin 80(1):1-19.

Manooch, C.S. and M. Haimovici. 1983. Foods of greater amberjack, *Seriola dumerili*, and almaco jack, *Seriola rivoliana* (Pisces: Carangidae), from the south Atlantic Bight. The Journal of the Elisha Mitchell Scientific Society 99(1):1-9.

Manooch, C.S. and J.C. Potts. 1997a. Age, growth, and mortality of greater amberjack from the southeastern United States. Fisheries Research 30:229-240.

Manooch, C.S. and J.C. Potts. 1997b. Age, growth, and mortality of greater amberjack, *Seriola dumerili*, from the U.S. Gulf of Mexico headboat fishery. Bulletin of Marine Science 61(3):671-683.

Marx, J.M. and W.F. Herrnkind. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida) -- spiny lobster. U.S. Fish and Wildlife Service Biological Report 82(11.61). U.S. Army Corps of Engineers, TR EL-82-4. 21 pp.

McFarland, W.N., E.B. Brothers, J.C. Ogden, M.J. Shulman, E.L. Bermingham, and N.M. Kotchian-Prentiss. 1985. Recruitment patterns in young French grunts, *Haemulon flavolineatum* (Family Haemulidae), at St. Croix, Virgin Islands. Fishery Bulletin 83(3):413-426.

McGraw, K.A. and D.A. Armstrong. 1988. Fish Entrainment by Dredges in Grays Harbor, Washington. pp. 113-131. *In*: C.A. Simenstad (ed.). Effects of Dredging on Anadromous Pacific Coast Fishes. Workshop Proceedings, University of Washington Sea Grant, FL.

Mercer, L.P. 1989. Species profile: life histories and environmental requirements of coastal fishes and invertebrates (South Atlantic) -- black sea bass. U.S. Fish and Wildlife Service Biological Report 82(11.99). U.S. Army Corps of Engineers, TR EL-82-4. 16 pp.

Mills, S. 2000. A cobia by any other name. Virginia Marine Resource Bulletin 32(1):2- 10.

Muncy, R.J. 1984. Species profile: life histories and environmental requirements of coastal fishes and invertebrates (South Atlantic) -- white shrimp. U.S. Fish and Wildlife Service. FWS/OBS-82/11.27. U.S. Army Corps of Engineers, TR EL-82-4. 19 pp.

Palko, B.J., G.L. Beardsley, and W.J. Richards. 1982. Synopsis of the biological data on dolphin-fishes, *Coryphaena hippurus* Linnaeus and *Corphaena equiselis* Linnaeus. NOAA Technical Report NMFS Circular 443, 28 pp.

Pérez-Farfante, I. 1969. Western Atlantic shrimps of the genus *Penaeus*. Fishery Bulletin 67(3):461-591.

Nelson, W. G. 1989. Beach nourishment and hard bottom habitats: The cause for caution. Proceedings of the 1989 National Conference on Beach Preservation Technology. Florida Beach and Shore Preservation Association. Tallahassee, Florida.

Reine, K.J. and D.G. Clark. 1998. Entrainment by Hydraulic Dredges - A Review of Potential Impacts. U.S. Army Engineer Waterways Experiment Station, Reseach And Development Center, Vicksburg, MS, DOER Tech Notes Collection (TN DOER-E1).

Render, J.H. and C.A. Wilson. 1992. Sexuality of the sheepshead *Archosargus probatocephalus* (Teleostei: Sparidae) from the northern Gulf of Mexico. Copeia 1992:917-919.

Richards, W.J., K.C. Lindeman, J.L. Shultz, J.M. Leis, A. Ropke, M.E. Clarke, and B.H. Comyns. 1994. Preliminary guide to the identification of the early life history stages of lutjanid fishes of the western central Atlantic. NOAA Technical Memorandum NMFS-SEFSC-345, 49 pp.

Sale, P.F. 1991. The Ecology of Fishes on Coral Reefs. Academic Press, Inc., San Diego, CA. 754 pp.

Saloman, C.H., S.P. Naughton, and J.L. Taylor. 1982. Benthic community response to dredging borrow pits, Panama City Beach, Florida. U.S. Army Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, VA, Miscellaneous Report No. 82-3. 138 pp.

Sedberry, G.R. 1985. Food and feeding of the tomtate, *Haemulon aurolineatum* (Pisces, Haemulidae), in the south Atlantic Bight. Fishery Bulletin 83(3):461-466.

Shaffer, R.V. and E.L. Nakamura. 1989. Synopsis of biological data on the cobia *Rachycentron canadum* (Pisces: Rachycentridae). NOAA Technical Report NMFS Circular 82, 21 pp.

Shaw, R.F. and D.L. Drullinger. 1990. Early-life history profiles, seasonal abundance, and distribution of four species of carangid larvae off Louisiana, 1982 and 1983. NOAA Technical Report NMFS Circular 89, 37 pp.

South Atlantic Fishery Management Council (SAFMC). 1998. Final Habitat Plan for the South Atlantic Region: Essential Fish Habitat Requirements for Fishery Management Plans of the South Atlantic Fishery Management Council: The Shrimp Fishery Management Plan, The Red Drum Fishery Management Plan, The Snapper Grouper Fishery Management Plan, The Coastal Migratory Pelagics Fishery Management Plan, The Golden Crab Fishery Management Plan, The Spiny Lobster Fishery Management Plan, The Coral, Coral Reefs, and Live/Hard Bottom Habitat Fishery Management Plan, The Sargassum Habitat Fishery Management Plan, and the Calico Scallop Fishery Management Plan. SAFMC. Charleston, SC, 457 pp.

Sullivan, B.K. and D. Hancock. 1977. Zooplankton and dredging: Research perspectives from a critical review. Water Research Bulletin 13(3):461-468.

Thresher, R.E. 1980. Reef Fish: Behavior and Ecology on the Reef and in the Aquarium. The Palmetto Publishing Company, St. Petersburg, FL. 171 pp.

Thresher, R.E. 1984. Reproduction in Reef Fishes. T.F.H. Publications, Inc., Neptune City, NJ. 399 pp.

Vose, F.E. and W.G. Nelson. 1994. Gray triggerfish (*Balistes capriscus* Gmelin) feeding from artificial and natural substrate in shallow Atlantic waters of Florida. Bulletin of Marine Science 55(2-3):1316-1223.

Walker, S.D. 1991. Reproducing the Atlantic spadefish at the Tulsa Zoo. Seascope 8:1-3.

Williams, A.B. 1955. A contribution to the life histories of commercial shrimps (Penaeidae) in North Carolina. Bulletin of Marine Science of the Gulf and Caribbean 5:116-146.

APPENDIX C

Section 404(b)(1) Evaluation

SECTION 404(b) EVALUATION

PINELLAS COUNTY, FLORIDA, BEACH EROSION CONTROL PROJECT ALTERNATIVE SAND SOURCE UTLIZATION

1. Project Description

a. Project Location. The project area is located in Pinellas County on the West coast of Florida, near the central portion of the Florida peninsula, approximately 25 miles west of Tampa. The sites evaluated in this document include the nearshore and offshore areas of Sand Key, Long Key, and Treasure Island.

b. General Description. The proposed work consists of dredging material from any of nine offshore borrow areas or four ebb tidal shoal areas offshore of Pinellas County, FL.

c. Authority and Purpose. Public Law 89-789 authorized the Pinellas County beach erosion control project on 7 November 1966. The project is described in House Document No. 519, 89th Congress, 2nd Session. The purpose of the project is to provide erosion control and flood protection along the Gulf coast of Pinellas County, FL.

d. General Description of Dredged or Fill Material.

1. General Characteristics of Material. The fill material is predominately fine quartz sand with varying amounts of whole and broken shell. Grain sizes of sediments within the offshore borrow areas ranged from 0.23 mm to 0.36 mm with a composite grain size of 0.29 for all the offshore borrow areas.

2. Quantity of Material. The fill material will come from one of the nine offshore borrow areas or four ebb tidal shoal areas. At least 15,000,000 cy of material is present within these potential borrow areas.

3. Source of Material. The source of the material will be one or more of the offshore borrow areas or ebb tidal shoals described in detail in the Environmental Assessment. The offshore borrow areas are labeled A-I and lie between 2 nautical miles and 6 nautical miles offshore of Sand Key. The ebb tidal shoal borrow areas include John's Pass, Blind Pass, Pass-a-Grille and Egmont shoal.

e. Description of Proposed Discharge Site.

1. Location. Fill material will be placed along the beaches of Pinellas County, FL. These locations may include previously nourished and un-nourished areas such as Indian Rocks Beach, Indian Shores, Redington Shores, North Redington Beach, Treasure Island, Upham Beach, as well as others yet to be identified.

2. Size. Size of the construction area will vary depending on project area.

3. Type of Site. The site for disposal of the sand material will be a segment of eroded, sandy, recreational beach and inshore seabed.

4. Type of Habitat. The disposal area will consist of currently eroding carbonate and quartz sand beach and inshore seabed. The borrow areas are characterized by sandy bottoms.

5. Timing and Duration of Discharge. Dredging and disposal duration will vary depending on the size and need of scheduled projects within Pinellas County.

f. Description of Disposal Method. It is anticipated that material will be excavated from the borrow areas with either a cutter head dredge or a hopper dredge. Once the material is pumped to the beach, grading will be performed using construction equipment to achieve the desired construction profile.

2. Factual Determination

a. Physical Substrate Determination

1. Substrate Elevations and Slope. Top elevations of the constructed beaches will be consistent with past projects. On average within this area elevations will be approximately 6.0 feet MLW. The equilibrium profile will vary along the project beach depending on the wave/current distribution of fill material. Generally, the equilibrium berm width will be less than the constructed width with a flatter slope from the berm to the existing bottom.

2. Sediment Type. The sediments are predominately fine quartz sand with varying amounts of shell fragments. Average grain size for composite samples from all borrow areas was 0.29 mm.

3. Dredge/Fill Material Movement. The fill material will be subject to movement by waves. Movement of material along each beach segment will vary with local wave regimes.

4. Physical Effects on Benthos. The fill material will bury some benthic organisms. Most organisms in this high wave energy environment are adapted for existence in area of considerable substrate movement. Re-colonization will occur in most cases within one year following construction. Benthic organisms associated with nearshore hardground areas that are covered will be lost. In some areas losses to hardground habitat has already taken place from previous beach nourishment projects.

b. Water Circulation, Fluctuation and Salinity Determination.

1. Water. The placement of fill on the beach will increase turbidity in the nearshore area. Because the immediate nearshore area is a high energy system and subject to naturally occurring elevated turbidity, increases due to the project will not be

significant. Fill placement will not result in 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 Flow**.** Currents in the project areas are both tidal and longshore. Net movement of water along the shoreline can be either northerly or southerly depending upon location. Placement of fill along the beach will have no effect on the currents.

3. Normal Water Level Fluctuations**.** Tides in the project area are semi-diurnal mixed. The mean range of tides in the project area is 2.6 feet (0.8m) and the spring range is 3.0 feet (0.9m). Wind set-up (piling up of water on the shoreline) has significantly more effect on seasonal and long-term water fluctuations than astronomical tides. The project will have no adverse impact.

c. Suspended Particulate/Turbidity Determinations.

1. Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site. There will be a temporary increase in turbidity levels seaward of the project area during construction. This short-term increase may have an adverse impact on non-motile autotrophic as well as infaunal and sessile organisms such as periphyton, drifting phytoplankton, and mollusks. This elevated turbidity level will be temporary and is not expected to be significant, as state standards for turbidity will not be exceeded.

2. Effects on Chemical and Physical Properties of the Water Column.

a. Light Penetration. The placement of fill material will reduce light transmission in the littoral zone due to elevated levels of suspended particulates. Because of the density of the fill material, this adverse impact is expected to be temporary and short-term in nature.

b. Dissolved Oxygen. Due to the low level of organic material in the borrow/fill material, no anoxic layers of sediment will be exposed by dredging.

c. Toxic Metals. Due to the clean nature of the calcareous borrow/fill material, toxic materials will not be introduced into the water column.

d. Pathogens. No pathogenic material is expected to be involved with the project.

e. Aesthetics. Aesthetic quality will be reduced during the beach construction period, but there will be a long-term increase in the aesthetic quality of the project area once the eroded beach is restored.

3. Effect on Biota.

a. Primary Production/Photosynthesis. Elevated turbidity levels from resuspended beach fill may have some minor adverse impact on drifting autotrophic

organisms in the immediate project area. It is anticipated that this will be a temporary and short-term phenomenon. Exposed intertidal rock provides a valuable attachment surface for photosynthetic algae. If these intertidal rock structures are permanently buried, these organisms and their ecological functions will be lost. Because of nearshore water exchange from tidal and wind generated currents, it is probable that photosynthetic organisms are continuously carried into and out of the project area. Therefore, no long-term adverse impacts are expected.

b. Suspension/Filter-Feeders. Beach fill material resuspended into the water column may contribute to the clogging of siphons of filter-feeders. This is expected to be a temporary and short-term condition. Because of high fecundity and turnover rates, rapid repopulation of these organisms is expected.

c. Sight Feeders. Elevated turbidity levels will have a short-term adverse impact on these organisms. However, these organisms are highly motile and are able to migrate into more favorable areas to fulfill their nutritional requirements.

d. Contaminant Determinations. Deposited shell and calcareous fill material is similar to the existing beach material in the surrounding area and will not introduce, relocate or increase contaminants in nearshore waters.

d. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton. Decreased light transmission caused by suspended beach material may have a temporary adverse impact on plankton. However, this is expected to be short-term and insignificant. Elevated turbidity levels will be a temporary condition and floating planktonic organisms may be removed from the project area via tides and currents.

2. Effects on Benthos. Those benthic species not able to migrate from the project area will be covered. Because of the high fecundity and high turnover rate of benthic invertebrates, repopulation of benthic communities should occur within a few months once the construction has ceased.

3. Effects on Nekton. Direct impacts to motile organisms will be insignificant because of their ability to avoid unacceptable conditions. Adjacent hardbottom habitat is periodically covered because of scouring and shifting sand. Any hardbottom structure that is permanently buried will have an adverse impact on nektonic (especially cryptic) species.

4. Effects on Aquatic Food Web. Beach nourishment activities are likely to have a temporary and insignificant short-term impact on both structures and associated organisms seaward of the project area. Because the non-motile organisms are quickly able to repopulate nourished intertidal zones, no long term adverse impacts to higher trophic level organisms are expected.

5. Effects on Special Aquatic Sites. The nourishing of project beaches is not expected to have any long-term significant adverse impact to aquatic communities. As the beach seeks equilibrium, resuspended sand may settle aquatic structures. However, the

project area lies within highly dynamic oceanographic conditions where resuspended bottom material is not uncommon.

a. Sanctuaries and Refuges. No Federal or State sanctuaries, refuges, or preserves exist in or adjacent to the project area.

b. Wetlands. There are no intertidal marshes or submerged seagrasses seaward or adjacent to the project area.

c. Vegetated Shallows. Because of the dynamic oceanographic conditions common to the project area, it is not uncommon for beach material to be resuspended into the water column. Because of the physical conditions, no submerged aquatic vegetation exists seaward of the project area.

6. Threatened and Endangered Species. In accordance with Section 7 of the Endangered Species Act, the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) have concurred that implementation of the proposed project would not adversely affect threatened or endangered species under their purview. Important safeguards will be implemented during construction will to assure that no adverse impacts from the project. Details of these safeguards are outlined in the attached Environmental Assessment.

7. Other Wildlife. Beach erosion control along Pinellas County's shoreline is not expected to have a long-term significant adverse impact on wading birds or terrestrial foraging animals. These organisms are highly motile and actively seek favorable environmental conditions for foraging and resting.

8. Actions to Minimize Impacts. All practical safeguards will be taken during construction to preserve and enhance aesthetic, recreational, and economic values in the project area.

e. Proposed Disposal Site Determinations.

1. Mixing Zone Determination. The fill material will not cause unacceptable changes in the mixing zone specified in the Water Quality Certificate in relation to: depth, current velocity and direction, variability, degree of turbulence, stratification, or ambient concentrations of constituents.

2. Determination of Compliance with Applicable Water Quality Standards. Class III State water quality standards will not be violated outside of the established mixing zone.

3. Potential Effects on Human Use Characteristics.

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. Finfish are highly motile animals and are well equipped to seek favorable environmental conditions elsewhere. Ichthyofauna

around the construction areas will relocate to more favorable habitat. As long as the offshore hardbottom structures are not permanently buried, no significant adverse impact to pelagic organisms is expected.

c. Water Related Recreation. The placement of fill will generate a temporary inconvenience for those using the beach for recreational purposes. Once construction has ceased, water related recreation would be preserved as well as enhanced by the creation of additional beach area.

d. Aesthetics. A temporary decrease in aesthetics will occur with the presence of earthmoving equipment. However, the stabilization of an eroding beach will only improve beachfront aesthetics.

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

f. Determination of Cumulative Effects on the Aquatic Ecosystem. The proposed discharge of material will have no cumulative negative impacts that would result in degradation of the natural, cultural, or recreational resources of the project area. The project will have no cumulative impacts that result in major impairment of water resources and will not interfere with the productivity and water quality of the existing aquatic ecosystem.

g. Determination of Secondary Effects on the Aquatic Ecosystem. No secondary effects are anticipated.

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

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States

c. The discharge of beach compatible fill material to be dispersed will not cause or contribute to violation of any applicable State water quality standards for Class III waters.

d. The discharge of fill material will not cause or contribute to violations of any applicable State water quality standards for Class III waters. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

e. The placement of beach compatible fill material will not jeopardize the continued existence of any species listed as threatened or endangered, or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended.

f. 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. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

g. The composition of the beach fill material obtained from the proposed offshore borrow sites are such that they will not contribute organics or pollutants to the aquatic environment. Earthmoving equipment is not expected to operate in water (below mean low water) and this will therefore minimize the likelihood that hydrocarbons from machinery will pollute the surrounding water. All responsible precautions will be taken to assure that no hazardous materials (oil, gas) are discharged from any construction activity or equipment.

h. On the basis of the guidelines, the proposed disposal site for the discharge of fill material is specified as complying with the requirements of the Clean Water Act.

APPENDIX D

Coastal Zone Management Consistency

ALTERNATIVE SAND SOURCE UTILIZATION, BEACH EROSION CONTROL PROGRAM ALTERNATIVE SAND SOURCE UTILIZATION
FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURES

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

Consistency Statement: The proposed work plans and information will be submitted to the State for a permit in compliance with this chapter.

2. Chapters 186 and 187, State and Regional Planning. These chapters establish the State Comprehensive Plan, which sets goals that articulate a strategic vision of the State's future. Its purpose is to define in a broad sense, goals and policies that provide decision-makers directions for the future and long-range guidance for orderly social, economic and physical growth.

Consistency Statement: The work has been coordinated with the State without objection.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a State Emergency Management Agency, with authority to provide for the common defense; to protect the public peace, health and safety; and to preserve and protect the lives and property of the people of Florida.

Consistency Statement: The proposed use of the borrow areas will for placement of material on Pinellas County's beaches will help protect the beach from erosion and reduce damage from storms. Therefore, this project would be consistent with the efforts of Division of Emergency Management.

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

Consistency Statement: The proposed activity will be coordinated with the State and appropriate State permits will be obtained. The proposed action will be consistent with the intent of this chapter.

5. Chapters 253, 259, 260 and 375, Land Acquisition. These chapters authorize the State to acquire land to protect environmentally sensitive areas.

Consistency Statement: As the property is already in public ownership, these chapters do not apply.

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

Consistency Statement: The proposed action will not directly impact any State managed parks or preserves.

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

Consistency Statement: The proposed action was coordinated with the State Historic Preservation Officer (SHPO) and is consistent with the intent of this chapter.

8. Chapter 288, Economic Development and Tourism. This chapter directs the State to provide guidance and promotion of beneficial development through the encouragement of economic diversification and promotion of tourism.

Consistency Statement: The proposed improvements and maintenance are consistent with the goals of this chapter.

9. Chapter 334 and 339, Public Transportation. This chapter authorizes the planning and development of a safe and efficient transportation system.

Consistency Statement: The proposed action will not adversely affect public transportation.

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

Consistency Statement: Marine crustacean, shell and andromous fishery resources will be temporarily impacted. Temporary and permanent impacts will occur within the marine and estuarine environment. These impacts will be mitigated.

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

Consistency Statement; The proposed project was coordinated with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service for compliance with the Section 7 Endangered Species Act. The project is consistent with the goals of this chapter.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage and consumption of water.

Consistency Statement: This work does not involve water resources as described in this chapter.

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

Consistency Statement: This work does not involve the transportation or discharge of pollutants. Conditions will be placed in the contract to handle inadvertent spills of pollutants such as vehicle fuels. The proposed action will comply with this chapter.

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

Consistency Statement: The proposed action does not involve the exploration, drilling or production of oil, gas or other petroleum products; therefore this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact of large-scale development.

Consistency Statement: The proposed action is consistent with the intent of this chapter.

16. Chapter 388, Arthropod Control. This chapter provides for a comprehensive approach for abatement or suppression of mosquitoes and other arthropod pests within the State.

Consistency Statement: The proposed action will be consistent with the goals of this chapter.

17. Chapter 404, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the State by the Department of Environmental Protection.

Consistency Statement: Water Quality Certification will be obtained for dredging and beach disposal operations.. The appropriate State permits will be obtained for this project.

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

Consistency Statement: The proposed action is not located near agricultural lands; therefore, this chapter does not apply.

APPENDIX E

Pertinent Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE

9549 Koger Boulevard
Suite 111
St. Petersburg, Florida 33702

April 23, 2003

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

Dear Mr. Duck:

This is in response to your letter of February 12, 2003 regarding the Alternative Sand Source Utilization Study for the Pinellas County Beach Erosion Control Project (BEC), Pinellas County, Florida. The authorized beaches of the Pinellas County BEC Project have already been coordinated with the Fish and Wildlife Service under Section 7 of the Endangered Species Act. The Corps will abide by the Terms and Conditions of the existing biological opinions and inform the Service of future nourishment events. We concur with the Corps assessment that the effects to listed species from using the alternative sand sources would be the same as those stated in previous consultations.

If you have any questions regarding this response please contact Bryan Pridgeon at 727-570-5398, extension 13.

Sincerely,

Don Palmer

for David L. Hankla
Field Supervisor

cc: Florida DEP, Bureau of Protected Species, Tallahassee

Haberer, Yvonne L SAJ

From: Eric Hawk [Eric.Hawk@noaa.gov]
Sent: Thursday, April 17, 2003 4:09 PM
To: Haberer, Yvonne L
Cc: Dugger, Kenneth R; Cheryl Scannell
Subject: Re: Pinellas County Borrow Area EA

Hi Yvonne,
I regret that the preparation / issuance of the Gulf of Mexico (GOM) Regional Biological Opinion (RBO) on hopper dredging has taken as long as it has, and may be delayed even further by recent designation of critical habitat for Gulf sturgeon.

Will this email response suffice, or do you need a signed letter from Georgia Cranmore, saying that the projects you mentioned in your message will be covered in the to-be-issued RBO for the GOM?

Contritely,

Eric

Yvonne.L.Haberer@saj02.usace.army.mil wrote:

> Hello Eric, I tried to reach you by phone today but was told you are out until Monday. Anyway, I just need to touch base with you regarding Sect. 7 consultation for the new borrow areas the Corps is proposing to use for future beach renourishment projects in Pinellas County. We coordinated with your office (Georgia Cranmore) a draft Environmental Assessment titled: Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project, dated January 13, 2003. This document was sent to your office the first week of February with a 30-day comment period. Prior to the EA, the Corps prepared a Biological Assessment for the borrow areas, and this was forwarded to your office by letter dated October 30, 2002. It is possible that a hopper dredge would be used if sand is utilized from some of the borrow areas located 2-3-miles or more offshore. In our letter, we determined the proposed action may affect sea turtles and Gulf sturgeon, therefore, requesting formal consultation with NMFS. We have not received a response from your office regarding the letter/BA or the draft EA. We would like to complete our NEPA process and to do so, need a response from your office regarding section 7 consultation. In a scoping letter response from you (letter dated Nov. 27, 2000), you had mentioned the borrow areas would be included in the RBO for the Gulf coast. If this is the case, the Corps will at least need a letter from your office stating this. If you have any questions or need me to fax over the letter/BA sent back in October, please give me a call at the number below or e-mail me at yvonne.l.haberer@usace.army.milThank you for your time. -YvonneYvonne HabererBiologistU.S. Army Corps of EngineersPlanning DivisionEnvironmental Branch701 San Marco Blvd.Jacksonville, FL 32207-8175Voice:904-232-1701Fax: 904-232-3442

Department of
Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

March 31, 2003

Ms. Yvonne Haberer
Planning Division, Jacksonville District
U. S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

RE: Department of the Army – Jacksonville District Corps of Engineers – Draft Environmental Assessment and Preliminary Finding of No Significant Impact - Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project - Pinellas County, Florida.
SAI # FL200301313365C

Dear Ms. Haberer:

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

Department (FDEP) staff note that construction of the project will require water quality certification in the form of a Joint Coastal Permit (JCP) from the FDEP Bureau of Beaches and Wetland Resources, and advise the applicant to provide additional information on the proposed borrow sites and pipeline corridors, hardbottom/benthic resources, beach placement design, mitigation for any marine resource impacts, etc. FDEP Southwest District Office and Coastal and Aquatic Management Areas staff in Tampa have provided comments and recommendations regarding the reduction of impacts to offshore hardbottom communities. Please refer to the enclosed FDEP memorandum for further details.

The Florida Fish and Wildlife Conservation Commission (FWC) indicates that a number of measures must be taken to eliminate, reduce and mitigate potential impacts to fish and wildlife species/habitat prior to dredging, pipeline placement and beach construction activities. To ensure consistency with the Marine Turtle Protection Act (section 370.12, *Florida Statutes*), updated Incidental Take Statements and Biological Opinions must also be obtained from both the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. Please see the enclosed FWC comments for additional information.

Pinellas County notes support for the project, as it helps to support and implement the many of the objectives and policies of the Pinellas County Comprehensive Plan.

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

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

Sincerely,

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm

Enclosures

cc: Brenda Arnold, FDEP, Southwest District
Rose Poynor, FDEP, Southwest District
Randy Runnels, FDEP, Southwest District
Alex Cordero, FDEP, OCAMA
Roxane Dow, FDEP, BBWR
Traci Wallace, FWC

Florida Department of
Environmental Protection

Memorandum

TO: Florida State Clearinghouse

FROM: Lauren P. Milligan, Environmental Consultant
Office of Intergovernmental Programs

DATE: March 28, 2003

SUBJECT: USACOE - Draft Environmental Assessment and Preliminary FONSI - Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project - Pinellas County
SAI # FL200301313365C

Department staff have reviewed the above referenced Draft Environmental Assessment (DEA) from the U.S. Army Corps of Engineers (USACOE) for the proposed Pinellas County alternative sand source project. We cannot determine the consistency of the project at this time as the potential environmental impacts of borrow site dredging and beach renourishment will be addressed in the application for a Joint Coastal Permit (JCP), authorization to use sovereign submerged lands and state water quality certification to be reviewed by the Department's Bureau of Beaches and Wetland Resources, pursuant to Chapters 161, 253, 258 and 373, *Florida Statutes* (*F.S.*). Additional detailed information will be required regarding the proposed borrow sites and pipeline corridors, hardbottom/benthic resources, beach placement design, mitigation for any marine resource impacts, etc. Final agency action on the permit application will constitute the State of Florida's final consistency determination. Future consistency will be based in part on adequate consideration of comments offered in this and subsequent reviews.

The Department's Southwest District Office and Coastal and Aquatic Management Areas staff in Tampa offer the following comments and recommendations:

- The stated Preferred Alternative is to utilize the nine offshore borrow sites and four ebb tidal shoals in addition to the authorized Egmont Shoal. Pursuant to the DEA, the objective is to reduce construction costs as the Egmont Shoal source is greater than 20 miles from some of the beaches to be renourished. It should be noted that utilization of the proposed ebb tidal shoal sources would significantly reduce that distance.

- Please note: the proposed breakwater structures and portions of the borrow areas are within the Pinellas County Aquatic Preserve and are therefore designated as Outstanding Florida Waters (OFW) - afforded the highest level of protection per Sections 62-4.242(2) and 62-302.700, *Florida Administrative Code*. The project must meet the OFW anti-degradation water quality standards (or criteria specified in any variance granted) and must be demonstrated to be clearly in the public interest per Section 373.414, *F.S.*

- Previous video transects off the Pinellas County shoreline have indicated that each of the areas studied is likely a unique site, whose hydrology and biota are related to distance from shore, depth and latitude. Their suitability as sand sources should be evaluated on a site-by-

site basis. Though the study indicates that approximately 75% of the surveyed sites are sand bottoms, hard and soft corals have been identified within the nine offshore borrow sites. Hardbottom areas provide significant habitat for transient and sedentary species. Project activities within and adjacent to these areas would be expected to result in adverse impacts, which may include reduced faunal abundance and increased turbidity. Feeding habits of commercially and recreationally important fish may also be temporarily altered.

- The DEA states that hardbottom impacts will only occur from utilization of the pipeline corridors - not the borrow sites. Impacts can occur from vessel staging, anchoring, cable sweep and vessel prop wash within the more shallow areas. Exclusionary buffer zones of 200 feet are proposed to avoid hardbottom impacts within the borrow sites. Please note that Blair and Flynn (1988)* documented impacts to hardbottom along the southeast coast of Florida by a dredge barge for a beach renourishment project. Approximately two acres of coral habitat were impacted, though the dredge was only authorized to excavate sand between two reefs parallel to shore. A 200-foot exclusionary buffer for the reef areas had been required, but dredging impacts occurred within the unauthorized areas.

- Construction of the two breakwater structures may result in hardbottom impacts. Though hardbottom communities were identified in the survey areas, detailed construction plans were not provided to show actual structural alignments. Hardbottom features only appear to exist within the most northern area of the Indian Rocks Beach breakwater survey area; therefore, impact minimization may be possible for this structure.

- Please provide the criteria for the density categories of the hardbottom areas and taxa considered in these categorizations. For example, is the wide range interpreted as "medium density" consistent with other studies?

- Characterizations like "dominant mollusks" appear to ignore the smaller species which, in many cases, contribute considerably to the biomass and diversity of the biotic communities. For example, past video surveys in the vicinity have shown sand areas densely populated by smaller snails not listed on the limited invertebrate species lists in this document.

- Hardbottom areas may be ephemeral - community changes may occur due to relatively thin veneers of sand, which may shift. Area surveys should be updated as necessary. It is noted, however, that the subject hardbottom community species are not as opportunistic and ephemeral as those in Tampa Bay. While some corals like *Siderastrea*, *Phyllangia* and *Occulina* may recruit relatively rapidly, others like *Montastrea* and *Stephanocoenia* are more indicative of a climax community that likely requires a number of years for impact recovery. For this reason, impact avoidance and minimization are particularly important.

- The DEA states that the anticipated renourishment cycle would be 5-7 years and the expected benthic community recovery would be 1-2 years. Some literature cites 2-2.5

years for biomass recovery. There is a concern that the proposed activities will result in continual disturbances to these communities and adverse cumulative impacts.

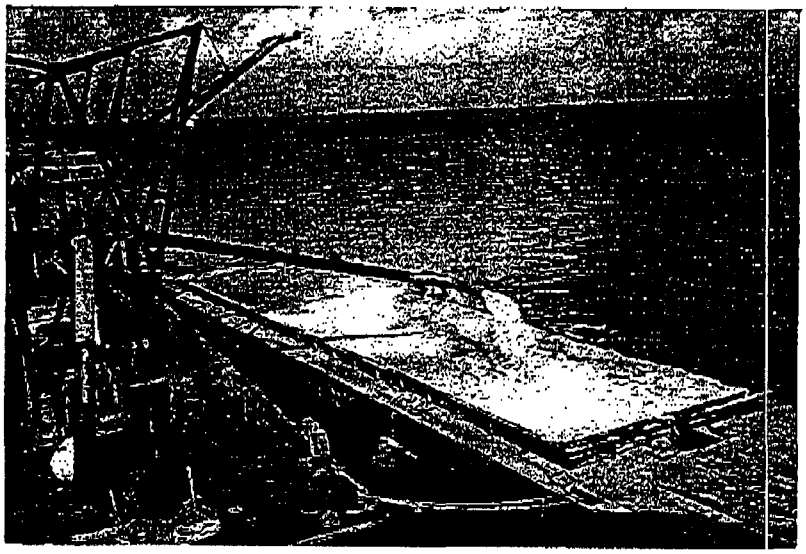
- The project would be expected to result in increased turbidity and potential sedimentation. The photo included below shows a typical plume associated with dredging/renourishment projects. It is evident that impacts may not be localized. A greater exclusionary buffer zone for hardbottom communities is requested to reduce potential impacts. NO

- It is recommended that continuous electronic positioning and navigation systems be utilized during all staging and dredging activities to ensure that dredging vessels and equipment remain within the approved limits.

- Staff request the following additional information to assist in area evaluations:

  - copies of the video transects;
  - side scan records;
  - ArcView shapefiles, AutoCad files or other resource map files suitable for conversion;
  - data from sediment cores, including: grain size distribution, sediment geochemistry (silicoclastics, carbonates, etc.) and other bulk properties such as permeability/porosity.

* Blair S. and B. Flynn. 1988. Sunny Isles Beach Restoration Project: Mechanical Damage to the Reefs Adjacent to the Borrow Area. Metro-Dade DERM Technical Report 88-14. 17 pp.



Pinellas County-Sand Key renourishment project-late 1980s.

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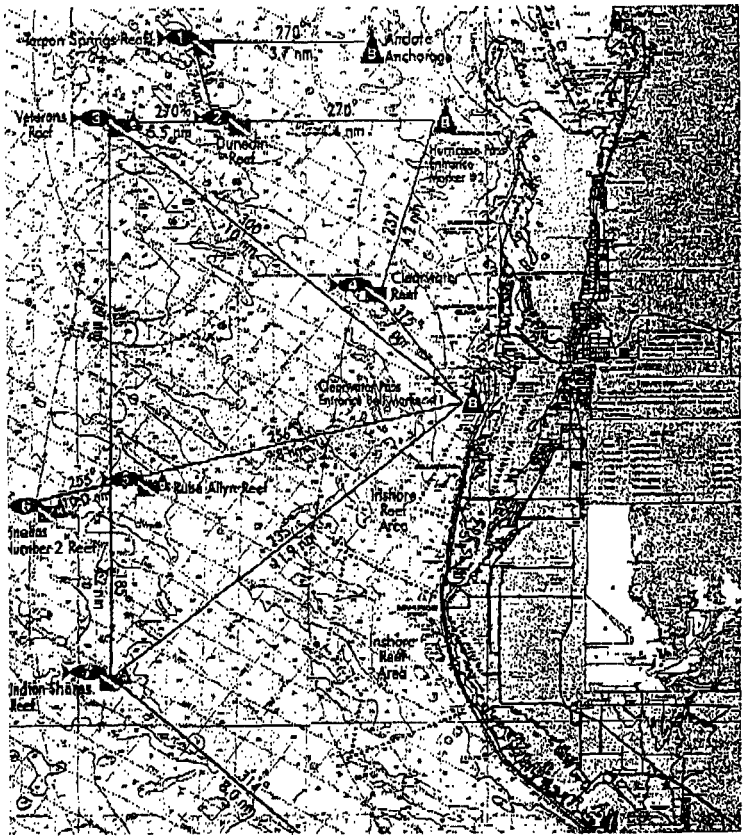


Borrow area G is located within the southern Inshore Reef Area identified within the above Pinellas County Artificial Reef Guide. Borrow areas E and F are located partially within this identified area. Proposed pipeline alignment routes for borrow areas D and I are partially located within the northern Inshore Reef Area.

We recommend that the USACOE and local project sponsor continue to coordinate with the Department's Bureau of Beaches and Wetland Resources to resolve any outstanding issues related to: sediment quality and composition; sediment placement; dredging/disposal turbidity; hardbottom, marine turtle and manatee protection; and marine resource mitigation. For additional information on JCP permitting requirements, please contact Mr. Martin Seeling in the Bureau of Beaches and Wetland Resources at (850) 487-4471, ext. 104.

We appreciate the opportunity to comment on the DEA. Please feel free to call me at (850) 245-2161 if you have any questions or need additional information.

/lpm

cc: Brenda Arnold, FDEP, Southwest District
Rose Poynor, FDEP, Southwest District
Alex Cordero, FDEP, OCAMA
Randy Runnels, FDEP, OCAMA
Roxane Dow, FDEP, BBWR

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

BRIAN S. BARNETT, INTERIM DIRECTOR
OFFICE OF ENVIRONMENTAL SERVICES
(850)488-6661 TDD (850)488-9542
FAX (850)922-5679

March 5, 2003

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

RE: SAI #FL200301313365C, U.S. Army Corps of Engineers Preliminary Finding of No Significant Impact – Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project

Dear Ms. Cranick:

The Office of Environmental Services of the Florida Fish and Wildlife Conservation Commission has reviewed the Preliminary Finding of No Significant Impact for the Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project, and offers the following comments.

Nine offshore subtidal areas and four ebb tidal shoals offshore of Sand Key, Treasure Island, and Long Key were identified as potential borrow areas for future beach nourishment projects in Pinellas County. Measures to eliminate, to reduce, or to avoid potential impacts to fish and wildlife resources include 200-foot buffer zones around hard bottom areas, mitigation of reef impacts due to pipe placement through creation of artificial reefs, standard manatee protection conditions during all dredging activities, and compliance with the terms and conditions of Biological Opinions from the U.S. Fish & Wildlife Service and the National Marine Fisheries Service.

To ensure consistency with the Marine Turtle Protection Act (s. 370.12 F.S.), updated Incidental Take Statements and Biological Opinions must be obtained from both the U.S. Fish & Wildlife Service and the National Marine Fisheries Service prior to dredging or construction on the beach.

Dredging activities should avoid the use of hopper dredges where possible. Dredging should avoid impacts to hard bottom areas utilized for foraging by marine turtles, including macroalgal areas used as developmental habitat by juvenile green turtles.

To the degree possible, beach nourishment activities should avoid the shorebird nesting season, April to September, and areas considered critical habitat for piping plovers (*Charadrius melodus*). Dredging of ebb tidal shoals should minimize impacts to both nesting shorebirds and winter migrants that might use these areas for resting or foraging.

Please contact me, or Dr. Robbin Trindell at (850) 922-4330, if you have questions about these comments.

Sincerely,

Brian Barnett

Brian S. Barnett, Interim Director
Office of Environmental Services

BSB/RNT
ENV 7-3-2
a:\sa3365c.doc
cc: Ms. Linda Ferrell, FWS-Vero
Mr. Eric Hawk, NMFS-SP

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

FEB 2 7 2003

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

Attn: Mr. James Duck, Chief
Planning Division

Subject: **Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project, Pinellas County, FL (January, 2003)**

Dear Sir:

Pursuant to Section 309 of the Clean Air Act, EPA, Region 4 has reviewed the subject document, an evaluation of the consequences of reconstituting the County's eroding beaches via nourishment material obtained from nine offshore borrow areas and four ebb tidal shoals. These additional sites would make nourishment activities more cost effective by shortening the transport distance between borrow and emplacement sites as well as allow for use of a wider range of excavation methods. Currently material from the Egmont Channel Shoal is translocated to the barrier communities of Clearwater Beach, Sand Key, Treasure Island, and Long Key. As was previously the case, indefinite re-nourishment will be necessary to retain the constructed beach profiles. Various sand retention features, viz., groins, revetments, and breakwaters, will also remain in place.

As a result of our review the following observations are provided for your use in finalizing the project design for the EA/FONSI:

o Alternatives which involve nonstructural measures are almost always discounted as not meeting planning objectives. We offer that the legitimate goal of these

"storm damage/flood reduction" projects should be to foster public health/safety while reducing attendant economic losses. However, the premise seems to have evolved that this can only be accomplished by pumping large amounts of sand from one location to another; oftentimes at variance to the natural directional movement of these sediments. We appreciate that temporarily broadening the beach with this imported sand appears to accomplish the stated project aims, but it also may make it seem that the underlying erosion problem has been solved. We understand that this may not be the case, but before this is demonstrated additional at-risk development may be encouraged. We suggest that non-structural measures such as rezoning to discourage land use intensification have an important place in the planning process. This is especially true on barrier features in which the shoreline can only retreat a nominal distance before encountering the lee side of the island.

o While the Egmont Shoal borrow area was competent to provide the necessary nourishment material, it is 11 to 25 miles from the various project reaches. We understand that this is a prohibitive distance to transport sand via hydraulic pipeline for a number of cost/logistical reasons. With the additional sites it now appears practical to forego the need for use of a hopper dredge and the attendant risk of sea turtle entrainment. Further, with the number of historic preservation sites in the area, use of a more focused excavation method, e.g., bucket/barge operation, in lieu of a hopper may be more appropriate.

o Texturally the representative core samples taken in connection with this modification appear to be incrementally larger than the native material on un-nourished beaches. Whether this is important as regards turtle nesting and/or beach stability remain to be seen. Hence, we suggest that monitoring be conducted post-project.

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

Sincerely,

Heinz J. Mueller, Chief
Office of Environmental Assessment

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

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

February 25, 2003

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

Dear Mr. Duck:

The National Marine Fisheries Service (NOAA Fisheries) has reviewed your letter dated January 27, 2003, transmitting an draft environmental assessment (EA) and an Essential Fish Habitat (EFH) assessment for the Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project in Pinellas County, Florida.

Based on information provided in EA and the EFH assessment, NOAA Fisheries concurs with your determination that the utilization of the borrow areas would not adversely affect EFH and, therefore, we do not have any EFH Conservation Recommendations to offer. Pursuant to the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act, no further coordination is necessary unless the project design is modified and you determine that implementation of those revisions could result in adverse impacts to EFH and dependent fishery resources.

We appreciate the opportunity to provide you with our comments. If you have any questions, please contact Mr. Mark Thompson of our Panama City Office at 850/234-5061.

Sincerely,

for Rickey N. Ruebsamen
Acting Assistant Regional Administrator
Habitat Conservation Division

cc:
F/SER4

Southwest Florida Water Management District

2379 Broad Street, Brooksville, Florida 34604-6899
(352) 796-7211 or 1-800-423-1476 (FL only)
SUNCOM 628-4150 TDD only 1-800-231-6103 (FL only)
On the Internet at: WaterMatters.org

An Equal Opportunity Employer

Tampa Service Office
7601 Highway 301 North
Tampa, Florida 33637-6759
(813) 985-7481 or
1-800-836-0797 (FL only)
SUNCOM 578-2070

Bartow Service Office
170 Century Boulevard
Bartow, Florida 33830-7700
(863) 534-1448 or
1-800-492-7862 (FL only)
SUNCOM 572-6200

Sarasota Service Office
6750 Fruitville Road
Sarasota, Florida 34240-9711
(941) 377-3722 or
1-800-320-3503 (FL only)
SUNCOM 531-6900

Lecanto Service Office
3600 West Sovereign Path
Suite 226
Lecanto, Florida 34461-8070
(352) 527-8131
SUNCOM 667-3271

February 13, 2003

Ms. Cindy Cranick
Florida State Clearinghouse
Florida Department of Environmentally Protection
3900 Commonwealth Boulevard, Mail Station 47
Tallahassee, Florida 32399-3000

Subject: U.S. Army Corps of Engineers – and Finding of No Significant Impact – Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project – Pinellas County, Florida.

SAI#: FL 200301313365C

Dear Ms. Cranick:

The staff of the Southwest Florida Water Management District (District) has conducted a consistency evaluation for the project referenced above. Consistency findings are divided into four categories and are based solely on the information provided in the subject application.

FINDING	CATEGORY
X	Consistent/No Comment
	Consistent/Comments Attached
	Inconsistent/Comments Attached
	Consistency Cannot be Determined Without an Environmental Assessment Report/Comments Attached

RECEIVED FEB 19 2003 OIP/OGA

This review does not constitute permit approval under Chapter 373, Florida Statutes, or any rules promulgated thereunder, nor does it stand in lieu of normal permitting procedures in accordance with Florida Statutes and District rules.

If you have any questions or if I can be of further assistance, please contact me in the District's Planning Department at extension 4423.

Sincerely,

Jason M. Mickel
Basin Planner

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

FEB 12, 2003

Mr. Dave Hankla
U.S. Fish and Wildlife Service
Jacksonville Field Office
6620 Southpoint Drive
Suite 310
Jacksonville, Florida 32216-0912

Dear Mr. Hankla :

In accordance with the provisions of Section 7 of the Endangered Species Act (ESA), as amended, the following information is provided concerning the Alternative Sand Source Utilization Study for the Pinellas County Beach Erosion Control (BEC) Project, Pinellas County, Florida.

The study investigated nine offshore areas and four ebb tidal shoals for potential borrow sites for future beach nourishment projects in Pinellas County. Historically, sand has been obtained from inlet borrow areas and the Egmont Channel Shoal. The new areas investigated are closer to Pinellas County beaches, thus offering a more cost effective alternative for future nourishment needs.

The U.S. Fish and Wildlife Service (FWS) has provided various reports and Biological Opinions for past nourishment activities for the federally authorized beaches of Pinellas County (Sand Key, Treasure Island and Long Key). Previous Biological Opinions evaluated the effects of beach nourishment on listed species under the jurisdiction of the FWS.

Since the authorized beaches of the Pinellas County BEC Project have already been coordinated with FWS under Section 7 of the ESA, the U.S. Army Corps of Engineers (Corps) is re-initiating consultation to include the alternative borrow areas that may be utilized in the future. It is our opinion that the effects to listed species would be the same as stated in previous Biological Opinions if the alternative sand sources were used. Therefore, the Corps will abide by the terms and conditions of the Opinions and keep you informed as necessary of future nourishment events.

Enclosed is a copy of the Draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for the study. We request your comments on the EA, and Section 7 of the ESA, within 30 days of receipt of this letter. If you have any questions or need further information, please contact Ms. Yvonne Haberer at 904-232-1701.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

Copy Furnished w/o encl:

Mr. Bryan Pridgeon, U.S. Fish and Wildlife Service, 9549 Koger Blvd., Suite 111, St. Petersburg, Florida 33702

FSC005-003

FLORIDA STATE CLEARINGHOUSE
RPC INTERGOVERNMENTAL COORDINATION
AND RESPONSE SHEET

RNR

AI#: FL200301313365C DATE: 1/29/03

OMMENTS DUE TO CLEARINGHOUSE: 3/2/03

REA OF PROPOSED ACTIVITY: COUNTY: PINELLAS CITY:

] FEDERAL ASSISTANCE [X] DIRECT FEDERAL ACTIVITY [ ] FEDERAL LICENSE OR PERMIT [ ] OCS

ROJECT DESCRIPTION

.S. Army Corps of Engineers - and Finding of No Significant Impact - Alternative Sand Source Utilization for the Pinellas ounty Beach Erosion Control Project - Pinellas County, Florida. Also available at: ttp//www.saj.usace.army.mil/pd/envdocs/envdocsb.htm

OUTING: RPC

X TAMPA BAY RPC

RECEIVED
FEB - 5 2003
Tampa Bay Regional Planning Council

LEASE CHECK ALL THE LOCAL GOVERNMENTS BELOW FROM WHICH COMMENTS HAVE BEEN ECEIVED; ALL COMMENTS RECEIVED SHOULD BE INCLUDED IN THE RPC'S CLEARINGHOUSE ESPONSE PACKAGE. IF NO COMMENTS WERE RECEIVED, PLEASE CHECK "NO COMMENT" OX AND RETURN TO CLEARINGHOUSE.

COMMENTS DUE TO RPC: 2/21/03

___PINELLAS

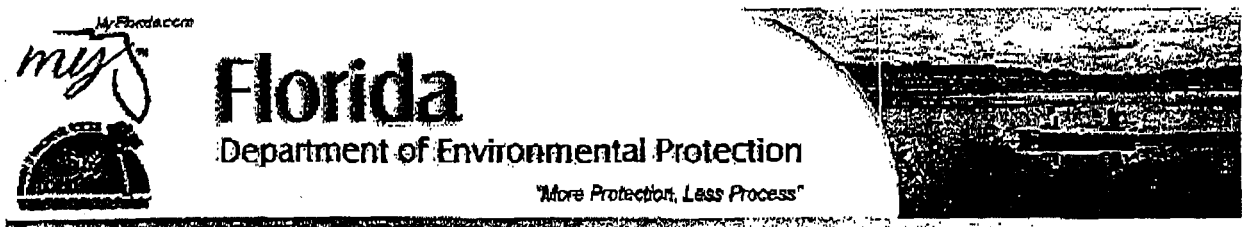
) COMMENTS: ✓

THE RPC DOES NOT RECEIVE COMMENTS BY THE DEADLINE DATE, THE RPC SHOULD CONTACT IE LOCAL GOVERNMENT TO DETERMINE THE STATUS OF THE PROJECT REVIEW PRIOR TO)RWARDING THE RESPONSE PACKAGE TO THE CLEARINGHOUSE.)

)TES:

L CONCERNS OR COMMENTS REGARDING THE ATTACHED PROJECT (INCLUDING ANY RPC)MMENTS) SHOULD BE SENT IN WRITING BY THE DUE DATE TO THE CLEARINGHOUSE. LEASE ATTACH THIS RESPONSE FORM AND REFER TO THE SAI # IN ALL CORRESPONDENCE.

YOU HAVE ANY QUESTIONS REGARDING THE ATTACHED PROJECT, PLEASE CONTACT THE STATE EARINGHOUSE AT (850) 414-6580 OR SUNCOM 994-6580.



Project Information	
Project:	FL200301313365C
Due Date:	MARCH 02, 2003
Description:	U.S. Army Corps of Engineers - and Finding of No Significant Impact - Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project - Pinellas County, Florida. Also available at: http//www.saj.usace.army.mil/pd/envdocs/envdocsb.htm
Keywords:	ACOE - EA/FONSI - Beach Erosion Project - Pinellas
Program:	

Agency Comments:
TAMPA BAY RPC - TAMPA BAY REGIONAL PLANNING COUNCIL
NC
PINELLAS - PINELLAS COUNTY
Pinellas County supports the project as it helps to support and implement the listed (in 2/21/03 letter) objectives and policies of the Comprehensive Plan.
ENVIRONMENTAL POLICY UNIT - OFFICE OF POLICY AND BUDGET, ENVIRONMENTAL POLICY UNIT
No Comment
COMMUNITY AFFAIRS - FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS
nc
FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
TO ENSURE CONSISTENCY WITH THE MARINE TURTLE PROTECTION ACT (S. 370.12F.S), UPDATED INCIDENTAL TAKE STATEMENTS AND BIOLOGICAL OPINIONS MUST BE OBTAINED FROM THE U.S. FISH AND WILDLIFE SERVICE AND THE NATIONAL MARINE FISHERIES SERVICE PRIOR TO DREDGING OR CONSTRUCTION ON THE BEACH.
STATE - FLORIDA DEPARTMENT OF STATE
No Final Comments Received
TRANSPORTATION - FLORIDA DEPARTMENT OF TRANSPORTATION
No Final Comments Received
ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
FDEP staff note that construction of the project will require water quality certification in the form of a Joint Coastal Permit (JCP) from the FDEP Bureau of Beaches and Wetland Resources, and advise the applicant to provide additional information on the proposed borrow sites and pipeline corridors, hardbottom/benthic resources, beach placement design, mitigation for any marine resource impacts, etc. FDEP Southwest District Office and Coastal and Aquatic Management Areas staff in Tampa have provided comments and recommendations regarding the reduction of impacts to offshore hardbottom communities.
SOUTHWEST FLORIDA WMD - SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
NC

For more information please contact the Clearinghouse Office at:

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

Visit the Clearinghouse Home Page to query other projects.

)UNTY: PINELLAS

DATE: 1/29/03
COMMENTS DUE DATE: 3/2/03
CLEARANCE DUE DATE: 3/30/03
SAI#: FL200301313365C

)ssage:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNITS
COMMUNITY AFFAIRS FISH and WILDLIFE COMMISSION STATE TRANSPORTATION ENVIRONMENTAL PROTECTION	SOUTHWEST FLORIDA WMD	X ENVIRONMENTAL POLICY UNIT

RECEIVED
FEB - 4 2003
OFFICE OF POLICY AND BUDGET

: attached document requires a Coastal Zone Management Act/Florida ıstal Management Program consistency evalutation and is categorized)ne 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:

U.S. Army Corps of Engineers - and Finding of No Significant Impact - Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project - Pinellas County, Florida. Also available at: http/www.saj.usace.army.mil/pd/envdocs/envdocsb.htm

RECEIVED
MAR 0 4 2003
OIP/OLGA

To: Florida State Clearinghouse
AGENCY CONTACT AND COORDINATOR (SCH)
2555 SHUMARD OAK BLVD
TALLAHASSEE, FLORIDA 32399-2100
(850) 414-6580 (SC 994-6580)
(850) 414-0479

EO. 12372/NEPA
- [X] No Comment
- [ ] Comment Attached
- [ ] Not Applicable

Federal Consistency
- [ ] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:
Division/Bureau: OPB/ENV
Reviewer: M. Tanner
Date: 2/28/03

COUNTY: PINELLAS

DATE: 1/29/03
COMMENTS DUE DATE: 3/2/03
CLEARANCE DUE DATE: 3/30/03
SAI#: FL200301313365C

Message:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNITS
X COMMUNITY AFFAIRS FISH and WILDLIFE COMMISSION STATE TRANSPORTATION ENVIRONMENTAL PROTECTION	SOUTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT

RECEIVED
FEB 4 2003
DEPT. OF COMM. AFFAIRS/DCP

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation 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.

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Project Description:

U.S. Army Corps of Engineers - and Finding of No Significant Impact - Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project - Pinellas County, Florida. Also available at: http//www.saj.usace.army.mil/pd/envdocs/envdocsb.htm

RECEIVED
FEB 0 7 2003
OIP/OLGA

To: **Florida State Clearinghouse**
AGENCY CONTACT AND COORDINATOR (SCH)
2555 SHUMARD OAK BLVD
TALLAHASSEE, FLORIDA 32399-2100
(850) 414-6580 (SC 994-6580)
(850) 414-0479

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: DCA/DCP
Reviewer:
Date: 2/07/03

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

REPLY TO
ATTENTION OF

JAN 27 2003

Planning Division
Environmental Branch

TO WHOM IT MAY CONCERN:

Pursuant to the National Environmental Policy Act and U.S. Army Corps of Engineers Regulation (33 CFR 230.11), this letter constitutes the Notice of Availability of the Preliminary Finding of No Significant Impact (FONSI) for the Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project, Pinellas County, Florida.

The Environmental Assessment (EA) and FONSI is available for viewing on the Corps of Engineers website under "Pinellas County Comprehensive Borrow Area Study" at http//www.saj.usace.army.mil/pd/envdocs/envdocsb.htm. Additionally, a copy of the EA and Preliminary FONSI is available at the St. Petersburg Beach Public Library, 365 73rd Avenue, St. Petersburg Beach, Florida. For library hours phone 727-363-9238.

Comments or questions concerning the EA that led to the FONSI should be provided to Ms. Yvonne Haberer at the letterhead address within 30 days of receipt of this letter. Ms. Haberer can also be reached at 904-232-1701.

Sincerely,

James C. Duck

James C. Duck
Chief, Planning Division

Planning Division
Environmental Branch

JAN 2 7 2003

St. Petersburg Beach Public Library
365 73rd Avenue
St. Petersburg Beach, FL 33706

Dear Sir/Madam:

Enclosed are two copies of the Environmental Assessment and Preliminary Finding of No Significant Impact for the Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project, Pinellas County, Florida. The copies are being provided for public review pursuant to the National Environmental Policy Act. Please make these copies available in the reference section of your library.

Thank you for your assistance. If you have any questions, please contact Ms. Yvonne Haberer at 904-232-1701.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

Haberer/CESAJ-PD-EP/1701 1-17-03
Dugger/CESAJ-PD-EG
Mason/CESAJ-PD-E
Mc[illegible]en/CESAJ-DP-I
Duck/CESAJ-PD

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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

JAN 2 7 2003

Mr. Rick Ruebsamen
Acting Assistant Regional Administrator
National Marine Fisheries Service
Southeast Regional Office
Habitat Conservation Division
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Ruebsamen:

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 Alternative Sand Source Utilization for the Pinellas County Beach Erosion Control Project in Pinellas County, Florida.

Included in the EA as Appendix B, is the Essential Fish Habitat (EFH) Assessment as required by the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). Based on analysis discussed in the EA, the U.S. Army Corps of Engineers has determined that utilization of the proposed borrow areas would not adversely affect the essential habitat of species managed under this Act.

We request your comments pursuant to NEPA and the MSFCMA within 30 days of receipt of this letter. If you have any questions or need further information, please contact Ms. Yvonne Haberer at 904-232-1701.

Sincerely,

James C. Duck

James C. Duck
Chief, Planning Division

Enclosure

CF (w/encl):

Mr. Mark Thompson, National Marine Fisheries Service, Panama City Field Office, 3500 Delwood Beach Road, Panama City, Florida 32408-7499

Planning Division
Environmental Branch

OCT 3 0 2002

Ms. Georgia Cranmore
Assistant Regional Administrator
for Protected Species
National Marine Fisheries Service
9721 Executive Center Drive, North
St. Petersburg, Florida 33702

Dear Ms. Cranmore:

This is in reference to the Pinellas County Shore Protection Project and the Comprehensive Borrow Area Study.

Enclosed is a Biological Assessment pursuant to Section 7(a) of the Endangered Species Act. The U.S. Army Corps of Engineers (Corps) has determined that the proposed action may affect sea turtles and Gulf sturgeon. Therefore, we are requesting formal consultation with the National Marine Fisheries Service (NMFS) to address potential impacts that the proposed project may have on sea turtles and Gulf sturgeon.

As discussed in the Biological Assessment, the Corps has identified several new borrow areas for the nourishment of Pinellas County beaches. As early as late spring or early summer 2003, the Corps is proposing to use one of the new borrow areas identified. It is our understanding that the NMFS intends to include the new Pinellas County borrow areas in the Regional Biological Opinion (RBO) being prepared for the Gulf Coast. Our office has no objection to this decision. However, if the NMFS anticipates a delay in releasing the final RBO, then the Corps requests that a separate Biological Opinion be prepared to prevent delays in our project schedule.

If you have any questions or need further information, please contact Ms. Yvonne Haberer at 904-232-1701 or by email yvonne.l.haberer@usace.army.mil.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

Copy Furnished (w/o encl):

CESAJ-DP-I (Mcmillen)

10-28-02
Haberer/CESAJ-PD-EP/1701 10/21/02
Acosta/CESAJ-PD-EP
Dugger/CESAJ-PD-EG
Mason/CESAJ-PD-E 10/28/02
McMillen/CESAJ-DP-I
Duck/CESAJ-PD

L:group/pde/haber/PinellasSec7NMFS.doc

ENDANGERED SPECIES
BIOLOGICAL ASSESSMENT
COMPREHENSIVE BORROW AREA STUDY
PINELLAS COUNTY, FLORIDA

1. Location.
The project area is located in Pinellas County on the west coast of Florida, near the central portion of the Florida Peninsula, approximately 25 miles west of Tampa (figure 1, location map)

2. Proposed Activity.
The Pinellas County Shore Protection Project has historically obtained beach quality fill from inlet borrow areas and the Egmont Channel Shoal for nourishment of Pinellas County Beaches including, but not limited to, Sand Key, Long Key and Treasure Island. To accommodate future renourishment needs, alternative borrow areas have been identified which are closer to the beach fill sites. A detailed marine biological survey was conducted in 2001/2002 to identify and delineate any marine resources present within the proposed borrow areas. Specific borrow areas being investigated include nine offshore sites (figure 2) and four ebb-tidal shoals of the following passes, Blind Pass, Pass-a-grill Pass, John's Pass, and Clearwater Pass (figure 3). Additionally, this study is investigating a segment of Egmont Channel Shoal (figure 3) and an area within Pass-a-grill Channel (figure 4). The offshore borrow areas are located between 2--6 miles offshore of Pinellas County. Therefore, the proposed dredging could involve the use of a hopper dredge.

3. References.
The Biological Opinions listed below have been prepared for previous shore protection and dredging projects on the Central/Southern Gulf Coast of Florida and are relevant to the proposed activities. Additionally, this Biological Assessment references the Regional Biological Opinion for the Gulf Coast listed below as 3c.

a. National Marine Fisheries Service Biological Opinion dated October 1, 1996, Dredging of Egmont Shoal to Nourish Pinellas County, Florida, Beaches. NMFS, Southeast Regional Office.

b. National Marine Fisheries Service Biological Opinion dated October 26, 1999, Maintenance Dredging of Charlotte Harbor Entrance Channel. NMFS, Southeast Regional Office.

c. National Marine Fisheries Service Biological Opinion (DRAFT) dated November 7, 2001, Maintenance Dredging of Gulf of Mexico Navigation Channels and Sand Mining ("Borrow") Areas Using Hopper Dredges. NMFS, Southeast Regional Office, Protected Resources Division.

4. Listed Species Likely to Occur in the Project Area.
Of the listed species occurring in the action area under National Marine Fisheries Service (NMFS) jurisdiction, the U. S. Army Corps of Engineers (Corps) has determined that the following species may be affected by dredging the proposed borrow areas:

SEA TURTLES:
1. Loggerhead sea turtle - *Caretta caretta*
2. Kemp's ridley sea turtle - *Lepidochelys kempi*
3. Green sea turtle - *Chelonia mydas*
4. Hawksbill sea turtle - *Eretmochelys imbricata*

OTHER:
Gulf of Mexico sturgeon - *Acipenser oxyrinchus desotoi*

Additional endangered species that are known to occur in the Gulf of Mexico include the leatherback sea turtle (*Dermochelys coriacea*), sperm whale (*Physeter catodon*), humpback whale (*Megaptera novaeanglia*), fin whale (*Balaenoptera physalus*), blue whale (*Balaenoptera musculus*), sei whale (*Balaenoptera borealis*), and Northern right whale (*Eubalaena glacialis*).

There has never been a reported take of a leatherback sea turtle associated with a hopper dredging activity. Due to their non-benthic feeding habitats and the unlikelihood of their presence nearshore, the Corps has determined that the leatherback sea turtle is unlikely to be adversely affected by the proposed dredging activities.

Due to the very low likelihood of hopper dredge interaction with the above listed whale species, the Corps has determined that the proposed dredging activities would not have any effect on whales.

CRITICAL HABITAT:
No critical habitat for listed species under jurisdiction of NMFS has been designated in the Gulf of Mexico.

5. Discussion of Potential Impacts to Listed Species.

Sea Turtles and Gulf sturgeon
The potential impacts to sea turtles and Gulf sturgeon that can be associated with hopper dredging and shore protection projects have been discussed at length in the Biological Opinions listed in Section 3 and are incorporated here by reference.

6. Efforts to Eliminate Potential Impacts on Listed Species.

During hopper dredging activities, the Corps will implement the following measures to minimize adverse effects to sea turtles and Gulf sturgeon:

1. The rigid sea turtle deflector draghead will be used on all hopper dredges.

2. Hopper dredging activities will be completed, when possible, between December and March when sea turtle abundance is lowest throughout the Gulf coastal and inshore waters.

3. There will be one hundred percent observer coverage of hopper dredging operations by NMFS-approved observers. Observers will monitor the hopper spoil, screening, and dragheads for sea turtles and Gulf sturgeon.

4. Any sea turtle or Gulf sturgeon takes would be reported immediately to the NMFS SERO and the FDEP.

5. The Corps will advise inspectors, operators and vessel captains about the prohibitions on taking, harming, or harassing sea turtles and Gulf sturgeon, and the civil penalties that apply.

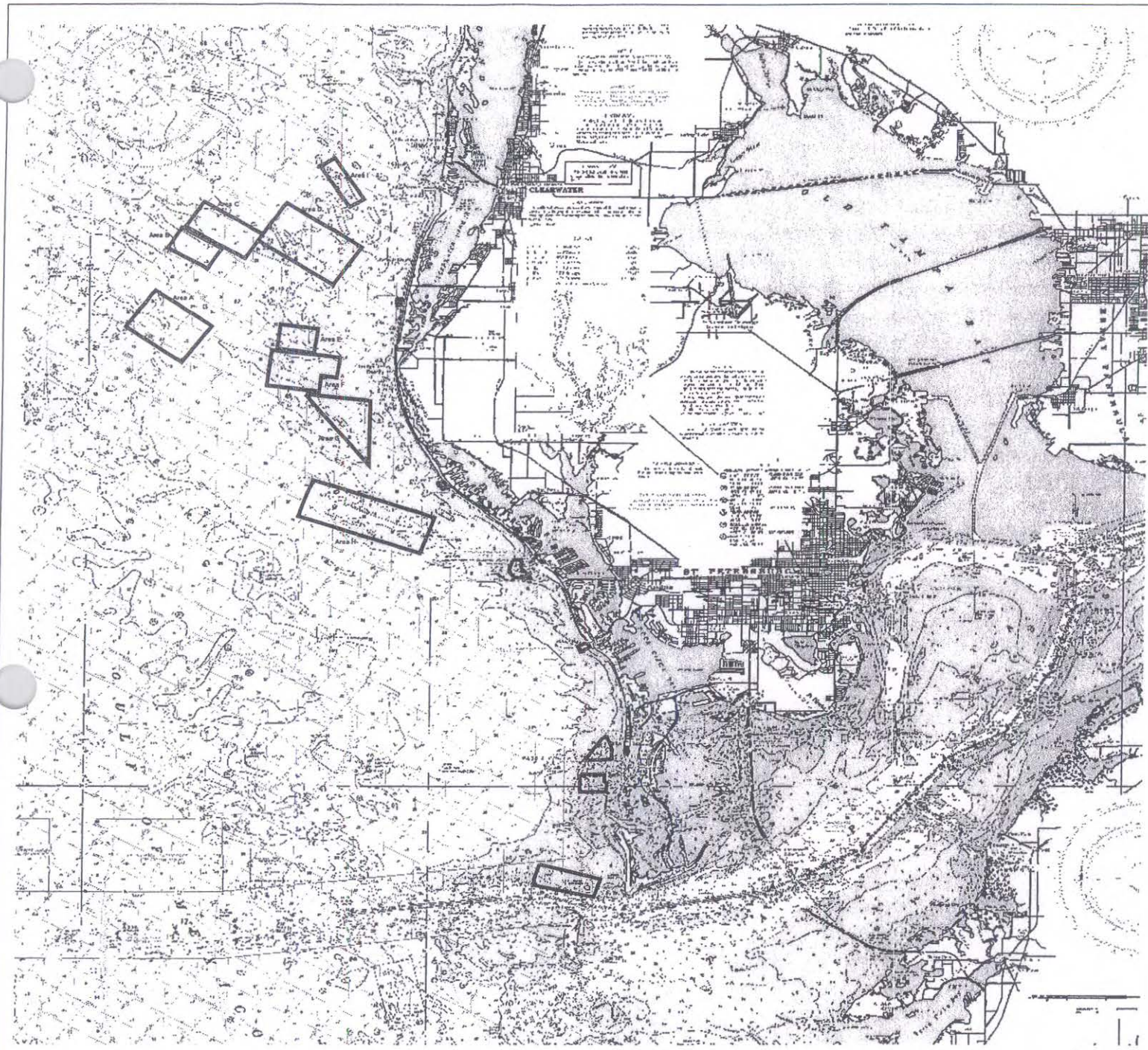
6. For hopper dredges, 100 percent inflow and overflow screening will be required whenever possible.

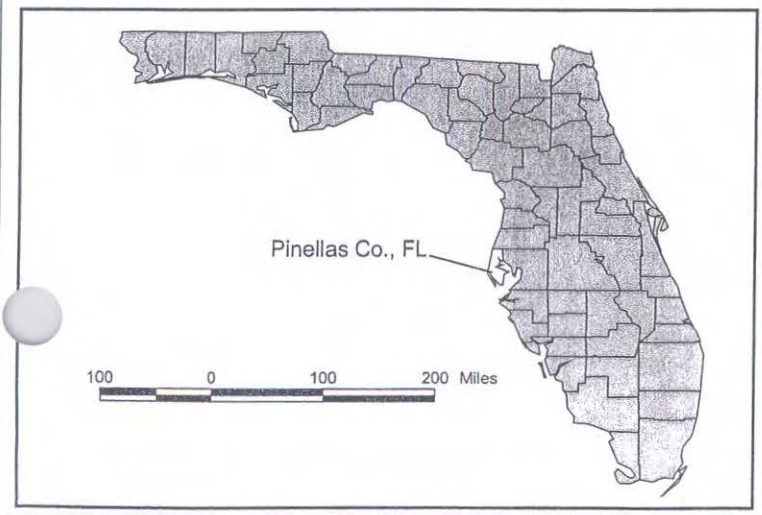
7. When disengaging dredging pumps, the dragheads must be firmly on the bottom to prevent impingement or entrainment of sea turtles within the water column.

8. The borrow areas have been designed in a way to ensure that dredging will not occur within a minimum of 200 feet from any hardground area.

7. Effects Assessment.

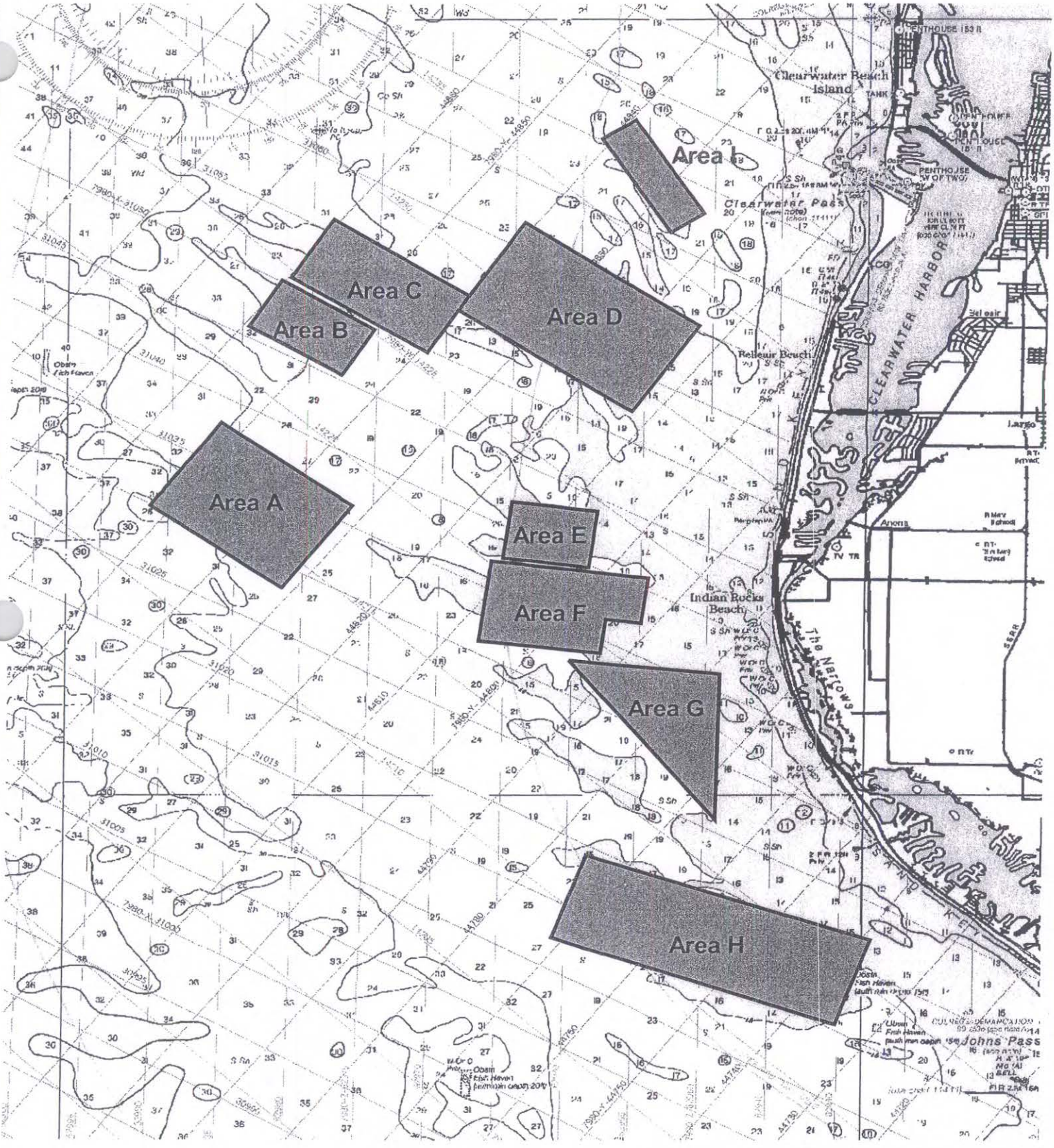
The Corps has determined that the proposed activities may affect sea turtles and Gulf sturgeon.





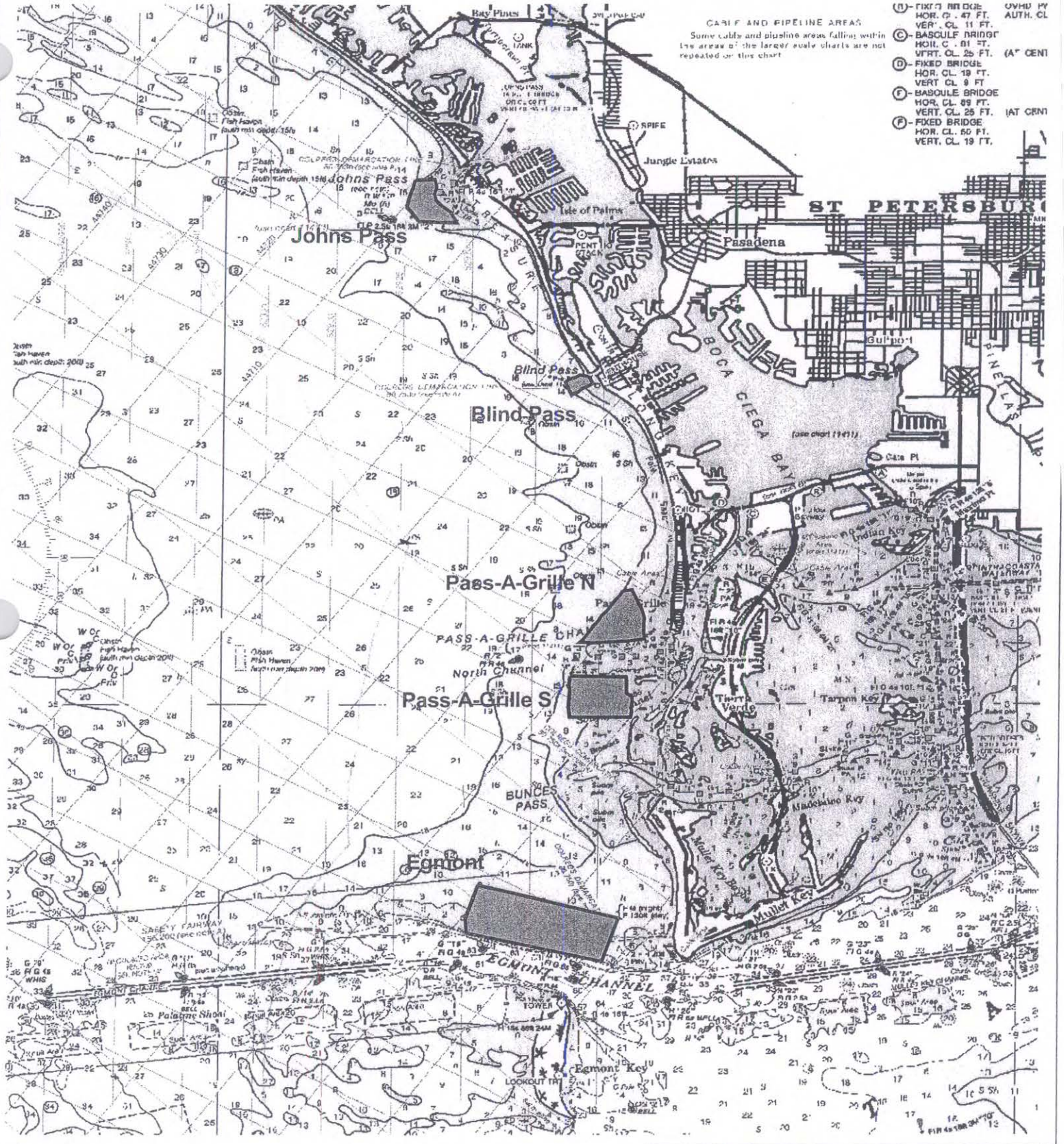
Pinellas County Marine Biological Survey Areas

Location Map	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 5 miles	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 1

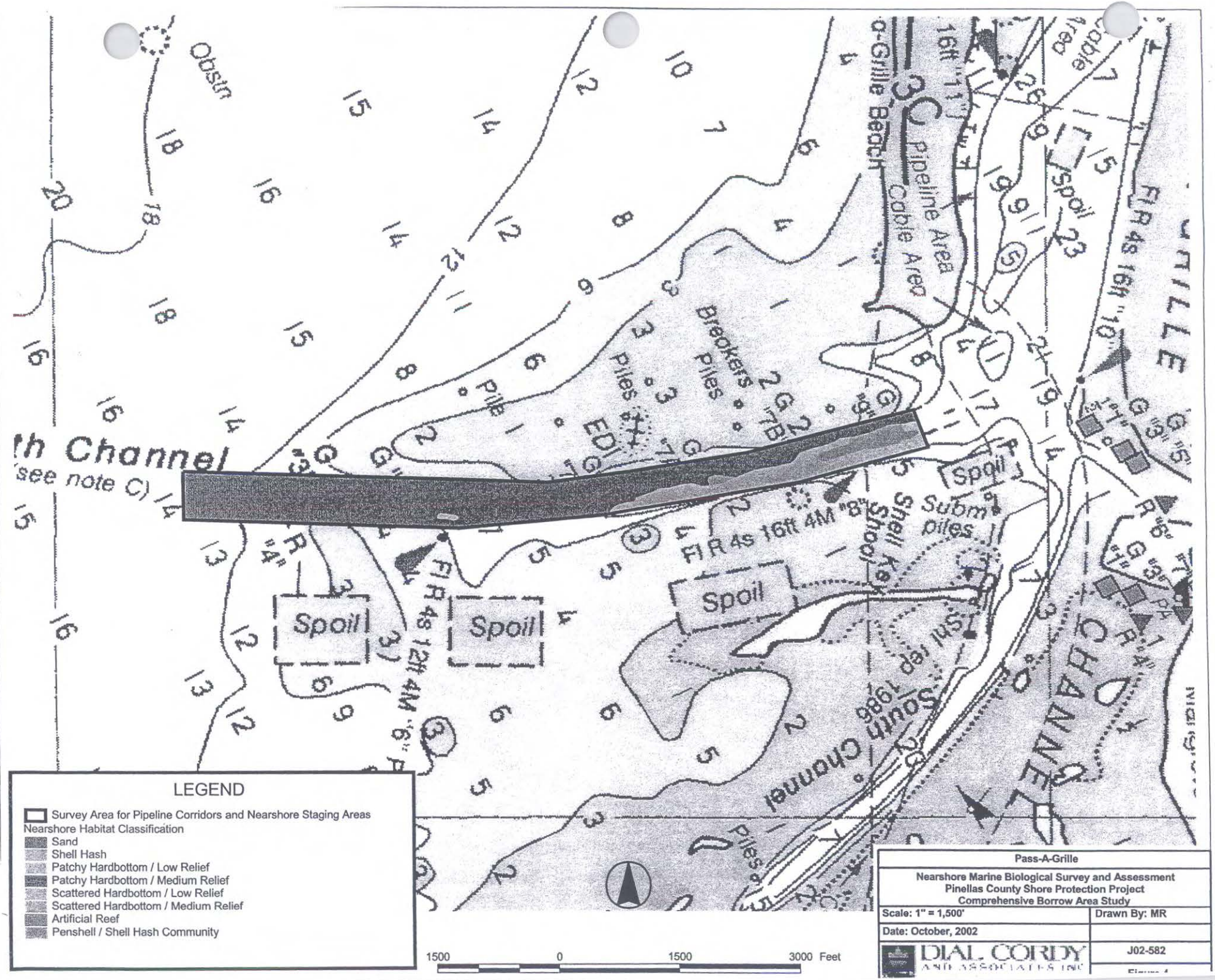


1 0 1 2 3 4 5 Miles

Offshore Borrow Areas	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 2 miles	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493
	Figure 2



Ebb Tidal Shoal Borrow Areas	
Preliminary Draft Marine Biological Survey Pinellas County SPP	
Scale: 1" = 2 miles	Drawn By: MR
Date: December, 2001	
DIAL CORDY AND ASSOCIATES INC Environmental Consultants	J01-493 Figure 3


Obstn
Pipeline Area
Cable Area
Spoil
Breakers
Piles
Spoil
Spoil
Spoil
Shell Ridge
Subm Piles
Fl R 4s 16ft 4M "8"
Fl R 4s 12ft 4M "6"
South Channel
Piles
LEGEND
Survey Area for Pipeline Corridors and Nearshore Staging Areas
Nearshore Habitat Classification
Sand
Shell Hash
Patchy Hardbottom / Low Relief
Patchy Hardbottom / Medium Relief
Scattered Hardbottom / Low Relief
Scattered Hardbottom / Medium Relief
Artificial Reef
Penshell / Shell Hash Community
1500 0 1500 3000 Feet
Pass-A-Grille
Nearshore Marine Biological Survey and Assessment
Pinellas County Shore Protection Project
Comprehensive Borrow Area Study
Scale: 1" = 1,500'
Drawn By: MR
Date: October, 2002
DIAL CORDY AND ASSOCIATES INC
J02-582

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

REPLY TO
ATTENTION OF

NOV 0 9 2000

Planning Division
Environmental Branch

TO WHOM IT MAY CONCERN

The Jacksonville District, U.S. Army Corps of Engineers (Corps), is gathering information to define issues and concerns that will be addressed in an Environmental Assessment during a Comprehensive Borrow Area Study for the Pinellas County Shore Protection Project, Pinellas County, Florida (see figure 1, location map).

Specific borrow areas to be investigated include nine offshore sites (figure 2) and four ebb-tidal shoals of the following passes, Blind Pass, Pass-a-grill Pass, John's Pass, and Clearwater Pass (figure 3).

The Pinellas County Shore Protection Project has historically obtained beach quality sand from inlet borrow areas and the Egmont Channel Shoal for nourishment of Pinellas County Beaches. To accommodate existing and future renourishment needs, alternative borrow areas have been identified which are closer to the beach fill sites and therefore more cost effective.

The Corps welcomes your views, comments and any information about resources, study objectives and any relevant features within the described study area. Letters of comment or inquiry should be addressed to the letterhead address to the attention of Planning Division, Environmental Coordination Section and received by this office within thirty days of the date of this letter.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosures

Department of the Army - Jacksonville District Corps of Engineers - Information Gathering to Define Issues and Concerns that will be Addressed in an Environmental Assessment During a Comprehensive Borrow Area Study for the Pinellas County Shore Protection Project - Pinellas County, Florida

SAI# FL200011160745C

The above-described project was received by the Florida State Clearinghouse on 11/16/00, and has been forwarded to the appropriate reviewing agencies. The clearance letter and agency comments will be forwarded to you no later than 1/1/01, unless you are otherwise notified. Please refer to the above State Application Identifier (SAI) number in all written correspondence with the Florida State Clearinghouse regarding this project. If you have any questions, please contact Cherie Trainor, Clearinghouse Coordinator at (850) 414-5495.

STATE OF FLORIDA

DEPARTMENT OF COMMUNITY AFFAIRS

"Dedicated to making Florida a better place to call home"

JEB BUSH
Governor

STEVEN M. SEIBERT
Secretary

December 28, 2000

Mr. James Duck
Department of the Army
Jacksonville District Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

RE: Department of the Army - Jacksonville District Corps of Engineers - Information Gathering to Define Issues and Concerns that will be Addressed in an Environmental Assessment During a Comprehensive Borrow Area Study for the Pinellas County Shore Protection Project - Pinellas County, Florida
SAI: FL200011160745C

Dear Mr. Duck:

The Florida State Clearinghouse has been advised that our reviewing agencies require additional time to complete the review of the above-referenced project. In order to receive comments from all agencies, an additional fifteen days is requested for completion of the state's consistency review in accordance with 15 CFR 930.41(b). We will make every effort to conclude the review and forward the consistency determination to you on or before January 16, 2001.

Thank you for your understanding. If you have any questions regarding this matter, please contact Ms. Cherie Trainor, Clearinghouse Coordinator, at (850) 414-5495.

Sincerely,

Joseph F. Myers, Acting Executive Director
Florida Coastal Management Program

JFM/cc

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100
Phone: 850.488.8466/Suncom 278.8466 FAX: 850.921.0781/Suncom 291.0781
Internet address: http://www.dca.state.fl.us

CRITICAL STATE CONCERN FIELD OFFICE
2796 Overseas Highway, Suite 212
Marathon, FL 33050-2227
(305) 289-2402

COMMUNITY PLANNING
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 488-2356

EMERGENCY MANAGEMENT
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 413-9969

HOUSING & COMMUNITY DEVELOPMENT
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 488-7956

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

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

December 7, 2000

James C. Duck, Chief
U.S. Army Corps of Engineers
Planning Division, Environmental Branch
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Duck:

This is in response to your request, dated November 9, 2000, for study objectives to be addressed in an Environmental Assessment for the Comprehensive Borrow Area Study for the Pinellas County Shore Protection Project in Pinellas County, Florida.

Be advised that the project areas are identified as Essential Fish Habitat (EFH) in the 1998 generic amendment of the Fishery Management Plans for the Gulf of Mexico. The generic amendment was prepared by the Gulf of Mexico Fishery Management Council as required by the 1996 amendment to the Magnuson-Stevens Fishery Conservation and Management Act. Federal agencies which permit, fund, or undertake activities which may adversely impact EFH must undertake an EFH Consultation with the National Marine Fisheries Service. EFH Assessments must include: 1) a description of the proposed action; 2) an analysis of the effects (including cumulative effects) of the proposed action on EFH, the managed fish species, and major prey species; 3) the Federal agency's views regarding the effects of the action on EFH; and 4) proposed mitigation, if applicable. Additional information regarding EFH can be found at http://galveston.ssp.nmfs.gov/.

We appreciate the opportunity to provide you with our comments. Please direct related comments, questions, or correspondence to Mr. David N. Dale in St. Petersburg, Florida. He may be contacted at 727/570-5311 or at the letterhead address above.

Sincerely,

for Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

cc:
F/SER4
F/SER43

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

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, FL 33702
(727) 570-5312; FAX (727) 570-5517

NOV 27 2000

F/SER3:EGH

Mr. James C. Duck
Chief, Planning Division
Army Corps of Engineers, Jacksonville District
P.O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Duck:

This responds to your November 9, 2000 letter regarding Corps of Engineers' (COE) gathering of information regarding issues of concern related to your Comprehensive Borrow Area Study for the Pinellas County Shore Protection Project. The National Marine Fisheries Service (NMFS), Protected Resources Division (PRD) requests that any COE environmental assessment considering use of alternative nearshore borrow areas also carefully consider their proximity to coral hard grounds. Hardgrounds are routinely used by sea turtles for foraging and protection. Since borrow areas for beach renourishment are often dredged by hopper dredges, which are known to lethally entrain sea turtles, the COE should give preference in their selection process to borrow areas that are not associated with, or distant from, coral hardgrounds.

Your letter is very timely. NMFS PRD takes this opportunity to formally request a list, including names and locations, of routinely used borrow areas off Florida's west coast, and potential borrow sites (such as the ones mentioned in your letter), and proximity to coral hardgrounds, for NMFS use to prepare a Gulf-wide biological opinion on hopper dredging of Gulf of Mexico channels and borrow areas, similar to the existing September 1997 NMFS biological opinion to the COE South Atlantic Division on hopper dredging of southeastern U.S. channels and borrow areas. We appreciate the opportunity to comment on this project and work with the COE Jacksonville District to ensure the protection of threatened and endangered species under NMFS purview, and to help the District fulfill its mandate under the Endangered Species Act. Please contact Mr. Eric Hawk at the telephone number listed above if you have any questions, or if we may be of assistance.

Sincerely,

Joseph E. Powers, Ph.D.
Acting Regional Administrator

cc: F/PR3
o:\section7\informal\borrow.jax
File: 1514-22 f.1. JAX FL

DIVISIONS OF FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Cheri Trainor
Florida Department of Community Affairs
2555 Shumard Oak Blvd.
Tallahassee, Florida 32399-2100

January 10, 2001

RE: DHR No. 2000-09584 SAI#: FL200011160745C
Agency: United States Army Corps of Engineers
Project Name: *Information Gathering for EA of Comprehensive Borrow Area Study for the Pinellas County Shore Protection Project*
Pinellas County, Florida

Dear Ms. Trainor:

Our office has received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*. The State Historic Preservation Officer (SHPO) is to advise and assist federal agencies when identifying historic properties (listed or eligible for listing, in the National Register of Historic Places), assessing effects upon them, and considering alternatives to avoid or reduce the project's effect on them.

We have reviewed the information submitted by your office for the above referenced property and proposed project. A review of the Florida Master Sites Files indicates that there has not been a systematic archaeological survey of submerged cultural resources conducted in the area of potential effect (APE) for the proposed project. Because of the rich maritime history of this area, it is the opinion of this office that a systematic remote sensing survey be conducted for the complete APE of the proposed project.

This survey should utilize modern remote sensing technology to include magnetometer data, side-scan sonar data, and depth recorded capabilities. The remote sensing data should be real-time correlated with DGPS positioning data. The survey should be directed by an accredited nautical archaeologist with experience in the operation of remote sensing instrumentation and specific knowledge of maritime history. All anomalies determined to indicate a potential significant cultural resource should be ground-truthed by divers with specific training in underwater archaeological techniques. Results of this survey should be submitted to our office for final review prior to initiating bottom disturbing dredging activities. The survey report shall conform to the specifications set forth in Chapter 1A-46, Florida Administrative Code, and will need to be forwarded to this agency in order to complete the process of reviewing the impact of this proposed project on historic properties.

The results of the investigations will determine if significant historic properties would be disturbed by this project. In addition, if significant remains are located, the data described in the report and the consultant's conclusions will assist this office in determining measures that must be taken to avoid, minimize, or mitigate adverse impacts to historic properties listed, or eligible for listing in the *National Register of Historic Places*, or otherwise of historical or architectural significance.

Because this letter and its contents are a matter of public record, consultants who have knowledge of our recommendations may contact the applicant. This should in no way be interpreted as an endorsement by this agency. The *Register of Professional Archaeologists* (RPA) is the national certifying organization for archaeologists. Upon request, our office can supply a listing of archaeologists who are RPA members living or working in Florida. In addition, we can provide information on ordering their Directory of Certified Professional Archaeologists from them.

If you have any questions concerning our comments, please contact Brian Yates, Historic Sites Specialist, at (850) 487-2333 or 1-800-847-7278. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Frederick P. Gaske, Deputy SHPO

for Janet Snyder Matthews, Ph.D., Director
Division of Historical Resources
State Historic Preservation Officer

JSM/Yby

xc: Mr. James Duck, United States Army Corps of Engineers, Jacksonville

APPENDIX F

Mailing List

MAILING LIST

Mayor of Belleair Bluffs
115 Florence Drive
Belleair Bluffs, FL 346401978

City Manager of Belleair Shores
1120 Gulf Blvd.
Belleair Shores, FL 346352745

Mayor of Treasure Island
120 108th Avenue
Treasure Island, FL 33706

City Manager of Treasure Island
120 108th Avenue
Treasure Island, FL 33706

City Manager of Belleair
901 Ponce De Leon Blvd.
Belleair, FL 346161096

Mayor of Belleair
901 Ponce De Leon Blvd.
Belleair, FL 346161096

City Manager of St. Petersburg Beach
7701 Boca Ciega Drive
St. Petersburg Beach, FL 337061701

Commander (OAN) Seventh Coast Guard District
909 SE 1ST AVENUE
Brickell Plaza Federal Bldg
Miami, FL 331313050

Mayor of St. Pertersburg Beach
7701 Boca Ciega Drive
St. Petersburg Beach, FL 337061701

Mayor of Gulfport
2401 53rd Street South
Gulfport, FL 33707

City Manager of Gulfport
2401 53rd Street South
Gulfport, FL 33707

Mayor of Indian Rocks Beach
1507 Palm Bay Blvd.
Indian Rocks Beach, FL 346352899

City Manager of Indian Rocks Beach
1507 Palm Bay Blvd.
Indian Rocks Beach, FL 346352899

City Manager of Belleair Bluffs
115 Florence Drive
Belleair Bluffs, FL 346401978

Mayor of Belleair Shores
1120 Gulf Blvd.
Belleair Shores, FL 346352745

Mayor of Belleair Beach
444 Causeway Blvd.
Belleair Beach, FL 346353399

Director Sierra Club - Florida Regional Office
2700 SW 3rd Ave
Ste 2F
Miami, FL 33129

Regional Director US Fish & Wildlife Service
1875 Century Blvd
Atlanta, GA 303453301

Regional Director FEMA INSURANCE & MITIGATION DIVISION
3003 CHAMBLEE-TUCKER ROAD
Atlanta, GA 30341

FLDEP - Div of State Lands
3900 Commonwealth Blvd
Mail Station 105
Tallahassee, FL 323993000

Southern Region Forester US Forest Service
1720 Peachtree Road NW
Atlanta, GA 303092405

Regional Env. Officer Housing & Urban Dev.
75 Spring St SW
Room 600-C
Atlanta, GA 303033309

Mayor of Tarpon Springs
324 Pine Street East
P.O. Box 5004
Tarpon Springs, FL 346885004

USDA - NRCS
1001 E Baker St
Ste 403
Plant City, FL 33566

City Manager of Dunedin
750 Milwaukee
P.O. Box 1348
Dunedin, FL 346971348

Tampa Bay Regional Planning Council
9455 Koger Blvd.
Suite 219
St. Petersburg, FL 33702

Mote Marine Laboratory
1600 Ken Thompson Parkway
Sarasota, FL 34236

Florida Shore & Beach Preservation Assn.
2952 Wellington Circle
Tallahassee, FL 32308

Chamber of Commerce Clearwater
128 Osceola Ave. N
Clearwater, FL 34615

Mayor of South Pasadena
7047 Sunset Drive South
South Pasadena, FL 337072895

Board of County Commissioners Pinellas County, FL Department of Public Works
315 Court Street
Clearwater, FL 34616

Save the Manatee Club
500 N. Maitland Ave
Maitland, FL 32751

City Manager of Safety Harbor
750 Main Street
Safety Harbor, FL 346953597

Mayor of North Redington Beach
190-173 Avenue
North Redington Beach, FL 337081397

Mayor of Seminole
7464 Ridge Road
Seminole, FL 346425226

City Manager of Madeira Beach
P.O. Box 8605
300 Municipal Drive
Madeira Beach, FL 337388605

Mayor of Madeira Beach
P.O. Box 8605
300 Municipal Drive
Madeira Beach, FL 337388605

Mayor of Clearwater
112 Osceola Avenue
Clearwater, FL 346184748

City Manager of Belleair Beach
444 Causeway Blvd.
Belleair Beach, FL 346353399

City Manager of Indian Shores
19305 Gulf Blvd.
Indian Shores, FL 346352257

Mayor of Indian Shores
19305 Gulf Blvd.
Indian Shores, FL 346352257

City Manager of North Redington Beach
190-173 Avenue
North Redington Beach, FL 337081397

Mayor of St. Petersburg
175- 5th Street North
P.O. Box 2842
St. Petersburg, FL 337312842

City Manager of Seminole
7464 Ridge Road
Seminole, FL 346425226

Mayor of Safety Harbor
750 Main Street
Safety Harbor, FL 346953597

City Manager of Redington Shores
17798 Gulf Blvd.
Redington Shores, FL 337081299

Mayor of Redington Shores
17798 Gulf Blvd.
Redington Shores, FL 337081299

City Manager of Redington Beach
105-164 Avenue
Redington Beach, FL 337081519

Mayor of Redington Beach
105-164 Avenue
Redington Beach, FL 337081519

Mayor of Dunedin
750 Milwaukee
P.O. Box 1348
Dunedin, FL 346971348

City Manager of Clearwater
112 Osceola Avenue
Clearwater, FL 346184748

City Manager of St. Petersburg
175- 5th Street North
P.O. Box 2842
St. Petersburg, FL 337312842

Honorable Kimberly Berfield
Florida House of Representatives, Dist. 50
2963 Gulf To Bay Blvd.
Clearwater, FL 337594259

Honorable Mike Bilirakis
United States Representative, Dist. 9
1100 Cleveland Street
Ste 1600
Clearwater, FL 33755

Peter Clark
Director Tampa Bay Watch, Inc.
8401 9th Street North
Ste 230B
St. Petersburg, FL 33702

Honorable Lee Constantine
Florida State Senate, District 22
4020 Park Street North
Ste 204
St. Petersburg, FL 33709

Cindy Cranick
Florida State Clearinghouse
3900 Commonwealth Blvd
MAIL STATION 47
Tallahassee, FL 323993000

Georgia Cranmore
Chief NMFS-SERO-PRB
9721 Executive Center Drive N
St. Petersburg, FL 33702

Richard Eckenrod
Executive Director Tampa Bay National Estuary Program
Mail Station 1-1/NEP
100 8th Avenue SE
St. Petersburg, FL 33701

Honorable Frank S. Farkas
Florida House of Representatives, Dist. 52
1510 4th Street North
St. Petersburg, FL 337044412

Mr. Steve Fidler
Operations Manager Tampa Port Authority
P.O. Box 2192
Tampa, FL 33601

Mr. Carl Fielland
Port Engineer Tampa Port Authority
P.O. Box 2192
Tampa, FL 33601

Honorable Bill Galvano
Florida House of Representatives, Dist. 68
1023 Manatee Avenue West
Ste 715
Bradenton, FL 34205

Honorable Bob Graham
US Senator
150 SE 2ND AVE
STE 1025
Miami, FL 33131

Lynn Griffin
Florida Coastal Management Program
3900 Commonwealth Blvd
Mail Station 47
Tallahassee, FL 323993000

Honorable Katherine Harris
United States Representative, Dist. 13
116 Cannon House Office Bldg.
Washington, DC 20515

Bradley Hartman
Director Florida Fish & Wildlife Conservation Commission
620 S.MERIDIAN STREET
Tallahassee, FL 323991600

Honorable Charlie Justice
Florida House of Representatives, Dist. 53
5769 38th Avenue North
St. Petersburg, FL 33710

Dr. Mark Kraus
Audubon of Florida
444 Brickell Ave
Ste 850
Miaim, FL 33131

Andreas Mager
Asst. Regional Administrator NMFS-SERO-HCD
9721 Executive Center Drive N
HABITAT CONSERVATION DIVISION
St. Petersburg, FL 33702

Dr Janet Matthews
Div of Historical Resources - SHPO
500 SOUTH BRONOUGH STREET
Tallahassee, FL 323990250

Honorable John McKay
Florida State Senate, District 26
3653 Cortez Road West
Ste 90
Bradenton, FL 34210

Heinz Mueller
EPA Region IV
Environmental Policy Section
61 FORSYTH STREET
Atlanta, GA 303033104

Honorable Bill Nelson
US Senator
US Courthouse Annex
111 N Adams St
Tallahassee, FL 32301

Mr. Rich Paul
National Audubon Representative
Florida West Coast
410 Ware Blvd. Ste 500
Tampa, FL 33619

Richard T. Paul
Manager Florida Coastal Islands Sanctuaries
Audubon of Florida
410 Ware Blvd., Suite 702
Tampa, FL 33619

Honorable Frank Peterman Jr.
Florida House of Representatives, Dist. 55
1198 62nd Avenue South
St. Petersburg, FL 337055620

David Rackley
NMFS-HCD
219 Fort Johnson Rd
Charleson, SC 294129110

Honorable James A. Sebesta
Florida State Senate, District 16
9887 4th Street North
Ste S319
St. Petersburg, FL 33702

JAY SLACK
Field Supervisor US Fish & Wildlife Service
1339 20TH Street
Vero Beach, FL 329603559

Mr. James B. Terry
Chief, Coastal/GIS Management Section Pinellas County Dept. of Public Works
440 Court Street
Clearwater, FL 34616

Edwin Turanchik
Commissioner Hillsborough County Board of Commisioners
P.O. Box 1110
Tampa, FL 33601

Ms. Julie Weston
City of St. Petersburg Planning Department
P.O. Box 2842
St. Petersburg, FL 33731

David White
The Ocean Conservancy
One Beach Drive SE
Suite 304
St. Petersburg, FL 33701

Honorable C. W. Bill Young
United States Representative, Dist. 10
360 Central Avenue
Ste 1480
St. Petersburg, FL 33701

REEFKEEPER INTERNATIONAL
P.O. Box 1316
Middletown, MD 21769

K. Lynn Enterprises
P.O. Box 61492
Ft. Myers, FL 33906